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Abstract

This thesis explores the energy security and climate change-related responses of the small oil and gas-exporting monarchies of the Persian Gulf at the turn of the 21st century. At a more fundamental level, the study is a detailed examination of the natural resource-related 'unsustainabilities' of these political economies. The study centres on a comparison of two structurally similar monarchies, Abu Dhabi and Qatar, which have responded to the issue of climate change with differing intensity and divergent methods. Departing from a regime survival strategy-oriented approach, the thesis aims to determine the drivers and motives of change and divergence behind the energy security and climate change-related perceptions, approaches, and policies of these two monarchies' governments at both domestic and foreign policy levels. In parallel, the study examines the emerging natural resource-related challenges and vulnerabilities.

Positioned in the intersection of Middle East studies and International Relations, the study pursues a multi-level and multi-causal explanation: At the domestic level it applies the concepts of rentierism and neotraditionalism for understanding the dynamics and elaborate strategies of regime survival that influence policy choices. At the foreign policy level (UNFCCC) it draws from the realist school of IR for the purpose of analysing the monarchies' policies and positions.

The study demonstrates how, at the domestic level, government responses are produced by the interactions of rentier structures, individual elite members, regime survival strategies, local institutions, and external opportunities and pressures. Despite the important role of the systemic and international environments, the study finds that the domestic environment has a strong influence at the foreign policy-level, and that the interests and perceptions of the decision-making elite, and the power relationships and dynamics of the decision-making system are an essential determinant of these responses.

Greening for Self-Conservation?

Energy Security and Responses to Climate Change in the Small Gulf Monarchies

Mari Elina Luomi

Thesis submitted for the degree of
Doctor of Philosophy in Middle East Politics

Institute for Middle Eastern and Islamic Studies
School of Government and International Affairs
Durham University

2011

Declaration

This thesis is the result of my own work. Material from the published or unpublished work of others which is used in the thesis is credited to the author in question in the text.

Mari Luomi
20 May 2011

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List of abbreviations

1NC	First/Initial national communication to the UNFCCC
2NC	Second national communication to the UNFCCC
ADCO	Abu Dhabi Company for Onshore Oil Operations
ADFEC	Abu Dhabi Future Energy Company
Adgas	Abu Dhabi Gas Liquefaction Limited
ADIA	Abu Dhabi Investment Authority
ADMA	Abu Dhabi Marine Operating Company (ADMA OPCO)
ADNOC	Abu Dhabi National Oil Company
ADWEA	Abu Dhabi Water and Electricity Authority
ADWEC	Abu Dhabi Water and Electricity Company
AGEDI	Abu Dhabi Global Environmental Data Initiative
AWG-KP	Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (UNFCCC)
AWG-LCA	Ad Hoc Working Group on Long-term Cooperative Action under the Convention (UNFCCC)
BAU	Business as usual
BQDRI	Barwa and Qatari Diar Research Institute
CBDR	Principle of common but differentiated responsibilities (UNFCCC)
CCS	Carbon capture and storage
CDM	Clean Development Mechanism (Kyoto Protocol)
CENTCOM	United States Central Command
CO_2	Carbon dioxide
CSP	Concentrated solar power
DECC	Directorate of Energy and Climate Change (UAE)
DSM	Demand side management
EAD	Environment Agency – Abu Dhabi
EIA	Environmental impact assessment
EIU	Economist Intelligence Unit
ENB	Earth Negotiations Bulletin (by the International Institute for Sustainable Development, IISD)
ENGO	Environmental non-governmental organisation
ENEC	Emirates Nuclear Energy Corporation
EOR	Enhanced oil recovery
ERWDA	Environmental Research and Wildlife Development Agency
ESCWA	United Nations Economic and Social Council for Western Asia
ETC	Environmental Technical Committee (Qatar)
EWS/WWF	Emirates Wildlife Society in association with WWF
FANR	Federal Authority for Nuclear Regulation (UAE)
FEA	Federal Environment Agency (UAE)
FEWA	Federal Electricity and Water Authority (UAE)
FNC	Federal National Council (UAE)
Gasco	Abu Dhabi Gas Industries
GCC	Cooperation Council for the Arab States of the Gulf
GDP	Gross domestic product

GHG	Greenhouse gas
GSDP	General Secretariat for Development Planning (Qatar)
GTL	Gas-to-liquids
HSE	Health, safety and environment
IAEA	International Atomic Energy Agency
IEA	International Energy Agency
IMF	International Monetary Fund
INGO	International non-governmental organisation
IPCC	Intergovernmental Panel on Climate Change
IR	International Relations
IRENA	International Renewable Energy Agency
KEPCO	Korea Electric Power Corporation
KP	Kyoto Protocol
LEED	Leadership in Energy and Environmental Design (certification system)
LNG	Liquefied natural gas
MENA	Middle East and North Africa
MIST	Masdar Institute of Science and Technology (also: MI)
MoFA	Ministry of Foreign Affairs
MW	Megawatt
NGO	Non-governmental organisation
NPT	Nuclear Non-Proliferation Treaty
OAPEC	Organisation of Arab Petroleum Exporting Countries
OPEC	Organisation of the Petroleum Exporting Countries
PEPC	Permanent Environment Protection Committee (Qatar)
PV	Photovoltaic(s)
QF	Qatar Foundation
QIA	Qatar Investment Authority
QP	Qatar Petroleum
QSAS	Qatar Sustainability Assessment System
QSTP	Qatar Science and Technology Park
SBI	Subsidiary Body for Implementation (UNFCCC)
SBSTA	Subsidiary Body for Scientific and Technological Advice (UNFCCC)
SCENR	Supreme Council for the Environment and Natural Reserves (Qatar)
SPC	Supreme Petroleum Council (Abu Dhabi)
TFC	Total final consumption (of energy)
UAE	United Arab Emirates
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNFCCC	United Nations Framework Convention on Climate Change
UPC	Urban Planning Council (Abu Dhabi)
US EIA	United States Energy Information Administration
WFES	World Future Energy Summit
WRI	World Resources Institute
Zadco	Zakum Development Company (Abu Dhabi)

1 Introduction

This thesis studies the energy security and climate change-related responses of the small oil and gas-exporting monarchies of the Persian Gulf (sometimes referred to as the Arabian Gulf)[1] from the 1990s until the end of the 2000s. At a more fundamental level, the study is a detailed comparison of the multiple dimensions of natural resource-related unsustainability of these political economies. Centring on two case studies, Abu Dhabi and Qatar, it shows how government responses to the broad issue of climate change are produced by the interactions of rentier structures, regime survival strategies, individual elite members, local institutions, and regional and international politics. Departing from a regime survival strategy-oriented approach, the aim of this thesis is to explain the drivers and motives of change and divergence behind the energy security and climate change-related perceptions, approaches, and policies of these two small Gulf monarchies' governments. In parallel, the study also examines the monarchies' emerging natural resource-related challenges and vulnerabilities, as these are deeply interlinked both with the (un)sustainability of the current state model and the expected future negative impacts of climate change in the region.

Despite the many similarities of the small Gulf monarchies, visible and tangible responses to climate change and environmental sustainability were in the late 2000s perceptible only in Abu Dhabi and Qatar. Interestingly, these are perhaps the most structurally similar monarchies in the Gulf: both own substantial fossil fuel resources, are members of the Organisation of Petroleum Exporting Countries (OPEC)[2] and rank among the world's top exporters. Both have expanded their wealth through record-high fossil fuel revenues and through the substantial accumulation of external rent in sovereign wealth funds. The leaderships of both have ambitious visions regarding the future of their respective emirates, and both can be classified among the purest examples of a rentier state, due to their small national populations and the large share of external rent of their merchandise exports and GDP. Although Abu Dhabi is not a sovereign state, it acts like one with regard to its local affairs and, to an increasing extent, also with regard to many areas of federal and foreign policy-making.

[1] These are: Bahrain, Kuwait, Oman, Qatar and the United Arab Emirates, formed by Abu Dhabi, Ajman, Dubai, Fujairah, Ras al-Khaimah, Sharjah, and Umm al-Quwain.
[2] Abu Dhabi is the only OPEC member among the emirates of the UAE.

From a social science perspective the small Gulf monarchies are somewhat of an enigma. Despite their size, their elites have succeeded in managing oil wealth and sovereignty in one of the most volatile regions of the world and have secured traditional monarchy amid increasing pressures for modernisation. Since the late 2000s, climate change, a critical issue on the international energy agenda and one of the biggest environmental challenges of our time, has risen as the latest challenge to the survival of these regimes. Despite structural similarities, the Gulf monarchies' initial responses to climate change have not been uniform. Differences have appeared at both the domestic level, in the form of different projects and policies, and at the international level, manifested by policy positions in negotiations under the United Nations Framework Convention on Climate Change.

From an academic perspective, the rationale for this study derives from a gap in the existing scholarship on the interlinkages of energy security, climate change and sustainable development in the small Gulf monarchies. A gap in previous academic literature can be observed in three areas: the scope of security (perspective and breadth); emphasis on different societal aspects (economics, politics, society and the environment); and the sampling of cases (groups vs. individual states and state size).

Firstly, energy security debates, both academic and policy-oriented, have a tendency to be Western- or importer-centric, considering mainly the security of supply of consumer states. Studies on energy security in the Gulf have also almost invariably embraced a narrow concept of security, most typically dealing with securing access and maintaining regional stability for the purpose of maintaining the flow of oil from the region to global markets.[3] Secondly, research that has focused on the Gulf oil exporters and international climate change politics has primarily been conducted in the area of environmental economics, including studies on the potential adverse impacts of the implementation of the Kyoto Protocol on the oil exporters,[4] or associated opportunities.[5] Thirdly, the few studies that have focused on the Gulf states' climate policies, in some cases factoring in domestic socio-political aspects, have mostly concentrated on the external level policies of either the

[3] See e.g.: K. M. Pollack, "Securing the Gulf", *Foreign Affairs* 82 (2003), pp. 2-16; A.H. Cordesman, "The One True U.S. Strategic Interest in the Middle East: Energy", *Middle East Policy*, 8 (2001), pp. 117-127; J. Calabrese, "China and the Persian Gulf: Energy and Security", *Middle East Journal*, 52 (1998), pp. 351-366.
[4] J. Barnett et al., "Will OPEC Lose from the Kyoto Protocol?", *Energy Policy*, 32 (2004), pp. 2077-2088; S. Ghanem et al., "The Impact of Emissions Trading on OPEC", *OPEC Review*, 23 (1999), pp. 104-107.
[5] See e.g.: M. Raouf, *Climate Change Threats, Opportunities, and the GCC Countries*, Policy Brief No. 12 (Washington D.C.: Middle East Institute, 2008).

OPEC as a bloc, or on the major Gulf exporter Saudi Arabia—and even Iran.[6] Moreover, with the exceptions of Hertog and Luciani, who have looked at sustainable energy policies in the Gulf Cooperation Council (GCC), and Reiche, who has examined the potential for ecological modernisation in GCC states' energy sectors,[7] the focus of previous literature has been on the implications of the oil exporting states' negotiating positions for the successfulness of international climate change mitigation efforts, not on the states themselves. Most importantly, due to the recentness of the climate change issue, not a single study has been published that defines the domestic and external factors that determine an Arab governments' stance towards the issue of climate change which, as will be demonstrated, also serve as a strong indicator of the state's external climate policy positions. Finally, with the momentous changes brought about by new energy security challenges and the international climate change issue, most of the previous literature relating to the Gulf states in these fields is already outdated and calling for a revision in light of the recent developments.

The more general significance of this study stems from its focus on what was essentially a moment of reflection for the Gulf monarchies. The emergence of climate change as an important international issue with an increasing impact on global energy demand patterns coincided and converged with the revelation of a number of weak spots in the areas of domestic energy, water, food and environmental security, which had been previously unheard of and unconsidered in this region. These exposed the economic and environmental unsustainability of the oil and gas-exporting monarchies in a most acute way. On the economic side, a period of fast economic and population growth, and wasteful practices and mentalities born as a result of, and sustained by, the abundance of domestic energy resources and the welfare states created around it, resulted in increasing natural gas shortages in all but one of the Gulf monarchies (Qatar, owner of the world's third largest gas reserves). On the environmental side, as a consequence of increasing domestic demand for desalinated water, and dependence on rising international food prices, domestic water scarcity and food insecurity climbed to the top of governments' priorities. Simultaneously, the degrading impact on the local environment of the 2000s' fast and predominantly

[6] P. Kassler and M. Paterson, *Energy Exporters and Climate Change* (London: Royal Institute of International Affairs, 1997); Chatham House, *OPEC and Climate Change: Challenges and Opportunities*, Chatham House Briefing Paper (London: Chatham House, 2005); Aarts, Paul, and Janssen, Dennis, "Shades of Opinion: The Oil Exporting Countries and International Climate Politics", *The Review of International Affairs*, 3 (2003), pp. 332-351. J. Depledge, "Striving for No: Saudi Arabia in the Climate Change Regime", *Global Environmental Politics*, 8 (2008), pp. 9-35.

[7] S. Hertog and G. Luciani, *Energy and Sustainability Policies in the GCC*, Working Paper No. 6 (London: LSE, 2009); D. Reiche, "Energy Politics of Gulf Cooperation Council (GCC) Countries—Possibilities and Limitations of Ecological Modernization in Rentier States", *Energy Policy*, 38 (2010), pp. 2395-2403.

uncontrolled growth became both a source of international attention and, most importantly, was finally recognised by the governments as a threat to the local environment.

Since the mid-1990s, the small Gulf monarchies, and particularly the three OPEC member states Kuwait, Qatar and the United Arab Emirates (UAE), together with their larger neighbour Saudi Arabia, had primarily been in contact with the issue of climate change through their participation in the international negotiations on climate change. In this framework, their common aim was to protect the status of oil in the international energy economy. Starting from around 2006-2007, following an international increase in climate change awareness, the Gulf monarchies too became more interested in the opportunities presented by the global climate agenda, including alternative sources of energy (most notably nuclear and solar) and economic returns and technology transfer through the flexibility mechanisms of the Kyoto Protocol. Some states, most notably Bahrain and later the UAE, also became visibly concerned over the long-term physical impacts of climate change, most importantly the consequences of rising sea levels on the low-lying and densely populated coastal areas. Awareness of these threats and opportunities was almost exclusive to the governments, some of which took the lead—in a way 'pre-empting the inevitable'—and began seeking to increase knowledge among their youthful and increasingly educated citizens on environmental sustainability and climate change.

On the conceptual side, rentierism and neotraditionalism,[8] two fundamental characteristics common to the small Gulf states' authoritarian political systems, are incorporated into the framework of analysis. It is argued that the domestic policies of small Gulf monarchies can only be understood if both structure and agency are taken into account. Not only are the monarchies' economies heavily dependent on external rent derived from one or two export products, but also their ruling elites' survival depends on an unwritten (and often unspoken) social contract, a ruling bargain, that is based on the allocation of oil and gas rent among the citizens in return for political acquiescence. It is argued that this kind of a distributive rentier system, which has far-reaching social consequences, is the main determining structure of energy and environmental sustainability policies in the Gulf monarchies. Another key factor in determining policy outcomes is arguably the ruling elite. The legitimacy and survival of the local elites is built on neopatrimonial networks and neotraditional legitimacy resources; these consist of the appropriation of traditional and other elements with positive associations and motifs, often in interaction with financial

[8] See chapters 2.1 and 2.2.

resources acquired through the 'structure', but in some cases counteracting the logic and explanatory power of the system and rentier state theory itself, as will be demonstrated. A tradition exists in research grounded in these two conceptual understandings of the Gulf states' politics which focuses on the complex topic of external rent dependency and regime survival.[9] The additional value of this study to these debates is the snapshot it offers of how rentier structures and local elites in Abu Dhabi and Qatar have become intertwined, creating divergent responses to environmental sustainability and climate change at both domestic and international levels.

The study also adopts the view that Middle Eastern states manage their foreign policies simultaneously at different levels or environments (international, regional and domestic), through careful *omnibalancing* of external and internal threats and pressures. In addition to state interests that are formulated in these different foreign policy environments, the decision-making structures and the personal interests and perceptions of key decision-makers must also be taken into account in forming an understanding of a country's foreign policy behaviour.[10] The focus of the study at this level is on the processes through which energy security and climate change-related perceptions and positions take form, and how they become translated into external policies. As a central theoretical outcome, the study demonstrates the importance of certain elements of the domestic level—more specifically the structures of the political economy, the decision-makers (key elite members) and the decision-making system (institutions)—in determining foreign policy outcomes. However, as the study also shows, the domestic environment does not exist in isolation to the external one, but domestic developments are simultaneously influenced by regional and international pressures, trends and tendencies.

[9] See chapters 2.1 and 2.2.

[10] See chapter 2.3 and: G. Nonneman (ed.), *Analyzing Middle East Foreign Policies and the Relationship with Europe* (Oxon and New York: Routledge, 2005); R. Hinnebusch, *The International Politics of the Middle East* (Manchester and New York: Manchester University Press, 2003), chapter 5; R. Hinnebusch and A. Ehteshami, "Conclusion: Patterns of Policy" in R. Hinnebusch and A. Ehteshami, *The Foreign Policies of Middle East States* (Boulder and London: Lynne Rienner, 2002), p. 335. On omnibalancing: S. R. David, "Explaining Third World Alignment", *World Politics,* 43 (1991), pp. 233-256.

1.1 Broader contextualization

The international security agenda is rapidly evolving as new priorities emerge and the concept of security is ever broadening.[11] Energy security and climate change are central elements in this development, and they are commonly cited among the most important security challenges of the 21st century.[12] Energy security, despite being an old concept, has gained a new significance as a result of many interacting factors, such as increasing global consumption, booming oil prices, political developments in some key exporting states,[13] and uncertainties regarding the future availability of the main fossil fuels, to mention a few. Climate change is a source of potential instability and is characterised by high uncertainty. The now almost complete global consensus among scientists and politicians on the veracity of global climate science[14] is transforming both the international politics of energy security and the concept of energy security itself.[15] For fossil fuel exporters, the ongoing transformation of the current energy paradigm entails increasing uncertainty over the future demand of their main export products. Also, due to their high per capita greenhouse gas emissions, capital-rich small Gulf monarchies face mounting external pressure to partake in global mitigation. Simultaneously, as climate science in the Middle East region advances, the expected adaptation needs are also becoming more crystallised for the local governments; they are coming to realise the potential multiplying effect of climate change on existing domestic natural resource challenges. As a consequence, in the late 2000s, in addition to climate change, food and water security became incorporated into the Gulf monarchies' security agendas.

The small monarchies of the Gulf, as oil and natural gas providers for the global energy economy, find themselves in many ways at the centre of debates on global energy security. They are also increasingly entangled in the international climate debates, although not as major players, such as the United States, China or the European Union, but due to their

[11] A broad conception of security incorporates non-military factors, such as economic, demographic, energy and environmental aspects. See e.g.: J. Tuchman Mathews, "Redefining Security", *Foreign Affairs* 68 (1989), pp. 162-177.

[12] On climate change, see e.g.: K. M. Campbell, *The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change* (Washington D.C.: CSIS and Center for a New American Century, 2007), p. 5: CNA, *National Security and the Threat of Climate Change* (Alexandria, VA: The CNA Corporation, 2007), p. 6.

[13] E.g. Russian gas export disputes with former Soviet bloc countries and Venezuela's '21st-century socialism'.

[14] See e.g.: IPCC, Climate Change 2007: *Synthesis Report. Summary for Policymakers* (Valencia: Inter-governmental Panel on Climate Change, November 2007), pp. 1-6.

[15] See e.g.: European Commission, *Limiting Global Climate Change to 2 degrees Celsius. The Way Ahead for 2020 and Beyond.* COM(2007) 2 final (Brussels: 10 January 2007).

economic dependence on the continuity of the current energy paradigm. In the past decades, they have benefited (although this is disputed[16]) from the integration of global energy markets, and are expected to continue do so. These states' central status in the current energy paradigm provides them with direct and indirect security guarantees against external threats. The most direct guarantees are external allies' military bases, such as those of the US, France and the UK, situated in Qatar and Abu Dhabi. The dependence of major consumer states on Gulf oil and gas, either directly, through imports, or indirectly, through the impact of oil exports from the region on oil prices, ensures that the maintenance of subregional stability is a universally shared interest, as long as the global energy economy is dominated by fossil fuels. As a more recent trend, the accumulation of external rent, especially in the form of sovereign wealth investments abroad, is seen as carrying important economic and political power projection potential both domestically and internationally.[17] Although the OPEC has suffered a relative loss of leverage in the global energy market, its member states (including Kuwait, Qatar and the UAE), have over the past two decades reclaimed a new channel of influence, through participating in the international climate negotiations. With their long-term goal of protecting oil exporters' interests, OPEC member states,[18] led by Saudi Arabia, have employed a range of tactics, including obstructionism, and have, alongside other demands, called for compensation for potential future income losses.[19]

On the flipside, both climate change and its mitigation generate many direct and indirect threats to the small Gulf states' economies. These states' socio-economic development is inextricably tied and highly vulnerable to the uncertainties of both global oil markets and climate change, but also to the states' capacity to deliver energy exports. Firstly, on the security of demand side, uncertainties are created by the unpredictability of global energy consumption and mix patterns; while global energy demand is expected to keep growing in the coming decades, consumer countries are diversifying into new sources of energy (alternative and fossil fuel), due to security of supply concerns and the need to cut emissions. High oil prices, as witnessed in the run-up to the 2008 financial crisis, further accelerate this quest as they make alternatives competitive. Simultaneously, technological

[16] See e.g.: P. Aarts, *The Arab Oil Weapon: A One-Shot Edition*, Emirates Occasional Paper No. 34 (Abu Dhabi: ECSSR, 1999).
[17] Shown by the mid-2000s' unease in the West regarding the transparency and ultimate motives of the sovereign wealth funds.
[18] Member states: Algeria, Angola, Ecuador, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates (Abu Dhabi) and Venezuela.
[19] See e.g.: S. Dessai, *An Analysis of the Role of OPEC as a G77 Member at the UNFCCC*, Report for WWF (2004).

development is also making alternative energy sources increasingly affordable. Secondly, although by the end of the 2000s, global climate change mitigation efforts and pledges had not reached a level sufficiently ambitious to prevent dangerous climate change or to impact oil demand or the price of oil, developing countries, particularly the largest emitters, were expected to be on board by the post-2012 period. The unpredictability of the direction and speed of international mitigation measures is a major uncertainty factor for the small Gulf monarchies. Also to be taken into account is the potential for a rapid acceleration of catastrophic climate change-induced events, such as polar ice sheet melting,[20] which would most likely prompt consumer states to abandon fossil fuels sooner than currently projected, not to mention the physical damage it would cause for coastal zones worldwide. Thirdly, the ability of Gulf monarchies to supply energy exports for global markets is an additional uncertainty factor: while Abu Dhabi's and Kuwait's oil and Qatar's gas reserves are expected to last for another century or more, other monarchies, including Bahrain, Dubai and Oman, are running out of oil fast. Moreover, all except Qatar are currently struggling to meet domestic demand for electricity due to a lack of cheap, available natural gas. Domestic consumption is a growing problem for both local governments, as it eats up both exports and export revenues. Finally, despite the number of optimistic international projections regarding the adequacy of future global supplies of fossil fuels,[21] peak oil theories should perhaps not be completely forgotten.[22] In the end, peak oil can eventually only be either demand or supply-driven.

In this context, the small Gulf monarchies (Bahrain, Kuwait, Oman, Qatar and the United Arab Emirates) are an interesting group of states to study for at least three reasons: their heterogeneity within homogeneity, their multidimensional dependence on fossil fuels and their variegated responses towards the issue of climate change and environmental sustainability in the late 2000s. Firstly, despite the small Gulf monarchies' apparent homogeneity in terms of history, size, population, wealth, development trajectory, and type of economy and polity, there are important differences: in addition to the divergent paths of socio-political development, examined for example by Nonneman, Ehteshami and Wright, and Davidson,[23] the extent to which their economies depend on fossil fuels also varies, as do their level and strategies of economic diversification.

[20] See e.g.: Environment Agency – Abu Dhabi (hence: EAD), *Climate Change: Impacts, Vulnerability & Adaptation* (Abu Dhabi: EAD, 2009), pp. 19-20.
[21] See e.g.: International Energy Agency (hence: IEA), *World Energy Outlook 2005: Middle East and North Africa Insights* (Paris: OECD/IEA, 2005).
[22] See e.g.: K. S. Deffeyes, *Beyond Oil: The View from Hubbert's Peak* (New York: Hill and Want, 2006).
[23] G. Nonneman, *Political Reform in the Gulf Monarchies: From Liberalisation to Democratisation? A Comparative Perspective*. Working Paper. (Durham: University of Durham, Centre for Middle Eastern and

Secondly, for the small Gulf states, many of which are among the world's largest oil exporters, energy security is directly linked to economic security, which in turn is linked to the domestic demand side of energy and the underlying and increasingly acute need to diversify the economic base. Moreover, the fact that the small Gulf monarchies embody the characteristics of a rentier state only adds to the challenge of the elites as they seek to manage social and political stability alongside economic growth, diversification and sustainable development.

Thirdly and most interestingly, a relatively rapid shift has taken place in some monarchies' attitudes towards addressing their growing domestic environmental and natural resource-related 'unsustainabilities', including in some cases the high per capita greenhouse gas emissions. This development is significant given the previously negative stance of these states towards climate change mitigation at the international level. While the general context of this change is clear, the exact drivers and motives in each of the monarchies are not. Due to the need to compromise quantity for the sake of depth, this thesis sets out to explore and explain why certain recent changes in attitudes towards climate change and environmental sustainability have and have not taken place in two, structurally similar, small Gulf rentier monarchies, Abu Dhabi and Qatar.

1.2 Objectives, research questions and assumptions

The aim of this thesis is to understand the drivers and motives of change and divergence behind the energy security and climate change-related responses of the small Gulf monarchies. Consequently, the study has four objectives:

- To define the energy security and expected vulnerability to climate change and its mitigation of the small Gulf monarchies in the context of their political economies;
- To analyse change and differences in energy security, climate change and environmental sustainability-related developments at the domestic level in two structurally similar monarchies;
- To analyse change and differences in the international level climate policy positions of these monarchies; and

Islamic Studies, 2006); A. Ehteshami and S. Wright, "Political Change in the Arab Oil Monarchies: From Liberalisation to Enfranchisement", *International Affairs* 83 (2007), pp. 913-932; C. Davidson, "The Emirates of Abu Dhabi and Dubai: Contrasting Roles in the International System", *Asian Affairs* 38 (2007), pp. 33-48.

- To explain why the approaches were different.

To achieve these objectives, the following questions will be addressed:

- How economically and politically stable/vulnerable are the small Gulf monarchies in relation to the ongoing global shift towards a new energy paradigm?
- What are the main potential climate change and global mitigation-related vulnerabilities?
- How did Abu Dhabi and Qatar begin to respond, at the domestic level, to the challenges and pressures relating to energy security, climate change and environmental sustainability that emerged in the late 2000s?
- What have the roles and policy positions of the United Arab Emirates (representing Abu Dhabi) and Qatar been in the negotiations under the UN Framework Convention on Climate Change? If they have changed, how has this happened?
- What has driven Abu Dhabi/the UAE and Qatar in their respective approaches at both levels (domestic and international)?

The study rests on the fundamental assumption that it is most fundamentally regime survival that drives decision-making in the small Gulf monarchies. Policy areas that are crucial for the maintenance of the status quo, the stability of the distributive political economy and more widely of the society, are at the centre of attention and often at the core of power of the ruling elites. Economic security, therefore, will always remain the governments' top priority,[24] particularly with the Arab uprisings that began in 2011. On these governments' agenda environmental considerations have generally ranked far below the sustainability of economic prosperity and socioeconomic growth. However, as the case of Abu Dhabi demonstrates, fossil fuel wealth can be utilised for alternative energy, climate change mitigation and environmental sustainability initiatives, as long as the ruling elite perceives these efforts as either economically or politically profitable, or as in most cases, both. The impact of the recent 'greening' developments on the political systems and level of authoritarianism in the small Gulf monarchies is, therefore, expected to remain minimal.

[24] See e.g.: K. Coates Ulrichsen, "Internal and External Security in the Arab Gulf States", *Middle East Policy*, 16 (2009), p. 41.

1.3 Methodology

The main methodological elements of this study encompass the academic positioning of the research, the main concepts, the research methods, and the methods of case selection and data collection. The study is positioned at the intersection of Middle East area studies and International Relations, or more precisely foreign policy analysis, often considered as its subfield. Its theoretical-analytical framework, as laid out in chapter 2, consists of a combination of elements from the two. Firstly, the main part of the study, consisting of chapters 3-5, employs existing literature on rentier states and neotraditional legitimacy and survival strategies of the elites in analysing domestic-level developments in the small monarchies. Secondly, analysis in chapter 6 draws from adaptations of realism and regional-level approaches of foreign policy analysis that stress the importance of including insights from a variety of International Relations schools in the analysis of external level climate policies of Gulf monarchies.

At the domestic level, the study examines decision-making and developments in a variety of sectors, namely energy, environment and climate change (essentially an environmental problem with an energy-related cause and solution), as well as economic and industrial policies. At the international level, the focus is on foreign-policy formulation.

Strongly rooted in the broad concept of security, the study understands energy security as more than merely consumer 'access to reliable and affordable supplies at reasonable prices'.[25] Consequently, both the fossil fuel producer perspective and the increasing weight of climate change on the global energy agenda are incorporated in the analysis. Sustainable development, in turn, is defined in accordance with the common view as development that meets 'the needs of the present without compromising the ability of future generations to meet their own needs'.[26] It consists of three mutually reinforcing pillars: economic development, social development and environmental protection.[27]

The main research methods applied in the thesis are comparative political science and foreign policy analysis. The small state approach is a further, albeit predominantly

[25] See e.g.: J. Bielecki, "Energy Security: Is the Wolf at the Door?", *The Quarterly Review of Economics and Finance*, 42 (2002), p. 237.
[26] UN General Assembly, "Report of the World Commission on Environment and Development", A/RES/42/187 (11 December 1987).
[27] United Nations, "Johannesburg Declaration on Sustainable Development", World Summit on Sustainable Development, A/CONF.199/20 (4 September 2002), annex art. 5.

somewhat implicit, element, with the exception of chapter 6, where it becomes explicit. The main approach to data collection and analysis in the study is qualitative, but quantitative elements, such as statistics and projections, are also employed, although generally for illustrative purposes.

As for the time frame of the research, the Earth Summit of Rio de Janeiro[28] in 1992 set the stage for international climate change politics by agreeing to establish the UN Framework Convention on Climate Change (UNFCCC) to reduce concentrations of greenhouse gases in the atmosphere. The first and binding update of the treaty is the Kyoto Protocol which was agreed upon in 1997 and which entered into force in 2005. The current commitment period will last from 2008 until 2012. The crucial negotiations on the next update, usually referred to as 'post-2012', are expected to be concluded before the expiration of this period. Hence, the time frame of this thesis spans two decades, starting from the early 1990s, until 2010. In practice, however, the small Gulf states began participating in the international climate negotiations only in the latter half of the 1990s. Furthermore, most of the domestic-level changes in projects, policies and perceptions only began in the mid to late 2000s. These realities lead to a heavy emphasis in the research material, and consequently the analysis, in the late 2000s.

As for the case selection, a choice was made to focus on two structurally similar, small members of the Gulf Cooperation Council. It was decided that emphasis would be placed on a profound understanding of the cases, which is why the examination of the other monarchies is limited to a broad overview in chapter 3. Still, it must be kept in mind that this approach naturally limits the generalisability of the final results.[29] Since the aim of the research is to explain differences, choosing cases that are structurally as similar as possible was obvious ('most similar systems design'[30]). This design also justifies the exclusion of Saudi Arabia, as explained below. Furthermore, due to the need for research material—something to analyse—it was decided that the two cases should have demonstrated at least some level of activity in the late 2000s in the areas of energy security, climate change mitigation and environmental sustainability. Even this, however, does not mean that the

[28] Officially the United Nations Conference on Environment and Development (UNCED).

[29] According to Dogan and Pelassy, comparing two states is the best way to take into account both the general and the specific. In addition to gaining information from two different systems, there exists a potential for contributing to the understanding of a wider phenomenon. M. Dogan and D. Pelassy, *How to Compare Nations: Strategies in Comparative Politics* (Chatham: Chatham House Publishers, 1984), pp. 112-113.

[30] Because the two cases are structurally rather similar, but differ in the dependent, or response variable, i.e. the kinds of changes in attitude and responses towards climate change mitigation, this particular design allows for the independent, or explanatory, variables to be more easily determined.

availability of research material would not be an issue: an imbalance in material is inevitable, as Abu Dhabi presents a far greater level of activity and change than Qatar during the period of observation. Therefore, the case of Abu Dhabi in this study inevitably takes a primary position, while the case of Qatar partly has the function of a control case. A third necessary point to be made is that although Abu Dhabi is part of a federal entity and is not a sovereign state, its behaviour, aided by the UAE's confederation-like system and its dominance of most of the federation's energy and financial resources, is very close to that of one in most areas of local decision-making and federal foreign-policy-making (as will be shown in chapters 4 and 6).

The exclusion of Saudi Arabia, which obviously calls for justification due to the similar challenges it is confronting, is due to two reasons: firstly, Saudi Arabia, as a GCC member state, is overwhelmingly larger than the others both in territory and population. Its role as one of the contemporary powerhouses of the Middle East, one of the three pillars of power in the Gulf and the guardian of Islam's holy places, sets it in a different league from its smaller regional neighbours. Saudi Arabia is the largest Arab economy and a member of the G20 group, hence not 'peripheral' in the vocabulary of dependency theories. It is the smaller GCC monarchies' 'big brother', with which these share often contradictory relationships, ridden with suspicion, distrust and even skirmishes. As is the case in international climate politics, Saudi Arabia has long been the bloc's unquestioned leader, although, as this study also shows, this status is becoming increasingly contested by some of its smaller members. Saudi Arabia, therefore, is the odd one in the six-member state group.

Secondly, and weighing heavily in the case selection were practical considerations relating to fieldwork, which would have required a number of visits and interviews in a country notorious for its conservativeness and stringent visa practices. In contrast, the small GCC states are more accessible, and present a set of standardised or 'controlled' variables, namely small population size, small or relatively small territory, similar subregional political status and a short period of independence.

In terms of data collection, due to the topicality of the issue and the lack of previous literature, the analytical part of the study relies substantially on interviews of UAE and Qatar-based decision-makers, stakeholders and opinion-makers. These groups include representatives of public agencies and ministries, local academics and experts, journalists,

environmental NGOs, climate change experts and negotiators, and informants from both local and Western companies operating in the case countries. Newspaper articles, mostly from local English-language newspapers, and official strategy documents, communications and reports constitute an important component of the research data. An important source of primary qualitative data consists of negotiating archives of the International Institute for Sustainable Development, and official speeches and statements given in international fora, mainly in the UNFCCC. The use of these various types of data, or triangulation, aims at increasing the validity of the study. As for quantitative methods, international and internationally recognised statistical databases,[31] official national statistics, and scenarios are used to establish the energy security situation and vulnerability to climate change of the countries observed.

There are a number of limitations and handicaps in data gathering that require separate discussion. These relate to authoritarianism, language, and statistics: Firstly, the authoritarianism of the political system in the UAE and Qatar, combined with relatively new environmental institutions and institutional practices, leads to limited access to information, or a '*mudir* culture'; often speaking to the 'person on the top' is the only way to gain information, as lower-level officials and employees of both state institutions and companies are either unaware, or too afraid to give information, regardless of whether it is in some way sensitive or not. These top-level managers, however, often appear elusive and uninterested in meeting with (junior) researchers. Particularly in the case of Qatar, the embryonic phase of many of the country's institutions and a somewhat obscure organisation of environmental governance have created a wall of silence, which at least this author found nearly impossible to penetrate.[32] Furthermore, due to the high level of authoritarianism and easy 'disposability' of expatriates perceived as trouble-makers, Gulf-based foreign experts often exercise a great level of caution and self censorship. One way around this is to grant the interviewees anonymity upon their wish. The same problem of self censorship also applies to the local press, which otherwise is a good source of up-to-date information, if only its role as an intermediary, not as a primary source of information, is kept in mind.

[31] These include the databases of BP, IEA, IMF, OPEC, US EIA, World Bank and World Resources Institute. Statistics by the Economist Intelligence Unit are also used.

[32] Attempts at contacting and interviewing a number of key climate change policy-related stakeholders in the Ministry of Environment and Qatar Petroleum/the Ministry of Energy and Industry included: e-mails, phone calls, text messages, meeting requests via colleagues within the same institution and in parallel institutions, and two face-to-face requests in conferences. The author only managed to interview a director and a manager at QP. Naturally, it needs to be acknowledged that this might have, to some extent, affected the study's results.

Secondly, it is acknowledged that the basic Arabic skills of the author set limitations to access to certain forms of data, most importantly local Arabic-language newspapers and some official documents. Particularly in the case of providing evidence on the pursuit of domestic legitimacy through green credentials, the study relies extensively on English language newspapers, which generally are not the main source of information for at least older Emirati and Qatari nationals. This is something to be explored in future research.[33]

Thirdly, the low quality and often complete lack of reliable statistical data is a major problem for any student of the Gulf monarchies, but particularly those focusing on environmental issues, as noted for example by a groundbreaking study comparing GCC states' environmental data from 2006.[34] Energy and demographic statistics are other problematic areas due to their politicised nature. In addition, the institutional infancy and inter-institutional competition which is especially rife in the UAE, both limits access to information and often produces disparate data sets that are not comparable due to their different, flawed or otherwise unsuitable data gathering methodologies. Arising from this, there are a number of methodological choices to make; in the case of conflicting data produced by local agencies, these all are presented without judgements regarding their validity, whereas in the case of conflicting data from international institutions and local agencies, a precedence is given for the former because, and always when, this allows for a comparison between states. This, of course, does not remove the problems relating to the origins of international statistics, often based either on data provided by the governments or on estimates. Population statistics[35] and greenhouse gas emissions[36] are cases in point.

[33] A note on transliteration: Arabic words are presented without diacritical marks. Arabic names are written in their standardised English spelling. In the main text, 'Al' means family (e.g. Al Thani, Al Nahyan) and 'al-' denotes the definite article. Since people in the Gulf, and elsewhere, use different transliterations of their names, I have respected this right in the footnotes by leaving the names of the people I interviewed in the form used by the individual in question.

[34] The Green Gulf report, compiled by a group of Indian and Dubai-based scientists and a wide group of GCC experts noted that data gathering was a major limiting factor, as there were important data gaps that hindered the assessment of the extent of each environmental problem covered in the report. Gulf Research Center, *Green Gulf Report* (Dubai: GRC, 2006), p. 8.

[35] For several reasons, including inadequate and infrequent censuses and the political sensitivities associated to population statistics in countries with small national populations and, in the case of Bahrain, sectarian sensitivities, population statistics of the five states are often far from accurate and must be treated critically.

[36] There are significant variations in GHG emission data between different sources, particularly in case of the three GCC OPEC states, mainly due to different methodologies, but arguably also owing to the opacity on real oil production levels stemming from the famously 'leaky' OPEC quota system. Sources examined include: the IEA, World Bank, World Resources Institute, the UAE's Energy Ministry, Qatar's General Secretariat for Development Planning and unpublished data acquired from Qatar Petroleum. The use of World Resource Institute estimates in this study is justified by the extensiveness and good reputation of its database, which compiles data from various international sources, including the IEA and the US EIA.

Also, the lack of historic long-term data sets on the local environment and climatic conditions is a major problem for climate science.[37]

1.4 Structure of the thesis

Chapter 2 establishes a theoretical-analytical foreign policy analysis framework for analysing the energy security and climate change-related responses (projects, policies and perceptions) of the small Gulf monarchies. The empirical part of the study begins with chapter 3, which defines the economic and political stability, energy security, and energy and climate change-related vulnerabilities of the small GCC states based on current statistics, energy outlooks, and climate change impact studies. Chapters 4-5 examine the domestic level dynamics, developments and responses in the cases of Abu Dhabi and Qatar, whereas chapter 6 analyses the international level role and policies of the small GCC states, with a special emphasis on the positions of the UAE and Qatar. Finally, the conclusions chapter (7) lays out the explanation to the main research questions, the most important being what drove Abu Dhabi and Qatar to their respective responses.

[37] Statistics-related problems will, hopefully, gradually diminish if/when new local authorities, such as the Qatar Statistics Authority (established in 2007) and the UAE's National Statistics Center (2009) become more established. There have also been reports of efforts to harmonise data-gathering methodologies across the GCC. See e.g.: Economist Intelligence Unit (hence: EIU), *United Arab Emirates: Country Report, June 2009* (London: EIU, 2009), p. 8.

2 Theoretical context and analytical framework

As in the study of politics in general, energy and climate policy have both a domestic and an external dimension. In order to fully understand related changes in the small Gulf monarchies in the late 2000s, both dimensions need to be examined. So far, domestic politics of energy security and climate change have received minimal attention in the field of Middle East studies. Similarly, studies in the field of International Relations have seldom examined the politics of energy security and climate change from an energy producer perspective, particularly in the case of the Middle East. Probable explanations for this include the formerly rather nonexistent interest of these states towards domestic energy and climate change issues, the Western bias towards a consumer perspective, and the 'black box approach' of the dominant (neo)realist school.

Recognising the resultant need to construct an analytical framework for analysing the energy security and climate change-related responses of small Gulf monarchies at both domestic and foreign policy levels, this chapter builds upon existing concepts and theories of Middle Eastern studies and International Relations. At the domestic level it draws from the rentier theories, which emphasise structure, and neotraditional and -patrimonial explanations, which stress the importance of agency. At the foreign policy level, the chapter establishes an adapted foreign policy analysis (FPA) framework by drawing from these two complementary domestic-level explanations, some of the internal reformers of the realist school, and theoretically pluralist adaptations of IR. Finally, the chapter positions the small Gulf monarchies in the broader context of the international politics of energy security and climate change.

2.1 Domestic level: rentier state theories

Scholars in the field of Middle East politics often divide 'the explanations of the state'—the emergence of the Gulf oil monarchies, the character of their political systems, the persistence of authoritarianism despite modernisation, and their policies and policy-making processes in general—into two categories. Firstly, there are those that stress economic

causes and other structural factors, mainly rentierism and dependency[1] theories. Secondly, and those that stress agency and the role of individuals: the role of 'desert shaykhs' and their active and conscious use of different kinds of immaterial resources (such as tradition, tribalism, Islam and other 'higher values') and sophisticated patrimonial networks, as means of legitimisation.[2]

Economic structural explanations of the development and persistence of authoritarian regimes stress the implications of oil wealth for the distribution of power among rulers and citizens in the oil-rich states of the Gulf. From an economic point of view, the small Gulf monarchies can be classified as either rentier states or post-rentier states. A rentier state can be defined as a country that receives 'on a regular basis substantial [a]mounts of external rent' from external actors[3] while rent is determined as a 'reward for ownership of all natural resources'.[4] The definition of a rentier state was first put forward by the economist Hossein Mahdavy in 1970 in an examination of Iran's economic development in the 1950s. Mahdavy noted that the ability of the rentier governments to avoid taxation has translated into significant independence of their citizens, but that despite the associated capabilities to both bribe and coerce individuals and groups, the rulers' power remains always highly vulnerable due to its dependence on external rent.[5] This remains the essence of the concept of rentierism.

Almost two decades and two major oil price shocks later, Beblawi and Luciani expanded the concept of rentierism by writing on rentier economies and allocation states. Focusing especially on the economic role and foundations of the state in the contemporary Arab world, the authors emphasised the interrelations of the economic base with other societal structures.[6] Beblawi treated the rentier state as a subset of a rentier economy, exhibiting three features: the predominance of external rent in the income of the economy, often

[1] Dependency theories are not considered in this study. They could indeed contribute an additional dimension to the external level analysis of the study, through emphasising the relations between local ruling elites and Western (mainly US) governments, as well as the role of these ties, along with Western consultants and business interests, in shaping climate change-related decision-making, particularly in the case of Abu Dhabi. This is something to be considered in future research.

[2] E.g.: S. Hertog, "Shaping the Saudi State: Human Agency's Shifting Role in Rentier-State Formation", *International Journal of Middle Eastern Studies*, 30 (2007), pp. 539-563.

[3] Mahdavy, "Patterns and Problems of Economic Development in Rentier States: the Case of Iran" in M. A. Cook (ed.), *Studies in the Economic History of the Middle East. From the Rise of Islam to the Present Day* (Oxford: Oxford University Press, 1970), p. 428.

[4] H. Beblawi, "The Rentier State in the Arab World" in H. Beblawi and G. Luciani (eds.), *The Rentier State* (New York: Croom Helm, 1987), p. 49.

[5] Mahdavy, "Patterns and Problems", p. 466-467.

[6] H. Beblawi and G. Luciani, "Introduction" in H. Beblawi and G. Luciani (eds.), *The Rentier State* (New York: Croom Helm, 1987), pp. 1-2.

paired with a weak productive domestic sector; a situation in which only a minority of the population is engaged in generating this rent while the majority is involved exclusively in either distributing or using it; and the role of the government as the principal recipient and distributor of this rent.[7] This last feature of the rentier state is a crucial one, since the economic power derived from external rent, through the state monopoly of wealth allocation, is what allows the rulers to maintain political power and renders the citizens dependent on the government.

Beblawi observed that the central role of the government as the principal rentier and redistributor of rent had profound effects on the distribution of power in the Arab oil states:

> Special social and economic interests are organised in such a manner as to capture a good slice of government rent. Citizenship becomes a source of economic benefit. … The whole economy is arranged as a hierarchy of layers of rentiers with the state or the government at the top of the pyramid, acting as the ultimate support of all other rentiers in the economy. … [T]he rentier nature of the new state is magnified by the tribal origins of these states. A long tribal tradition of buying loyalty and allegiance is now confirmed by [a welfare state], distributing favours and benefits to its population.[8]

The first of the small Gulf states to adopt this kind of distribution of welfare was Kuwait. The other monarchies soon followed suit. Currently, the distribution of wealth in these states takes place in the form of public goods and services—characterised by their significantly low or free cost[9]—, public employment, and housing and land allocations.

Luciani preferred to use the expressions 'allocation state' and 'production state' and to concentrate on the main function of the state: an allocation state derives a predominant share, more than 40%, of its revenue from oil or other foreign sources and has an expenditure that corresponds to a substantial share of GDP. Its main function is the distribution of rent, while in production states, the state engages in both production and reallocation.[10] Of the Gulf monarchies, Qatar, Abu Dhabi and Kuwait can be considered the purest examples of an allocation or rentier state. However, in the absence of reliable information on the share of external rent of state revenue and accurate data on the size of state expenditure, additional and alternative indicators need to be used to exemplify this (see table 3.1).

[7] Beblawi, "The Rentier State", pp. 51-52.
[8] Ibid., p. 53.
[9] Ibid., p. 54.
[10] Beblawi and Luciani, "Introduction", p. 13.

Two key factors in the development and maintenance of the rentier state in the Gulf have undeniably been the extent of oil wealth and small size of the native population. High external rent combined with a national population that comprises only a fraction of the total population means that there are less people to allocate the rent to than official population statistics allow us to assume. This combination has enabled the rulers to assert their power through the inclusion of most nationals in a small rentier elite, with special economic and social privileges, while expatriates are excluded from most of the rights and benefits enjoyed by the nationals, including citizenship. In the case of the small Gulf monarchies, due to the high share of non-nationals in the populations, GDP per capita can therefore only serve at best as an indicator of the (on average considerably wealthier) national population, while that of the expatriate population is not of concern, as they rarely seek political participation.

Small Gulf monarchies can be divided into strong rentier states and weak, or post-rentier states. A post-rentier state is defined here as one in which external rent is still gained but it is not enough to cover expenditure. Importantly, the citizens of weak and post-rentier states, such as Bahrain and Oman, still remain dependent on the allocative state. If the external rent of a state is in permanent decline (because of the rent commodity's declining amount and/or value), the main conundrum of the ruling elite becomes how to balance replacing external rent with internal revenues, often through removing fuel subsidies and increasing taxation, in the face of weak democratic legitimation and the persistence of a 'rentier mentality' among the citizens.[11] In the case of these two monarchies, as well as the six less affluent emirates of the UAE, this categorisation is becoming increasingly relevant as declining fossil fuel reserves (and consequently revenues), together with high population growth and diversification efforts (and consequently higher energy demand), place a growing strain on the government's rent allocation ability.

The socio-economic consequences of the above described rentier structures are numerous. The absence of a need to tax citizens leads to a lack of ruler accountability and hence enforces the authoritarianism of the political system: 'no taxation, no representation'. The atomisation of society and the quasi-absence of autonomous civil society institutions are another consequence.[12] Furthermore, the line between private interest and public service is often blurred as members of the political elite participate in private sector business

[11] Beblawi and Luciani, "Introduction", pp. 16-17.
[12] See e.g.: R. Brynen et al., "Introduction: Theoretical Perspectives on Arab Liberalization and Democratization" in R. Brynen et al. (eds.), *Political Liberalization & Democratization in the Arab World: Theoretical Perspectives* (London: Lynne Rienner, 1995), p. 15.

activities. Another feature is that the government is the major employer of the citizens. In the Gulf monarchies this has lead to high expectations regarding employment and also to decreased efficiency in the public sector, as employment is often seen as a granted benefit rather than as something achieved. Even more importantly, a rentier economy produces rentier mentality, characterised by 'a break in the work-reward causation', which leads to a deterioration of work ethics, among other things. In rentier states, only expatriates and foreign workers maintain the relationship between work and reward. Typically, a rentier is the antithesis of a '[d]ynamic, innovative, risk-bearing' Schumpeterian entrepreneur.[13]

The government also controls the distribution agents, a function restricted only to nationals. This has given rise to the *kafala* (from *kafil*, sponsor) system. This 'kafil mentality', characteristic of a rentier state, according to Beblawi, has transformed citizenship into an economic, or pecuniary relation.[14] Related consequences are very limited naturalisation, cronyism/nepotism, and important dependencies for non-citizens.

Typically, most oil-exporting states, despite their heterogenic characteristics, have suffered from political and economic crises and seem to be locked in what Karl described as a 'paradox of the plenty'. Oil rents create unstable political economies and produce a barrier to change because the required political reforms are not in the interests of the political leaders. Although the small Gulf monarchies have mostly managed this instability,[15] they share a crucial characteristic with other 'petro-states' in that their 'framework of decision-making [is] both constructed and subsequently based upon highly politicised allocation of rents'. This creates a perverse incentive structure, characterised by the postponement of needed structural changes, institutional rigidity, lack of policy innovation, and 'a policy style marked by an exaggerated tendency to throw money at problems'.[16]

During the past decades, two periods of low oil prices have occurred, in the mid-1980s and late 1990s. Related reflections on the future of the rentier state can be useful in projecting the future impact of global energy security and climate change mitigation policies on the Gulf oil exporting monarchies. Among the long-term challenges of lower oil revenues Beblawi and Luciani mention the need to revise the structure of taxation and the need to substantially reinforce fiscal instruments, which would lead to a departure from the rentier

[13] Beblawi, "The Rentier State", p. 50; 52; 58-59.
[14] See e.g.: ibid., pp. 55-56.
[15] With the exception of Bahrain and Oman in early 2011.
[16] T. L. Karl, "The Perils of the Petro-State: Reflections on the Paradox of Plenty", *Journal of International Affairs* 53 (1999), passim. Quotes from pp. 36-37. Karl defines as petro-states OPEC states and Mexico.

character of the state. Indeed, 'whenever the state must ask for sacrifices, be they under the form of increased revenue or reduced expenditure', calls for democratisation tend to increase. However, the authors assert that some Arab states will maintain their rentier nature despite low oil prices.[17]

As Beblawi and Luciani point out, diversification alternatives are scarce:

> Oil may become cheaper but rent will not disappear from Arab politics as a factor shaping equilibria and rules of the game. Some Arab states simply lack the resource base of minimum conditions that would allow them to become significant agricultural or industrial producers. Their lifestyles are inextricably tied to oil and the rent it generates, and they can credibly outlive oil only if this rent is permanent. For these countries, a reduction in rent revenue accruing to the states necessarily implies a reduction in expenditure, but is not likely to imply a significant reduction in dependency on rent, because alternative sources are meagre.[18]

The Gulf monarchies survived the 'bust' periods of the 1980s and 1990s. In the cases of the emirates of Kuwait and Abu Dhabi, this was supported by state-owned investment authorities, or sovereign-wealth funds, established in 1953 and 1976 respectively—if to an unverifiable extent, owing to the lack of data on both the size of the funds and the yearly flows of money to the state budget. Nevertheless, both funds are currently ranked among the largest in the world.[19] Oman established a relatively small fund in 1980 and other Gulf monarchies have followed suit during the 2000s.[20] After the boom in oil prices since the early 2000s and the consequent bust in 2008, these funds have turned out to provide an essential, though not limitless, buffer for the economy.

Given the nature of the rentier system, it can hence be argued that there are three ways in which the fossil fuel-based rentier state in the Gulf can be disbanded. Firstly, this could occur involuntarily, in the case of a rapid and drastic drop in oil prices, prompted for example by a global economic crisis or a shift towards lower-carbon energy sources. In a second scenario, the state manages to escape the 'resource curse' before its own resources are depleted, through rent-financed economic diversification into non-oil sectors. Nevertheless, the past decades serve as strong counter-evidence to this scenario. Empirical

[17] Beblawi and Luciani, "Introduction", p. 19.
[18] Ibid., 20.
[19] Kuwait Investment Authority is estimated to hold US$200bn and Abu Dhabi Investment Authority US$600bn in assets. A third large SWF is Qatar Investment Authority, established in 2005, with an estimated US$85bn in 2010. Sovereign Wealth Fund Institute, "Rankings".
[20] Oman's State General Reserve Fund. Other smaller GCC SWFs of US$20bn of less include: IPIC (Abu Dhabi/1984); Mubadala (Abu Dhabi/2002); RAKIA (Ras Al-Khaimah/2005); Investment Corporation of Dubai (2006); Mumtakalat Holding Company (Bahrain/2006); Oman Investment Fund (2006); ADIC (Abu Dhabi/2007); and Emirates Investment Authority (UAE, federal/2007). Ibid.

evidence shows that meaningful and rapid diversification is most likely to happen only when the source of rent is depleted and the state is left with no other choice, which often leads to economic instability and calls for increasing political participation. Dubai and Bahrain, where the era of oil rent is coming to an end, are good examples.[21] Meanwhile, other Gulf monarchies with more oil or gas, and hence less urgency, have exhibited more inertia in their diversification efforts.

Since democratisation is clearly not in the interests of the wealthy and powerful ruling elites of the Gulf, a third possibility is rent substitution, which allows for lowering dependence on oil and gas revenues without disbanding the existing rentier structures. Conventional, non-fuel types of external revenue, termed by Beblawi as 'second order rents', include real estate and stock market speculation.[22] Luciani adds to this transportation infrastructures.[23] Free economic zones, particularly numerous in the UAE, can also be classified as a derived form of land rent. Dubai for example, despite declining oil revenues, has so far maintained many characteristics of a rentier state by this kind of rent substitution. Finally, and most importantly, solar energy can also be converted, with the right kind of investments, into a source of rent in the Gulf. Due to its abundance it arguably has the most potential to replace oil rents in the future.

In addition to receiving revenues from oil concessions since the first half of the 20th century, most small Gulf monarchies have already for decades gained considerable amounts of external rent from their strategic location, by granting landing rights for the United Kingdom since the 1920s[24] and by hosting British, American, and most recently French (the UAE) military bases. As long as these friendly external powers have important strategic interests in the region (such as guaranteeing the flow of oil from the region, the protection of Israel, and the containment of Iran), the Arab states of the Gulf will continue to benefit from this type of rent, along with gaining protection from external threats. An important strategy of engaging external actors and their interests in the stability of the region and its polities, employed actively by for example Abu Dhabi and Qatar, has been

[21] Dubai, however, as part of an increasingly Abu Dhabi-financed federal system, has mostly escaped calls for political reforms.
[22] Beblawi, "The Rentier State", pp. 56-58.
[23] G. Luciani, "Allocation vs. Production States: A Theoretical Framework" in H. Beblawi and G. Luciani (eds.), *The Rentier State* (New York: Croom Helm, 1987), p. 70.
[24] C.M. Davidson, *Dubai: The Vulnerability of Success* (London: Hurst, 2008), pp. 24-29.

to create interdependencies by sustaining diversified external ownership of the national oil and gas companies.[25]

The role of external actors in supporting the ruling elites and maintaining the rentier state in the Gulf goes beyond guaranteeing economic stability through sustained oil and gas imports. In an examination of monarchies in the Arabian Peninsula, Gause attributes their success and survival to two factors: oil revenue and support from powerful allies. Nevertheless, he admits that these are not 'an ironclad guarantee of stability' and, in the face of such future challenges as growing populations and maintaining the level of welfare in times of low external revenues, the renegotiation of the 'rentier bargain' will be crucial in determining the survival of Middle Eastern monarchies—as the case of Bahrain in early 2011 aptly demonstrated. Therefore, from a regime survival perspective, other strategies that aim at conserving the ruling elite's power have been devised. These, according to Gause, evolve in the context of domestic politics where local monarchs employ both political and economic external assets to guarantee the survival of the regime.[26]

2.2 Domestic level: agency and neotraditionalism and -patrimonialism

Academics who have emphasised agency in explaining contemporary polities and their continuity in the Gulf have focused on the relationships of power that are established and maintained by the ruling elite, through patronage networks, based on kinship and other elements of tradition. Herb, for example, attributes the resilience of the monarchy in the Arabian Peninsula to 'dynastic monarchism', the skilful consolidation of political power through monopolisation of the state's key offices by a ruling family.[27] Gause, in turn, asserts that traditional and cultural elements are not, by definition, the key to the persistence of monarchy in the Gulf, but rather how they have been 'invented' in the modern context,[28] and how they are used as a socio-political strategy of power legitimisation and survival by the local ruling elite. Thus, tradition only appears to be the social glue of the political systems in the small Gulf monarchies, and its function is best

[25] See: C. M. Davidson, *The United Arab Emirates: A Study in Survival* (Boulder and London: Lynne Rienner, 2005), pp. 93-95.
[26] F. G. Gause, "The Persistence of Monarchy in the Arabian Peninsula: A Comparative Analysis" in J. Kostiner (ed.), *Middle East Monarchies: The Challenge of Modernity* (Boulder and London, Lynne Rienner, 2000), p. 182.
[27] M. Herb, *All in the Family: Absolutism, Revolution and Democracy in the Middle Eastern Monarchies* (Albany: State University of New York, 1999), pp. 18; 235.
[28] Gause, "The Persistence of Monarchy", pp. 176-177.

understood as a 'legitimacy resource' or an element of an unwritten social contract, or a 'ruling bargain', imposed on the citizens by the rulers empowered by oil wealth.[29]

The embedding of traditional elements in political rule and legitimacy-seeking in the Arab world, or more specifically, in the Gulf monarchies, has been examined from different conceptual-theoretical viewpoints by a number of scholars who have also attributed different degrees of importance to these elements in explaining the survival of these polities and the dynamics of their rule. Baabood, for example, holds that the monarchies have adapted their modern institutions to traditional forms and use tribalism and Islam as 'institutional and ideological supports'.[30] Gause, with a more radical standpoint, sees that 'the belief that Arabian culture—tradition, tribalism, and Islam—are conducive to monarchical forms or rule' stems from a successful attempt by the local monarchical regimes to create an image of themselves as 'embodiments of centuries-old Arabian traditions'.[31] He points out that despite the use of traditional symbols, the style of government and its relations with its citizens in the Gulf monarchies are new. The local monarchs cannot claim a long and independent historical line of rule, as their 'dynasties' date back to mid-18th century at the most,[32] and most states' political independence can be questioned up to the present day.

In the past, tribal relations, in addition to being a collective force, constituted a major challenge to the Gulf Arab rulers. According to Gause, '[t]he successful monarchies have been those that have tamed tribalism: rallying tribal support when necessary, but once established in power, breaking the autonomy of the tribes'. In modern times, the outreach of the monarchs' rule has been vastly extended. Oil wealth has enabled the Gulf monarchs to create allocation states and manipulate societal relations according to their interests by supporting, co-opting and coercing groups and individuals.[33] Anderson speaks of 'official civic myths', 'the discovery and creation' of which Gulf monarchies have devoted significant time and resources since their independence.[34] In addition to traditional

[29] See e.g.: Davidson, *A Study in Survival*.
[30] A. Baabood, "Dynamics and Determinants of the GCC States' Foreign Policy, with Special Reference to the EU" in G. Nonneman (ed.), *Analyzing Middle East Foreign Policies and the Relationship with Europe* (Oxon and New York: Taylor and Francis, 2005), p. 150.
[31] Gause, "The Persistence of Monarchy", pp. 176.
[32] Al Khalifa (Bahrain): 1783; Al Sabah (Kuwait): 1756; al Said (Oman): 1744; Al Thani (Qatar): 1871; Al Nahyan (Abu Dhabi): before 1793; the UAE's other rulers: since 1803 at most. According to: J. Kéchichian, *Power and Succession in Arab Monarchies: A Reference Guide* (London: Lynne Rienner, 2008), pp. 433-473.
[33] Gause "The Persistence of Monarchy", pp. 170-172; 174. Quote from p. 174.
[34] L. Anderson, "Dynasts and Nationalists: Why Monarchies Survive" in J. Kostiner (ed.), *Middle East Monarchies: The Challenge of Modernity* (Boulder and London, Lynne Rienner, 2000), p. 64.

authority, Gulf ruling families have also sought charismatic authority. In the case of Abu Dhabi and the UAE, the myth of Sheikh Zayed as the father of the nation and an environmentalist has been created and recreated throughout the past decades for the purpose of upholding the domestic legitimacy of the sheikh and his sons.

In the late 1980s, Sharabi used the concept of neopatriarchy to explain the lack of development in Arab societies, which he labelled as 'modernised version[s] of the traditional patriarchal sultanate'. He argued that instead of being displaced or modernised, the traditional patriarchal structures in Arab societies have in fact only been strengthened, if in a deformed manner. According to him, neopatriarchal societies are characterised by vertical relations between the ruler and the ruled, analogous to a father-child-relationship, and by a two-state system in which alongside the military-bureaucratic structure there exists an internal security apparatus *(al-mukhabarat)*[35] that serves to reassert or replace the more subtle repression of the rentier economy. Sharabi, however, ignores the fact that due to abundant oil rent, the small Gulf monarchies have not needed a repressive element to secure the continuity of their rule—even if they have built up large security apparatuses. Adding to this, Hudson has suggested that it is simplistic to draw a direct parallel between patriarchal family structures and absolutist national government. Other factors to be considered are, for example cultural values, class, the political arena and non-kinship solidarities.[36]

Some authors have rejected the rentier explanation altogether. Herb demonstrated how in the oil-rich states of the Gulf, the key variable in explaining regime resilience and stability has been 'how political actors, in the context of existing political institutions' handle this wealth.[37] According to him, the successful creation of a 'dynastic monarchy', as the central political institution with a high concentration of power, gives the best explanation; 'the emir rules, surrounded by his relatives' and the ruling family, characterised by unity and solidarity, secures the top positions of power in the state.[38] This kind of rule was first established in Kuwait in late 1930s and now exists in all Gulf monarchies except Oman.[39] Concentrating mainly on the internal causes of revolution and intra-elite power balancing,

[35] H. Sharabi, *Neopatriarchy: A Theory of Distorted Change in Arab Society* (New York: Oxford University Press, 1988), pp. 4; 7.
[36] M. C. Hudson, *Arab Politics: The Search for Legitimacy* (New Haven and London: Yale University Press, 1977), pp. 85-86.
[37] Herb, *All in the Family*, p. 11.
[38] Ibid., pp. 2-3; 7; 235-236. Quote from p. 2.
[39] Oman, under Sultan Qaboos, currently has a 'one-bullet regime'.

in addition to seeking to disprove the importance of rentierism, Herb also underplayed the crucial influence of the external environment on state power and behaviour.[40]

While Sharabi and Herb both give rather one-dimensional interpretations on the relative importance of traditional resources and structures compared to rentierism, Hudson, Nonneman and Davidson represent a middle ground view. These 'modernisation revisionists' adhere to the rentier explanation but believe that traditional resources also play a role in explaining the longevity of monarchy in the Gulf. In a study from 1977, Hudson argued that modernisation had brought about a shortage of legitimacy in the Arab world. Modernisation increases social mobility, which generally leads to increased calls for equality and democracy, and to weakening of paternalistic authority.[41] According to him, Arab monarchies seek to maintain their authority with a patriarchal legitimisation formula that combines traditional autocratic authority with diffuse nationalism. The main legitimising values for these states' rulers are kinship, religion and custom, and the main types of legitimisation are the personal reputation of the ruler, the tradition of kingship, and 'an ideology emphasising religious rectitude and kinship obligation'.[42] Additionally, Hudson sees that the monarchies in the Arabian Peninsula have increased their legitimacy by embracing modernity, supporting societal development (with oil revenues), and allowing limited political participation. Economic wealth and external technical assistance have also played an important role in building governments' capabilities.[43] Importantly for this study, Hudson also pointed out that the monarchies of the Lower Gulf, the UAE and Qatar, owing to their oil wealth, relatively late onset of modernisation and better social cohesion, have managed modernisation and legitimacy better than Bahrain and Oman, which are less wealthy and where kinship does not carry the same 'fortifying value'.[44]

Nonneman has suggested that the modern Gulf monarchies' polities are most accurately described as 'post-traditional states using neotraditionalist forms and methods'.[45] This is indeed a useful definition, since, in addition to recognising the break with tradition through the socio-economic development of the societies, it incorporates the understanding that

[40] See e.g. ibid., p. 248.
[41] Hudson, *Arab Politics*, pp. 7; 12; 87.
[42] Ibid., pp. 25; 165. Quote from p. 25.
[43] Ibid., pp. 162; 166; 402.
[44] Ibid. p. 189-209. Hudson, does not clearly distinguish between the emirates of the UAE (but c.f. p. 197).
[45] Nonneman, *Political Reform*, p. 4. Hudson (*Arab Politics*, p. 17) was among the first to use the term post-traditional for Arab states.

traditional elements are employed as means of legitimisation by the rulers.[46] Nonneman gives a more in-depth description of the power relations between the rulers and the citizens by pointing out that, despite their apparent authoritarianism, the Arab monarchies of the Gulf have maintained traditional forms of interaction and channels of input (such as the ruler's *majlis*), a level of social pluralism, and even a civil society, although all these have mostly been co-opted and their powers strictly limited. According to him, therefore, the acquiescence of the population is the outcome of a system in which the government commits to maintaining the rentier bargain and not acting against key values.[47]

Another useful concept is Weber's neopatrimonialism, which can be understood as a form of neotraditionalism. The concept denotes 'new ways of using what only superficially resembles the old patrimonial style and mechanisms'.[48] Davidson has examined neopatrimonialism in the context of regime survival in the United Arab Emirates. He argues that, instead of resorting to the survival strategies described by Samuel Huntington for the 'king's dilemma'[49]—voluntary transformation of the polity, institutionalised coexistence or resisting reform—the rulers of the UAE created a sophisticated 'neopatrimonial network' for this purpose. Davidson describes this as essentially a society-wide extension of the ruler's personal network; a pyramid in which all links are tied to the top and which the local rulers have built by encouraging and nurturing 'new and extended patterns of authority based on informal relations, kinship groups, and long-standing traditional loyalties'.[50]

In addition, Davidson presents other types of resources of legitimisation which the local rulers have skilfully exploited, such as, culture and religion (as explained in the previous paragraphs), personal resources (including leadership charisma), ideology (for example the Israeli-Palestinian conflict), local identity (in the case of the UAE, both Emirati and emirate-specific identities), and institutionalisation of authority (laws and governmental institutions).[51] Also, in the case of Abu Dhabi and the UAE, environmentalism has long

[46] Nonneman (*Political Reform*, p. 3) adds that in addition to the regime, different parts of the populations engage in the reinterpretation and appropriation of these elements.
[47] Ibid., p. 5-7.
[48] Ibid., p. 3.
[49] According to Davidson (*A Study in Survival*, pp. 66-67), paraphrasing Huntington's idea from 1968, the sheikh's dilemma of the rulers of the Arabian Peninsula was created as these countries modernised and new groups emerged in the society. As a result, the rulers had to choose between resisting reform and accommodating these new groups. In either case the monarchs would ultimately have to give up their powers. However, Huntington argued that there were certain strategies that they could employ to postpone this fate.
[50] Ibid., pp. 73;85. Quote from p. 73.
[51] Ibid., pp. 70-87.

served as an additional form of leadership legitimisation,[52] in the form of the 'legacy of Sheikh Zayed', known as the 'man who turned the desert green' (see chapter 4.2.1).

As demonstrated above, neotraditionalism and neopatrimonialism only appear to be cultural explanations of the state-society relationship. A more adequate description would label them as actor-driven legitimisation and regime survival strategies; intangible power mechanisms and structures that are created and sustained with the help of material and immaterial legitimacy resources. Together, these elements constitute the backbone of the unwritten social contract, common for all eleven small monarchies (counting the seven emirates of the UAE), in which citizens allow the ruling elite to exert political autonomy in exchange for welfare and preservation of core values. It is argued that these legitimisation strategies and structures, together with the overarching rentier state structures, form the basis for understanding the small Gulf monarchies' domestic context, in which also foreign policy interests and, consequently, international climate change policies are to a great extent shaped.

2.3 Foreign policy level: realism and foreign policy analysis

Many studies, particularly those inclined to realism and structuralism (Marxism), have stressed the importance of the external environment and especially powerful state allies, like the UK and the US, for monarchical survival in the Gulf, as well as in determining the foreign policies of these states.[53] While keeping in mind major power interests and local elite dependencies, it is arguably equally crucial to pay attention to the domestic level as a source of interests and perceptions that shape foreign policies in the small Gulf monarchies. Because of this, it is argued that instead of following one theoretical school, contributions from different theoretical approaches of International Relations can make the analysis of small Gulf states' foreign policies richer and more comprehensive.

[52] C. Davidson, "Abu Dhabi's New Economy: Oil, Investment and Domestic Development", *Middle East Policy*, 16 (2009), p. 69.
[53] See e.g. R. Said Zahlan, *The Making of the Modern Gulf States: Kuwait, Bahrain, Qatar, the United Arab Emirates and Oman* (Reading: Garnett, 1998); Gause, "The Persistence of Monarchy", p 167; Davidson, *A Study in Survival*, pp. 30-31; Baabood, "Dynamics and Determinants", pp. 145-146. For structuralism, see e.g. Hinnebusch, *International Politics*.

Realist[54] IR scholars have traditionally been unconcerned with what happens inside the black box of the Middle Eastern state and, more specifically, foreign policy decision-making.[55] Furthermore, as Korany et al. note, realism sees international cooperation and law only as secondary to the states' own preparedness to guarantee their national security and interest. The central characteristics of realism include the anarchy of international relations, plurality of centres of military power, and the continuing insecurity and struggle for power at the international level.[56] Some of the most fundamental elements of (neo)realist theory, namely anarchy, insecurity and power balancing, are indeed highly characteristic of the Middle East regional state system. However, as Hinnebusch has pointed out, neorealism encounters various problems in the context of this region. Most importantly, in the unconsolidated state system, the dynamics of the regional level do not lead directly to uniform patterns of action, including balancing against threats. Middle Eastern states are not the unitary and rational actors neorealism assumes them to be; instead they are 'fragmented and penetrated'.[57] Hinnebusch criticises neorealism's ahistorical approach by pointing out that many reasons for current conflict in the regional system are located in its historical construction and not in the anarchic nature of the state system as such.[58] In the case of the small Gulf monarchies, this formative period was the transition in 1971 from British protectorates to penetrated pro-western sheikhdoms, later to be safeguarded by the US.[59] Realism has also been criticised for both its in-built claim of universal validity and a state-centeredness that ignores other normative priorities apart from that of safeguarding national sovereignty.[60]

Two important analytical additions arguably help in adapting realism's narrow view on security and foreign policy for the purpose of studying the small Gulf states' external energy and climate change-related policies, namely: acknowledging the broadening of their security agenda and keeping in mind the important linkages between the domestic and foreign politics of these states. Firstly, as the Arab states' 'economic needs' have grown and they have become increasingly integrated into the international economy, economic

[54] In this study, the term realism is used in the generic sense.
[55] This is mostly a consequence of the dominant position of the (neo)realist school both globally speaking and among the observers of Middle Eastern politics, the latter of whom have usually been interested only in external and material factors, such as size and location.
[56] B. Korany et al., "The Analysis of National Security in the Arab Context: Restating the State of the Art" in B. Korany et al. (eds.), *The Many Faces of National Security in the Arab World* (Basingstoke and London: Macmillan,1993), pp. 6-8.
[57] R. Hinnebusch, "Introduction: An Analytical Framework" in R. Hinnebusch and A. Ehteshami, *The Foreign Policies of Middle East States* (Boulder and London: Lynne Rienner, 2002), p. 2.
[58] Hinnebusch, *International Politics*, pp. 9-10.
[59] See e.g. Zahlan, *The Making*, passim.
[60] Korany et al., "The Analysis of National Security", p. 9.

security concerns have gained prominent status on their agendas.[61] In the Gulf, these concerns have mainly related to the rentier economy and its economic sustainability, but in the 2000s, fast economic and population growth elevated the importance of a number of new issues, including food, water and environmental security, all of which also have important foreign policy dimensions. Secondly, it should be recognised that the internal and external politics of Arab states are, as described by Korany et al., interconnected and overlapping. This is caused by their two central characteristics: external vulnerability, caused by the geopolitical setting and international significance of the region, and internal fragility, stemming from the short period of state formation and continuing penetration by outside influence.[62] A similar stance was taken by Katzenstein who argued that the 'externalization' of domestic structures is as important as the 'internalization' of international relations for understanding states' foreign economic policies.[63] This arguably applies to other areas of foreign policy as well, including security, energy and the environment.

Realism typically sees the main sources of threat as external to states; the Iraqi invasion of Kuwait in 1990 and the rising fear over a nuclear Iran support this view. This, however, does not always hold for the small Gulf monarchies, as was shown for example by the mass demonstrations of Bahrain in 2011. It follows that, if domestic regime legitimacy and survival constitute the ultimate interest and aim of the ruling elite, as established in the previous subchapters, internal threats and pressures not only matter but they can override external ones in affecting foreign policy choices. Also, regime survival may at times change the pursuit of national interest into that of personal interest. This argument is also supported by David's theory of omnibalancing;[64] acknowledging the role that regime survival has in foreign policymaking of third-world states, he suggests that 'the most powerful determinant of Third World alignment behaviour is the rational calculation of … leaders as to which outside power is most likely to do what is necessary to keep them in power'.[65] From this it follows that Third World states can be seen as microcosms of international politics because 'the state is often simply the representative of a group that

[61] P. Noble et al., "Conclusion: The Changing Regional Security Environment" in B. Korany et al., *The Many Faces of National Security in the Arab World* (Basingstoke and London: Macmillan, 1993), p. 298.
[62] Korany et al. "Analysis of National Security", pp. 10-11.
[63] In a classical critique of the lack of attention to the domestic environment in analyzing foreign policy Katzenstein argued in 1976, by using the United States and France as case studies, that foreign economic policies are formed as a result of both international effects and domestic structures. P. Katzenstein, "International Relations and Domestic Structures: Foreign Economic Policies of Advanced Industrial States", *International Organization*, 30 (1976), p. 2.
[64] David, "Explaining Alignment", pp. 235-236.
[65] Ibid., p. 235.

holds power in the capital'.[66] In this setting, 'balancing to ensure survival is as critical for groups within states as it is between states'.[67] As Herb has demonstrated, the ruling families of the Gulf monarchies have been exceptionally successful in distributing vast amounts of power among their highest members as well as excluding outsiders from their internal disputes. They have managed to hold tightly on to power while maintaining multiple types of contacts with the society.[68]

Recognising the realist nature of the Gulf system but also that foreign policy is often 'an extension of domestic policy and a reflection of domestic realities',[69] the foreign policy level examination of this study draws from the neoclassical (or neotraditional) realist perspective for the analysis of small Gulf states' foreign policies. Starting from the viewpoint that 'relative material power establishes the basic parameters of a country's foreign policy', neoclassical realists recognise the importance of domestic intervening variables, such as political leaders and elites, their perceptions, 'the strength and structure of states relative to their societies', and also the impact of systemic pressures and incentives.[70] In other words, explanations inclined towards neoclassical realism insist that 'state characteristics and leaders' views of how power should be used intervene between structural constraints and behaviour'.[71] Hence, domestic intervening variables, or decision-makers' perceptions, together with systemic pressures and incentives,[72] are filters through which foreign policies are formulated. Gause supports this view:

> [The Gulf monarchies'] foreign policies, whether dealing with regional challenges like Iran and Iraq or with the United States, can only be understood in terms of their domestic realities—rich countries with small populations and political systems subject to a number of pressures. It is the intersection of domestic realities with international political factors that will determine their oil policies and their political futures.[73]

As Rose has noted on the importance of individuals:

> The international distribution of power can divide countries' behaviour only by influencing the decisions of flesh and blood officials…, and… analysts of foreign

[66] Ibid., p. 239.
[67] Ibid., p. 243.
[68] Herb, *All in the Family*, p. 4.
[69] Baabood, "Dynamics and Determinants", p. 148.
[70] G. Rose, "Neoclassical Realism and Theories of Foreign Policy", *World Politics*, 51 (1998), pp. 146–147.
[71] C. Elman, "Realism" in M. Griffiths, (ed.), *International Relations Theory for the Twenty-First Century: An Introduction* (New York: Routledge), p. 16.
[72] Due to the authoritarian nature of these rentier states and due to climate change not being perceived as a priority issue by GCC states' national populations, state power in foreign policy can be argued to be close to equal to 'national power' (see: Rose "Neoclassical Realism", p. 162).
[73] F. G. Gause, *Oil Monarchies: Domestic Security Challenges in the Arab Gulf* (New York: Council on Foreign Relations Press, 1994), pp. 4-5.

> policy thus have no alternative but to explore in detail how each country's policymakers actually understand their situation.[74]

Although subscribing to a constructivist research agenda, Aarts and Janssen have argued in a partly similar vein that:

> … oil exporting countries are no exception to the rule that national interests are the result of choices made by the elites based on their assessment of the effects, the urgency and the seriousness of both global warming and climate change abatement policies.[75]

The kind of research agenda this approach implies, is of course extremely challenging even in the most democratic of states, let alone in the highly authoritarian Gulf monarchies where key decisions are taken by a small and extremely opaque group of ruling family members, generally leaving students of foreign policy only with official statements and stakeholder accounts on the workings of the 'sheikh's psychology'.

Also, other domestic factors can intervene in the process, as Schweller has described:

> … complex domestic political processes act as transmission belts that channel, mediate, and (re)direct policy outputs in response to external forces (primarily changes in relative power). Hence states often react differently to similar systemic pressures and opportunities, and their responses may be less motivated by systemic level factors than domestic ones.[76]

Following similar thinking, a number of scholars in the field of Middle East politics, including Ayoob,[77] Ehteshami and Hinnebusch,[78] and Nonneman,[79] have argued that the study of the region's states' foreign policies requires attention to the different environments of policymaking. Ayoob has argued that analysis of the national security of all developing world states requires attention to three dimensions, namely the domestic, the regional and the global.[80] For correcting the inadequacies of the realist worldview, Hinnebusch has suggested an inclusion of insights from other IR theories, including

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[74] Rose, "Neoclassical Realism", p. 158.
[75] Aarts and Janssen, "Shades of Opinion", p. 342.
[76] Elman, "Realism", p. 16, quoting: R. L. Schweller, *Unanswered Threats: Political Constraints on the Balance of Power* (Princeton, NJ: Princeton University Press, 2006), p. 6.
[77] M. Ayoob, "Unraveling the Concept: 'National Security' in the Third World" in B. Korany et al., *The Many Faces of National Security in the Arab World* (Basingstoke and London: Macmillan, 1993), p. 31.
[78] R. Hinnebusch and A. Ehteshami, *The Foreign Policies of Middle East States* (Boulder and London: Lynne Rienner, 2002).
[79] G. Nonneman, "Analyzing the Foreign Policies of the Middle East and North Africa: A Conceptual Framework" in G. Nonneman (ed.), *Analyzing Middle East Foreign Policies and the Relationship with Europe* (Oxon and New York: Routledge, 2005), pp. 6-18.
[80] Ayoob, "Unravelling the Concept", p. 31.

structuralism (core-periphery relations), constructivism (supra-state identity) and pluralism (domestic politics, leadership worldviews).[81]

Nonneman calls his foreign policy-analysis framework a theoretically pluralistic, complex model of international politics. He argues that all related explanations must be multi-layered, multi-causal and contextual, and calls for better integration of the national level into the study of international politics.[82] Seeking to establish a middle ground, Nonneman encourages open, but systematic exploration of the different determinants offered by the different schools of IR as well as foreign policy analysis. He cautions against placing excessive emphasis on the role of the international system or the dependencies of developing countries, as realism and structuralism do. Also, domestic factors should not be overemphasised. For Middle Eastern and North African states' foreign policy analysis Nonneman proposes the following method:

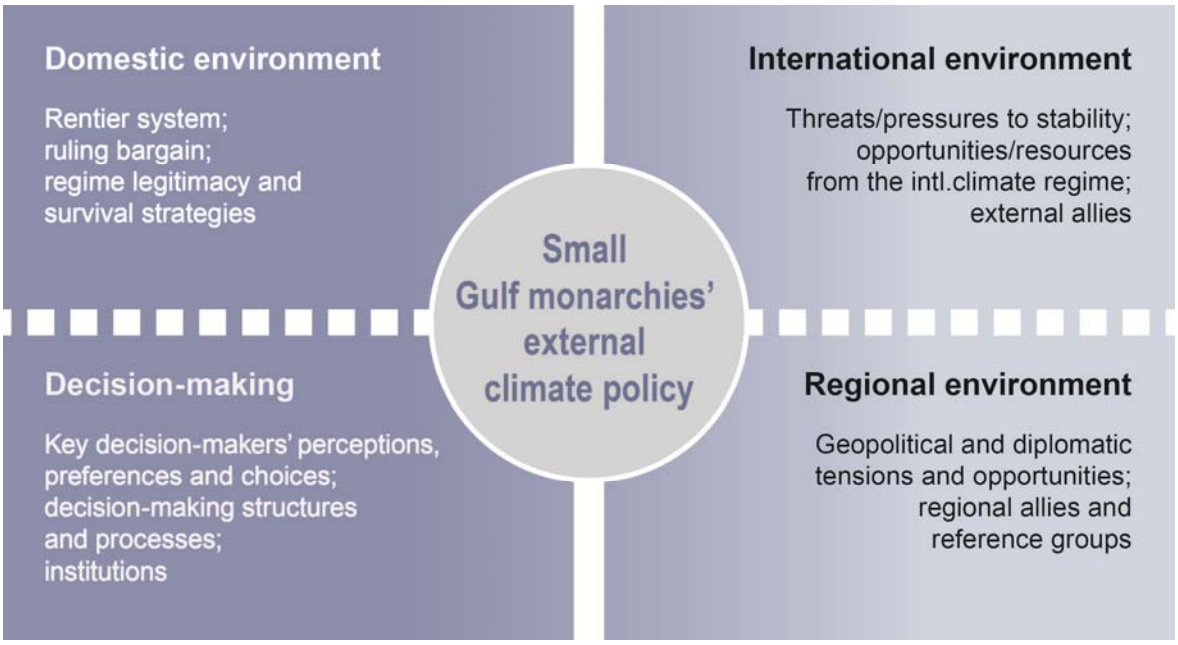
1. Start an interpretation from the domestic environment and the survival imperative of regime and state.
2. View this in the context of the regional environment and transnational ideological factors.
3. Appreciate the overall limiting and enabling effects of the international environment.
4. Take into account decision-making structures and decision makers' perceptions, since particular policy choices are indeed capable of making the sort of difference that cannot be explained by structural factors alone.[83]

A fairly similar approach is offered by Hinnebusch,[84] according to whom the foreign policies of Middle Eastern states can be sufficiently understood only by studying both the determinants (to which decision-makers respond while creating policies) and the structures and processes of foreign policy (which factor the inputs of actors into policies that respond to these determinants)—an argumentation familiar to neoclassical realism.[85]

From this multi-causal, multi-level and theoretically pluralist thinking it is possible to draw the following analytical framework (figure 2.1) for explaining the international climate policies of the small Gulf Cooperation Council (GCC) states:

[81] Hinnebusch, *International Politics*, pp. 1-2.
[82] Nonneman, "Conceptual Framework", pp. 2; 9.
[83] Ibid., pp. 10-11. Quote, p. 10.
[84] Hinnebusch (*International Politics*, pp. 91-93) too divides the determinants of foreign policy into three broad level-based categories: (1) international level and dependency, (2) regional level and geopolitics, and (3) domestic level and identity, adding also (4) decision-making.
[85] Ibid., p. 91.

Figure 2.1. Determinants of external climate policies of the small Gulf monarchies.



The scheme divides the determinants of external climate policy into three levels: domestic (the rentier system, regime survival and legitimacy), regional (geopolitics and diplomacy, allies and reference groups) and international (pressures, resources and external allies). In addition, the decision-making system and the role and perceptions of key decision makers are taken into account. This study seeks to demonstrate that, while the regional and international levels act as important sources of opportunities and constraints that influence policies, it is the rentier structures, elite interests and perceptions, and dynamics of decision-making at the domestic level that have a crucial role in the external-level climate policies of small Gulf states.

2.4 International politics of energy security and climate change

The outcome of the UN Copenhagen climate change conference of 2009 demonstrated that climate change had made its way into international high politics—or the other way around: geopolitics entered the climate agenda.[86] Particularly since the late 2000s, climate change has been a major driver in the international energy economy as both developed and

[86] After the Copenhagen climate conference in 2009, a flood of commentaries appeared announcing the entry of geopolitics in international climate negotiations. See e.g.: R. Falkner, "The New Geopolitics of Climate Change after Copenhagen", *Industry Vision* (World Economic Forum, January 2010).

developing states feel the pressure to mitigate its negative impacts by shifting towards low-carbon economies. Climate change is also increasingly recognised globally as a challenge multiplier that can produce new sources of threats and instability for states. In the largest Gulf oil exporting monarchies, however, the global energy transition has in the past couple of decades been perceived as a more urgent and tangible source of instability than the potential threats of climate change itself. This is because the imminent global shift away from fossil fuels pushes the oil revenue-dependent rentier states to hasten domestic economic diversification towards either alternative sources of external rent or new economic, and consequently, political models.

Different conceptions of energy security

Gulf exporters arguably evaluate energy security in terms of sustained international demand and prices of fossil fuels, duration of domestic reserves, and their availability for both domestic use and export. Regardless of increasing global energy demand, Middle Eastern oil exporters have not managed to regain the leverage they exerted on prices in the 1970s due to increased supply from non-OPEC member states and expansion of alternative resources.[87] In many Middle Eastern states export capacity is affected by diminishing fossil fuel reserves and a simultaneous trend of growing domestic energy consumption, prompted by population and economic growth and social development. Most oilfields in the Gulf area are mature, and non-OPEC exporters Dubai, Bahrain and Oman are coping with falling oil production. On the domestic side, all GCC member states except Qatar face growing domestic gas shortages.[88]

Energy importers, in turn, stress security of energy supply. Since the first international oil shocks in the 1970s, sustainable and secure energy supplies have figured as a central concern in international politics. Since approximately 2003, increasing oil prices led to an unprecedented rise in the global significance of energy security, resulting, according to Giddens, in a 'recognition of the key importance of foreign policy to energy security… and [also] an awareness of the need to integrate energy policy with the struggle to limit climate change'.[89]

[87] See e.g.: Aarts, *The Arab Oil Weapon*. OPEC's share of global oil supply is, however, projected to rise in the coming decades.
[88] U.S. Energy Information Administration (hence: US EIA), *Bahrain*: *Country Analysis Brief* (US EIA, March 2008); US EIA, *Oman*: *Country Analysis Brief* (US EIA, April 2007); Oxford Business Group, *The Report: Dubai* (OBG, 2007), p. 122; *Petroleum Economist* (29 July 2010).
[89] A. Giddens, *The Politics of Climate Change* (Cambridge: Polity Press, 2009), p. 44.

Climate change emerged as an internationally important issue already in the late 1980s,[90] but its rise on the international agenda was significantly accelerated by the four reports of the Intergovernmental Panel on Climate Change in 1990-2007.[91] Since this period, climate change, both as a phenomenon and as a politicised issue of international relations, began having significant foreign policy implications globally, including in some small Gulf monarchies. This emergence also introduced new aspects to both energy politics and the concept of energy security, including: diversification of energy sources, energy efficiency, increasing the share of sustainable and low-carbon energy sources, and reducing carbon dioxide emissions. These new aspects reflected increasing concern regarding the safety of the use of different forms of energy, and their consequences for the earth's climate. It is generally understood that cutting global greenhouse gas emissions to safe levels (under 2°C rise from pre-industrial levels) will require a large range of actions, including increasing the share of alternatives to fossil fuels, decreasing the carbon content of the fossil fuels still used (with the help of technologies), improving energy efficiency, and setting price-driven instruments (taxation or cap-and-trade) to change spending patterns. [92]

The negative consequences of climate change and its mitigation

The majority of international climate scientists agree that climate change is expected to create new kinds of challenges and threats to the stability of states, such as coastal flooding and food and water insecurity.[93] Although it is generally considered that climate change alone cannot cause conflicts, since around 2007, it has been described in Western security literature as a 'threat multiplier' that has the potential to complicate pre-existing problems and instabilities, thereby inducing 'multiple chronic conditions'.[94] As an important indicator of an elevated importance in international relations, climate change was discussed in the UN Security Council, as a result of a British initiative, in April 2007.[95] In June 2009, the UN General Assembly passed by consensus a resolution that recognised that adverse

[90] According to Matthew Patterson since 1988. M. Paterson, *Global Warming and Global Politics* (London: Routledge, 1996), p. 1.

[91] In its fourth assessment report the IPCC declared that 'warming of the climate system is unequivocal' while there is a 90 percent probability that it is anthropogenic, that is, caused by the emission of greenhouse gases by humans. IPCC, *Climate Change 2007*.

[92] See e.g.: European Commission, *Green Paper: A European Strategy for Sustainable, Competitive and Secure Energy*, COM(2006) 105 final (Brussels: 8 March 2006); World Wildlife Fund for Nature, *No Energy Security without Climate Security* (Gland: WWF, July 2006), p. 2.

[93] IPCC, "Summary for Policymakers" in M.L. Parry et al. (eds.), *Climate Change 2007: Impacts, Adaptation and Vulnerability* (Cambridge: Cambridge University Press, 2007), pp. 13-16.

[94] The term was first mentioned in: CNA, *Threat of Climate Change*, p, 6. Since around 2007, climate change has been increasingly perceived as a security issue by scholars and decision-makers, especially in the Anglo-Saxon security community. See also: European Commission, *Climate Change and International Security*, S113/08 (14 March 2008).

[95] UN Security Council, "Security Council holds first-ever debate on impact of climate change on peace, security, hearing over 50 speakers", SC/9000 (17 April 2007).

impacts of climate change could have possible security implications. This time, the initiative came from small Pacific island states that perceive climate change as literally an existential threat.[96] Because of the transboundary nature of the problem, small emitters of greenhouse gases with little historical emissions, including countries in the Middle East, will also suffer from the potential negative consequences of climate change—possibly even more than the major emitters (the United States, the European Union countries, China, Russia, Japan and India). Indeed, the Middle East is considered to be one of the regions in the world most vulnerable to the negative impacts of climate change.[97] The Gulf monarchies' physical vulnerability stems primarily from their already hot, desert-like climate and their concentration of population and infrastructure on low-lying coastal areas.

As a consequence of climate change, average temperatures in the Middle East could rise from current levels by 2.0-3.7°C or 3.2°C by the 2070s, according to the Intergovernmental Panel on Climate Change and the UK Met Office, respectively, while precipitation is generally projected to decrease, albeit with large spatial variability. An increase in extreme temperatures and incidences of extreme weather events are also considered possible.[98]

Expected consequences are, among other things, drought, decreasing availability of water and dwindling agricultural production. Together with the existing stress factors, including the unsustainable use of natural resources (mainly energy and water), population growth, and the region's history of conflict, climate change could precipitate a number of social and economic problems, including: increased electricity and water demand, leading to relative resource scarcity; inter and intra-state tensions over natural resources; declining returns in agriculture leading to internal migration; loss of coastal areas to sea level rise and seawater intrusion leading to significant economic losses and migration; as well as a host of related consequences, such as poverty, unemployment, social instability and radicalisation.[99] In addition to climate change-induced losses,[100] negative economic impacts for Middle Eastern states could also be caused by international mitigation.

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[96] UN General Assembly, *Climate Change and Its Possible Security Implications,* A/63/L.8/Rev.1 (18 May 2009).

[97] World Bank, "Adaptation to climate change in the Middle East and North Africa region", [http://go.worldbank.org/B0G53VPB00]. Accessed on 12 December 2010.

[98] R.V. Cruz et al., "Chapter 10: Asia" in M.L. Parry et al. (eds.), *Climate Change 2007: Impacts, Adaptation and Vulnerability.* (Cambridge: Cambridge University Press, 2007), p. 480; Met Office, *Climate Change and the Middle East* (Met Office, 2009).

[99] O. Brown and A. Crawford, *Rising Temperatures, Rising Tensions: Climate Change and the Risk of Violent Conflict in the Middle East* (Winnipeg: IISD, 2009), pp. 8-18.

[100] Lord Stern asserted that failing to act now will result in several times higher adaptation costs in the future. N. Stern, *The Stern Review: The Economics of Climate Change* (Cambridge: Cambridge University Press, 2007).

Vulnerability in the Middle East is, however, uneven. While the physical impacts may in many cases be relatively homogeneous, some states are in a better position than others to weather the consequences. In the short and medium term, most GCC states are arguably better placed in terms of the strength of the state and economical capability than most of their regional Arab neighbours. The abundance of hydrocarbons translates into assets, such as the availability of cheap energy and large financial assets. These, in turn, can be converted into enhanced adaptation capacity ahead of future climate change-induced challenges, including extreme climatic conditions and increasing water and food insecurity. As long as energy resources and external rent are maintained, the Gulf monarchies will at least in theory maintain their capability to sustain their energy-intensive modern lifestyles (requiring constant air-conditioning and seawater desalination); secure food supply through subsidised local farming and foreign farmland purchases; continue the opulent land manipulation projects; and, generally, keep up a strong state capacity through rent distribution, despite rising temperatures and sea levels.

In addition to these climate change-related instability factors, the internal stability of the oil exporting Gulf monarchies in the coming decades will arguably depend largely on both the international demand for oil and the ability of the local rulers to sustainably diversify their economies away from oil revenue dependence. Evidently, as long as the GCC states rely on a political economy that is based on rentierism, their governments' immediate interest is the maintenance of external revenues. The aim of international climate change mitigation, to drastically cut greenhouse gas emissions, will necessarily (without viable decarbonising technologies) imply a move away from the oil and natural gas that simultaneously function as the Gulf monarchies' main exploitable natural resources, principle export products and key internal stability resources for the local ruling elites. It is therefore only logical that elites in GCC states with vast remaining oil and natural gas resources should perceive global mitigation as an indirect threat to their countries' economic growth and political stability.

Indeed, potential economic losses induced by international climate change mitigation have had the most weight in the considerations of governments in oil export-revenue dependent Gulf monarchies regarding the different types of possible negative consequences of climate change (see chapter 6.1). Although there is not yet concrete evidence of such losses, these have unquestionably constituted the main negotiating issue for the group of OPEC countries in international climate negotiations. The dramatising of this issue, particularly in

the case of Saudi Arabia[101] but also other GCC OPEC member countries (Kuwait, Qatar and the UAE), seems, however, partly contradictory in the light of recent medium-term projections of international energy demand. According to these, despite international mitigation efforts, oil demand will keep growing (albeit slower than in pre-2008 predictions) for at least the coming two, possibly even three, decades (see chapter 3.2). Predicting the long-term price of oil is, of course, impossible, because of the numerous factors at play, such as demand, supply, speculation, and various taxes and subsidies. The global financial crisis that began in 2008 once again brought a reminder of the volatility and unpredictability of oil prices.[102]

The international climate regime[103]

At present, climate change is widely understood as part of the broad global security agenda.[104] It is by nature a transboundary problem, the challenges and threats of which are only indirectly caused by other states. Climate change therefore fits poorly in traditional security thinking, in which threats are military and they are directed at states, caused by other states. Nevertheless, ideas of interest coalitions and the responsibility of some states to act more than others are at the background of all international climate politics. The South-North division and the concept of common but differentiated responsibilities (CBDR), with its different interpretations, form the basis for all international climate negotiations and continue to supply the main tension between states or groups of states in the international climate regime.

Under the United Nations Framework Convention on Climate Change (UNFCCC), countries are divided into historico-geographical groups. The main division lies between the developed and developing countries (according to a classification agreed upon in 1992), with questions of responsibility and equity at its core. The two main groups under the UNFCCC are the Annex I countries, or the industrialised countries and the transition economies that have committed to return their greenhouse gas emissions to 1990 levels,

[101] See: M. Luomi, *Bargaining in the Saudi Bazaar: Common Ground for a Post-2012 Climate Agreement?* FIIA Briefing Paper No. 48 (Helsinki: FIIA, 2009).

[102] Moreover, in the short term, the financial crisis will heavily impact on states' willingness to fight climate change and to adopt international commitments that are expected to impact their competitiveness. After the 2009 Copenhagen climate conference, and the consequent dramatic lowering of ambition and expectations, it seemed increasingly unlikely that the OPEC member states' oil revenues would be significantly cut as a consequence of policies and measures to mitigate climate change during the 2010s.

[103] The international climate regime is defined in this study as the UNFCCC framework, including the Kyoto Protocol and other institutions and fora that seek to multilaterally prevent dangerous climate change. The limit of dangerous climate change is defined as an average global warming of over 2ºC from the pre-industrial levels.

[104] For a groundbreaking article on the broadening concept of security, see: Tuchman Mathews, "Redefining Security", pp. 162–177.

and below, and the Non-Annex I countries, or the countries classified as developing countries, that have ratified or acceded the convention but have lesser commitments towards it. Secondary divisions are constituted by interest groups many of which are regionally based. While the developing countries' umbrella group is the roughly 130-member G77+China group,[105] there are several other formal and informal negotiating groups. As of 2010, the main developing country subgroups were: BASIC (Brazil, South Africa, India and China), AOSIS (Alliance of Small Island States), LDCs (Least Developed Countries), the Africa group, OPEC (led permanently by Saudi Arabia) and the newly-emerged ALBA (the Bolivarian Alliance, led by Venezuela).

For the six Gulf monarchies, in addition to the GCC, the G77+China and the OPEC are the most significant reference groups. OPEC is a generally tightly disciplined group of structurally very different states that has traditionally held sway in the G77+China group on certain specific issues. However, of the GCC states, only Saudi-Arabia, Kuwait, Qatar and the United Arab Emirates are members of the OPEC group. Additionally, the member states of the Organisation of Arab Petroleum Exporting Countries[106] coordinate their positions, with only Oman not belonging in this group. The functioning and relevance of the League of Arab States as an interest aggregate, despite an all-inclusive membership and increasing attempts at coordination, has for the most part been invisible.

Through actively engaging in the international climate regime, states can seek to promote international mitigation and adaptation. Due to the consensus-based negotiating system, they can also act in a way that goes against the majority's interests, or even the common good. It can be justifiably argued[107] that certain OPEC member states have held positions that, if materialised, would effectively block ambitious[108] international climate change mitigation and hinder adaptation in developing countries. It can be argued that particularly Saudi Arabia, but also the other GCC OPEC states, have deliberately aimed at slowing down the negotiations so as to secure the role of oil in the global energy economy. OPEC states have particularly impacted progress on the adaptation agenda by insisting that their demands regarding the negative impacts of international mitigation should be advanced at a similar pace to other issues on the agenda (see chapter 6). The small GCC states,

[105] The Group of 77 was established in 1964 by a corresponding number of developing states. The Group of 77, "About the Group of 77", [http://www.g77.org/doc/index.html]. Accessed on 9 February 2009. China partakes in the group as an associate member.
[106] The OAPEC member states are: Algeria, Bahrain, Egypt, Iraq, Kuwait, Libya, Qatar, Saudi Arabia, Syria, Tunisia and the United Arab Emirates.
[107] See e.g.: Depledge, "Striving for No"; Luomi, *Bargaining*.
[108] Ambitious generally refers to policies and measures aimed at limiting global temperature increase to 2°C.

however, are small emitters and players in the big picture. Limiting the global temperature rise to two degrees will above all depend on the major emitters of greenhouse gases, namely the United States (representing 20% of global CO2 emissions in 2006) and China (with 22% in 2006), but also India, Russia, Japan and the EU.[109]

By the end of 2010, the end of the observation period of this study, many questions relating to ambitious international action to prevent dangerous climate change were still open and lacked a robust political solution.[110] Based on the principle of CBDR, the first commitment period of the Kyoto Protocol (2008-2012) carries greenhouse gas emission reduction commitments for only the most developed, or Annex I countries. The other, non-Annex I parties, are only obliged to monitor and report their emissions. The new agreement is expected to bring new commitments to developing countries, in the form of nationally appropriate mitigation actions (NAMAs), which will be supported with financing and technology from the developed countries. While most pressure has been on major greenhouse gas emitting developing economies China and India, the question of additional commitments for states with a high GDP per capita but currently classified as developing states under the climate convention was debated during the negotiations on the post-2012 treaty.[111] However, due to the small total emissions of most of these countries and low political ambition among the developed states, including the United States' inability, due to its domestic political situation, to sign into any internationally binding agreement to cut greenhouse gas emissions, this issue remained in the margins of negotiations as of 2010.

The oil monarchies' diverging responses

Despite an apparent unity among OPEC and GCC countries in international climate negotiations, these represent different degrees of rentier state and often different leadership interests and perceptions, which in turn have led to different positions in the past; pre-Ahmadinejad Iran, for example, held a more cooperative attitude while Saudi Arabia has generally been against all attempts to move away from fossil fuels.[112] For the two non-OPEC Gulf states, Bahrain and Oman, the potential negative impacts of international mitigation measures on the demand and price for oil are arguably not as relevant as for

[109] World Resources Institute, *Climate Analysis Indicators Tool (CAIT),* Version 8.0 (Washington D.C: WRI, 2010).
[110] These included the meaning of the principles of historic responsibility and equity; the division of labour among the developed and developing states in determining the corresponding commitments; an efficient framework for global mitigation, adaptation, financing and technology transfer; and the actual concrete roadmap for the implementation of the post-2012 regime of international climate politics.
[111] H. Al Mulla, "Post 2012 Kyoto Protocol Climate Change Negotiations: Issues and Strategic Challenges to Qatar", paper presented at *the 7th Natural Gas Conference*, Doha, 10-12 March 2009.
[112] Aarts and Janssen, "Shades of Opinion", p. 384.

their wealthier neighbours whose fossil fuel reserves are expected to last for several decades, even centuries, at current production rates. Due to their lower adaptation capacity, Bahrain and Oman could arguably benefit more from the advancement of the broader agenda than ensuring there is a mechanism for compensation for any future losses in hydrocarbon revenue. For the latter ones, oil-rich Abu Dhabi and Kuwait and gas-rich Qatar, the status of oil and natural gas in the global energy economy remains crucial. Due to these structural realities (different levels of wealth and reserve size), dissimilar domestic responses and international policy positions were expected to appear in the small Gulf monarchies during the period of writing this study (2008-2010), as climate change climbed towards the core of international relations—and indeed they did.

However, as the responses of structurally very similar Abu Dhabi and Qatar confirm, this kind of a structural explanation does not suffice to provide an explanation of their respective responses and their divergence, both in substance and intensity. What remains to be determined by this study are the factors that caused the observed convergence and divergence in state responses to the challenges of energy security, environmental sustainability, and climate change and its international mitigation. As will be demonstrated, in addition to structural factors, a range of other domestic factors, including decision-making elites with different perceptions and future visions, and distinct domestic institutional settings and dynamics, go a long way in explaining the domestic responses of these small Gulf monarchies to the issue of climate change. In addition, as will be shown, regional and international factors, including reference groups and regional and external allies, should not be forgotten either, as these can play an important role in conditioning responses, particularly at the external level.

3 The small Gulf monarchies and the emerging energy paradigm

This chapter demonstrates the increasing complexity of the internal and external pressures challenging the small Gulf monarchies' stability and sustainability, which intensified particularly in the 2000s as high oil prices brought about a rapid accumulation of wealth, growth, population and, as a consequence, a series of natural resource-related challenges. The main focus is on the quantifiable indicators of the factors affecting the economic and political stability of the small Gulf monarchies in relation to and in interaction with the ongoing global shift towards a new energy paradigm. These include societal factors (the geopolitical environment and demographics), economic factors (dependence on fossil fuel revenues), and energy security-related factors (global demand and price of oil/gas and domestic energy security). Climate change, to which the states themselves contribute, brings in an additional layer of physical, social and economic challenges that may exacerbate existing vulnerabilities.[1]

3.1 Political economy[2] and stability

Subregional geopolitics (external environment)

The most concrete shared characteristics of the small Gulf states' external environment relate to their geopolitical circumstances, most importantly, geographic location, size of territory and source of external security. In geostrategic terms, the five states are located in one of the world's most volatile subregions, the security environment of which has undergone several changes during the last decades.[3] Energy resources play a key role in the geopolitics of the subregion. The Gulf has endured three major wars during the last three decades, all of which have involved considerations of energy security and either the direct or indirect participation of major international actors.

[1] Globally aggregated statistics (from sources such as the World Bank or the IEA) generally represent a two year lag, which is why data in some cases was only available up to 2008.
[2] In this study, political economy is understood as the interrelationship and functioning of political and economic structures and processes within and among the states and their federal subunits.
[3] See e.g.: Pollack, "Securing the Gulf", pp. 2-16.

Despite the small territories, from tiny 694km^2 (Bahrain) to relatively small 309,500km^2 (Oman),[4] which are easier to defend, the 'immutable effects of geography and demography—small populations, in some cases vulnerable borders, and valuable natural resources—combine with [the states'] domestic realities' creating a diplomatic style 'characterised by reliance on politics of balance and manoeuvre to maintain security'. This style includes evading direct confrontation and becoming over-identified with a regional power in the fear of either provoking other neighbours or turning this power into a security threat, as Gause has noted.[5] Owing to these vulnerabilities and the realities of the regional security system (the need to cope with three large neighbours: Iran, Saudi Arabia and Iraq), all five small Gulf monarchies have externalised their de facto national defence to the United States and other Western powers.[6]

Since the 1970s, the subregional security constellation has been determined by the Saudi Arabia-Iran-Iraq triangle, with the United States as the only external power who 'concretely influences the security, politics and objectives of regional players'.[7] The continued flow of oil from the region to the world is a key factor in short-term global energy security and assures price stability, as around 40% of the world's traded oil passes through the narrow Strait of Hormuz.[8] Of the other major external actors, the European Union and individual member states, such as the UK and France, have long been primarily economic players in the region, and their capability to use even soft power is debatable. So far, China and Russia, the two main contesting powers, have not shown willingness to challenge the US role as the regional policeman. China, despite many predictions based on its recent policies in Africa, has not tried to expand its political or, even less, military presence in the Gulf.[9] The scale of expansion in trade relations between China and the GCC has, however, been rapid: a seven-fold growth from 2000 to 2006, when total capital flows were US$32bn, although the volumes still continued to be less than GCC-United States trade, US$72bn the same year. The main article of trade between the Gulf and China is energy: in 2008 China imported around 50% of its oil from the six Gulf states and the IEA predicted that this share would rise to 70% by 2015. In 2008, the United States

[4] Kuwait: 17,818 km^2; Qatar: 11,000 km^2 and the UAE: 83,600 km^2. United Nations, *United Nations Common Database*. Updated on 19 December 2007. Accessed through ESDS International, University of Manchester on 3 December 2008.
[5] F. G. Gause, *Oil Monarchies*, p. 121.
[6] M. Yaffe, "The Gulf and a New Middle East Security System", *Middle East Policy* 11 (2004), pp. 123-124.
[7] R. Aliboni, *Europe's Role in the Gulf: A Transatlantic Perspective.* Gulf Paper (Dubai: Gulf Research Center, 2006), p. 8.
[8] A. H. Cordesman, *Iran, Oil and the Strait of Hormuz* (Washington D.C.: CSIS, 2007), p. 2.
[9] But cf. B. Simpfendorfer, "China's historic return to the Gulf", *The Middle East Channel blog*, Foreign Policy (2 April 2010), [http://mideast.foreignpolicy.com/posts/2010/04/02/china_s_historic_return_to_the_gulf].

imported only 20% of its crude oil from the GCC.[10] Bilateral memoranda of understanding (MoUs) and cooperation agreements between the Gulf monarchies and the United States in the area of nuclear energy, since 2008,[11] have demonstrated US willingness to maintain its stakes in the region's energy (geo)politics, but European powers, Russia, and other nuclear suppliers are increasingly competing with US interests in this area. Indicators of this have been the numerous bilateral MoUs and agreements signed between these and the GCC states, as well as the Korean-Emirati nuclear deal of 2009.[12]

As long as rent is present, shared economic interdependencies are arguably among the most efficient security guarantees for the local rulers against both external and internal stability threats, as the case of US-Saudi relations has aptly demonstrated. Gulf monarchs therefore actively seek to engage a number of external players, in multiple ways, in the region's energy sector—and increasingly in the emerging non-oil sectors as well. This omnibalancing has been employed by Abu Dhabi and Dubai in their oil and gas sectors (through multi-stakeholder joint ventures) and later by Qatar in its LNG sector (see chapters 4.1.2 and 5.1.1).

Fossil fuel-based economy and demographics (internal environment)

The small Gulf states' enduring dependence on fossil fuel revenues and their demographic imbalances constitute the two most important instability factors for the local rentier bargains. Estimates on the size and duration of oil and gas reserves, as well as their importance for the economy, give an indication of the rent allocation potential of the monarchies in the future. In addition to hydrocarbons, other external sources of rent, such as land (military bases and real estate developments), capital inflows (direct investment), and portfolio investments (deposits, bonds, stocks, real estate etc.), are increasingly important for the continuation of rentierism in all small Gulf monarchies, Dubai being the prime example.

[10] K. H. Teslik, *China-Gulf Economic Relations.* Backgrounder (Council on Foreign Relations, 4 June 2008).
[11] See e.g.: IISS, *Nuclear Programmes in the Middle East: In the Shadow of Iran*, IISS Strategic Dossier (Hastings: International Institute for Strategic Studies, 2008), pp. 48; 53.
[12] See e.g.: ibid., p. 51; 53; *Gulf News* (15 January 2008); (27 December 2009); *UPI* (22 September 2010).

Table 3.1. Indicators of wealth and rentierism in small Gulf monarchies (I).[13]

	Proven oil/gas reserves of world total (%, 2009)	**Share of oil and gas revenue of govt. revenue** (%, 2008)	**Share of fuel exports of merchandise exports** (%)	**Share of fuel revenue of GDP** (%)	**Est. duration of oil reserves** (yrs, current prod. rates)
Bahrain	Negligible/>0.05	85	81 (2007)	60 (2007)	15
Kuwait	7.6 / 1.0	77	96 (2007)	53 (2007)	112
Oman	0.4 / 0.5	88	87 (2008)	54 (2008)	19
Qatar	2.0 / 13.5	57	91 (2007)	54 (2007)	(gas: 284) 55
The UAE	7.3 / 3.4	80	65 (2008)	59 (2008)	103
- Abu Dhabi	7.0 / 3.2	n/a	n/a	n/a	ca. 100
- Dubai	0.3 / 0.1	–	–	5 (2007)	n/a

As table 3.1 shows, all five states demonstrate a high level of economic dependence on external rent and their governments receive a high share of their revenues from external rent, clearly over the 40% limit set by Luciani. Hence, all can be classified as rentier states, albeit with degrees of difference: the three OPEC members, Qatar, Abu Dhabi and Kuwait, have the wealthiest populations (see table 3.2) and the vastest hydrocarbon reserves, both in size and longevity. Coupled with their small national populations, they can hence be characterised as strong rentier states. Significantly, the other six UAE emirates (most of which never had much oil), Bahrain and Oman are already struggling with declining oil and gas revenues and are thus on the verge of becoming post-rentier states.

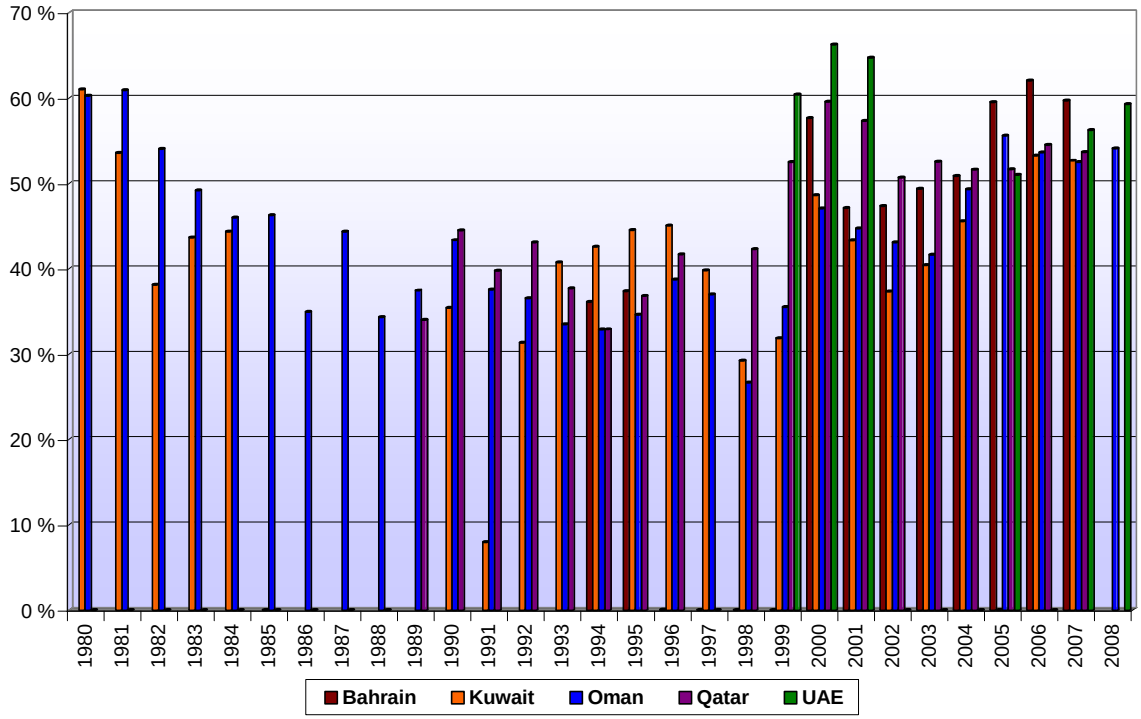
Although oil production in the five states began at different times: first in Bahrain (1933) and last in Oman (1967),[14] it has acted as the most important contributor to GDP growth during the past decades, as figure 3.1 demonstrates. In the 2000s, due to rising oil and natural gas prices, GDP growth was particularly fast in Qatar, 8.8% per year in 2001-2006, but also in the other monarchies, on average 5.1% per year in 2000-2008.[15]

[13] Nb. Official government figures on the total reserve size are not totally reliable. Oil and gas reserve and duration: BP, *Statistical Review of World Energy.* June 2010 Edition. Abu Dhabi and Dubai: US EIA, *United Arab Emirates: Country Analysis Brief* (US EIA, November 2009). Reserve duration for Bahrain: EIU, *Bahrain: Country Profile 2008* (London: EIU, 2008), p. 32. Government revenue: D. Losman, "The Rentier State and National Oil Companies: An Economic and Political Perspective", *The Middle East Journal* 64 (2010), p. 428. Economic statistics (latest available used): World Bank, *World Development Indicators*, September 2010 edition. For Dubai: International Monetary Fund (hence: IMF), *United Arab Emirates: Statistical Appendix 2009*.

[14] Kuwait and Qatar in 1949 and Abu Dhabi in 1962 (first of the to-be-UAE). Hudson, *Arab Politics,* pp. 187; 194; 204; Kéchichian, *Power and Succession*, p. 69; C. Davidson, *Abu Dhabi: Oil and Beyond* (London: Hurst, 2009), p. 50.

[15] World Bank, *World Development Indicators.* Average growth rates calculated based on years listed in the database: Bahrain: 5.3%; Kuwait: 4.7%; Oman: 5.4%; and the UAE: 5.0%.

Figure 3.1. Share of fossil fuel revenues of GDP in the small Gulf states 1980-2008.[16]



Despite diversification efforts, the relative share of fossil fuel revenues in the GDP kept rising throughout the 2000s, owing to the price boom. As a result of this high dependence, the economies have also been highly vulnerable to the price oscillations of oil, as figures 3.2 and 3.3 illustrate for the cases of the UAE and Qatar.

[16] Ibid. Note: data for several years/countries n/a. Clearly erroneous data (e.g. rates of 0.0-0.3% for Bahrain in the 1980s) have been omitted. Data reliability issues should be kept in mind, as discussed in the introduction.

Figure 3.2. GDP of the UAE and OPEC reference basket prices 1982-2008.[17]

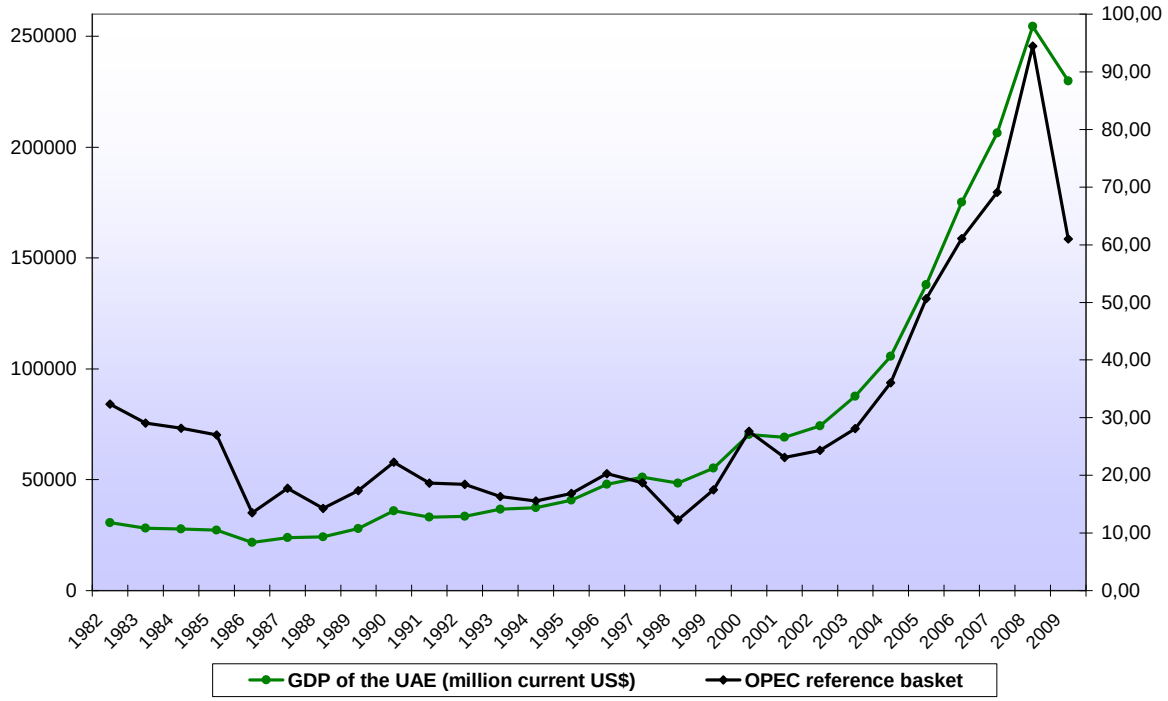
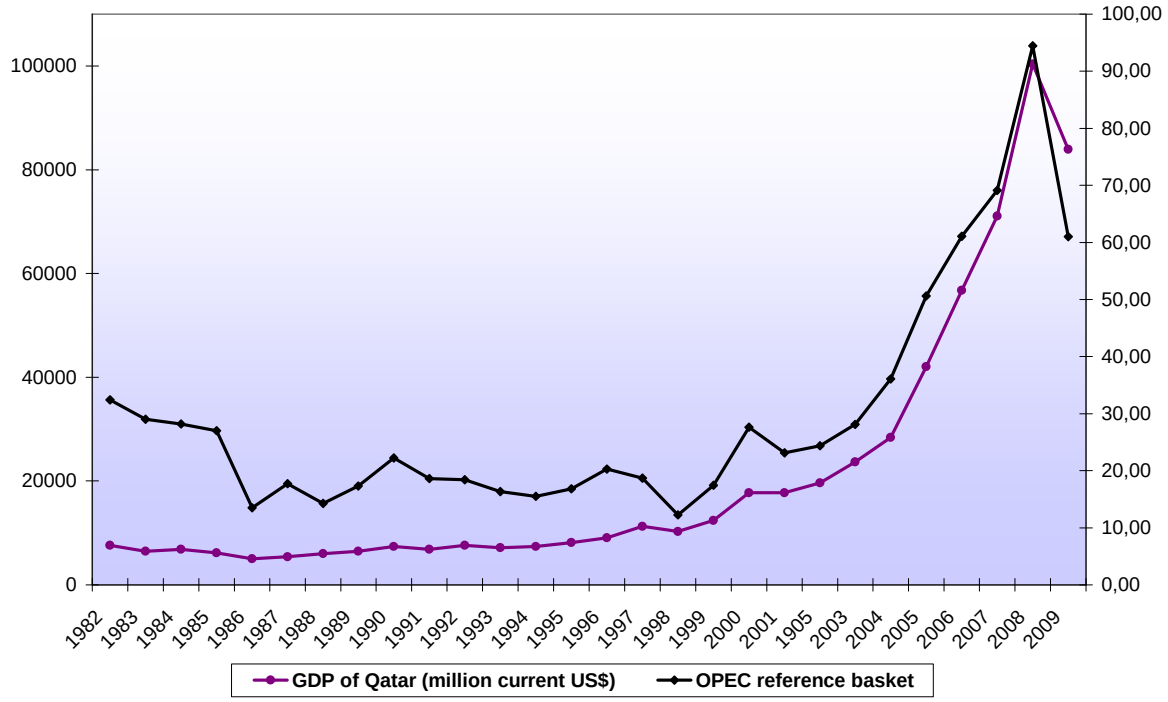


Figure 3.3. GDP of Qatar and OPEC reference basket prices 1982-2008.[18]



[17] Oil prices in US$. OPEC, *Annual Statistical Bulletin 2009*, [http://www.OPEC.org/library/Annual%20 Statistical%20Bulletin/interactive/2009/FileZ/Main.htm]. Accessed on 15 December 2010. OPEC data on the reference basket is available only from 1982.
[18] Ibid.

The global economic downturn that started in late 2008 was also a stark reminder of the vulnerability of attempts at diversification into non-oil sources of rent. In addition to seeking to diversify their economies into non-oil sectors, governments of the small Gulf monarchies have relied on sovereign wealth funds, with estimated total assets of close to US$1 trillion (2010),[19] as buffers in helping sustain the rentier economies over periods of low or negative growth. While the simultaneous global financial crisis and the consequential decline in oil prices are estimated to have made a large dent in both the oil revenue and sovereign assets of Abu Dhabi, Qatar and Kuwait—with sovereign wealth losses alone estimated at 36-41% between 2007 and 2008[20]—, Dubai, often hailed as the most diversified of the Gulf economies, was still the worst hit. As the case of Dubai pointedly demonstrated, as long as the economy is dependent on external revenue with a volatile price, the rentier bargain, and consequently the political legitimacy and independence of the leadership, is at stake.

With small total populations, ranging roughly from 1 to 5 million, and even smaller national populations, estimated between 0.2 and 2.2 million (see table 3.2), the total GDPs of the small GCC states are relatively small on a global scale. Their GDP per capita figures (PPP), however, rank mostly among the highest in the world, with the three OPEC member states Qatar, Kuwait and the UAE at the top end, and Bahrain and Oman close to the EU average of US$29,700 in 2009, according to the IMF.[21] As table 3.2 shows, due to Abu Dhabi's oil wealth its GDP per capita is almost as high as Qatar's. These figures naturally do not reflect the average GDP per capita of the nationals, which can be several times higher.[22]

[19] Sovereign Wealth Fund Institute, "Rankings".
[20] B. Setser and R. Ziemba, *GCC Sovereign Funds: Reversal of Fortune*. CFR Working Paper (Council on Foreign Relations, Center for Geoeconomic Studies, January 2009), p. 2.
[21] IMF ranking: Qatar: 2; Kuwait: 14; the UAE: 15; Bahrain: 32; and Oman: 35. IMF, *World Economic Outlook*, October 2010 edition.
[22] Davidson estimated in 2006 the Emiratis' GDP/capita as 3 times the total GDP/capita. C. M. Davidson, "After Shaikh Zayed: The Politics of Succession in Abu Dhabi and the UAE", *Middle East Policy* 13 (2006), p. 42.

Table 3.2. Indicators of wealth and rentierism in small Gulf monarchies (II), estimates.[23]

	Total population (millions, 2010)	**National population** (share of total)	**GDP per capita, PPP** (current intl. dollars, 2009)	**GDP** (US$m, 2009 [ranking])	**Annual population growth rate** (average 2000-2009)
Bahrain	(2008) 1.107	51% (2007)	27,214	21,900 [93]	2.4%
Kuwait	3.566	31% (2008)	37,849	148,020 [49]	2.6%
Oman	2.968	81% (2010)	25,635	60,300 [65]	1.9%
Qatar	1.647	14% (2009)	78,260	71,040 [60]	8.7%
The UAE	(2008) 5.060	17% (2007)	36,843	261,350 [33]	1.4%
- Abu Dhabi	(2009) 1.643	25% (2009)	(2007) 73,000	148,763 [–]	(1995-2005) 4,0%
- Dubai	1.896	5% (2007)	(2007) 41,750	n/a	n/a

The share of expatriates of the total population in all monarchies is also extremely high; independent estimates rising as high as over 95% in Dubai (see table 3.2). As a result of high economic growth in the 2000s and the small size of the national workforce, population in the five states grew at record speed throughout the decade, particularly in Qatar, where average growth was estimated at close to 9% per annum.[24] As a forward comparison, should Qatar's total population continue grow at a similar pace, it would reach four million by 2020. In the case of the UAE, different government agencies' estimates differ widely, some suggesting an annual population growth of over 10% between 2005 and 2009.[25] Although most population growth comes through immigration, and is therefore highly volatile, fertility rates are still relatively high in the monarchies, estimated at 1.94-3.04 in 2008[26]—although in decline among nationals.

[23] On reliability of demographic data, see chapter 1. Total population data: Central Bank of Bahrain, *Statistical Bulletin*, September 2010 issue; Central Bank of Kuwait, *CBK Quarterly Statistical Bulletin*, September 2010 issue; Central Intelligence Agency, *The World Factbook. Oman 2010,* [https://www.cia.gov/library/publications/the-world-factbook/geos/mu.html]; Qatar Statistics Authority, "Total Population, 30 Nov 2010", [http://www.qsa.gov.qa/eng/index.htm]; National Media Council, *UAE Yearbook 2010* (Abu Dhabi, 2010), p. 146; Statistics Center - Abu Dhabi, *Statistical Yearbook of Abu Dhabi 2010* (SCAD, 2010), p. 17; 23; 126 (also Abu Dhabi nationals' share, population growth and GDP); Dubai Statistics Center, "Population Clock", [http://www.dsc.gov.ae/en/pages/home.aspx]. All sources accessed on 8 December 2010. Nationals' shares: EIU, *Bahrain: Country Profile 2009* (London: EIU, 2009), p. 2; EIU, *Kuwait: Country Profile 2008* (London: EIU, 2008), p. 11; Central Intelligence Agency, *The World Factbook. Oman* 2010; EIU, *Qatar: Country Profile 2009* (London: EIU, 2009), p. 15; EIU, *United Arab Emirates: Country Profile 2008* (London: EIU, 2008), p. 12. GDP: World Bank, "Gross domestic product 2009", [http://siteresources.worldbank.org/DATASTATISTICS/Resources/GDP.pdf]. Updated on July 2010. GDP per capita: IMF, *World Economic Outlook*; IMF, *United Arab Emirates: Statistical Appendix 2009.* IMF Country Report No. 09/120. Population growth rates: World Bank, *World Development Indicators.*

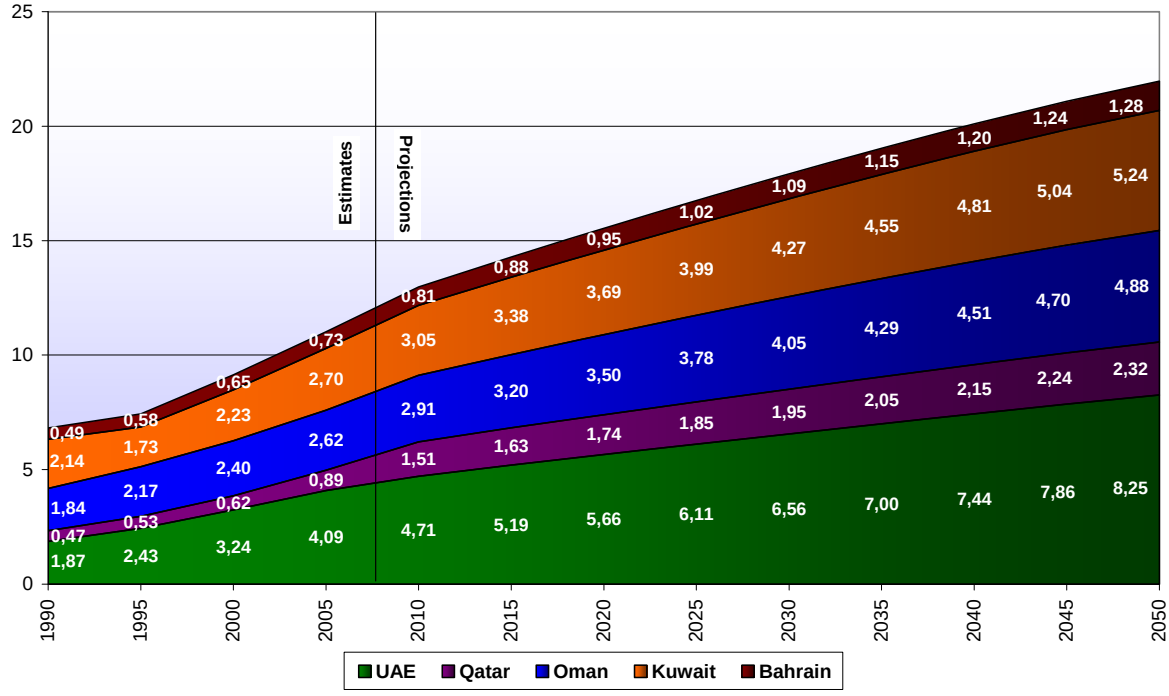
[24] World Bank, *World Development Indicators*. In the 2000s, global average growth was 1.2% and in non-OECD high income countries 1.4% per annum.

[25] *Gulf News* (6 October 2009a).

[26] World Bank, *World Development Indicators*.

Figure 3.4 illustrates recent UN population statistics and post-financial crisis population scenarios for the five states up to 2050. While the future projections are partly outdated and in most cases possibly overly modest, the population estimates for 1990-2008 show the consequences of the combination of small national populations, economic growth and aggressive diversification plans for total population growth.

Figure 3.4. UN population projections for the small Gulf states 1990-2050, millions.[27]



Population growth is a key factor threatening the continuation of the allocative state system and the power of the ruling elite. This happens through the growth of the national population (often combined with rising or sustained expectations of nationals regarding welfare benefits), the extension of welfare benefits to non-nationals, nationalisation, and growing total energy and water demand. Population growth is also closely linked to domestic energy security, which is becoming increasingly eroded in most of the monarchies.

Partly overwhelmed by the large influx of immigrants, partly as a result of failing labour nationalisation and job creation policies, the small Gulf monarchies' governments are currently struggling with numerous demographic imbalances, which hinder economic and

[27] From 2009. Due to the problems of demographic statistics, the contribution of the UN estimates is mainly suggestive. United Nations, *World Population Prospects: The 2008 Revision* (New York: UN DESA, Population Division, 2009). Updated in 18 June 2009. Note: Medium variant estimates used for projections 2010-2050.

social development efforts in all five monarchies. Such hindrances include a high level of dependence on foreign workforce, particularly in the private sector; a bloated and expensive public sector employing mostly nationals with high salaries and demonstrating generally poor levels of productivity (and reliance on foreign consultants); high unemployment among nationals, particularly women, and high expectations regarding employment and career advancement; and a low-performing education sector. Harry attributes these problems to the rentier state, pointing out that excessive reliance on external rent for economic development at the expense of human resource development has proven not to be a successful strategy.[28]

There are a number of strategies the governments have employed to safeguard the allocative system and the state-citizen rentier bargain. Firstly, relating to the national population, the governments have limited the right to citizenship to nationals and have discouraged—even prohibited—marriages between Gulf nationals and other nationals.[29] The governments have also encouraged nationals to have more children by providing different kinds of welfare benefits and other subsidies.[30] While these strategies of positive eugenics could in some monarchies carry the risk of eventually running counter to the goal of preserving the small size of the local rentier elite, natality statistics indicate otherwise: natality among Emiratis, for example, has been declining rapidly during the past decades due to later marriages and increasing education among women, among other reasons.[31] In their official discourse, local governments portray themselves as actively seeking to lower the share of non-nationals. As Kapiszewski has noted, '[t]he presence of a large number of expatriates constitutes… a major threat to the stability of the GCC countries; it endangers the culture, influences the structure of society and, furthermore, has an impact on the foreign policy'.[32] However, arguably, the marginalisation of nationals can also contribute to the ruling elites' survival in power by reducing political reform pressures, as political liberalisation would inevitably entail a debate on the political rights of non-national long-term residents.

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[28] W. Harry, "Employment Creation and Localisation: The Crucial Human Resource Issues for the GCC", *International Journal of Human Resource Management*, 18 (2007), pp. 134; 142.
[29] See e.g.: *Gulf News* (24 August 2010).
[30] A good example is the UAE's Marriage Fund.
[31] According to the market research firm Euromonitor, the fertility rate fell by two-thirds in 1980-2010, standing at 1.87 in 2010. Quoted in: Yahoo News Maktoob (13 April 2010). See also: M. Al Awad and C. Chartouni, *Explaining the Decline in Fertility among Citizens of the G.C.C. Countries: the Case of the U.A.E.* [http://www12.georgetown.edu/students/caa26/Carole_Chartouni_Paper3.pdf] Accessed on 8 December 2010.
[32] A. Kapiszewski, *Arab versus Asian Migrant Workers in the GCC Countries,* UN/POP/EGM/2006/02. Paper presented in a meeting of the UN Population Division (22 May 2006), p. 11.

Secondly, in theory at least, the governments retain a strong ability to manipulate the share of non-nationals in the total population. Existing restrictions include the kafala system, the rotation system for certain categories of workers, and restrictions on naturalisation and the citizenship rights of those naturalised.[33] However, the segmentation of the labour market and the economic diversification imperative effectively nullify the states' ability to curb the growing demographic imbalance, which is led by the influx of construction and service sector employees from Asia and the Middle East. The labour nationalisation policies that started in the 1980s[34] and have aimed at increasing the share of nationals in the private sector have so far been largely unsuccessful in all five states. An estimate from 2007 placed the share of foreign workers at 55-90% of the total workforce and at a 'very high percentage' in the private sector.[35] Government is still a major employer of nationals: in the mid-2000s, government salaries made up over 10% of the GDP in most of the GCC economies. Also, lack of functionality (or producing the right skills and attitudes) in the educational systems, high salary expectations and the rentier mentality that has eroded the work ethic of nationals are listed as major reasons for the failure.[36]

Thirdly, the employment of nationals figures as a core element in the current medium and long-term plans of at least Bahrain, Oman, Qatar and the emirates of Abu Dhabi and Dubai. These plans include related tools, such as workforce nationalisation policies, and goals, like increasing the skills and productivity of the national population (in most cases through employment in the private sector, and ensuring the general welfare of the citizens.[37] The World Bank estimated that in 2009 around 16-31% of the population in the five states were less than 14 years old.[38] The UAE census of 2005 calculated the share of nationals under 20 at over 50%.[39] A study from 2004 estimated youth unemployment at as high as 49% in Oman, 21% in Bahrain and 12% in Qatar, where 50% of young women

[33] Kapiszewski, *Arab versus Asian,* p. 4.
[34] J. Chalcraft, *Monarchy, Migration and Hegemony in the Arabian Peninsula.* Research Paper No. 12. (London: LSE, 2010), p. 26.
[35] Harry, "Employment Creation", pp. 133; 139.
[36] Ibid., pp. 134-136.
[37] Bahrain Economic Development Board, *From Regional Pioneer to Global Contender: The Economic Vision for 2030* (2008), p. 7; General Secretariat for Development Planning, *Qatar National Vision 2030* (July 2008), pp. 18; 29; Ministry of National Economy of Oman, *Second Long Term Development Strategy 1006-2020)* (2008); Government of Abu Dhabi, *The Abu Dhabi Economic Vision 2030,* Context and Executive Summary (2008), pp. 5-7; 13; Government of Dubai, *Dubai Strategic Plan 2015: Highlights* (2007), p. 22.
[38] Bahrain: 26%, Kuwait: 23%, Oman: 31%, Qatar: 16% and the UAE: 19%. World Bank, *World Development Indicators.*
[39] *MEED* (8 September 2006).

were unemployed.[40] The continual failure to create meaningful employment for the growing national population, including the women that are now increasingly entering the labour market, is not only detrimental to the economy but is also a major potential domestic stability issue for the local regimes, as unemployment renders citizens unsatisfied. Here, economic diversification and labour nationalisation link directly to political stability.

Reform pressures and state strategies

A further instability factor for the small Gulf monarchies, from a regime survival perspective, is pressure for political and economic reforms, which can originate both from the domestic and external environments. So far, the ability of the states to resist these pressures and avert especially political reforms has been relatively strong due to the combination of abundant rent allocations and the skilful application of immaterial legitimacy resources and strategies towards the national populations.

After the regional economic and political liberalisation wave of the 1990s and early 2000s, the latter part of the 2000s passed with only few electoral reforms in the small Gulf monarchies, with the partial election of the UAE's Federal National Council and Kuwait's electoral reform in 2006 as the only more salient positive examples.[41] Wright has described liberalisation efforts up to the mid-2000s as 'controlled elite driven reforms' that are gradual and long-term in character. He has underscored that 'the strategic objective of these reforms is to maintain the ruling elite's privileged position without a clear reliance on coercion'. Typically, the impetus for reforms has been—at least until 2011—the transition of power to a new member of the ruling family.[42] Indeed, the rulers of the GCC states have used these gradual reforms as 'political decompression' that, as argued by Nonneman, are aimed at creating 'liberalised autocracies' at most.[43] As a result, by the end of 2010 a genuine democratisation process had not been initiated in any of the GCC states.[44]

Despite the high GDP per capita rankings, there are persistent, or even increasing, social and political inequalities faced by foreign workers in all five states and most of the local

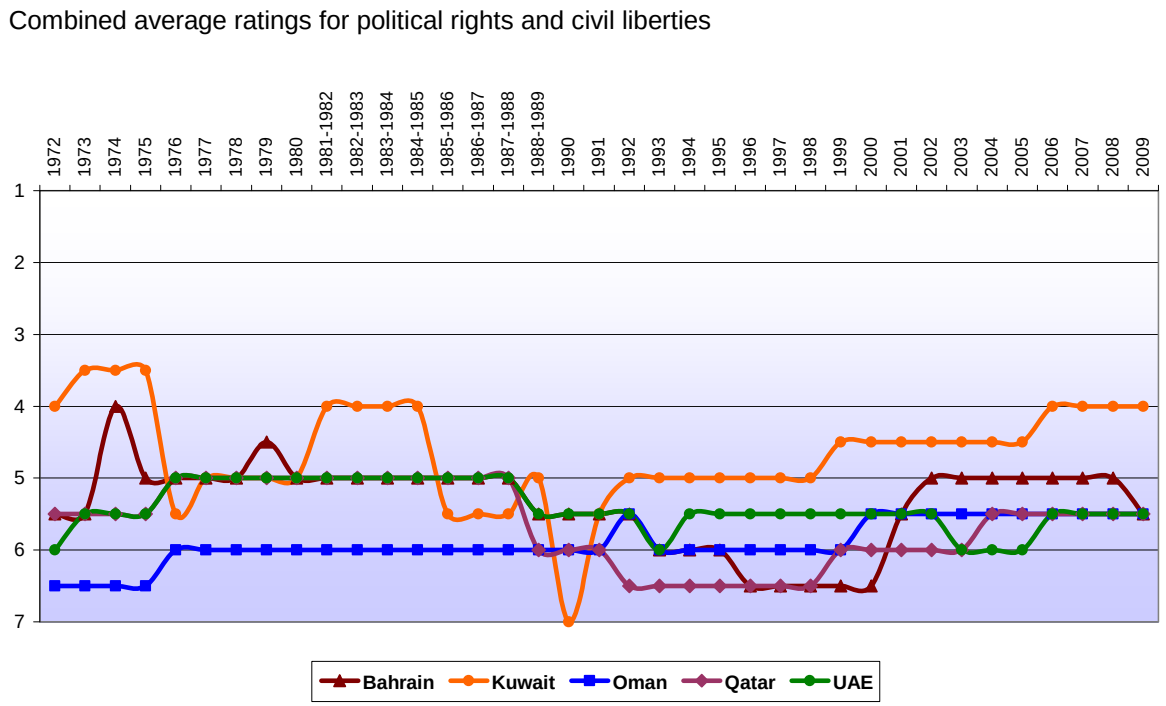
[40] ESCWA cited in: Harry, "Employment Creation", pp. 134-136. Data for Kuwait and the UAE n/a. Female data stated only for Qatar. Governments have different definitions for 'youth', the most common being 15-24 years.
[41] Ehteshami and Wright, "Political Change", pp. 917; 929.
[42] S. Wright, *Generational Change and Elite-Driven Reforms in the Kingdom of Bahrain.* Durham Middle East Papers. Sir William Luce Publication Series, No. 7, pp. 11; 25.
[43] Nonneman, *Political Reform*, pp. 31; 37.
[44] Ehteshami and Wright, "Political Change", p. 930.

Shia in Bahrain.[45] In the absence of data on GINI coefficients, it is impossible to quantify the obviously extremely high social inequalities between nationals and the low-wage construction labourers. Despite the repeated criticism from human rights organisations regarding the conditions of migrant workers,[46] all five states rank in the high or very high human development category of the UNDP's human development index.[47]

Despite the wealth and high levels of human development, the political systems of the small Gulf monarchies can presently be classified as either authoritarian or semi-authoritarian at most. In Freedom House's Freedom in the World index for 2009, Kuwait was classified as 'partly free' while all other monarchies were ranked as 'not free'. The historical scores in figure 3.5 show two things: firstly, the level of 'freedom' has not increased since the 1970s. Secondly, although undoubtedly oil hinders democracy, as found by Ross,[48] in the case of the small Gulf states, the price of oil has not correlated inversely with the level of democracy, as suggested by Friedman.[49] This mainly serves to demonstrate the intricate nature of the local rentier bargains and the number of other intervening factors.

[45] International Crisis Group, *Bahrain's Sectarian Challenge*. Middle East Report No. 40, (6 May 2005), p. 7.
[46] See e.g.: Human Rights Watch, *World Report 2010* (New York: HRW, 2010).
[47] Very high: Bahrain, Qatar and the UAE; high: Kuwait. Oman's newest HDI score (high) is from the 2008 report. UNDP, *Human Development Report 2010: The Real Wealth of Nations* (New York: United Nations Development Programme, 2010), pp. 143-144.
[48] M. Ross, "Does Oil Hinder Democracy", *World Politics* 53 (2001), pp. 325-361.
[49] T. Friedman, "The First Law of Petropolitics", *Foreign Policy*, May/June (2006), pp. 28-36.

Figure 3.5. Freedom in the World Index for the small Gulf states 1972-2009.[50]



Importantly, the authoritarian system has a number of consequences for environmental governance and policymaking since the concentration of decision-making powers in the hands of a small political elite can function either as a hindrance or as a catalyst.[51] If an issue is perceived to be in the interests of top decision-maker(s), the launch of a policy or plan and its implementation can be very fast and effective. In the Gulf, concrete examples of this are the pre-2008 'Dubai model',[52] Qatar's LNG infrastructure projects and, seemingly also Abu Dhabi's nuclear energy programme. In an opposite case, a lack or loss of interest on behalf of individual top leaders can lead to grandiose plans remaining as plans, or decisions getting stuck in government agencies indefinitely—as happened with Dubai's green building legislation in 2008—or suffering important delays or downscaling—such as in the case of Abu Dhabi's awaited energy policy and its Masdar City (2009 onwards).

[50] Freedom House, "Freedom in the World Comparative and Historical Data", [http://www.freedomhouse.org/template.cfm?page=439]. Accessed on 14 December 2010. In the Freedom House index countries are ranked according to a numerical classification, which indicates their level of freedom (1-2.5 for *free*, 3-5 for *partly free* and 5.5-7 for *not free*) expressed by political rights and civil liberties.

[51] For speculation on the impacts on ecological modernisation, see: J. O'Brien et al., "Towards a New Paradigm in Environmental Policy Development in High-Income Developing Countries: The Case of Abu Dhabi, United Arab Emirates", *Progress in Planning*, 68 (2007), p. 245.

[52] See: M. Hvidt, *The Dubai Model: An Outline of Key Components of the Development Process in Dubai*, Working Paper No. 12 (CCMES, University of Southern Denmark, 2007), p. 2.

The consequences of limited political rights and civil liberties are also twofold. On the one hand, in democratic societies the media, NGOs and other interest groups can act freely and seek to influence the government; this is not the case in the Gulf monarchies where NGOs are co-opted through compulsory licensing and government funding, and the media is either government-owned or exerts systematic self censorship. The small number of environmental NGOs, with often very limited agendas, a side-effect of both the political and rentier system, also slows down effective environmental awareness-raising efforts. On the other hand, in a more liberal parliamentary system decision-making processes are slower and more difficult for the ruling elite to control; such as in Kuwait where the National Assembly can overturn decrees issued by the Emir and can influence the appointment of all ministers.[53] For an environmentally oriented leadership, this could act as an obstacle to action. Also, if public opinion is generally passive towards ecological issues and/or powerful groups are against climate change mitigation-related policies, a more liberal system might not provide enough incentives to progressive policy-making. An even more radical argument has been made, namely that 'a more authoritarian approach from the government' might be what is required from governments to sufficiently address climate change,[54] although this remains yet to be seen.

3.2 Energy security

Security of demand

The price of oil is arguably the most significant external instability factor for the five states' economic security. The logic of oil prices is different from natural gas, which is still not traded on an international market and is mostly sold through long term contracts with set prices.[55] The price of oil has generally followed a boom-bust cycle and the ability of OPEC to control pricing is presently weak due to the self-seeking behaviour of the member states, erosion of spare capacity, and speculation, among other things.[56]

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[53] Freedom House, *Freedom in the World, 2008 Ed. Country Report: Kuwait*. [http://www.freedomhouse.org/template.cfm?page=22&year=2008&country=7426]. Accessed on 15 December 2008.

[54] Giddens (*Climate Change*, p. 73) quoting D. Shearman and J. W. Smith, *The Climate Change and the Failure of Democracy* (London: Praegner, 2007), ch. 4 and passim.

[55] *Datamonitor* (19 November 2008), pp. 4-5.

[56] See: B. Fattouh, *The Drivers of Oil Prices: The Usefulness and Limitations of Non-Structural Model, the Demand-Supply Framework and Informal Approaches*, WPM 32 (Oxford: Oxford Institute for Energy Studies, 2007).

Sudden price falls can prove dangerous for economic and political stability when producer states plan their budgets based on higher price levels: most budgets of the Gulf monarchies for 2009 were not prepared for prices below US$50/barrel, which obliged them to cut spending and tap into their sovereign wealth funds. This, however, is only a short-term solution. Moreover, periods of lower prices, according to the OPEC, tend to have a dramatic impact on the industry due to scaling down of investments, cost-cutting strategies, reduction in R&D spending and lack of ability to attract students.[57] Signs of this were visible in late 2008 when oil prices plunged and Saudi Arabia, Kuwait and the UAE were forced to review important oil production capacity expansion projects.[58]

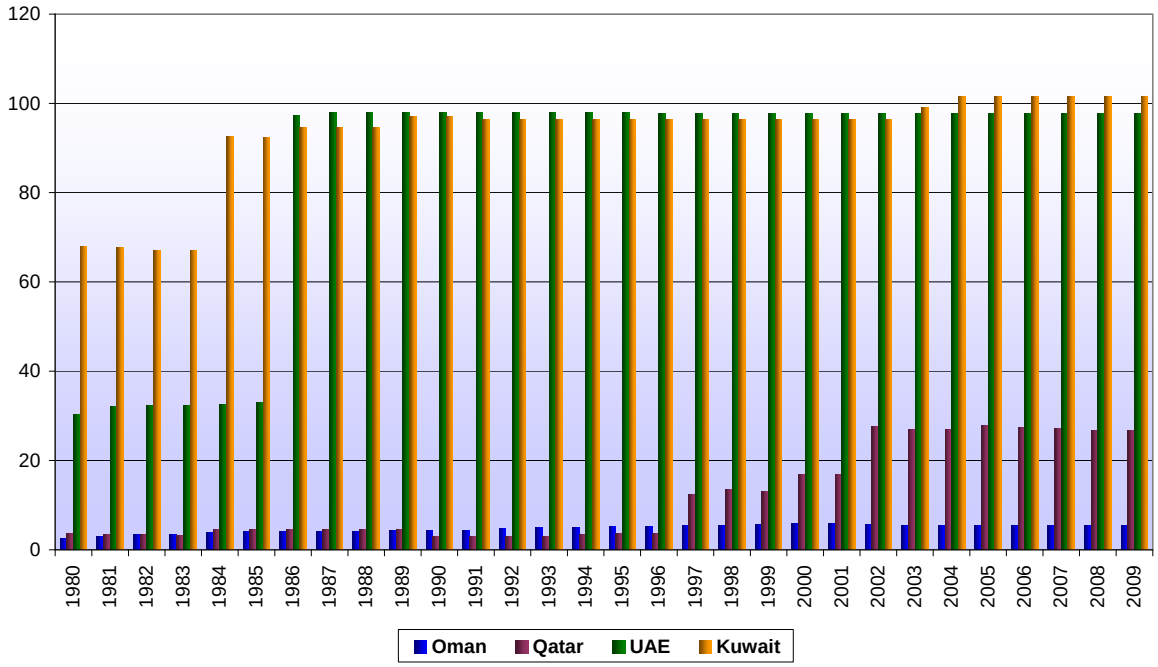
In the medium and long term, global supply and demand and the price of oil will arguably be steered by several factors, all of which have important embedded uncertainties. These factors include growth in the major Asian economies (mainly China and India), the national energy efficiency and security policies of consumer states, climate change abatement policies, and the development of alternative energy technologies and infrastructure and clean fossil fuel technologies (such as CCS). The physical and social impacts of climate change may also speed up the global transition to a non-oil energy paradigm.

The economies of the small Gulf states still depend highly on global demand patterns of oil and natural gas, as pointed out in chapter 3.1. In 2009, their combined proven oil resources amounted to 17% and natural gas resources to 18% of the global total, with shares of global production at 9% and 6% respectively.[59] While Kuwait, the UAE and even Qatar (relative to its size) still have considerable amounts of oil in proven reserves: 102, 98 and 27 billion barrels respectively in 2007, it is widely assumed that the official data given by the governments is considerably exaggerated either to allow for larger yearly national production quotas under OPEC,[60] or for political motives.[61] This is clearly illustrated by figure 3.6: the sudden jump in total oil reserves of Kuwait in 1984 and the UAE in 1986 and the consequent balancing within a very small margin (92-102bn bbl) point towards

[57] OPEC, *World Oil Outlook 2008* (Vienna: OPEC Secretariat, 2008), p. 5.
[58] *The National* (10 November 2008); *Financial Times* (4 November 2008).
[59] BP, *Statistical Review of World Energy*. BP combines primary official sources, and data from OPEC, World Oil and the Oil & Gas Journal.
[60] IEA, *World Energy Outlook 2005*, pp. 125-126.
[61] According to Cordesman, Gulf states raised their official oil reserve figures during the Iraq-Iran War for obtaining outside aid and political status. A. H. Cordesman, *Energy Developments in the Middle East* (Westport: Praeger, 2004), p. 9.

intentional data falsification. If the amount of 'hot air' in the statistics is significant, this might have negative consequences for global energy security in the future.

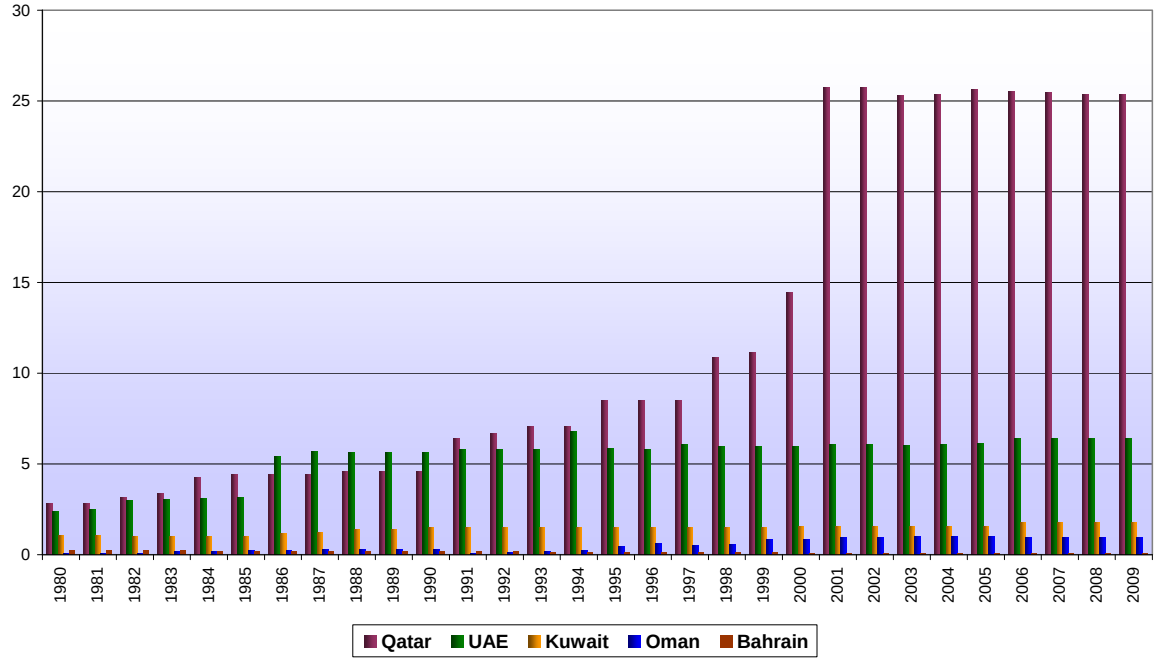
Figure 3.6. Proven oil reserves (billion barrels) of small Gulf states 1980-2009.[62]



Notwithstanding the relatively abundant natural gas reserves of these same four states, the only one with exports expansion potential is Qatar, with 25 trillion cubic metres, which equals to 14% of global proven reserves.[63] The other four states have little potential to expand production in the medium term (see figure 3.7), using most of their gas domestically. Oman and Abu Dhabi still export gas, but due to their increased domestic demand Qatar supplies both through the Dolphin pipeline (see chapter 5.1.2).

[62] Note: Bahrain n/a. BP, *Statistical Review of World Energy.*
[63] Ibid. Nb. the author has not been able to ascertain the reason for the jump in Qatar's reserves in 2001, but presumably this is was a raise in reserve estimate, also linked to Iran's partial ownership of the field.

Figure 3.7. Proven natural gas reserves (trillion m^3) of the small Gulf states 1980-2009.[64]



From this it becomes evident that for Kuwait, Abu Dhabi and Qatar the key external energy security concern is how long and for what price the world will keep consuming oil (and for Qatar, also natural gas). Here, the medium and long-term estimates of global energy consumption (quantity and mix) are extremely important, as they help determine the need for investment in additional production capability on the one hand, and the speed and seriousness of the needed economic diversification efforts, on the other. The two most quoted sources are the energy outlooks of the International Energy Agency (IEA) and OPEC.

The IEA World Energy Outlook 2010 central scenario for 2008-2035 estimates global primary energy demand as likely to grow by 36%, with most of this coming from non-OECD countries. In this scenario, oil remains the dominant fuel (albeit with a diminishing share due to higher prices and fuel efficiency) and its demand is projected to reach 99 mb/d in 2035 (from 84 mb/d in 2009), while in a scenario that aims at limiting global temperature increase to 2°C (the limit of dangerous climate change[65]) oil demand is expected to peak at 86 mb/d by 2020. Under the central scenario, OPEC output keeps

[64] Ibid.

[65] The IPCC suggested in its Fourth Assessment Report in 2007 that global emissions should be stabilised at 445-490 ppm of CO_2 equivalent (or 350-400 ppm of CO_2) in order to limit the global average temperature increase at 2.0-2.4°C from pre-industrial levels. This scenario assumes that global emissions peak by 2015 and that they are reduced by 50-85% from 2000 levels by 2050. Intergovernmental Panel on Climate Change, *Synthesis Report*, p. 20.

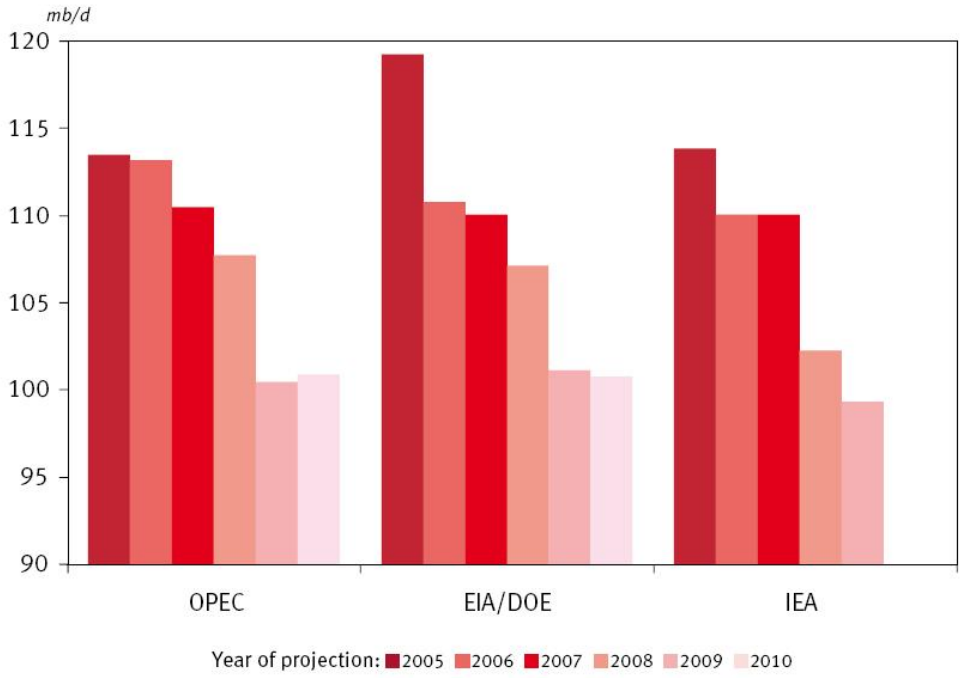
rising and its share of global production will increase from 41% to 52%, and substantial new gross capacity will be needed to offset decline in production. Due to environmental considerations, demand for natural gas is expected to increase by 44%. The outlook, however, concludes that 'the global outlook for oil remains highly sensitive to policy action to curb rising demand and emissions'.[66]

The OPEC's World Oil Outlook paints a slightly more positive picture for oil: world energy demand is expected to rise by more than 40% by 2030. Oil demand in the reference scenario grows to 90 mb/d by 2014 and 106 mb/d by 2035, and oil remains as the lead fuel (over 30%), albeit with a slightly falling share. Natural gas use is also in this scenario expected to grow fast, partly due to shale gas in the US and elsewhere.[67] Both IEA and OPEC scenarios project high growth for coal but only modest growth for renewable and nuclear energy during the periods included in the projections.

Despite the more positive projections for oil, OPEC's outlook observes that global demand projections have been constantly revised downwards in the 2000s due to climate change policies and later the economic downturn (see figure 3.8).

[66] IEA, "World Energy Outlook 2010: Presentation to the Press", [http://www.worldenergyoutlook.org/docs/weo2010/weo2010_london_nov9.pdf]. London, 9 November 2010; IEA, *World Energy Outlook 2010 Fact Sheets*, [http://www.worldenergyoutlook.org/docs/weo2010/factsheets.pdf]. Accessed 15 December 2010, quote from p. 2.
[67] OPEC, *World Oil Outlook 2010* (Vienna: OPEC Secretariat, 2010), pp. 46-53; 63.

Figure 3.8. Changing world oil demand projections for 2025 by OPEC.[68]



The numerous factors that influence international oil prices, including supply and demand, energy policies, and the international economy, make reliable price projections close to impossible; the IEA's projection of US$113 per barrel from 2010 for 2035[69] is as good as any.

The GCC OPEC members have traditionally been interested in oil prices that are not so low as to 'damage supply prospects', but are not so high as to endanger economic growth. High oil prices also 'make significant amounts of alternatives to conventional oil economically feasible'.[70] According to Mitchell, for example, this limit is US$60. Above it, oil will compete with natural gas and other fuels, as well as 'investments in technologies which reduce energy and oil demand'.[71] Since 2008, Gulf OPEC states have held US$70-80 as a 'good price'.[72]

Energy export diversification is an effective way to buffer the negative impacts of price downturns on the economy. Two of the monarchies, Abu Dhabi and Qatar, have realised the need to not only engage with, but seek a stronger position in the future of global energy, namely natural gas and renewables. Qatar's rise as the world's largest LNG

[68] OPEC, *World Oil Outlook 2010*, pp. 78-79.
[69] IEA, *Fact Sheets*.
[70] OPEC, *World Oil Outlook 2010*, pp. 22-23.
[71] 2006 $. John V. Mitchell quoted in: J. V. Mitchell and P. Stevens, *Ending Dependence: Hard Choices for Oil-Exporting States* (London: Chatham House, 2008), p. 20.
[72] See e.g.: *Reuters* (11 December 2010); *Emirates Business 24/7* (3 November 2010).

exporter, and Abu Dhabi's quest to become the region's 'alternative energy leader' with the help of its Masdar energy initiative and through hosting the headquarters of the International Renewable Energy Agency, are positive examples in this sense (see chapters 4-6). Alongside diversification into areas where the GCC OPEC monarchies have a comparative advantage due to their plentiful domestic energy resources (as far as the domestic energy security situation permits), diversifying into other energy export products, particularly solar, are indeed probably the best chance the local monarchies have of extending their external rent, and consequently their domestic rentier bargains, beyond oil.

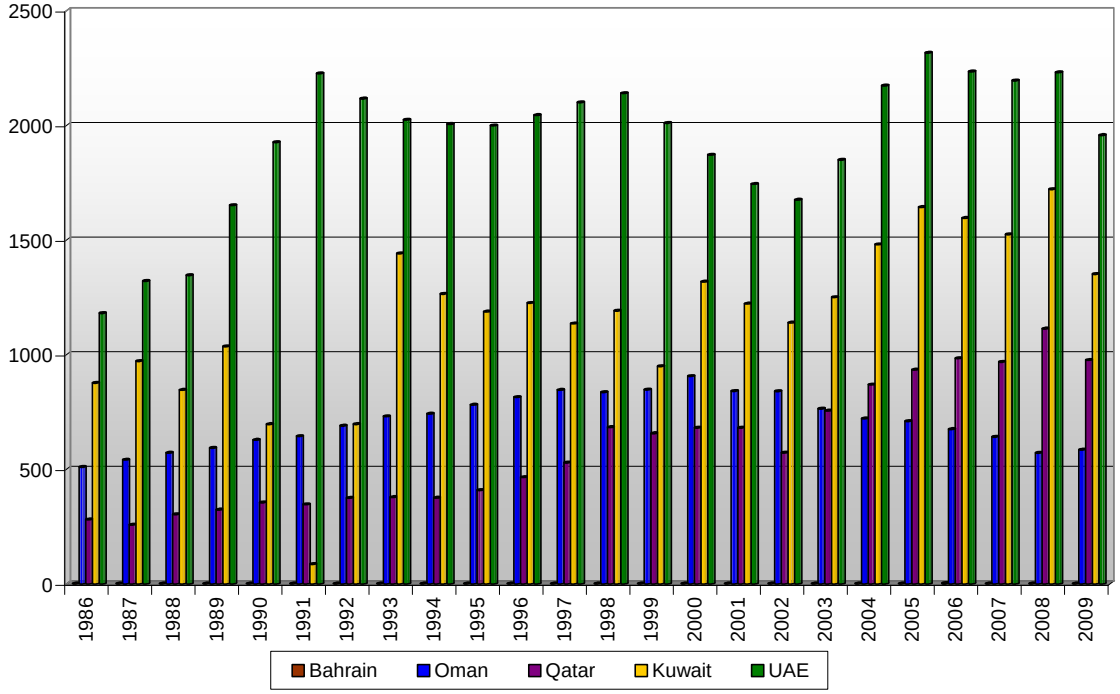
Security of supply and domestic demand management

On the domestic side, reserve depletion (leading to external rent decline) is the most serious threat to stability in the small Gulf monarchies. Also, the highly subsidised domestic energy and water consumption, a product of the rentier system, creates important opportunity costs for governments, particularly when international prices for hydrocarbons are high. Since the late 2000s, this economic aspect became an important concern, as domestic energy demand had grown at unexpectedly high rates due to the booming economy and population. Also, due to the rising domestic energy demand, increasing shortages of natural gas appeared in all monarchies but Qatar. For the first time during the oil era, domestic energy security considerations rose onto government agendas in the form of alternatives to oil and gas, as well as demand side management.

Oil is a relatively short-term phenomenon in the Gulf. Although it has dominated the monarchies' economies throughout their independence, its era is already coming to an end in some of them: production has already peaked in Bahrain (1970s), Dubai (1991) and Oman (2001).[73] While Dubai's economic security is at least partially safeguarded by Abu Dhabi, as is that of the five smaller emirates of the UAE (see chapter 4.1.1), urgency to diversify the economy is especially pressing in Bahrain and Oman, where dependence on oil revenues continues to be high and oil reserves are expected to deplete within two decades (see table 3.1). Partly reflecting the size of each country's oil reserves, there are large differences in export volumes, as figure 3.9 illustrates. The absolute difference between Bahrain and the other states' exports is particularly striking and, despite obvious differences in population size, it illustrates the precariousness of that allocation state.

[73] IEA, *Oil Information 2010* (Paris: OECD/IEA, 2010); G. Butt, "Oil and Gas in the UAE" in I. Al Abed and P. Hellyer (eds.), *United Arab Emirates: A New Perspective* (London: Trident Press, 2001), p. 237; EIU, *Oman: Country Profile 2008* (London: EIU, 2008), p. 29.

Figure 3.9. Oil exports (thousand barrels/day) from the small Gulf states 1986-2009.[74]

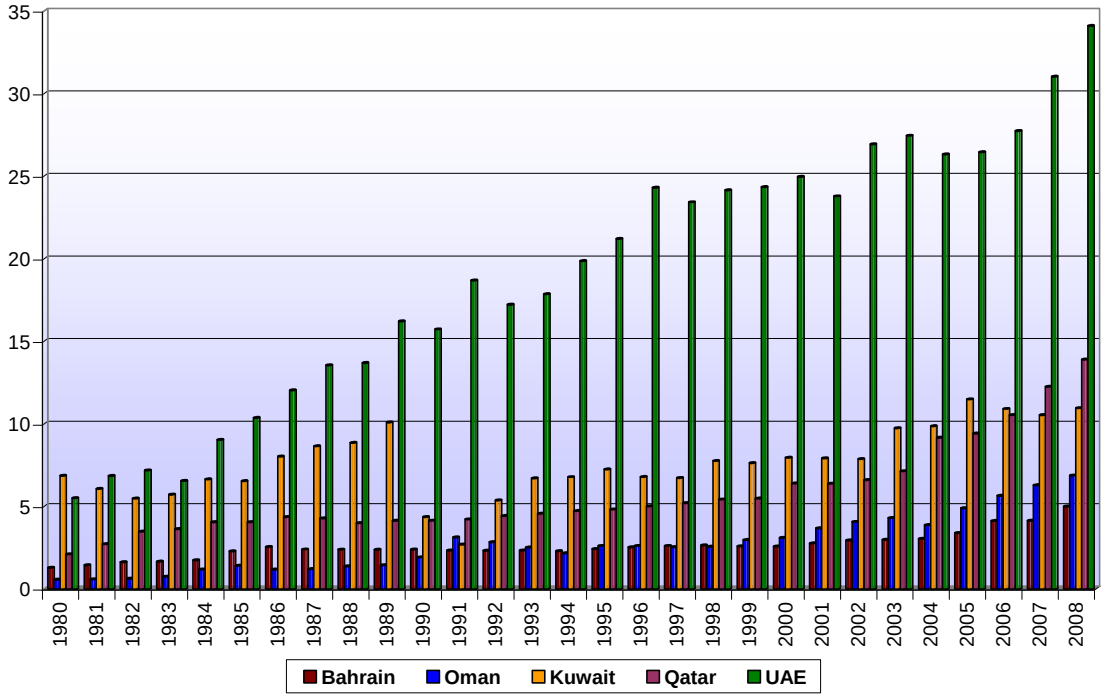


Of the five monarchies, only Qatar exports significant quantities of natural gas, namely 68bn cubic metres in 2009, equal to 8% of global exports. The UAE (7 bcm/0.8% in 2009) and Oman export smaller quantities (12 bcm/1.3% in 2009), but also receive imports from Qatar.[75] Most of the region's natural gas is associated gas the production of which is linked to OPEC's production quotas that were decreased after the 2008 financial crisis (see figure 3.9). Simultaneously, new sources of non-associated gas have been difficult to find and develop (high-sulphur or tight gas).[76]

Reflecting the fast socio-economic development of the past three decades, domestic consumption of energy in the five states has grown extremely rapidly. In absolute terms, the UAE experienced the fastest growth, whereas in proportional terms, the greatest increases in 1980-2008 took place in Oman (1140%), Qatar (564%) and the UAE (520%) (see figure 3.10). During the same period, energy consumption in the OECD Europe grew by only 26%.[77]

[74] Data available for 1986-2009. US EIA, "International Energy Statistics", [http://tonto.eia.doe.gov/cfapps/ipdbproject/IEDIndex3.cfm]. Accessed on 16 December 2010. Data originally from the Oil & Gas Journal.
[75] Exports of consumer-grade natural gas. Ibid.
[76] Booz & Company, *Gas Shortage in the GCC: How to Bridge the Gap*, Perspective (Booz & Co., 2010), p. 5.
[77] IEA, *Energy Balances of OECD Countries*, 2010 Edition.

Figure 3.10. Total final consumption of energy (Mtoe) in the small Gulf states 1980-2008.[78]



The main drivers of energy consumption in the Gulf monarchies have been rising living standards, population growth, economic growth (industrialisation), and natural resource subsidies (water, electricity and fuel). Natural gas, regarded domestically as increasingly precious, is also used as a feedstock for industries and for increased enhanced oil recovery.[79] The abundance of hydrocarbon resources has impacted domestic energy consumption patterns in two major ways: through the comparative advantage it creates and the allocative systems that have been created around it. Due to the comparative advantage, the states have invested in energy intensive heavy industries as a diversification strategy. The fuel production sector itself is also highly energy intensive: in Qatar, for example, the oil and gas industry and flaring comprised 58% of total energy use in 2006.[80] Moreover, the abundance and low cost of energy creates a strong pressure to distribute it to the population with low user prices, this in turn easily leads to wasteful consumption. As Hertog and Luciani observe, this pattern is so 'deeply rooted', that even 'building codes and standards have paid little attention to containing power requirements',[81] which again leads to enormous energy losses in the hot climate of the Gulf. Indeed, in per capita terms,

[78] Total final energy consumption (TFC) indicates the sum of consumption by the different end use sectors. Ibid.
[79] See e.g.: Hertog and Luciani, *Energy and Sustainability*, pp. 5-6; Booz & Company, *Gas Shortage*, p. 3.
[80] General Secretariat for Development Planning, *Advancing Sustainable Development: Qatar National Vision 2030. Second National Human Development Report* (Doha: GSDP, 2009), p. 108.
[81] Hertog and Luciani, *Energy and Sustainability*, p. 6.

the small Gulf states have the highest energy consumption rates in the world: in 2007, all except Oman ranked in the top five in the world, according to the World Resources Institute.[82]

The small Gulf monarchies still are among the most energy self-sufficient countries in the world but, due to rising domestic consumption, this ratio has been falling.[83] A way to illustrate the situation is to juxtapose domestic energy consumption (TFC) with export figures (see figure 3.11). In 2008, consumption in Bahrain and the UAE corresponded to 47% and 25% of their energy exports, respectively. In the three other states the shares (TFC/energy exports) were 9-15%.[84]

Figure 3.11. Export and consumption of energy (ktoe) in the small Gulf states 1980-2008.[85]

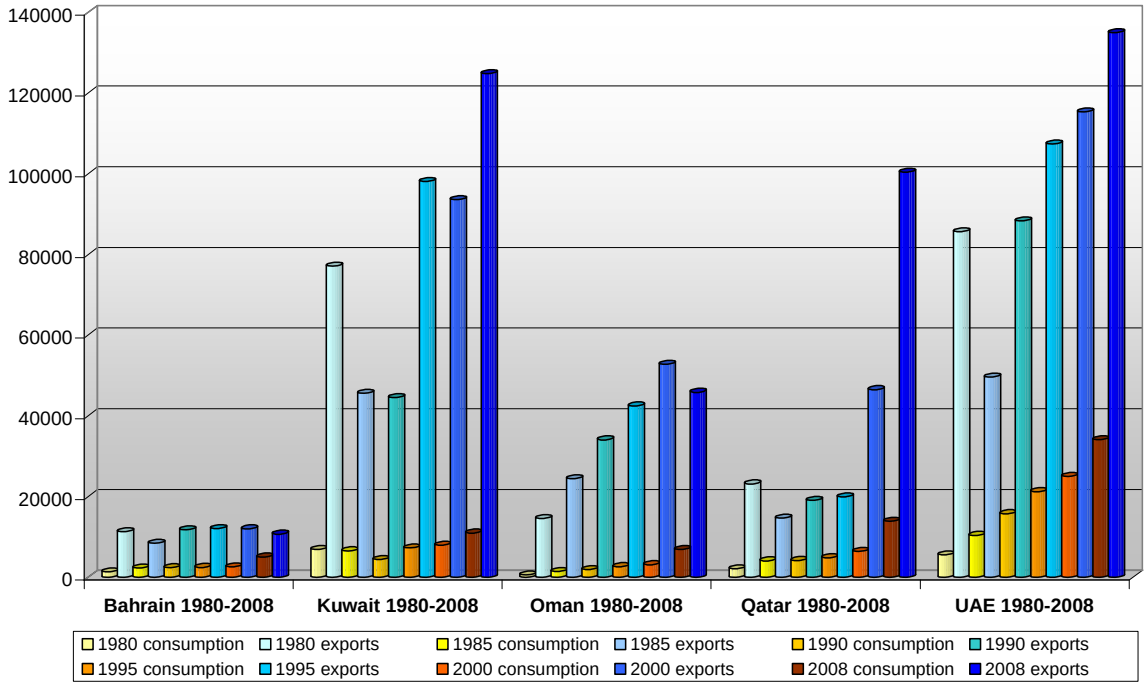


Figure 3.11, however, only tells half the story, as it does not reveal the current domestic energy crisis caused by the rapidly growing domestic demand for electricity and desalinated water, which will become increasingly evident in the near future. Gas is the

[82] World Resources Institute, *CAIT 8.0*. World ranking: Qatar 1st (19.5 toe/capita), the UAE 3rd (11.8), Bahrain 4th (11.6), Kuwait 5th (9.5) and Oman 16th (5.7). The constant need for air conditioning and desalinated water also raises consumption levels.

[83] Measured with energy production/total primary energy supply. During the last decade, the ratios have declined, most steeply in Oman, from 7.5 in 2000 to 3.9 in 2008. The ratios for Kuwait and Qatar increased (5.7 to 5.8 and 4.9 to 5.2, respectively) while decreasing in the UAE (4.5 to 3.1). Bahrain's ratios (from 2.5 to 1.9) are already close to the non-OECD average (1.3 in 2008). The Middle East average ratio was 3.5 in 2000 and 2.7 in 2008. IEA, *Energy Balances, Non-OECD*.

[84] Ibid.

[85] Ibid.

main and also preferred electricity source in the Gulf monarchies, as its netback returns (profits) are considerably lower than for oil; the UAE and Qatar use gas in all their power plants. Kuwait, due to limited gas availability, also uses crude oil for electricity generation. As a result of not managing to develop their own gas fields apace with the growing domestic demand (partly due to the discouraging impact of subsidised prices), all small Gulf monarchies except Qatar have been forced to resort to regional and even international sources of gas imports.[86] Oman and the UAE have been receiving gas from Qatar via the Dolphin pipeline (56 mcm/d in 2009[87]) since 2007. In 2009 and 2010, Kuwait imported LNG for the summer months' demand peaks[88] from outside the region, as Kuwait and Qatar could not agree on a price. In 2010, Dubai started receiving LNG from Qatar, and Bahrain signed a deal with Russia on gas imports.[89] By the end of 2010, several of the monarchies had been in bilateral talks with Iran on gas imports but none had been concluded successfully. In the UAE, the inter-emirate level brings an additional layer of dependencies since Abu Dhabi both sells, and is strongly suspected to provide, free allocations of oil and electricity for the other emirates (see chapter 4.1.1). Despite the gas imports and allocations, in the late 2000s, the UAE's four northernmost emirates were reported to suffer from chronic power shortages and Sharjah, Bahrain and Kuwait experienced repeated summer blackouts.[90]

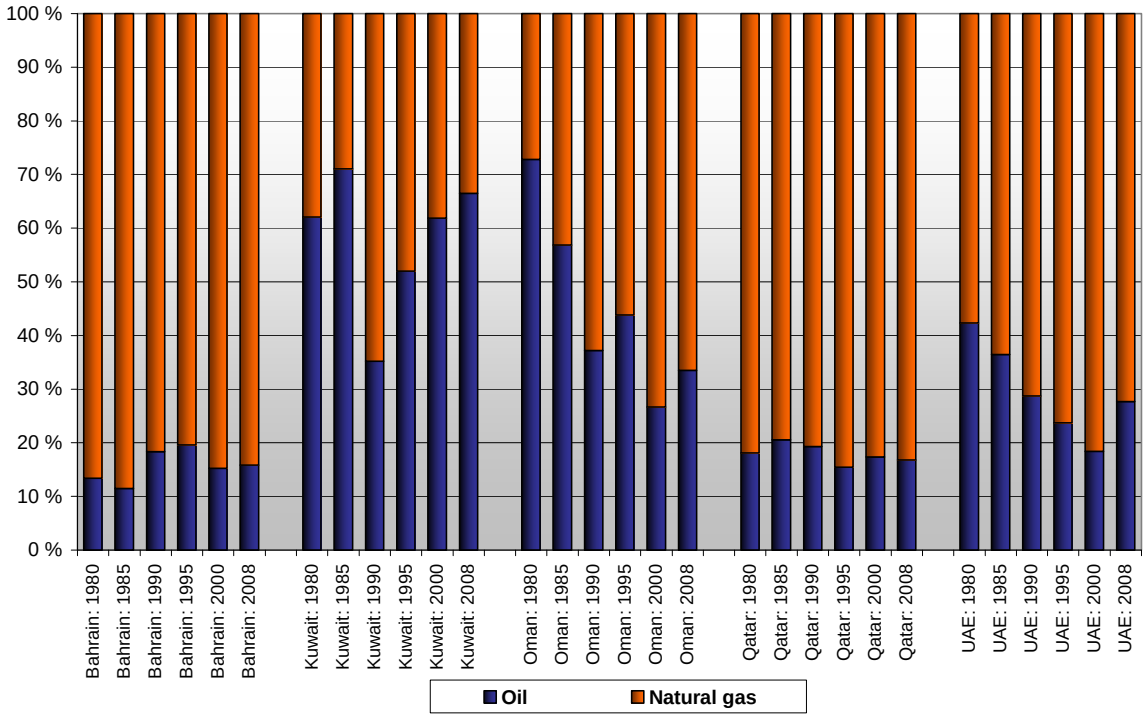
The energy shortages have also had positive consequences, in the form of speeding up intra-GCC energy cooperation. In 2009, the first phase of the GCC-wide power grid, which had been planned since the establishment of the council in 1981,[91] was completed and the national grids of Bahrain, Kuwait and Saudi Arabia were connected. The UAE and Oman are expected to join in 2011. In 2010, the grid helped the connected countries to avoid power cuts, with up to 1,000 MW solicited by Kuwait in the summer of that year.[92] As a result of electricity exchanges, 5,000 MW, or more, of total savings in capacity expansion are estimated by 2030. The main purpose of the intra-GCC grid is to serve as emergency assistance, but it will also allow for regional and global energy trading, potentially linking the GCC to the planned Desertec energy supergrid that is envisaged to export renewable

[86] Hertog and Luciani, *Energy and Sustainability*, pp, 2; 6; 8. Also, Qatar, the UAE and Oman have tied a considerable share of their gas production to long-term LNG export agreements to Asia and Europe. Booz & Company, *Gas Shortage*, 5.
[87] US EIA, *Qatar: Country Analysis Brief* (US EIA: December 2009).
[88] *Reuters*, (22 April 2010).
[89] *Gulf Daily News* (28 October 2010); *Bloomberg* (30 November 2010).
[90] *The National* (6 January 2010; 9 May 2010; 29 July 2010).
[91] *MEED* (16 November 2007).
[92] *The National* (29 July 2010).

energy from the MENA region to the EU.[93] The US$1.6bn project is also seen as a possible catalyst for expanding cooperation into other natural resources, including water, gas and transportation. A feasibility study for a GCC water grid with encouraging results was carried out in 2003, without further follow-up.[94]

Around 2006-2007, as a result of the above described opportunity cost considerations and insufficient natural gas availability, Gulf monarchies started becoming vocal about their willingness to replace oil and gas domestically with alternative sources, such as nuclear energy and renewables. As figure 3.12 shows, the energy mix of all five states is dominated by natural gas and oil, the former constituting the major share in all except Kuwait in 2008. There are no 'reasonable' alternatives to replace oil as a liquid fuel, but nuclear, solar and even wind energy are increasingly seen by economists and governments alike as potentially 'valid options' for electricity production in the Gulf monarchies.[95]

Figure 3.12. Total primary energy supply in the small Gulf states 1980-2008.[96]



Small-scale solar and wind energy and R&D developments in the Gulf monarchies date back to the 1970s, but the knowledge gained was never transferred to the industrial sector

[93] See: [http://www.desertec.org/].
[94] *Arab News* (15 December 2009).
[95] Hertog and Luciani, *Energy and Sustainability*, p. 2.
[96] IEA, *Energy Balances, Non-OECD*. 'Oil' includes crude oil, NGL, feedstocks and petroleum products.

due to a lack of a 'socio-economic perspective' behind the early projects.[97] In the smaller monarchies more tangible renewable energy projects only appeared in the 2000s. One example is the 850 kW wind power project on the Sir Bani Yas island of Abu Dhabi, which was commissioned by the ruler at the time, Sheikh Zayed, and built in 2003-2004.[98] Even then, deployment was extremely limited. Most renewable energy plans that emerged as a consequence of the late 2000s' energy crunch had still not progressed from the planning stage by late 2010, generally due to their lack of economic viability. These included: a 100 MW solar plant in Oman, a 100 MW solar desalination plant and a total of 3,500 MW (US$4bn) in solar capacity in Qatar, and a 'solar island' project in Ras Al Khaimah.[99] Wind pilot projects have also been announced in Oman and Bahrain.[100] Also, many projects were buried as a consequence of the economic crisis, including a solar panel production plant with an annual capacity of 130 MW in Dubai.[101] Furthermore, despite their being pioneering in nature, completed projects like Bahrain's World Trade Centre (2008), the world's first skyscraper with integrated wind turbines, seemed to have few positive spillover effects on their surroundings, and were even rejected by them: Bahrain's WTC could not feed its excess electricity to the local grid due to lack of legislation.[102]

The only larger-scale project in the renewables energy sector that had been completed by the end of 2010 is a 10 MW PV solar plant in Masdar City, owned by Abu Dhabi's Masdar Initiative. Masdar, established in 2006, is also working on a 100 MW concentrated solar power plant, with a plan to expand capacity to 1,300-1,500 MW by 2020. In addition to solar plants, Masdar has invested abroad in renewables technologies, established a research institute, and is working with different types of carbon reduction projects (see chapter 4.3.1). In Qatar, the Qatar Science and Technology Park is leading a push in the area of R&D into renewables and energy technologies (see chapter 5.3.2).

As for nuclear energy, a non-renewable but carbon dioxide-free source of energy, all six GCC states have justified their interest in it in terms of domestic energy security reasons rather than military. Also environmental reasons, in particular the need to cut CO_2

[97] Saudi Arabia particularly, where a solar village of US$100m was built, but also R&D in Kuwait and Bahrain since the 1980s. I. Jeridi Bachellerie, "Renewable Energy Transition in the GCC: Finding the Right Paradigms", *GRC Analysis* (Dubai: Gulf Research Center, 2010).
[98] GTZ, "Wind power project on Sir Bani Yas island", [http://www.gtz.de/en/weltweit/maghreb-naher-osten/vereinigte-arabische-emirate/13565.htm]. Accessed on 17 December 2010.
[99] MEED, "Solar power projects in the Middle East and North Africa" (Excel file, 28 March 2010), [http://www.meed.com/supplements/2010/gcc-power-market-report-2010/gcc-power-harnessing-the-elements/3005249.article]; *The National* (13 September 2010).
[100] *MEED* (28 March 2010a).
[101] *Gulf News* (25 October 2008).
[102] *Construction Week* (17 January 2009).

emissions, have been used as an additional argument by the governments. As recently as in 2006, fossil fuel abundance and military alliances with the United States and its presence in the region, were seen as sufficient reasons for the GCC states to not consider nuclear energy programmes. Iran's acquiring of a nuclear weapon was seen by analysts as the only potential trigger for any of the Gulf states changing their resolve.[103] In December 2006, on Kuwait's proposal,[104] the six Gulf Cooperation Council states announced a study on the feasibility of a collective civil nuclear programme. Due to the timing and the previous lack of interest in the resource, the move was perceived by most observers as an effort to create a strategic challenge to Iran.[105] However, it soon became clear that economic and energy security motives were driving the GCC, in addition to nuclear supplier states keen to sell their technologies to new markets.

The GCC joint study was conducted by the International Atomic Energy Agency (IAEA) and completed in November 2007. Multiple assurances of the civilian and peaceful nature of the programme have followed, including both the UAE and later Kuwait pledging US$10m to one of the international nuclear fuel bank proposals.[106] An IISS report from 2008 evaluated the GCC project as it had been outlined as not posing a proliferation threat.[107] The collective plan, however, has not advanced since then. Explanations for this arguably include, among others, mutual distrust among the group's member states—including the fear of growing Saudi hegemony—, the fact that sharing a nuclear programme involves important security concerns that are exacerbated by this distrust, and the inertia of a multilateral process compared to national projects.[108] Notably, not a single joint nuclear energy programme exists in the world to date. Clearly, one of the reasons the GCC project has all but withered was the UAE's decision to take the traditional route by proceeding unilaterally. As of 2010, Abu Dhabi was the only Gulf monarchy pressing ahead with its plans to build four 1,400 MW reactors by 2020 (see chapter 4.3.3).

While coal could be an affordable and safe (supply-wise) option for some of the monarchies, the rise of climate change on the international energy agenda led to Abu

[103] See e.g.: A. Kadhim, "The Future of Nuclear Weapons in the Middle East", *Nonproliferation Review* 13 (2006), p. 586; IISS, *Shadow of Iran*, p. 55.
[104] EIU, "Qatar: Energy Report", *EIU Industry Briefing* (1 December 2009).
[105] IISS, *Shadow of Iran*, p. 36.
[106] *Global Security Newswire* (9 March 2008).
[107] IISS, *Shadow of Iran*, p. 36.
[108] Ibid.

Dhabi discarding it as an environmentally 'detrimental' option.[109] In 2008-2009, Ajman and Ras al-Khaimah each made announcements on the commissioning of a 1,000 MW coal plant, but promises from Abu Dhabi in 2010 to provide electricity to the northern emirates presumably led to the plans being cancelled.[110] Oman has also announced the building of a 1,000 MW coal plant.[111]

Also, replacing the gas used in enhanced oil recovery (EOR) with CO_2 has become a popular potential option for the local governments, as this would also 'decarbonise' oil production. Carbon capture and storage (CCS) technologies are only at the pilot stage and while uncertainties regarding their availability for large scale utilisation prevail, Gulf OPEC monarchies have been highly active in seeking to include them in the post-2012 UN climate treaty so as to ensure financial support from developed countries for their costly implementation (see chapter 6).

As could be expected from energy-rich states, demand side management (DSM) in the small Gulf monarchies was in the past mainly ignored, and heavy emphasis was placed on guaranteeing domestic supply at any cost. As Hertog and Luciani have noted, the logic behind the high subsidies for fuels is political, not economic.[112] In 2009, according to the IEA, the UAE spent roughly 5% and Qatar 3% of its GDP on fossil-fuel consumption subsidies.[113] Households are the most important consumers of electricity in the Gulf monarchies but lowering subsidies significantly is a taboo due to the existing social contract, and other incentives, such as awareness-raising, are not as effective.[114] In the residential sector, air conditioning consumes significant amounts of energy. Savings by consumers could bring financial benefits for both individual consumers and the government, as this would ease the pressure to increase power production capacity. Savings could be achieved from the transportation sector as well: in Qatar, for example there were 470 vehicles and passenger cars per 1000 inhabitants in 2007, which was close to the OECD average of 490.[115] Having fewer cars per family, using public transportation, or raising room temperatures would not require major economic investments, but a change of mindset. Indeed, the natural resource subsidies that extend beyond the nationals produce

[109] See e.g.: Government of the UAE, *Policy of the United Arab Emirates on the Evaluation and Potential Development of Peaceful Nuclear Energy* (20 April 2008), p. 1.
[110] *Gulf News* (18 July 2008); *Financial Times* (25 March 2009); *The National* (6 January 2010).
[111] *Reuters* (2 July 2010).
[112] Hertog and Luciani, *Energy and Sustainability*, p. 2.
[113] IEA, "Presentation to the Press 2010".
[114] Hertog and Luciani, *Energy and Sustainability*, p. 7.
[115] Kuwait: 263; the UAE: 292. Bahrain and Oman: n/a. OPEC, *World Oil Outlook.2010*, p. 84.

a population-wide rentier mentality, characterised by a 'break in the consumption-cost causation',[116] in energy and water use patterns. This, in addition to the large and changing expatriate populations that often have little sense of belonging in their host countries, and no concern for the local environment, might prove to be the major obstacle to energy savings and efficiency in individual consumption in the small Gulf states. As of 2010, however, as a sign of the unsustainability of the situation, particularly in the weak rentier monarchies, the need for a gradual weakening of the subsidy regime was becoming more openly admitted by the governments.[117]

Environmental (un)sustainability

Contemporary societies in the Gulf inflict a heavy toll on the surrounding environment, not only through their GHG emissions. Although largely outside the scope of this study, it is important to understand the region's other environmental unsustainabilities, as these are all directly interlinked with the local rentier states and their negative externalities. An extensive study by the Gulf Research Center on the state of the environment in the six GCC member states, from 2006, describes as their most pressing environmental issues:

- Land degradation and desertification: caused by population growth and urbanization, overgrazing, and intensification and expansion of agriculture;
- Water security: scarce resources by definition, but situation has been worsened by high consumption rates due to population growth, urbanisation, agriculture and food self-sufficiency policies;
- Marine biodiversity: endangered by oil spillage, human settlements in coastal areas and seawater desalination;
- Air pollution: high due to high per capita carbon dioxide emissions; and
- Waste management: becoming increasingly problematic with population growth and high consumption patterns and due to very limited recycling.[118]

'Sustainable development', in its most common usage as defined by the Bruntland Commission in 1987, refers to 'meeting the needs of the present without compromising the ability of future generations to meet their own needs' and integrates economic, social and ecological goals without compromising environmental or developmental goals.[119] However, sustainability, an elusive concept due to its extensive use in different contexts, is

[116] Comparable with rentier mentality and 'work-reward causation', explained in chapter 2.1.
[117] E.g. in late 2010, Bahrain's oil minister called for rethinking the existing fuel prices subsidies. *Arabian Business* (14 December 2010).
[118] Gulf Research Center, *Green Gulf*, pp. 5-6.
[119] UN General Assembly, "Report of the World Commission on Environment and Development".

often adapted to suit political goals and is hard to quantify. Moreover, sustainable development is often used in the Gulf context to denote sustained *economic* development.[120]

Some international environmental sustainability indicators, however, can be used to describe the relative sustainability of a country compared to others. Among the best known is the Ecological Footprint index of the global conservation organisation WWF. The index ranks countries according to the burden they place on the biosphere in terms of biologically productive land and sea that is needed to provide the resources used and to absorb the waste produced by the local population. In 2010, the UAE ranked first and Qatar second, ahead of Denmark, Belgium and the US. According to WWF, each average UAE inhabitant required 6 planet Earths to sustain his/her lifestyle.[121] Another indicator, the American Environmental Performance Index from 2010, ranked the five states in the second worst category (at ranks 113-152), together with a number of African countries.[122]

3.3 The impacts of climate change and its mitigation

As Mathews has pointed out, 'population growth lies at the core of most environmental trends' and fast growth rates can overwhelm any government.[123] In the late 2000s, the small Gulf monarchies' demographic and economic circumstances, together with the rentier system, created a situation in which not only energy resources became scarcer, but other resource-related problems began surfacing, most prominently in the areas of water, food and environmental security.[124] These domestic developments interplayed with the simultaneous transformation of the international agenda relating to energy security and climate change, in some cases resulting in passive or defensive and in others proactive responses to international climate change mitigation (see chapters 6.3 and 6.2.2) by the small monarchies' governments.

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[120] Based on author's experience.
[121] WWF, *Living Planet Report 2010* (Gland: WWF, 2010), p. 36. Bahrain was not included in the report due to its small population.
[122] Yale University, "Country Scores", 2010 Environmental Performance Index, [http://epi.yale.edu/Countries]. Accessed on 20 December 2010.
[123] Tuchman Mathews, "Redefining Security", pp. 164-164.
[124] Environmental security is defined here as preventing 'the erosion of the carrying capacity of the earth resulting in the loss of environmental sustainability in the future'. N. P. Gleditsch, "Environmental Change, Security and Conflict" in C. Crocker et al. (eds.), *Leashing the Dogs of War: Conflict Management in a Divided World* (Washington D.C.: US Institute of Peace Press, 2007), p. 179.

This subchapter presents a review of the expected consequences of climate change and its international mitigation for the small Gulf monarchies. Three dimensions of potential negative impacts of climate change, divided into physical, social and economic, are examined through relevant quantitative indicators. The subchapter also looks at the contribution of the five states to anthropogenic climate change and their potential role in international mitigation. Abu Dhabi and Qatar-specific vulnerabilities and adaptation and mitigation issues will be discussed in more detail in chapters 4.3 and 5.3.

Physical and social impacts

A major gap in both historical data (time series on past climate and weather patterns and groundwater aquifers) and region-specific future projections complicates projections of the physical and social impacts of climate change on the Middle East.[125] The Middle East and North Africa region is, however, considered to be among the most vulnerable to climate change.[126] As already noted, as a consequence of climate change, average temperatures in the Middle East could rise from current levels by 2.0-3.7°C by the 2070s, while precipitation is generally projected to decrease. An increase in extreme weather events and temperatures is considered as possible. A model used in the UAE predicts temperature increases of 2.1-2.8°C by 2050 and 4.1-5-3°C by 2100, and a drier climate. Sea-level rise is the third major physical consequence of climate change that could cause significant inundation of coastal areas.[127] The region's agriculture and coastal areas are described by the World Bank as vulnerable to both temperature increases and sea-level rise.[128] Other vulnerabilities listed by a UAE report to the UNFCCC are the sensitive dryland ecosystems, and public health.[129] Moreover, traditional environmental problems, including desertification, marine, coastal and air pollution, construction and demolition debris, water quality issues and the consequences of military conflicts (particularly in the case of Kuwait), already plague the GCC states.[130]

[125] See e.g.: M. Raouf, *Water Issues in the Gulf: Time for Action*, Policy Brief No. 22 (Washington D.C.: The Middle East Institute, 2009), p. 10.
[126] See e.g.: M. Tolba and N. Saab (eds.), *Arab Environment Future Challenges.* Report of the Arab Forum for Environmental Development (Beirut: AFED, 2008), pp. X-XI.
[127] Ministry of Energy of the UAE, *The United Arab Emirates: Second National Communications to the Conference of the Parties of UNFCCC* (2010), p. XIII.
[128] World Bank, "A Strategy to Address Climate Change in the MENA Region" (2 October 2008), [http://go.worldbank.org/OIZZFRJZZ0].
[129] Ministry of Energy of the UAE, *The United Arab Emirates: Initial National Communication to the UNFCCC* (Abu Dhabi: 2006), pp. 36-37.
[130] Raouf, *Water Issues*, p. 1.

Linked to rising temperatures, the most important potential negative consequence of climate change for the small Gulf monarchies is resource scarcity and insecurity in the areas of energy, water and food. Domestic energy demand can be expected to grow in all five states under a business-as-usual scenario, but climate change-induced higher temperatures would further increase the need for air conditioning and water, and consequently, the demand for electricity and desalination. However, compared to water and food security, energy security is not as critical an issue for most Gulf monarchies, since they can always turn to oil as a last resort—with Bahrain and Oman as the obvious exceptions.

According to the UN, all Gulf monarchies except Oman already suffer from 'acute water scarcity'.[131] Most of the small Gulf monarchies rely almost completely on desalination for drinking water[132] and have emergency reserves of only 2-5 days.[133] Even so, they exhibit the world's highest water consumption rates, of 300-750 litres daily per person, according to Raouf. The agricultural sector consumes most of the total water used in the five states. Due to consumption rates that are higher than recharge, groundwater reserves are quickly depleting and their salinity has increased.[134] Abu Dhabi, for example, is estimated to run out of exploitable groundwater resources in 20 years if current consumption patterns prevail and if more sustainable and efficient water management policies are not put into practice.[135]

Although the Gulf monarchies are relatively well adapted to their structural food scarcity, unsustainable food self-sufficiency policies, initiated in the 1970s, are still maintained in many sectors. In addition to high water use, agricultural production is highly subsidised. However, its contribution to GDP is generally very marginal[136] and the five states are still completely or highly dependent on imports of basic food articles, including sugar, rice, wheat and flour (99-100%), meat (55-80%) and vegetables (27-81%).[137] While the impacts

[131] Raouf, *Water Issues*, p. 1.
[132] 40% in Oman and 85-99% in the other monarchies in 2005. M. A. Dawoud, *Water Scarcity in GCC Countries: Challenges and Opportunities*, Research Paper (Dubai: Gulf Research Center, 2007).
[133] EAD, "Water resources in Abu Dhabi emirate" (2009), [http://www.ead.ae/Tacsoft/FileManager/Misc/2-%20Water%20Resources%20in%20Abu%20Dhabi%20Emirate-EAD.pdf]. Accessed on 18 December 2010.
[134] Raouf, *Water Issues,* pp. 2-3.
[135] EAD, "Water resources".
[136] Raouf, *Water Issues*, p. 4.
[137] E. Woertz, "The Gulf Food Import Dependence and Trade Restrictions of Agro Exporters in 2008" in S. Evenett (ed.), *Will Stabilisation Limit Protectionism? The 4th GTA Report* (London: Centre for Economic Policy Research, 2010), p. 49.

of climate change on water demand in the Gulf are uncertain,[138] increasing water shortages and salinisation of coastal aquifers caused by current practices and consumption patterns alone might destroy the last hopes of national food self-sufficiency. As a reaction to declining water reserves, growing population and rising global food prices (particularly in 2007-2008), many Gulf states have since the late 2000s sought food security outside their borders through purchasing, leasing and investing in farmlands in Asia and Africa.[139] These agricultural policies are controversial, as they could undermine food security in the producing countries and lead to tensions between the producing and importing country. Also, by leasing foreign land, the Gulf monarchies are 'spreading rentierism' to new countries by turning local governments into rentiers.

Rising sea levels can cause economic damage and population displacement, particularly in the small island states and low-lying urban areas of the Gulf, including man-made islands and land reclamation projects in Dubai and elsewhere. Estimates on the levels of rise vary greatly: according to the IPCC's report from 2007, the expected range is 0.37-0.59 metres by 2100, but as much as 10 metres or over, if glacial melting is included.[140] Bahrain has repeatedly expressed its concern over the impacts of rising sea levels. A national study published in 2005 predicted a 5-10% loss of territory (36-69 km^2) by 2100 for a sea level rise of 0.2-1.0 metres.[141] A more recent study from the UAE, with a considerably larger territory, predicts land losses of 1-6% (1,555-5,000 km^2) by 2100.[142] Thirdly, according to the IPCC, extreme weather events like hurricanes and heat spells are expected to become more frequent as global temperatures rise.[143] In 2007, Gonu, the strongest tropical cyclone ever recorded in the Arabian Sea and to ever hit the Arabian Peninsula, struck Oman causing around 50 deaths, US$1bn worth of physical damage and US$200m of losses in oil exports due to a production break.[144]

It has also been argued that climate change can act as a 'threat multiplier' by precipitating existing social and economic problems in the Middle East, including inter and intra-state tensions over scarce resources, migration induced by declining returns in agriculture and

[138] See e.g.: CNA, *Threat of Climate Change*, p. 30; Ministry of Energy of the UAE, *Second National Communications*, p. 30**.**
[139] E. Woertz, "Food Import Dependence", p. 44.
[140] IPCC, *Synthesis Report*, p. 45.
[141] Kingdom of Bahrain, *Bahrain's Initial National Communication to the UNFCCC. Volume I: Main Summary Report* (Manama: GCPMREW, 2005), p. 18.
[142] Possible accelerated ice cap melting accounted. Ministry of Energy of the UAE, *Second National Communications*, p. 27.
[143] IPCC, *Synthesis Report*, p. 13.
[144] *International Herald Tribune* (11 June 2007); *Arabian Business* (11 June 2007).

seawater intrusion (climate refugees), and if the state's adaptation capacity fails, even increased poverty, unemployment, social instability and radicalisation.[145] Poor states and weak governments are expected to suffer the most, as these have the lowest adaptation capacity. The small Gulf states, in turn, are at present relatively to very wealthy and their state apparatuses are robust, they are not envisaged to suffer any major environmental crises in the near future, and they are not engaged in resource use-related disputes. Raouf, however has noted that the lack of studies on the shared water aquifers in the Gulf is dangerous, as in a situation of scarcity, disputes may arise between the states.[146] A scenario in which water scarcity could cause internal tensions in the small Gulf monarchies is also arguably unlikely, as long as the rentier bargain with the local population is upheld, as the governments have signalled low tolerance towards any demonstrations by non-nationals.[147]

Economic impacts

It is difficult, if not impossible, to predict the economic consequences of climate change, since there is high uncertainty even regarding the physical consequences. For example, the widely cited but also criticised report by Lord Stern from 2007 estimated that greenhouse gas emission cuts, aimed at preventing a two-degree rise in temperature, would cost one percent of the global GDP, while the consequences of inaction would cut it by 5-10 percent.[148] Although the Stern Review is at most only a best estimate, both climate change mitigation and adaptation are deemed to require huge investments. The transition to a low carbon economy will also create indirect profits and losses. Despite the lack of concrete evidence of such losses, climate change *mitigation*-induced potential economic losses have had the most weight in GCC OPEC member states' considerations of all the possible consequences.

There are four possible interlinked ways in which international climate change mitigation could negatively affect the small Gulf states' economies. Barnett and Dessai name three mechanisms that can affect oil export revenues: reduced demand, reduced price, and reduced market rent due to taxes.[149] If an ambitious global climate pact is agreed upon and implemented, these could all ensue. Furthermore, if global demand peaks before the five

[145] Brown and Crawford, *Rising Temperatures,* pp. 10-18.
[146] Raouf*, Water Issues*, p. 3.
[147] E.g. deportations of tens or hundreds of workers. *Gulf News* (3 May 2009).
[148] Stern, *Stern Review*.
[149] J. Barnett and S. Dessai, "Articles 4.8 and 4.9 of the UNFCCC: Adverse Effects and the Impacts of Response Measures", *Climate Policy*, 2 (2002), p. 234. Decrease in the global demand for fossil fuels can be motivated by binding caps and global emissions trading, taxes and/or, a sudden unfolding of an extreme climate change scenario in the future.

states' reserves are depleted, they will also suffer economic losses due to the unexploited resources.

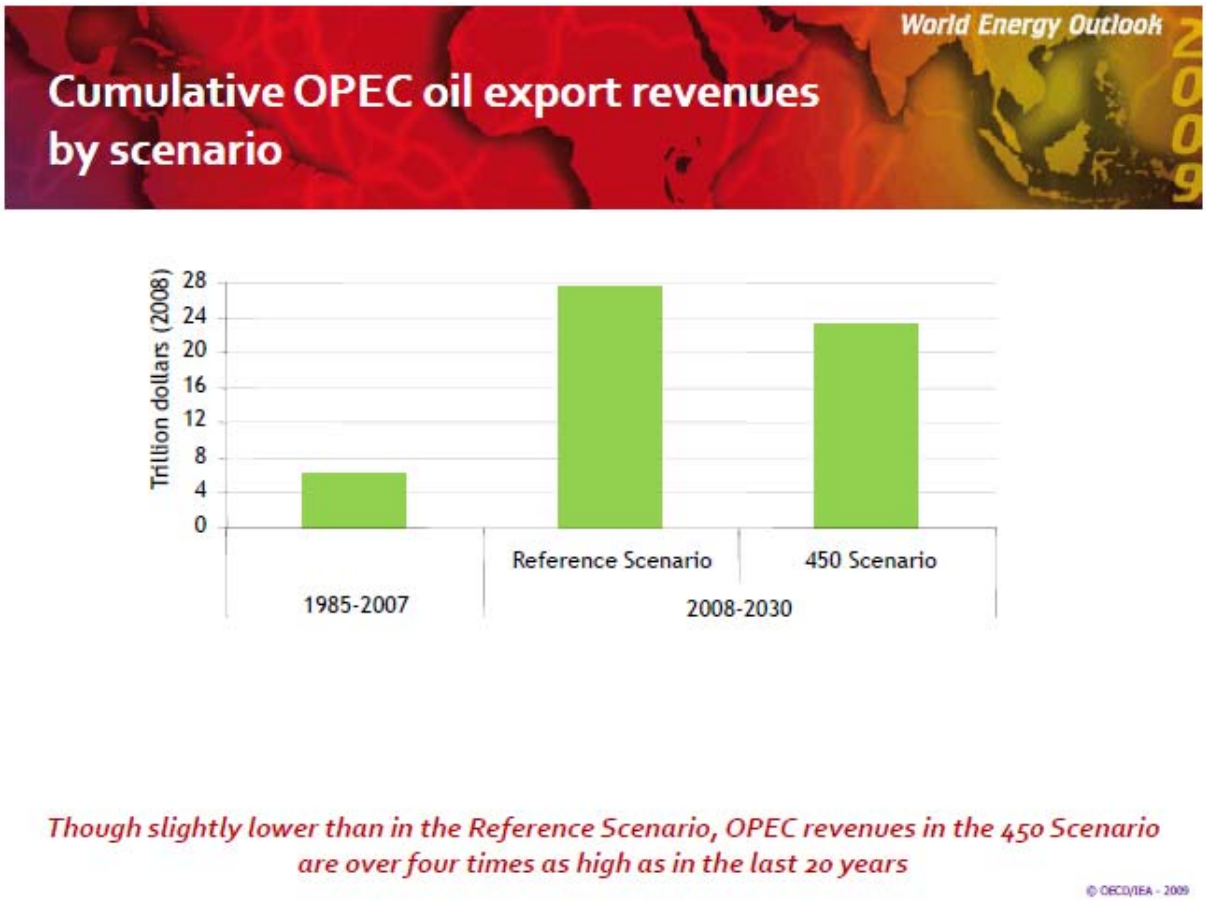
Because of the importance attached by the OPEC members to the issue, the potential adverse impacts of global climate change mitigation, or 'response measures', have been studied in a number of model scenarios. The picture they present is mixed, to say the least. A scenario study conducted by Ghanem et al. in 1999 predicted that if abatement targets under the first commitment period of the Kyoto Protocol (2008-2012) were met, OPEC member states would be likely to suffer substantial export revenue losses. Although the scenario extends until 2020, by 2010, however its basic assumptions had become badly outdated.[150] In a study from 2007, Persson et al. surveyed model-based literature from the late 1990s to the mid-2000s, which predicted that OPEC will lose up to a third of export revenues compared to baseline revenues by 2050 as a result of international climate politics (either carbon tax or cap-and-trade). The authors also developed a model that estimates potential OPEC revenue losses in a climate regime with universal emissions reduction targets, and discovered that this might actually increase OPEC revenues from conventional oil.[151]

The OPEC countries themselves most frequently rely on the OPEC World Energy Model (OWEM), developed in the 1980s and updated annually, to justify their case for the need for compensation. In the early 2000s, the model predicted the largest proportional losses in GDP by 2010 for the four GCC OPEC members (over 3% in Qatar and the UAE and 2% in Kuwait), Iraq and Libya.[152] A lot of politics is involved in the studies and their presentation. In addition to different calculation methods, different sides also present the figures in a way that supports their position: in 2009, the OECD's International Energy Agency, representing countries which are primarily energy importers and most of which advocate ambitious climate change mitigation, launched a study which projected that, under a 450 ppm scenario (which might limit the global temperature increase to below 2ºC), OPEC's total oil revenue would be US$23 trillion in 2008-2030. This is over four times higher than revenues during the previous two decades (see figure 3.13). Compared to a business-as-usual scenario, there would only be a 16% loss for the oil exporters. The main Saudi negotiator, Mohammed Al-Sabban, immediately dismissed the figures in the

[150] Ghanem et al., "Emissions Trading", pp. 104-107. Similarly, the numerical data of a modelling study by Kassler and Paterson from 1997 (*Energy Exporters*), which reaches similar conclusions, is out of date.
[151] T. A. Persson et al., "Major Oil Exporters May Profit Rather than Lose in a Carbon-Constrained World", *Energy Policy*, 32 (2007), pp. 6346-6347; 6352.
[152] Barnett et al., "Will OPEC Lose?", pp. 2084-2087.

press as biased and referred to an older study by Charles River, which estimates annual losses of US$19bn from 2012 onwards for Saudi Arabia alone.[153]

Figure 3.13. OPEC oil export revenues by 2030 according to the IEA.[154]



As the models have so far demonstrated, predicting the demand and price of oil is extremely difficult, as these are influenced by a large number of other factors than mitigation policies. The 2000s passed with no response measure-induced losses for the OPEC members; the 2008 price collapse was caused by the global financial crisis, not abatement policies. Moreover, in the end of 2010, the swift creation of a global carbon market or implementation of carbon taxes seemed increasingly unlikely as the major emitting countries, the US and China in the lead, continued to display a lack of political will to commit internationally to ambitious emission cuts and targets. As Barnett et al. have reminded, payment of compensation for lost oil revenues, sought by the OPEC, is 'politically unrealistic and practically problematic', because the calculation of the exact

[153] *New York Times* (13 October 2009).
[154] IEA, "Presentation to the Press", [http://www.iea.org/speech/2009/Tanaka/WEO2009_Press_Conference.pdf]. London, 10 November 2009.

amount of losses is technically impossible.[155] OPEC countries therefore need to look into other kinds of 'adaptation strategies'. What is more, the already existing domestic demographic pressures and natural resource security trends might well push the small Gulf monarchies to economic diversification away from oil far earlier than global mitigation does.

Adaptation

Importantly, according to some studies, there are already visible physical impacts of climate change in the Lower Gulf. Most impacts, however, are expected to take place in the coming decades. By then, fossil fuel-derived external rent is expected to be dwindling as a result of resource depletion (particularly in Bahrain and Oman) and/or declining global demand (new technologies or international climate change mitigation).[156] In addition to this, regional instabilities can have destabilising impacts in the otherwise internally robust Gulf monarchies: climate change-induced drought, poverty, unemployment and migration can turn the presently turbulent neighbourhood into one of failing states and large-scale social unrest.

As in the case of environmental change in general, those countries best equipped in terms of working institutions, financial resources and good governance, will be in the best position to cope with the threats and challenges associated with natural resources and climate change. Adaptation has not been a major concern for the Gulf monarchies. As Raouf, in 2008, has described the situation, 'adaptation to the various impacts of climate change [in the GCC] has been very low. Information acquisition, public awareness, mainstreaming impacts into policies, monitoring, evaluation, and implementation measures [are] almost nonexistent.'[157] Cooperation in the area of adaptation with other states in the region is also lacking. However, many existing policies and reform processes enhance the monarchies' adaptation capacity, most importantly economic diversification and sustainable water management practices and food security policies.

Anthropogenic contribution to climate change

Although the industrialised countries bear the historic responsibility for climate change, the 'future responsibility' will lie on the developing countries, particularly large emerging

[155] Barnett et al., "Will OPEC Lose?", p. 2086.
[156] See: D. Kumetat, "Climate Change in the Persian Gulf—Regional Security, Sustainability Strategies and Research Needs", Conference on *Climate Change, Social Stress and Violent Conflict*, Hamburg, 19-20 November 2009, pp. 1; 5.
[157] M. Raouf, *Climate Change Threats,* p. 5.

economies, such as China and India, where emissions are growing fast.[158] Simultaneously, however, enshrined in the United Nations' values, is the principle of right to development of the developing countries.[159] Thirdly, of importance for the fossil fuel exporters is the question of responsibility for the emissions of their export products: GCC OPEC states have been advocating the polluter pays principle despite having benefited for decades from revenues from a product with negative environmental externalities.

The small Gulf states' total greenhouse gas emissions are small, both historically and in current terms, but their per capita emissions are the highest in the world (see table 3.3).

Table 3.3. Carbon dioxide emissions of the small Gulf states in a global context 2007.[160]

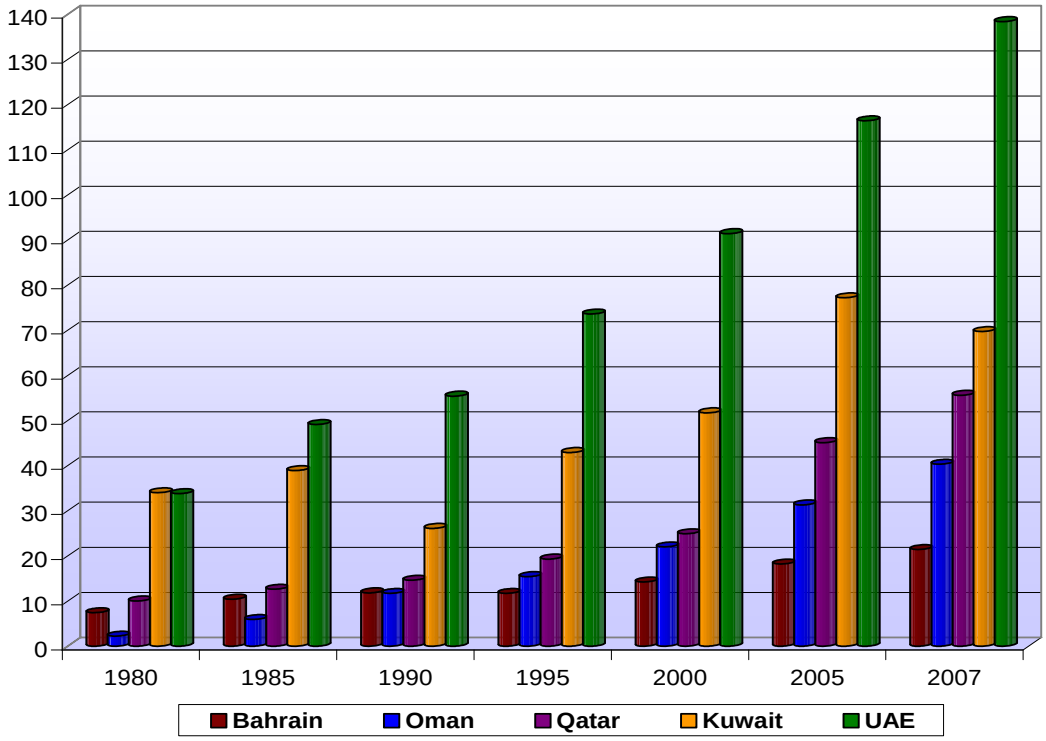
	CO_2 emissions (Mt)	**CO_2 emissions, % of world total**	**CO_2 emissions, global rank**	**Per capita emissions of CO_2** (tonnes)	**Per capita CO_2 emissions, global rank**
Bahrain	21.4	0.07	80	28.1	3
Kuwait	69.7	0.24	46	26.2	4
Oman	40.3	0.14	67	14.8	12
Qatar	55.6	0.19	56	48.8	1
UAE	138.4	0.47	33	31.7	2
United States	5,826.7	19.73	2	19.3	7
China	6,702.6	22.70	1	5.1	66
Saudi Arabia	373.4	1.26	18	15.5	11
GCC	698.7	2.37	…	19.5	…
MENA	2,216.9	7.51	…	4.8	…
Non-Annex I	14.489.9	49.07	…	2.8	…
World	29,259.1	100.0	…	4.5	…

According to the World Resource Institute, the cumulative historical CO_2 emissions of the five states in 1850-2007 represent 0.04%-0.18% of the world total. The states' total emissions in 2007 (1.1% of global total) amounted only to a fraction of US or China's emissions (19.7% and 22.7%) in 2007. Due to economic and population growth, socioeconomic development, expanding energy and heavy industries, and economic

[158] In its World Energy Outlook 2008, the IEA pointed out that even if every single OECD country cut their greenhouse gas (GHG) emissions to zero by 2030, this would not be enough to reach a safe level of emissions globally. *International Energy Agency*, Press release (12 November 2008).
[159] UN General Assembly, *Declaration on the Right to Development*, A/RES/41/128 (4 December 1986).
[160] Data for other GHGs n/a. World Resources Institute, *CAIT 8.0*. Data excludes land use change and international bunkers. Non-Annex I refers to countries classified as developing countries under the UNFCCC. As members of the Non-Annex I, the small Gulf monarchies are not obliged to produce yearly emission inventories.

diversification efforts, the small Gulf states' emissions have however grown rapidly in the past decades, as figure 3.14 shows: from 1980 to 2007, the emissions of most were multiplied by several times.

Figure 3.14. Total CO_2 emissions of the small Gulf states 1980-2007 (WRI).[161]



The high per capita emissions of the Gulf monarchies, which placed them as the top emitters in the world in 2007 (ranks 1-4 and 12), attracted unwanted international attention in the late 2000s: the Western press published articles on the unsustainability of the Gulf societies,[162] and pressure mounted in the UN climate change negotiations for the GCC states to take on new commitments (see chapter 6). In 2007, according to the WRI, an 'average Qatari resident' produced almost 11 times the emissions of an average person in the world and 2.5 times that of an American (see table 3.3). However, after taking into account the emissions of the industrial sector and the marked differences in energy consumption patterns of an average Gulf national and an Asian low-wage worker, it becomes apparent that a per capita emission is actually 'no-one's emission'. Among other things, the high per capita emissions tell about the region's hot and arid climate, lack of freshwater resources, and economic growth, but also the impact of fossil fuels and

[161] Ibid.
[162] See e.g.: *Guardian* (29 January 2009); *New York Times* (27 October 2010).

rentierism in the form of a fossil-fuel dominated energy mix, structural energy inefficiencies, energy intensive industries, and rentier mentality of the populations.

The greenhouse gas emissions of the MENA region, which accounted for 7.5% of global emissions in 2007, are projected to grow faster than the global average in the coming decades. Despite the uncertainties associated with emission projections (similarly to energy), they provide a general indication: the French POLES model estimates the Gulf states' average annual emission growth as 2.7% in 2007-2030, while placing global average growth at 2.2% and that of the rest of the Middle East at 3.4%. Emissions in most European countries and the US are projected to grow by less than 1% per annum.[163]

Mitigation

Existing national mitigation measures in the small Gulf states are still very few, as the five states do not have any obligations under the Kyoto Protocol to cut or limit emissions. A Chatham House report describes mitigation activities in the OPEC member states up to 2005 as resulting from wider developments in the energy field. These include investments in more efficient technologies; the development of gas markets, investments in non-associated gas and recovery of associated gas; and technological developments, including gas flaring recovery and LNG. Alongside these actions, technology transfer and CDM-type mechanisms will, however, remain essential for improving the energy infrastructures and developing new technologies.[164] With only two notable exceptions, the small Gulf monarchies have been slow to seize the opportunities of the CDM. These have been Qatar's massive gas flaring reduction project from 2007 and four energy projects (solar, landfill and efficiency) in the UAE from 2009, including 10 MW and 100 MW solar power plants in Abu Dhabi.[165] Notable developments in the area of alternative energies and technologies since 2006 include Abu Dhabi's Masdar Initiative (see chapter 4.3.2) and projects undertaken by the members of the Qatar Science and Technology Park (see chapter 5.3.2). By the end of 2010, the most concrete mitigation pledge by a Gulf monarchy was Abu Dhabi's declaration from 2009 that it would seek to produce 7% of the emirate's electricity (capacity) with renewables by 2020.

[163] World Resources Institute, *CAIT 8.0*. The US EIA's energy emission projections (low and high) for 2005-2030, estimate a growth of 1.9-2.4% in the Middle East and a global CO_2 emission growth of 1.3-2.1%. Ibid.
[164] Chatham House, *OPEC and Climate Change*, pp. 40-41. It must be noted, however, that even those countries in the West that have managed to cut their greenhouse emissions substantially have been motivated by energy security concerns rather than a preoccupation for climate change. Giddens, *Climate Change*, p. 88.
[165] J. Fenhann "CDM projects in the pipeline", UNEP Risoe Centre. Excel chart, [http://cdmpipeline.org/]. Updated on 1 December 2010.

Raouf has criticised the lack of clear carbon intensity reduction targets and the lack and bad quality of emission registries, and has called for new domestic policies, such as tax incentives for renewable energy and clean technologies, as well as policy integration.[166] By 2010, carbon reduction targets had not yet been announced by any of the five states, and the political realities (low level of ambition in the international climate process, the Non-Annex I status and the unwillingness to commit internationally) made it seem unlikely that any targets would be launched in the coming years. Emission registries were being improved significantly in the UAE, and Qatar produced a registry for 2006. Still, bureaucratic competition and opacity led to problems in data availability and reliability. Feed-in-tariffs for solar were discussed in the Gulf in the late 2000s, and climate change considerations began appearing on water and food security policy agendas. Little concrete action, however, had been taken by the end of the observation period.

There are also potential adverse impacts relating to national mitigation that affect the local governments' willingness to act: Buhaug et al. argue that strict measures to restrict CO_2 emissions in high-growth developing countries would most probably damage their economic growth, which could result in political instability and civil unrest.[167] For the rentier state, this is a serious issue, particularly when it comes to natural resource subsidies. On the other side, as the Stern Review reminds, the costs of delayed action might be higher than prompt action.

[166] Raouf, *Climate Change Threats*, p. 5.
[167] H. Buhaug et al., *Implications of Climate Change for Armed Conflict*. Social Dimensions of Climate Change (Washington D.C.: World Bank, 2008), p. 41.

4 Abu Dhabi's energy security and climate change responses

Abu Dhabi, as the holder of over 90% of the UAE's proven fossil fuel reserves, has built the country's economic wealth and development on its non-renewable and exhaustible resources. Since the 2000s, the emirate has been increasingly confronted by internal pressures caused by economic growth, domestic energy demand, and an increasingly environmentally unsustainable development trajectory, as well as external pressures and uncertainties relating to the international demand for energy and the future impact of climate change. In the late 2000s, Abu Dhabi's young and dynamic ruling elite, particularly brothers Sheikh Mohammed and Sheikh Abdullah bin Zayed Al Nahyan, devised a set of energy and environmental sustainability-related survival strategies, which are now profoundly transforming the emirate's domestic agenda.

While fossil fuels will remain the backbone of both domestic energy security and economic security in Abu Dhabi, important changes in the field of energy started taking place from 2006 onwards, in the form of two new alternative energy strategies. The nuclear programme, announced in 2008, is envisaged to make a significant impact on the entire federation's energy security. Abu Dhabi's 7% by 2020 renewable energy target, announced in early 2009 in connection with the multi-faceted 'future energy' company Masdar, established in 2006, is a sign of broader changes in elite perception and interest regarding the interactions of the evolving global energy economy and international politics of climate change.

4.1 Case-specific background

4.1.1 Political economy and stability

The United Arab Emirates, located on the southern coast of the Persian Gulf, is a small, high-income developing country, a capital-rich 'strong rentier state', formed in 1971 as a consequence of British withdrawal from the region. Abu Dhabi is the first of the seven emirates that form the (con)federation, both in terms of territory (roughly 80%),

hydrocarbon reserves (93-94%) and, consequently, power.[1] In terms of population it is roughly equal to the other major emirate Dubai (around 1.5 million in 2008).[2] Abu Dhabi's gross domestic product is well over half of the federal total. In 2010, plans were to spend US$100-300bn in industrial development by 2020 while increasing the emirate's GDP by five times and tripling its non-oil GDP by 2030.[3]

Subregional geopolitics

The external stability of the United Arab Emirates, as one of the five smaller Gulf Cooperation Council member states, is defined by the geopolitical setting of the Gulf region.[4] Alliances with external players, including the US, France and other Western states, are an important pillar of the UAE's external security strategy and reflect a longer-term policy principle of avoiding reliance on only one foreign power. Another strategy has been the maintenance of partial foreign ownership of the national oil and gas companies, increasing thus the number of external actors with a vested interest in stability. A bilateral defence agreement, dating back to 1994, has enabled the United States' military to use the UAE's ports and hold troops at Abu Dhabi's Dhafrah airbase,[5] some even suggesting that it has become 'the preferred military partner for the US in the Gulf'.[6] In 2009, as a result of President Sarkozy's push to expand France's strategic and economic presence in the Gulf, the country opened a permanent military base in Abu Dhabi which, according to some analyses, also furthered the emirate's goal to seal its hold on the federation's permanent capital.[7] Moreover, Australia and Italy, among others, have bases in Abu Dhabi and Dubai.[8] Because the UAE does not host a permanent US base it has sought to build up a robust defence capability: in 2005-2007 annual defence expenditure was over US$10bn, and in the latter half of the 2000s the UAE accounted for 57% of all conventional arms purchases in the Gulf.[9]

[1] In 2009, Abu Dhabi owned 7.0% and 3.2 % of the world's proven oil and natural gas resources. US EIA, *United Arab Emirates*. The land area of Abu Dhabi is 67,340 km^2, 30% of its which is inhabited. Abu Dhabi Tourism Authority, "Geography", [http://www.visitabudhabi.ae/en/about.abudhabi/geography.aspx]. Accessed on 21 December 2010.
[2] IMF, *UAE Statistical Appendix*.
[3] *Wall Street Journal* (15 March 2010).
[4] See e.g.: Pollack, "Securing the Gulf", p. 3.
[5] Davidson, *Oil and Beyond*, p. 145; IISS, *Shadow of Iran*, p. 54.
[6] *Gulf States Newsletter* (9 April 2010), p. 3.
[7] *Stratfor* (15 January 2008a); *The Middle East* (June 2009), p. 43.
[8] *The National* (2 June 2009; 28 June 2009). Canada, New Zealand and the Netherlands also have allegedly used or continue to use the Minhad Air Base in Dubai.
[9] 2005-2009. Stockholm International Peace Research Institute, *The SIPRI Military Expenditure Database*, [http://www.sipri.org/databases/milex]. Accessed on 2 January 2011; *The National* (26 December 2010).

The UAE maintains relatively good relationships with its GCC neighbours, including Saudi Arabia, and the other two major subregional powers, Iran and Iraq. Abu Dhabi, however, has in recent years grown increasingly bold in challenging Saudi Arabia's leadership of the GCC. Since the 2000s, a 'long list of small spats, ranging from lorry drivers stranded at the border… to complaints over proposed causeways' has developed between the two countries,[10] and the Abu Dhabi-led foreign policy has become increasingly bolder. In 2009, the UAE withdrew from the GCC's common currency project in disapproval of the plans to place the central bank in Saudi Arabia. The two monarchies' rivalry has also hindered the completion of a GCC customs union.[11] Because of their long history of trade and other links with Iran, Dubai and Sharjah maintain a closer and warmer relationship with the country, while Abu Dhabi has been more suspicious towards Iran's regional ambitions, particularly regarding its nuclear programme (see chapter 4.3.2). Three islands, Abu Musa, and the Greater and Lesser Tunbs have been disputed by Sharjah, Ras al-Khaimah and Iran since the 1970s. In an attempt to position itself as a 'wealthy active neutral' and divert public attention away from its US alliance, the UAE has sent peacekeepers and offered mediation in numerous regional and international conflicts.[12]

Fossil fuel-based economy

The main development objectives and challenges of the UAE have remained the same since the 1980s, namely: sustaining high growth, diversifying and transforming the economy away from oil, securing stable non-oil income sources, and gearing the national population towards productive labour.[13] Economic growth during the last decades, on average, has been a success story. In 2009, the UAE economy ranked 36th on a global scale, and the country's GDP per capita was among the top-20.[14] Marked socioeconomic differences however exist both between and within the seven emirates. Abu Dhabi's share of the federation's GDP is around 55-60%[15], and its GDP per capita (US$73,000 in 2007), several times larger than of that of the poorest emirate, Ajman (US$12,000 in 2007), sets the emirate's nationals, along with Qataris, among the richest people in the world.[16]

[10] *Gulf States Newsletter* (9 April 2010), p. 1. Saudi Arabia also originally opposed the Dolphin pipeline.
[11] *Kuwait Times* (9 May 2010); *Financial Times* (21 May 2009).
[12] Davidson, *Oil and Beyond*, p. 145.
[13] F. Al Shamsi, "Industrial Strategies and Change in the UAE during the 1980s" in A. Abdelkarim (ed.), *Change and Development in the Gulf* (Houndmill and London: MacMillan, 1999), pp. 79; 100.
[14] World Bank, "Gross domestic product 2009"; Central Intelligence Agency, "Country comparison: GDP per capita (PPP)", [https://www.cia.gov/library/publications/the-world-factbook/rankorder/2004rank.html]. Accessed on 22 December 2010.
[15] Average from 2003-2007. IMF, *UAE Statistical Appendix*.
[16] Ibid. The UAE's average was 44,000 US$. Data originally from the UAE's Ministry of Economy. An estimate by Davidson ("After Sheikh Zayed", p. 42) put the 'value' of one Emirati citizen at US$75,000 in 1999.

Economic diversification is still a major challenge, since Abu Dhabi's wealth and growth continues to be based on external rent, mainly from oil. Industrialisation began shortly after the discovery of oil in 1959, although until 1966, when Sheikh Zayed assumed leadership, export revenues were not used towards infrastructure development.[17] Even so, until 2005, Abu Dhabi's development was slower than in neighbouring Dubai.[18]

Abu Dhabi is the sovereign owner of 94% and 93% of the federation's proven oil and natural gas reserves (92.2bn bbl and 5.6 trillion cubic metres), respectively.[19] This share has been rising since Dubai's oil production peaked in 1991.[20] The reserves of the five smaller emirates are even less significant. Oil has contributed decisively to the country's economic growth and development, especially during the oil price boom of the 2000s, and continues as the single most important contributor to GDP growth, estimates of its share ranging between 39-59% (2007-2008).[21] For Abu Dhabi, official government data places the share at 53% of the emirate's GDP in 2007,[22] which in reality could be even higher, as part of oil revenues are paid directly to reserve accounts.[23] According to the IMF, over 80% of Abu Dhabi's income derives from the national oil company ADNOC and its 14 group companies.[24] From 2003 to 2007, Abu Dhabi's annual oil exports rose from US$26bn to US$58bn, and in July 2008, at the peak of oil prices (US$140/bbl), with oil production at 2.5 million bbl, the emirate was estimated to earn US$351m a day from oil and gas.[25]

Due to its oil wealth, Abu Dhabi's long-term economic strategy lies extensively on a combination of overseas investments and industrialisation in energy intensive industries (such as aluminium and petrochemicals) and the hydrocarbon sector. Since the emirate's oil reserves are estimated to last roughly 100 years at current production rates, the shift away from oil is planned to be gradual. Abu Dhabi's industrial strategy has long been based on its comparative advantage derived from cheap energy. Indicating its long-standing emphasis on heavy and state-sponsored industry and lesser interest in foreign direct investment, even in the in the mid-2000s, Abu Dhabi received only 9% of the total

[17] Davidson, "Contrasting Roles", p. 35.
[18] Davidson, *Vulnerability of Success*, p. 79.
[19] Data for 2009. US EIA, *United Arab Emirates.*
[20] In 2000, with oil production at 170,000 b/d, Dubai's oil reserves were expected to be exhausted in 20 years. Butt, "Oil and Gas", p. 237.
[21] Lower estimate (2007): IMF, *UAE Statistical Appendix.* Originally from the Ministry of Economy and Central Bank of the UAE for 2007. Upper estimate (2008): World Bank, *World Development Indicators*.
[22] IMF, *UAE Statistical Appendix.* Originally from the Ministry of Economy of the UAE and ADNOC.
[23] EIU, *United Arab Emirates: Country Report, April 2009* (London: EIU, 2009), p. 6.
[24] Cited in: *The National* (13 July 2008).
[25] Ibid.; IMF, *UAE Statistical Appendix*. Data from ADNOC.

non-oil-related foreign direct investment to the UAE, although the emirate accounted for over half of the total manufacturing output.[26] The importance of overseas investments as a short-term survival strategy has grown significantly since the establishment of the Abu Dhabi Investment Authority (ADIA) in 1976, which, even after suffering losses after the 2008 financial crisis, was still considered in 2010 to be the world's largest sovereign wealth fund (US$627bn).[27] In addition to ADIA, there are seven smaller funds either owned or controlled by the local government.[28] Moreover, large, unquantifiable amounts of wealth have been accumulated both by the ruling family, and citizens.[29]

Abu Dhabi's non-fossil fuel economy

While Dubai's diversification has been imperative, in Abu Dhabi it has always lacked urgency. After the death of the emirate's long-time ruler, Sheikh Zayed bin Sultan Al Nahyan, in 2004, however, Abu Dhabi's dynamic new leaders initiated fast-paced diversification efforts, accompanied by massive infrastructure developments and modernisation programmes.[30] Davidson maintains that, in addition to the leadership of the emirate's new crown prince Sheikh Mohammed bin Zayed Al Nahyan, 'an increasing concern over domestic employment prospects, unhealthy trade balances [non-oil exports to imports ratio standing at 1:50], and inflationary pressures' were the main thrusts for the strong emergence of new economic sectors, which include: 'high technology heavy industries' (connected mainly to Mubadala), cultural tourism and real estate (for example the Saadiyat Island), and alternative energy technologies and production (Masdar, owned by Mubadala).[31] These new economic sectors, which observers have evaluated as carefully thought out, are designed and built with top global partners, so as to ensure the highest possible chances of success[32]—if only political and financial support are sustained.

Since 2004, Abu Dhabi began to emulate Dubai's model in the development of its real estate sector and diversification of its sources of (potentially volatile) external rent. Although the real estate sector also serves as an extension of the allocative state and in

[26] Davidson, "Contrasting Roles", pp. 8; 38; 42 and *Oil and Beyond*, pp. 69-70.
[27] Sovereign Wealth Fund Institute, "Fund Rankings". Estimates vary greatly due to the opacity of the fund.
[28] *The National* (13 July 2008).
[29] Davidson, "Contrasting Roles", p. 38.
[30] Plans had probably been prepared already during Zayed's lifetime, as changes started taking place at a fast pace quite soon after his death. Interview with Abu Dhabi-based investor, Abu Dhabi, October 2008.
[31] Davidson, *Oil and Beyond*, pp. 77-78 and chapter 4.
[32] See e.g.: ibid., p. 69. Masdar, pre and post-2008, is a pertinent (negative) example of swaying financial support from the government.

maintaining patronage links between the government and citizens,[33] Abu Dhabi's government still owns most land, and megaprojects continue to remain in the domain of powerful businessmen who are either within or linked to the royal family.[34] In 2007, the total value of all planned and ongoing construction projects in the emirate was estimated at US$300bn.[35] Also, to attract foreign capital, land ownership rights have, since 2005, gradually been extended to non-nationals though long-term leaseholds.[36] Abu Dhabi's free zones will also support diversification. The current and planned free zones include the Industrial City of Abu Dhabi, Khalifa Port and Industrial Zone, and Masdar City, the former two of which accommodate different sizes of industries and the latter specialises in alternative energy technologies.

Expansion plans in the tourism sector are massive, with expectations of 4.9 million tourists by 2020 and 7.9 million by 2030, compared to 1.8 million in 2007.[37] The developments, many of which are linked to the expansion of the real estate sector, are aimed at luxury tourism, some incorporating nature conservation and/or local cultural heritage, others F1 racing or golf. The expansion of the tourism industry, expected to employ mostly foreigners, will be boosted by the 'national' airline Etihad's US$43bn fleet expansion.[38]

Another potential alternative source of external rent, but also production-based revenues, is alternative energy and related technologies. The Masdar Initiative, founded in 2006, is the locus of developments related to R&D, foreign asset acquisitions, technology transfer, domestic implementation of renewables and 'clean' energy technologies. If successful, in the long term it will also contribute to building the local knowledge economy and will provide jobs for nationals.

Demographics and reform pressures

In the case of the UAE, in addition to the GCC-wide problems of demographical data[39], the federation structures complicate coherent data aggregation. Population data is perhaps the best/worst and most politicised example, with great divergence between various agencies'

[33] Audited institutions like ADIA are not suitable for this purpose, while the welfare state structures alone are not deemed adequate. Interview with Abu Dhabi-based investor, October 2008.
[34] Davidson, "Contrasting Roles", p. 41.
[35] J. Wilén, *Arabiemiraatit: Abu Dhabin rakentaminen*, Toimialakatsaus (Finpro, 2007).
[36] Long-term leasing to non-nationals began in Dubai in 1997 and then extended to other emirates. Davidson, *Oil and Beyond*, p. 86.
[37] Abu Dhabi Urban Planning Council, *Plan Abu Dhabi 2030: Urban Structure Framework Plan* (2007), p. 45.
[38] *The National* (14 July 2008).
[39] See methodological note in introduction.

figures, which renders the demographic statistics for the country mainly indicative. Estimates on total population ranged between 5.1-6.0m for 2009 and a clearly fabricated estimate from 2010 claimed a total population of 8.2m.[40] During past decades, Abu Dhabi's population has grown fast, from around 200,000 in 1975 to 950,000 in 1995 and 1.6-1.7 million in 2009. Official estimates place the nationals' share at 25%.[41] Abu Dhabi, similarly to the other Gulf monarchies, has a high male to female ratio (1.9 in 2009[42]), reflecting the economic reliance on foreign labour, especially in male-dominated sectors of the economy. The emirate's long-term urban plan is built on the assumption that the population of the emirate will rise to 2 million in 2020 and 3-5 million in 2030.[43]

Abu Dhabi's national population is young, and thereby presents a job-creation challenge to the local government: in 2009, 40% of the emirate's nationals were below 15 years old, and in 2008, 10.4% were registered as unemployed. Population growth rates for nationals were 9.1% in 1975-1985 and 4.5% in 1995-2005, and for non-nationals 10.1% and 3.8%, respectively.[44] The fast growth of the non-national population has brought a series of problems, ranging from energy insecurity to dilution of the Emirati identity, and some nationals have expressed concern about the fast decline in birth rates among the native population.[45]

In an attempt to increase the country's permanent knowledge base, the state seeks to guarantee all Emirati high school graduates a place in a university. Almost two thirds of university students are female, a ratio which is presumably reversed in the labour market.[46] Often the demand of the local labour market and the supply of qualified and willing Emiratis do not meet. In 2008, expatriates accounted for 99% of the private sector and 91% of the public sector jobs in the UAE. 45% of Emiratis worked in the public sector. By 2020, according to some estimates, Emiratis will constitute only 4% of the total

[40] Ministry of Economy: 5.1m in mid-2009. *UAE Interact* (19 May 2009); Department of Naturalisation and Residency, the Ministry of Interior and the Ministry of Labour: 6m as of October 2009, including 1.75m Indians, 1.25m Pakistanis. *Gulf News* (6 October 2009b); National Bureau of Statistics: 8.2m in mid-2010. *The National* (30 May 2010).

[41] Ministry of Economy of the UAE, "UAE in Numbers 2007", [http://www.economy.ae/Arabic/EconomicAndStatisticReports/StatisticReports/Documents/Statistic%20Reports/UAE%20in%20Numbers/UAE%20Figures2007.pdf]. Accessed on 22 December 2010; IMF, *UAE Statistical Appendix*; Statistics Center – Abu Dhabi, *Statistical Yearbook 2010*, pp. 103-104.

[42] Statistics Center – Abu Dhabi, *Statistical Yearbook 2010*, p. 103.

[43] Abu Dhabi Urban Planning Council, *Plan Abu Dhabi 2030*, p. 45.

[44] 58% aged 15-64, and 2% aged 65+. Statistics Center – Abu Dhabi, *Statistical Yearbook 2010*, pp. 103; 193.

[45] *The National* (21 June 2009a).

[46] *The National* (13 July 2009). Reliable statistics on female unemployment were not available.

workforce.[47] The government has implicitly admitted that emiratisation policies so far have largely failed.[48] The lower wages of the private sector, low working morale and negative stereotypes associated with nationals have been mentioned among the reasons.[49] In 2007, the Abu Dhabi government embarked on a rationalisation effort that included outsourcing of non-core functions to the private sector.[50]

Pressure to reform is generally low in the UAE and major changes to the current political system, characterised by authoritarianism, tribalism and federalism, have not been notably advocated.[51] The national population is tied into a rentier bargain through a dense web of material welfare benefits (free education, subsidised natural resources, financial support, and land and home allocations, to mention a few) and immaterial legitimacy resources based on kinship and proximity to the ruling elite. Welfare benefits are the strongest in Abu Dhabi, and hence, future calls for reform are likely come from the smaller emirates. In terms of political reforms, the UAE scores poorly both on the Freedom House's freedom index (see chapter 3.1) as well as the Economist Intelligence Unit's democracy index: in 2008, the country ranked 147th of 167, below countries with a notorious reputation, such as Iran and Afghanistan. However, as the EIU notes, the UAE's high (average) income status equates to fewer social strains than in poorer countries with similar scores.[52]

Dynamics of the federation

As Heard-Bey has noted, 'the combination of the adopted federal form of government with the inherited role of the tribal rulers… makes the UAE unique in terms of political structure and reality of governmental administration'.[53] Davidson describes the UAE as more of a confederation, a voluntary association of independent entities, due to the weakness of centralisation during the entire existence of the federation.[54] Each emirate maintains a local government and retains complete sovereignty over its natural resources.[55] Still, since its formation 1971, there has been some evolution towards a federation, as key

[47] National Media Council, *UAE Yearbook 2010* (Abu Dhabi, 2010); p. 156; *Gulf News* (4 July 2008).
[48] See e.g. Prime Minister of the UAE, "Prime minister's first e-session with the public", [http://www.uaepm.ae/en/media/e-sessions/Public-e-Session-en-010609.html]. Updated on 1 June 2009.
[49] The actual figure is estimated to be higher. *Gulf News* (4 July 2008).
[50] Abu Dhabi Executive Council, *Policy Agenda 2007-2008: The Emirate of Abu Dhabi* (2007), p. 38.
[51] See e.g.: F. Heard-Bey, "The United Arab Emirates: Statehood and nation-building in a traditional society", *Middle East Journal*, 59 (2005), p. 375. But cf. *Gulf News* (9 March 2011).
[52] EIU, *UAE Country Report, April 2009*, p. 14; EIU, "The Economist Intelligence Unit's Index of Democracy 2008", [http://graphics.eiu.com/PDF/Democracy%20Index%202008.pdf]. Accessed on 23 December 2010.
[53] Heard Bey, "Statehood", p. 358.
[54] Davidson, "Contrasting Roles", p. 37.
[55] G. Brown (ed.), *OPEC and the World Energy Market: A Comprehensive Reference Guide*. 2nd edition (Essex: Longman, 1991), p. 360.

powers, including military, foreign policy and immigration, have been ceded to the federal government.

Abu Dhabi directly finances the federal budget, around 40% in 2010.[56] Due to its economic strength, Abu Dhabi holds the (de facto) permanent presidency and the capital of the federation, and controls all foreign policy as well as the federal Union Defence Force. It has been abundantly financing the smaller emirates, and, to some extent, even the second wealthiest emirate, Dubai, since the early days of the federation.[57] Although Dubai has never had significant power in federal matters, owing to its size and economic weight, it has a large number of ministerial and legislative posts and, similarly to Abu Dhabi, it can veto decisions of the Supreme Council of Rulers.[58] The influence of Abu Dhabi over Dubai has always been a sensitive issue. In addition to the free allocations of oil Abu Dhabi is said to provide to Dubai, Abu Dhabi has, on more than one occasion, rescued significant sectors of Dubai's economy through federal intervention. This has considerably strengthened its influence over the second wealthiest emirate, particularly after the 2008 credit squeeze.[59]

Another marked feature of UAE dynamics is inter-emirate competition. Throughout the history of the federation this has resulted in important duplication of institutions, investments and infrastructure, some of which can be judged as unprofitable from both federal and local viewpoints.[60] In the 1970s, major infrastructure and social welfare investments were made, which led to partial duplication of expenditure. The several international airports and the competition between Dubai's airline Emirates and Abu Dhabi's Etihad are just two examples of the continuing problem. Duplication of official bodies has also caused problems in the energy sector[61], and duplication of environmental agencies has led to major deficiencies, even tensions, in policy coordination and -making (see chapter 4.2.1).

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[56] Press reports. Dubai's contribution was 3%. *The National* (16 June 2010).
[57] Davidson, "Contrasting Roles", pp. 37-38; Davidson, "After Shaikh Zayed", pp. 43-44. According to Davidson, at least Fujairah and Ras al-Khaimah rely on Abu Dhabi funds for their peripheral development. According to newspaper reports, in 2006, subsidies at home and transfers to the smallest emirates amounted to AED23bn (US$6.2bn). *The National* (13 July 2008).
[58] Davidson, "After Shaikh Zayed", p. 54.
[59] See e.g.: Davidson, "Contrasting Roles", p. 43; N. Partrick, *Nationalism in the Gulf* States, Research Paper No. 5 (London: LSE, 2009), p. 18.
[60] However, the markedly independent and dynamic role of Dubai, has been generally recognised as a complementary asset for the federation's development and diversification and as a provider of employment for the growing national population. Davidson, "Contrasting Roles", p. 43.
[61] EIU, *UAE Country Profile*, p. 5.

4.1.2 Energy security

Security of demand

Due to the abundance of its oil reserves, Abu Dhabi's main external energy challenges relate to global demand and price of fossil fuels in the medium and long term. In addition to these, there are other important uncertainty factors, including potential exaggerations in the official statistics, the maturity of the reserves, and uncertainties relating to investments in production capacity.

Although potential exaggerations regarding Abu Dhabi's proven oil reserves (discussed in chapter 3.2) could have implications for global prices, the worst negative implications would be for the emirate's economic security. Oilfield maturity is another problem: 11 of the 12 primary fields were discovered between 1958-1969, and one in 1975. The largest field in the UAE, Zakum (1963), is estimated to have 66bn proven barrels alone. Enhanced oil recovery is increasingly applied and recent exploration efforts have been described as disappointing.[62]

In order to be able to maintain supply to international markets from its maturing oil fields and reap revenues for the growing population, important investments are needed in the coming years; even despite the financial crisis, plans in 2010 were to expand the UAE's total production capacity from 2.7 million barrels per day (mb/d) in 2009 to 3.5 mb/d in 2018-19, including a 400,000 b/d capacity expansion by Abu Dhabi Company for Onshore Oil Operations (ADCO) costing over US$4bn.[63] With massive investments in the pipeline, sustained global oil demand is crucially important for Abu Dhabi. In 2009, President Sheikh Khalifa stated that a fair price would be US$70-75.[64] (Estimates on Abu Dhabi's break-even price for that year ranged between US$40-79.[65]) Fortunately, most of Abu Dhabi's exports are destined for East Asia, where demand is expected to keep growing. According to the OPEC, 96% of the UAE's crude oil exports in 2009 went to Asia. Japan

[62] Zakum is the third largest oil field in the Middle East. Butt, "Oil and Gas", p. 248; US EIA, *United Arab Emirates*. Note: A 2007 version is referred to in only this paragraph. The November 2009 version is used elsewhere.
[63] Targets have been repeatedly revised. *Reuters*, (22 September 2010); National Media Council, *UAE Yearbook 2010*, pp. 88; 94.
[64] *ArabianOilandGas* (25 March 2009).
[65] Fitch and Citigroup. Higher estimate due to possible liability for Dubai's debt. *The National* (22 November 2008).

is the main crude oil export destination, with 369m bbl in 2008 and 286m bbl (US$17.6bn) in 2009.[66]

Abu Dhabi's energy sector is organised under the major state-owned company, the Abu Dhabi National Oil Company (ADNOC, est. 1971), a conglomerate including 14 subsidiaries specialising in different areas of the industry. In order to safeguard the uninterrupted flow of oil to the world and the regime's rule, Abu Dhabi continues to engage in joint ownership of its national oil and gas companies; Japanese, French, British and American oil companies own up to 40% of Abu Dhabi's energy sector, the stated aim of which is to ensure the companies secure top foreign expertise and technology. The three main joint ventures, ADCO, ADMA and Zadco, control almost all oil production, accounting for 94% of the UAE's total production in 2008.[67]

As for natural gas, notwithstanding the exploitation problems (see below), Abu Dhabi's proven reserves are relatively abundant, constituting 5.6 trillion cubic metres (3.2% of the world's proven reserves).[68] The reserves, owned and managed by ADNOC and its foreign partners, are currently predominantly exploited for domestic use: either consumed at subsidised prices or re-injected in oil reservoirs for EOR.[69] In 2007 the UAE's total exports of natural gas (LNG) were 7.6bn cubic metres and they went mainly to Japan.[70] The development of Abu Dhabi's sour gas reserves, which constitute 50% of the UAE's total reserves, was first considered in the mid-1990s, but was postponed for over a decade due to higher extraction costs than elsewhere in the region. In the 2000s, as a consequence of rising oil prices and rising demand from the growing population and petrochemical and heavy industries, a new emphasis was given to their development.[71]

Security of supply and domestic demand side

According to the International Energy Agency's statistics, energy consumption (TFC) of the federation grew over five-fold from 1980 to 2008.[72] In 2008, domestic oil consumption

[66] 25% of Japan's total crude oil imports and 41% of UAE's oil exports in 2008. *Japan External Trade Organization*, Press releases (2 July 2009; 2 August 2010); OPEC, *Annual Statistical Bulletin 2009*.
[67] Butt, "Oil and Gas", pp. 233-234; OPEC, *Annual Statistical Bulletin 2008* (Vienna, OPEC, 2009).
[68] Data for 2009. US EIA, *United Arab Emirates.*
[69] Due maturity, the amount of gas required in oil production is increasing. IEA, *Betwixt Petro-Dollars and Subsidies: Surging Energy Consumption in the Middle East and North Africa States*, IEA Information Paper (Paris: OECD/IEA, 2008), p. 5.
[70] OPEC, *Annual Statistical Bulletin 2008*; US EIA, *United Arab Emirates.*
[71] Butt, "Oil and Gas", p. 231; *MEED* (5 January 2007).
[72] IEA, *Energy Balances, Non-OECD*.

was 17% of total oil production.[73] Serious domestic supply side issues in power generation emerged in the 2000s due to the fast growth in electricity demand, desalination, demand from the petrochemical industry, and EOR. Domestic gas, the main source of electricity (98% in 2008[74]), has not sufficed for domestic use since 2007 when domestic demand first outstripped supply, partly because of the unplanned growth and a late start in developing Abu Dhabi's gas resources, a large share of which are sour and hence difficult to exploit.[75] The fact that most of Abu Dhabi's gas is associated gas is another major factor that slows up exploitation, due to OPEC production quotas. According to a UAE official, around 65% of natural gas consumed domestically comes through the Dolphin pipeline from Qatar (see chapter 5.1.2).[76]

Already in the late 1990s, power and water demand in Abu Dhabi increased by 8% per year.[77] Growth continued throughout the 2000s, and in 2008, an ADNOC manager admitted that local demand had gone beyond the planners' imagination and the need to accelerate reserve development was urgent.[78] A government study from 2008 stated that the UAE's annual peak demand for electricity was likely to rise by 9% per year from around 13,000 MW in 2007 to over 40,000 MW by 2020. Natural gas would be able to supply around half of the needed capacity, and renewables 7% at most.[79] Despite the 2008 economic crisis, official federal demand estimates for the next decade were still high; the UAE's Ministry of Energy was quoted in 2010 as estimating the federation's peak demand in 2020 at 33,400 MW,[80] presenting a significant decrease, but still beyond what is achievable by domestic gas supplies and solar alone. According to the Abu Dhabi Water and Electricity Company (ADWEC), the global economic crisis had little or no impact on electricity demand in the emirate. In 2010, it forecasted that local demand would rise from 6,300 MW (gross) to 19,000 MW in 2020 and 26,000 MW in 2030.[81]

[73] Consumption: 166m bbl, production: 949m bbl. BP, *Statistical Review of World Energy*.
[74] The rest is produced from oil. IEA, *Energy Balances, Non-OECD*.
[75] US EIA, *United Arab Emirates*. In 2009, domestic consumption of natural gas was 59.1bn cubic metres and production reached only 48.8bn cubic metres (marketed production, not including 22.0bn cubic metres used in reinjection). Consumption: BP, *Statistical Review of World Energy*. Production: OPEC, *Annual Statistical Bulletin 2009.*
[76] Phone interview with Hamad Ali Al Kaabi, Permanent Representative of the UAE to the IAEA, November 2010.
[77] Abu Dhabi Water and Electricity Authority (ADWEA) data. Butt, "Oil and Gas", p. 243.
[78] Abdul Al Kindy, quoted in: *The National* (4 November 2008).
[79] Government of the UAE, *Policy on Peaceful Nuclear Energy*.
[80] *MEED*, (28 March 2010b).
[81] K. Miller, "ADWEC Winter 2009/2010 Demand Forecast", presentation in Abu Dhabi, 30-31 March 2010. ADWEC provides electricity and water also for the Northern emirates and water for Sharjah.

In 2007 Abu Dhabi began importing natural gas from Qatar and since 2008 volumes have been around 9.6bn cubic metres annually.[82] Despite existing additional capacity in the undersea pipeline, Qatar is not willing to export more to Abu Dhabi because of disagreements on the price, and the moratorium Qatar has placed on its massive North Field (see chapter 5.1.2).

Four 1,400 MW nuclear reactors are under way for Abu Dhabi, and despite a government policy paper from 2008, which excluded coal as an environmentally detrimental and supply-wise risky option—presumably for Abu Dhabi—, this option remains on the table in other emirates.[83] In November 2010, Dubai rather simplistically announced its energy mix by 2030 would consist of 20% nuclear energy and 20% coal.[84] According to a local official, the UAE is currently looking at 'clean coal' as an additional option to fill any remaining gap between total demand and supply.[85] As for renewables, the Abu Dhabi government has taken up a domestic goal of having a 7% renewables capacity by 2020, which, with the above mentioned ADWEC figures would translate into 1,330 MW.

From an economic perspective there are a number of reasons why the deployment of renewables has been and is expected to remain relatively sluggish: the low cost of fossil fuels and high cost of solar energy, high electricity and water subsidies, and the lack of international obligations to curb greenhouse gas emissions stemming from the UAE's developing country status in the UNFCCC. Feed-in-tariffs have nevertheless been planned by the Abu Dhabi government, and it has also been promising since 2009 to announce an energy policy that is expected to allow for establishing subsidy mechanisms for renewable energy.[86]

Electricity and water subsidies not only foster wasteful consumption but also create a heavy financial burden. The UAE population is amongst the top per capita consumers of energy in the world, and the residential sector takes up roughly a third of all electricity consumption.[87] Causes for the high consumption in the residential sector include economic growth, the 2000s construction boom (and previous lack of building codes), different types

[82] Dolphin Energy, "Core Customers and Volumes" [http://www.dolphinenergy.com/Public/marketing-distribution/marketing-natural-gas-customers-volumes.htm] Accessed on 23 December 2010.
[83] See e.g. *Gulf News* (14 November 2010).
[84] *Gulf News* (10 November 2010).
[85] Phone interview with Hamad Ali Al Kaabi, November 2010.
[86] *The National* (10 July 2010).
[87] According to the World Resources institute (*CAIT 8.0.*), in 2007, per capita consumption of energy was 11.8 toe, the third highest in the world. Ministry of Energy of the UAE, *Statistical Report 2003-2007*, [http://www.moenr.gov.ae/assetsmanager/Documents/Statistical%20Report.pdf]. 2008.

of price subsidies (fuel, electricity and water),[88] as well as the hot climate (need for constant air-conditioning), the high average standard of living, lack of environmental awareness, and arguably the rentier mentality in general. In 2010, electricity production in Abu Dhabi was estimated to cost 18-25 fils/kWh (5-7 US$ cents) while the industry, commercial sector and non-Emiratis paid 15 fils/kWh (4 US$ cents) and Emiratis only 3-5 fils/kWh (0.8-1.3 US$ cents).[89] In 2007, according to some estimates, the emirate allocated AED6.9bn (US$1.9bn) in subsidies to the water and electricity authority ADWEA.[90] The average gasoline price in the UAE was estimated by the IMF to have been 52-80% of the average US retail price in 2006-2008.[91] The unsustainability of the opportunity cost, however, has led the government to initiate a gradual liberalisation in petrol prices, with two price hikes in 2010 alone.[92]

Water desalination is also a major consumer of power. The process is both expensive and energy intensive. In the late 2000s, water desalination accounted for 20% of Abu Dhabi's electricity production in the summer and 46% in the winter, when air conditioning is used less.[93] In 2009, Abu Dhabi alone produced 1,045 mcm of water, and announced plans to double this during the 2010s at a cost of US$20bn.[94]

During the 2010s, demand side management issues will constitute the UAE's main energy security challenge, although the 2008 financial crisis came as a partial saver, as it cooled down economic growth; while in 2009 Abu Dhabi was still considering the construction of its first oil-fired plant, the slowing growth of power consumption by industry, major residential projects and ADNOC was reported in 2010 to have given ADWEA 'breathing space' to build additional power capacity.[95]

The government's primary response has been to increase supply and its cost-effectiveness. With this objective, Abu Dhabi privatised its electricity production sector starting from the late 1990s and managed to attract foreign investment and savings in terms of cost per unit

[88] See e.g.: M. A. Al-Iriani, "Climate-Related Electricity Demand-Side Management in Oil-Exporting Countries—The Case of the United Arab Emirates", *Energy Policy* 33 (2004), p. 2358.
[89] *The National* (19 October 2010); Regulation and Supervision Bureau, *Electricity Tariffs for Large Users in the Emirate of Abu Dhabi*, Information Tariffs (November 2009), p. 3.
[90] IMF, *UAE Statistical Appendix.* The total sum increased significantly during the 2000s.
[91] Ibid.
[92] 25% in total. See e.g.: *Emirates Business 24/7* (9 December 2010).
[93] EAD, "Water resources".
[94] *Gulf News* (15 June 2009).
[95] *MEED* (10 July 2009); *The National* (30 March 2010).

produced.[96] Major capacity expansion plans, aimed at electricity production and water desalination were announced in the late 2000s by the two government-owned gas companies Gasco (for onshore operations) and Adgas (for offshore).[97] ADNOC is also working on a massive sour gas project at the Shah, which has suffered from repeated delays.[98]

Typically for a fossil fuel-rich country, even as late as 2004, the UAE had not considered demand side management (DSM) as a policy option.[99] From the late 2000s however, energy and water efficiency measures were gradually introduced, and some elite members openly admitted that a change in behaviour relating to energy use patterns was ahead.[100] Abu Dhabi's Executive Affairs Authority was entrusted to prepare a comprehensive DSM strategy for electricity and water consumption in the emirate.[101] In 2009, a local newspaper reported on a government-commissioned study that had discovered that the equivalent of two power stations could be saved through awareness-raising among consumers.[102] Also, efficiency measures could reduce water demand by 30%.[103] A Water Master Plan for Abu Dhabi was launched in 2009 by the Environment Agency – Abu Dhabi (EAD), which also announced the installation of water-saving devices in 100,000 homes and public buildings.[104] As the softness of these planned and implemented measures indicates, the government still finds (and can afford to treat) abolishing natural resource subsidies a quasi-taboo.

The inter-emirate level of energy security

The inter-emirate level adds another layer to the equation; the Northern Emirates' increasing energy dependence is a serious energy security issue for the poor emirates, but also a burden for Abu Dhabi,[105] as it is engaged in a costly federal-level rentier bargain with them. Because of their significantly scarcer fossil fuel resources, the six other emirates, especially the five smaller ones (Sharjah, Ajman, Ras al-Khaimah, Fujairah and Umm al-Quwain) depend on Abu Dhabi not only for infrastructure development but also

[96] Al-Iriani, "Climate-Related DSM", p. 2359.
[97] National Media Council, *UAE Yearbook 2009* (Abu Dhabi 2009), pp.129-130.
[98] In 2010, ConocoPhillips pulled out from an US$10bn agreement it had signed with ADNOC on developing Abu Dhabi's offshore Shah field so as to produce 5.6bn cubic metres per year for domestic consumption by 2015. *Financial Times* (28 April 2010).
[99] Al-Iriani, "Climate-Related DSM", p. 2353.
[100] *Financial Times* (21 January 2009).
[101] Abu Dhabi Executive Affairs Authority, "Economic and Energy Affairs", [http://eaa.abudhabi.ae/Sites/EAA/Navigation/EN/AdvisoryUnits/economic-affairs.html]. Accessed 21 December 2009.
[102] *The National* (10 July 2009a).
[103] *The National* (22 June 2009).
[104] *UAE Interact* (22 March 2009); *The National* (21 June 2009b).
[105] Interview with Dr Tarik Yousef, Dean of Dubai School of Government, Dubai, October 2008.

for oil, gas and electricity. Even despite the 2008 economic crisis, power demand all over the federation kept rising due to high population growth, growth in the construction sector, and unsustainable subsidies. The Federal Electricity and Water Authority (FEWA), established in 1999, which provides most of the electricity of the four smallest emirates, had committed to an annual supply increase of 7%, while demand growth in some emirates was three-fold.[106]

Around 2007-2008, lack of local supplies and limited feedstock availability from Abu Dhabi began causing frequent power shortages, even blackouts, which placed limitations on local industries and led to important delays in residential and commercial projects in Sharjah and the poorer Northern Emirates. In late 2008 Ras Al-Khaimah was reported to have around 2,000 new buildings lacking connection to the grid, and an entire port relying on generators. In Umm Al-Quwain, a US$8bn megaproject was put on hold. Even in early 2010, at least 900 houses and commercial buildings were reported to lack access to electricity in the Northern Emirates.[107]

The reluctance of Abu Dhabi to continue supplying for its smaller neighbours' construction boom was evident in the announcement by FEWA in early 2008 that it would only supply electricity for residential projects.[108] In 2008, Abu Dhabi and FEWA signed an agreement under which the emirate is responsible for providing energy to the five northern emirates.[109]

Nevertheless, with supplies from Abu Dhabi no longer fully guaranteed, the other emirates devised a number of other plans, ranging from a gradual dismantling of government subsidies for non-nationals[110] to gas imports from other countries, as well as exploring alternative sources of energy. Dubai, with around 0.1 trillion cubic metres (2% of federal total) of remaining gas reserves, imports natural gas from Qatar both via Abu Dhabi through the Dolphin pipeline and, since 2010, also as LNG.[111] Sharjah, which owns some gas reserves (0.3 trillion cubic metres, 5% of the UAE's total), similarly had to resort to

[106] *The National* (6 January 2010); *UK Trade & Investment, Power & Water: Dubai and the Northern Emirates, United Arab Emirates (UAE)*, Sector Report (June 2009), pp., 3-4.
[107] *The National* (15 October 2008; 6 January 2010).
[108] As reported by: *The National* (15 October 2008).
[109] *MEED* (11 January 2008). A national power distribution grid, to be operated under FEWA, has also been announced by Abu Dhabi. EIU, *UAE Country Profile*, p. 16.
[110] *MEED* (20 March 2008).
[111] US EIA, *United Arab Emirates*; *Gulf Times* (7 December 2010).

gas imports from Abu Dhabi. Sharjah has for almost a decade sought Iranian gas, so far unsuccessfully.[112]

Although significantly more expensive and polluting than natural gas, diesel generators were a common short-term solution for both individuals and businesses in the smaller emirates. The four emirates sought a diverse range of more permanent solutions, including joint oil development projects, exploration of alternatives, and gas imports from Iran. Ajman and Sharjah agreed to develop jointly the offshore Zora gas field,[113]and Ajman, Ras al-Khaimah, Fujairah, and even Dubai, signalling their desperation, announced in 2008-2009 they were considering coal as an energy option.[114] Ajman was the first to sign a US$2bn deal in 2008 with a Malaysian power producer for a one-gigawatt plant that would be operating by 2012. Two Abu Dhabi-financed electricity plants were to be built to supply the needed energy meanwhile. However, in mid-2009, a source close to the Ajmani government confirmed the postponement of the coal plant project until further notice.[115] In 2009, Ras al-Khaimah announced it would start importing coal from Indonesia for a new plant to be built in the emirate.[116] Fujairah also studied the viability of coal power. The problems associated with coal-fired electricity: reliance on imports, large storage facilities and high carbon dioxide emissions, however, might not make coal a realistic option,[117] particularly if and when cheap nuclear electricity from Abu Dhabi's becomes available.

Even renewable energy has been considered, although mostly not on a large scale, for example, Ras al-Khaimah has since 2007 been developing and testing floating 'solar islands'.[118] All emirates, following Abu Dhabi's example, have also been seeking to increase private sector participation in the water and power sector as a partial solution to their inefficiencies. However, despite a 2008 law that allowed private power plants, the high electricity subsidies kept repelling private interest in the sector.[119]

[112] US EIA, *United Arab Emirates*; *The National* (15 February 2009); EIU, *UAE Country Profile*, p. 17.
[113] *MEED* (14 November 2007).
[114] *The National* (17 July 2008; 19 May 2009); *Gulf News* (23 March 2009).
[115] Interview with HH Sheikh Abdul Aziz bin Ali Al Nuaimi, Helsinki, August 2009. Also, Ajman Marina announced in late 2008 it would build its own power plant to ensure power supply. *The National* (20 October 2008).
[116] *The National* (4 March 2009).
[117] Interview with Abu Dhabi-based journalist, Abu Dhabi, October 2008.
[118] *Gulf News* (1 October 2007). Tests on a 1 MW prototype began in 2010. *The National* (13 September 2010).
[119] *MEED* (14 November 2007; Supplement 2009).

4.2 Domestic level structures and dynamics

A rather recent 'dynastic monarchy', power in Abu Dhabi has been held since 1966 by a 'ruling group at the pinnacle of the… bureaucratic state', led by Sheikh Zayed bin Sultan Al Nahyan and, after his death, a small number of his sons. The Al Nahyan, precedent from the Bani Yas tribe, however, have ruled in the area since the mid-18th century.[120] The current ruling elite's grip on power is strong and prospects of any large-scale political liberalisation can be evaluated as dim, based on the robustness of the allocative state, skilful coalition-building, exploitation of neotraditionalist legitimacy resources,[121] and the 'monarchy's pre-emptive strike'[122] with regards to embracing environmental sustainability on the policy agenda before calls for changes started emerging from among the nationals.

Neotraditionalism and -patrimonialism are clearly visible in the environmental ethos of Abu Dhabi's past, present and future greening, which crystallises in the famous *legacy of Sheikh Zayed* and the 'environmental legitimacy resources'[123] derived from it by the environmental elite through the continuous reproduction of Sheikh Zayed and his sons as the patriarchal, visionary 'greeners' of the emirate and the federation.

4.2.1 Decision-makers and related structures

Top decision-makers, past and present

The significance of Sheikh Zayed in creating what can be termed as a *culture of patriarchal environmentalism* in the federation is crucial for understanding the contemporary environmental sustainability discourse in Abu Dhabi. Sheikh Zayed bin Sultan Al Nahyan, born around 1917-1918, has been described as one the most distinguished political leaders in the Arab world, and 'a singular figure of immense charisma'.[124] As described by Davidson, 'the personal vision and energy of Shaikh

[120] Herb, *All in the Family*, p.136; Kéchichian, *Power and Succession*, p. 290; Davidson, *Oil and Beyond*, p. 6.
[121] Davidson, *Oil and Beyond*, p. 122.
[122] Davidson has argued that if the monarchy can be seen as the motor of change, this will prevent revolutions in the future: 'better to loose a little now than loose it all later'. C. Davidson, "Political Reform and Civil Society in the Small Gulf Monarchies", The Politics of the Oil Monarchies lecture series. Durham, 1 February 2008.
[123] See e.g.: Davidson, *Oil and Beyond*, p. 137.
[124] B. Reich (ed.), *Political Leaders of the Contemporary Middle East and North Africa: A Bibliographical Dictionary*. Connecticut: Greenwood Press, 1990), p. 515; Herb, *All in the Family*, p. 140; Kéchichian, *Power and Succession*, p. 295.

Zayed… always provided the polity with its ultimate patriarchal figure'.[125] Coming from the al-Bu Falah section of the greater Bani Yas tribe, Sheikh Zayed ruled the emirate of Abu Dhabi since 1966, and the federation since its independence in 1971, until his death in 2004. Sheikh Zayed first gained influence as the governor, *wali*, of the town of Al-Ain, which he transformed into both a regional economic hub and the 'garden of the Gulf'.[126] Among Zayed's achievements as the governor of Al-Ain in 1946-1966, were the restoration and maintenance of the deteriorated local irrigation (*falaj*) system, and provision of free water to small landowners so as to encourage agriculture in the area.[127] He also had a defining role in the physical and psychological development of the 'Emirati nation', hence the title 'Father of the United Arab Emirates', and enjoyed wide and strong support of the citizens of the UAE, with whom he maintained a close and interactive relationship despite, and partly because of, the fundamentally patriarchal nature of his rule. The reinforcement of the value of the nation's past—by promoting 'heritage' though numerous different material and immaterial ways, such as traditional sports and poetry and care for the environment—therefore became another part of Zayed's legacy.[128] Intergenerational justice, preserving the land for future generations, also figured prominently among Zayed's values.[129]

Nationally regarded as a conservationist, Sheikh Zayed who 'greened the desert', also earned the title 'Man of the Arab Environment'. His leadership style has been described as 'politics of stewardship', which involves 'a closely personal involvement in preserving and improving the condition of the [e]mirate, physically and otherwise, for the future'. This traditional-style 'enlightened environmentalism' was based on planting trees and preserving wildlife.[130] Caring for the nature was also often invoked by Zayed as both an Islamic duty, part of the 'triad of modernity, Islam and tradition' of power legitimisation common for the GCC states.[131] In order to fight desertification, Sheikh Zayed has been estimated to have mandated the planting of as many as 200 million trees. Among other things, he also regulated hunting of endangered animals (in 1976 in Abu Dhabi, 1983 in the UAE), founded a zoo in Al Ain (1967) and established a wildlife sanctuary on the

[125] Davidson, "After Shaikh Zayed", p. 43.
[126] Ibid., pp. 44; 52.
[127] Reich, *Political Leaders*, pp. 516-517; Kéchichian, *Power and Succession*, p. 281.
[128] Reich, *Political Leaders*, p. 518.
[129] Interview with Dr Nawal Al Hosany, Associate Director of Sustainability, Masdar, Abu Dhabi, October 2010.
[130] Ibid., p. 518; United Nations Environment Programme, "Champions of the Earth: 2005 Laureates", [http://www.unep.org/champions/laureates/2005/Zayed.asp]. Accessed on 26 December 2010.
[131] P. Ouis, "Greening in the Emirates: The Modern Construction of Nature in the United Arab Emirates", *Cultural Geographies*, 9 (2009), p. 339.

island of Sir Bani Yas (1971).[132] Sheikh Zayed's conservationism also brought international recognition; most saliently, in 2005, the UN Environment Programme posthumously granted him the Champion of the Earth award.[133]

After his passing, Sheikh Zayed was peacefully succeeded by his eldest son Sheikh Khalifa bin Zayed Al Nahyan as the Emir of Abu Dhabi and President of the federation. Prior to 2004, Sheikh Khalifa already held the simultaneous positions of crown prince, chairman of the Abu Dhabi Executive Council, the Supreme Petroleum Council, ADIA and the Department of Buildings and Social Affairs, as well as deputy supreme commander of the federal UAE Armed Forces, which granted him control of the central institutions of both wealth creation and it distribution.[134] Khalifa handed the titles of crown prince, chairman of the Executive Council and deputy supreme commander of the UAE Armed Forces to his younger half-brother Sheikh Mohammed. Sheikh Khalifa, whose succession took place by unanimous decision of the Supreme Council of Rulers, continues to enjoy strong legitimacy both among Abu Dhabi's ruling family and those of the other emirates, and among the general population.[135]

Sheikh Khalifa has no full brothers. Zayed's second oldest son, Sultan, holds a number of high-level posts in the emirate, but none as highly influential as some of his younger brothers.[136] While Sheikh Zayed had several wives, sons and daughters, the so-called Bani Fatima, comprising the six sons of his favourite wife Fatima, has since the mid-2000s been transforming into an increasingly important group within the ruling family who control many of the emirate's key portfolios. The Bani Fatima (with important posts in brackets) are: Sheikh Mohammed (crown prince, deputy supreme commander of the UAE Armed Forces, chairman of the Abu Dhabi Executive Council), Sheikh Hamdan (the Ruler's representative to the Western Region, chairman of the Environment Agency – Abu Dhabi), Sheikh Hazza (national security advisor), Sheikh Mansour (minister of presidential affairs

[132] S. Aspinall, "Environmental Development and Protection in the UAE" in I. Al Abed and P. Hellyer (eds.), *United Arab Emirates: A New* Perspective (London: Trident Press, 2001), p. 295. Kéchichian, *Power and Succession,* pp. 295; 342.
[133] United Nations Environment Programme, "2005 Laureates".
[134] UAE Interact, "Government – President of the UAE", [http://www.uaeinteract.com/government/zayed.asp]. Accessed on 26 December 2010; Davidson, "After Shaikh Zayed", p. 47. According to Davidson, as the crown prince, Sheikh Khalifa was in control of day-to-day affairs of Abu Dhabi.
[135] Kéchichian, *Power and Succession*, p. 296.
[136] Thereafter, Sultan has been nominated the representative of the President. He is also chairman of Emirates Heritage Club and the Media Cultural Centre. *UAE Interact* (2 November 2010).

and deputy prime minister since 2009), Sheikh Tahnoon, and Sheikh Abdullah (foreign minister).[137]

Davidson has described the Bani Fatima as 'approaching a political bloc in an otherwise highly fragmented dynasty'.[138] Sheikh Mohammed, the eldest of the Bani Fatima, is one of Abu Dhabi's most powerful figures, a younger and more dynamic figure than Sheikh Khalifa. The emirate's accelerating pace of reform and economic development is generally attributed to Mohammed's growing influence over the emirate's decision-making.[139] Since 2002, he has been the chairman of the Mubadala Development Company, the main investment vehicle of the Abu Dhabi government. Consequently, the Masdar Initiative is also under Sheikh Mohammed's directive umbrella. He is also head of the UAE Offset Program Bureau, the Urban Planning Council, and the Abu Dhabi Education Council, among others. Importantly Sheikh Mohammed has never held a federal minister's post and his succession to power after his brother Khalifa is not set in stone; the Al Nahyan are described as divided and there are many contenders for power, including other sons of Sheikh Zayed and two sons of Sheikh Khalifa.[140]

In addition to Sheikh Mohammed, another key person in Abu Dhabi's 'new economy' and its decision-making is Khaldoon Khalifa al-Mubarak, who holds the posts of chairman of the Executive Affairs Authority, vice chairman of the Abu Dhabi Urban Planning Council and CEO and Managing Director of Mubadala.[141]

Decision-making structures and dynamics

The United Arab Emirates is officially both a federal presidential system and a constitutional monarchy. The Supreme Council of Rulers, formed by the seven Emirs, acts as the ultimate executive and legislative power, and elects the president (by convention, the ruler of Abu Dhabi[142]), the members of the Council of Ministers and the judges of the Federal Supreme Court. Each emirate has a minimum of one post in the Council of

[137] Inter alia: Davidson, "After Shaikh Zayed, pp. 48-49); UAE Interact, "Government – Political system", [http://www.uaeinteract.com/government/political_system.asp]. Accessed on 26 December 2010. According to Davidson ("After Shaikh Zayed", p. 46 and interview in June 2009), Sheikh Zayed had 19 legitimate sons. Herb (*All in the Family*, p. 140) mentions 24 sons and 22 daughters.

[138] Davidson, "After Shaikh Zayed", p. 48. The Economist (25 September 2008) has suggested the group is 'calling the shots'.

[139] Davidson, "After Shaikh Zayed", p. 48; EIU, *UAE Country Report, June 2009*, p. 4.

[140] Kéchichian, *Power and Succession*, pp. 300-305.

[141] Executive Affairs Authority, "Chairman of the Executive Affairs Authority", [http://eaa.abudhabi.ae/Sites/EAA/Navigation/EN/chairman-executive-affairs-authority.html]. Accessed on 26 December 2010.

[142] Sheikh Khalifa was re-elected for a second five-year term by the Supreme Federal Council in 2009. *UAE Interact* (4 November 2009).

Ministers, which is led by the prime minister (by convention, the ruler of Dubai, who is also the vice president), but Abu Dhabi and Dubai hold the majority and most senior of posts.[143] In 2010, the council comprised 24 ministerial posts.[144] Political parties are prohibited and the 40-member legislature, the Federal National Council (FNC), enjoys only consultative status. In 2006, for the first time, half of its members were chosen through indirect elections. In the absence of a true legislative power, the Council of Ministers initiates legislation, which is then ratified by the Federal Supreme Council.[145] In general, with the exception of the FNC elections, reforms of the political system have been almost nonexistent.[146]

The individual emirates also have local level governments, the most important of which are the Executive Councils of Abu Dhabi and Dubai, chaired by their respective crown princes (Mohammed bin Zayed Al Nahyan and Hamdan bin Mohammed Al Maktoum). The Abu Dhabi Executive Council is the emirate's top decision making body. In addition, Abu Dhabi has a National Consultative Council composed of 60 selected members from the main tribes and families of the emirate. Due to its size, Abu Dhabi is further divided into two administrative regions governed by the Ruler's Representatives. Alongside the newer institutions, the traditional institution of ruler's *majlis* still exists.[147]

Abu Dhabi's Executive Council's chair crown prince Sheikh Mohammed receives strategic analysis and policy advice from the Executive Affairs Authority (EEA). The Executive Council, which holds weekly meetings, consists of chairmen of the departments and some agencies, and members appointed by Emir Sheikh Khalifa. Abu Dhabi's government divides up into five ministry-like departments. Additionally, there are seven councils, including the Urban Planning Council, and a number of autonomous agencies with specified powers, including the Environmental Agency – Abu Dhabi (EAD) and the Abu Dhabi Water and Electricity Authority (ADWEA), as well as regional and municipal authorities.[148] According to observers, the increased role and weight of Abu Dhabi's

[143] National Media Council, *UAE Yearbook 2009*, pp. 27-28.
[144] UAE Interact, "Government – Political system".
[145] National Media Council, *UAE Yearbook 2009*, pp. 27-28; EIU, *UAE Country report, April 2009*, p. 26.
[146] E.g.: O'Brien et al., "New Paradigm", p. 209.
[147] National Media Council, *UAE Yearbook 2009*, pp. 28-30.
[148] Executive Affairs Authority, "About us", [http://eaa.abudhabi.ae/Sites/EAA/Navigation/EN/about-us.html]. Accessed on 27 December 2010; National Media Council, *UAE Yearbook 2009*, p. 29; Abu Dhabi Executive Council, "Abu Dhabi Government" and "Executive Council", [http://gsec.abudhabi.ae/Sites/GSEC/Navigation/EN/root.html]. Accessed on 27 December 2010.

agencies in the 2000s, stems from Sheikh Mohammed's personal pursuit of a stronger power base for his future role as the President of the federation.[149]

In energy policy-making, the sovereignty of the individual emirates over their natural resources means that the domestic role of the federal Ministry of Energy (formerly Petroleum and Mineral Resources), led by Mohamed Dhaen Al Hamli, is largely ceremonial.[150] In the early 1990s, the role of the ministry was significantly cut down to policy coordination, meaning mainly OPEC representation and 'subsidies at the pump'. The rest of the tasks were replaced by the Abu Dhabi Supreme Petroleum Council (SPC), established in 1988 and headed since then by Sheikh Khalifa.[151] Abu Dhabi's main hydrocarbons conglomerate, ADNOC, is governed by the SPC, which hence controls the emirate's oil policy.[152] Abu Dhabi, due to the size of its resources and its pre-independence membership (1967), is the only one of the seven emirates that participates in OPEC decision-making and is bound by its decisions.[153] A new local-level energy policy, incorporating renewables and nuclear energy, has been expected since 2009.[154]

Decision-making-related problems induced by the neopatrimonial power strategies and structures abound; particularly in Abu Dhabi, but also in the other emirates, government officials are often appointed due to their social status, rather than competence, and personalities are said to be crucial in determining the status of government departments.[155] Interagency cooperation in the environmental sector has been a major problem but, according to a local stakeholder, since the late 2000s, there has been visible improvement, including the flow of information and integration of plans and actions.[156] Interaction between peer departments and agencies in the different emirates, and even between local and federal level institutions, however, can still remain very limited.[157]

[149] Interviews with Abu Dhabi-based journalist, October 2008; Christopher Davidson, Durham, June 2009.
[150] Davidson, "Contrasting Roles", p. 37; *A Study in Survival*, p. 205.
[151] EIU, *UAE Country Profile*, p. 5; National Media Council, *UAE Yearbook 2009*, p. 35; V. Marcel, *Oil Titans: National Oil Companies in the Middle East* (Baltimore: Brookings, 2006), p. 78.
[152] Butt, "Oil and Gas", p. 236. ADNOC has consequently been described as the 'second tier of power' of the emirate's hydrocarbons sector. *APS Review Oil Market Trends* (22 January 2007).
[153] Dubai, not an OPEC member, does not consider itself bound by production quotas. Cordesman, *Energy Developments*, p. 202.
[154] *The National* (10 July 2009b).
[155] O'Brien et al., "New Paradigm", p. 242.
[156] Interview with climate change policy expert at the EAD, Abu Dhabi, October 2010.
[157] Ibid. and personal observations regarding the UAE's environmental and climate change governance.

Planning

Regarding long-term planning and future development, the most important policy documents of the emirate in the latter half of the 2000s were the Plan Abu Dhabi 2030: Urban Structure Framework Plan, (from 2007), and the Abu Dhabi Economic Vision 2030, (from 2008), both mandated by crown prince Sheikh Mohammed. With a long-term emphasis not common in the region, the documents lay out a master plan aimed at making the urban planning coordinated and the economy more diversified and sustainable. The Economic Vision, based on an earlier document (Abu Dhabi Policy Agenda 2007-08), defines four priority areas: economic development, human resources, infrastructure development and environmental sustainability, and improving government. Main objectives include reducing dependence on oil and creating employment and better education for the nationals. The vision identifies a number of strategic economic sectors for achieving growth and diversification, including elements of both the oil-reliant economy (such as heavy industries) and the 'new economy' (including tourism, healthcare and education).[158] Other important documents include the medium-term Strategic Plan 2008-2012 for the streamlining and increased coherence and coordination of the different departments and agencies.[159] As part of Sheikh Mohammed's new approach to government, all government entities are required to deliver updated 5-year plans annually.[160]

4.2.2 Environmental and climate change-related governance

Decision-making and institutions

Environmental governance in Abu Dhabi is dominated by a handful of influential figures and institutions, at the top of which is crown prince Sheikh Mohammed. As the chairman of the Abu Dhabi Executive Council, he is the motor of Abu Dhabi's new economy, of which alternative energy and sustainability-related developments are a part. Environmental issues are said to be one of the three priorities on Sheikh Mohammed's agenda, in addition to education and security. The crown prince's interest in the environment has been

[158] Government of Abu Dhabi, *The Abu Dhabi Economic Vision 2030.*

[159] A. Al Bowardi, speech, 17 April 2008, [http://www.abudhabi.ae/egovPoolPortal_WAR/appmanager/ADeGP/Citizen?_nfpb=true&_pageLabel=P420011379121844426083 9&lang=en]. Accessed on 27 December 2010.

[160] Interview with climate change policy expert at the EAD, October 2010.

described as something inherited from his father, which has been 'running in his blood for a long time'.[161]

Sheikh Abdullah, as foreign minister, is responsible for the UAE's nuclear policy vis-à-vis external audiences and has since 2009 been increasingly involved in the renewable energy and climate change-related endeavours of the emirate, including the International Renewable Energy Agency headquarters and the Ministry's Directorate on Energy and Climate Change. Sultan al-Jaber has served as the CEO of Masdar, the seed of all climate change-related policy developments in Abu Dhabi, and has since 2010 also served as the UAE's special envoy for energy and climate change and the UNFCCC lead negotiator. The Environment Agency – Abu Dhabi (EAD), led by Majid al-Mansouri, plays an increasingly important and visible role in the emirate's environmental governance. As a newcomer, the long-term managing director of the UAE's most important ENGO, the Emirates Wildlife Society, Razan Khalifa al-Mubarak (the sister of Khaldoon Khalifa al-Mubarak) has since 2010 held the post of assistant secretary general of the EAD. Also, the federal Ministry of Environment and Water, led by Rashid Ahmed bin Fahad, guides (at least in theory) environmental and climate-policymaking in Abu Dhabi.

From a historical perspective, environmental considerations first appeared on the UAE government's agenda in the early 1970s when the municipalities were mandated to preserve the environment. In 1975, the Higher Environment Council/Committee was established under the Council of Planning to 'link environmental considerations to planning and development policy'. Ensuing from the UAE's participation in the Rio Earth Summit in 1992, so as to keep pace with international developments in the area of sustainable development, the Federal Environment Agency (FEA) was established under the Ministry of Health in 1993, replacing the Council.[162] While the FEA was responsible for developing legislation and environmental standards, the local environmental authorities (Abu Dhabi, Sharjah and Ras al-Khaimah) or the municipalities (the other emirates) have had the main responsibility for implementation of the federal environmental laws and environmental preservation in general.[163] Reflecting the increasing attention given to

[161] Interview with manager at Masdar, Masdar City, Abu Dhabi, October 2010.
[162] Aspinall, "Environmental Development", pp. 295-296; 298; ECSSR, "UAE Experience in Combating Desertification: Strategies and Policies" (2004), [http://www.ecssr.ac.ae/CDA/en/FeaturedTopics/DisplayTopic/0,1670,305-101-84,00.html]. Accessed on 16 July 2009; Ministry of Economy of the UAE and UNDP, *Millennium Development Goals. United Arab Emirates.* Second Report (2007), p. 25 (quote).
[163] F. Launay, *Environmental Situational Assessment for the GCC Countries,* GRC Research Paper (Dubai: Gulf Research Center, 2006), pp.70-71; Aspinall, "Environmental Development", pp. 297-298; O'Brien et

environmental and water issues, the Ministry of Environment and Water was established in 2006. Since 2008, the minister's post has been held by Rashid Ahmad bin Fahad from Dubai.[164] Before being fully incorporated into the Ministry, the FEA coexisted with it until 2009.[165] In 2010, the Ministry was still weak, presumably partly owing to its short existence, but also because of a lack of funding and capability.[166] The strength of Abu Dhabi's local environmental institution most probably also played a role.

The most capable and best-resourced local environmental authority in the UAE is the Environment Agency – Abu Dhabi (EAD). Established in 2005, it replaced the Environmental Research and Wildlife Development Agency (ERWDA, est. 1996) that had been funded by the patronage of Sheikh Zayed.[167] Originally a research-oriented institution, the EAD's role was quickly expanded to that of the competent local authority.[168] Currently the EAD's areas of activities include environmental management and policy, biodiversity management and environmental awareness.[169] It also funds and has organised a large number of international and regional environmental (and more recently also renewable energy-related) conferences, which have brought it increasing visibility.[170] Confirming the unwritten rule that the relative importance of a bureaucracy in the UAE is reflected in the size of its budget and human resources,[171] the agency, which has currently over 500 employees, has been lauded for its excellence at the local level and has been titled as the spearhead of strategic environmental planning in the Arab world.[172] The agency's leading figures are secretary general Majid Ali al-Mansouri, managing director Ahmed al-Bowardi, and chairman Sheikh Hamdan bin Zayed. Al-Mansouri, who is in charge of the agency's day-to-day management, aside from belonging to one of Abu Dhabi's most powerful tribes,[173] started his career at a lower executive post in the EAD in

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al., "New Paradigm", p. 241; Raouf, Mohamed A., *Economic Instruments as an Environmental Policy Tool: The Case of the GCC Countries* (Dubai: The Gulf Research Center 2007), p. 93.

[164] The ministry replaced the Ministry of Agriculture. Gulf Research Center, *Gulf Yearbook 2006-2007* (Dubai: Gulf Research Center 2007), p. 470.

[165] *The National* (1 October 2009).

[166] Phone interviews with Dubai-based environmental expert, March 2009; UAE-based climate policy expert, June 2009; interview with carbon expert at Masdar, Abu Dhabi, October 2010.

[167] ERWDA was replaced by EAD by an Emiri decree (Law 16/2005) in 2005.

[168] O'Brien et al., "New Paradigm", p. 241.

[169] Abu Dhabi Government, "Environment Agency – Abu Dhabi (EAD)", [http://www.abudhabi.ae/egovPoolPortal_WAR/appmanager/ADeGP/Citizen?_nfpb=true&_pageLabel=p_citizen_departments&did=852&lang=en]. Accessed on 27 December 2010.

[170] Personal observations and e.g. EAD, "Conferences & Exhibitions", [http://www.ead.ae/en/portal/conferences.exihibitions.aspx]. Accessed on 27 December 2010.

[171] O'Brien et al., "New Paradigm", p. 242.

[172] Tolba and Saab (eds.), *Arab Environment*, p. XXI; EAD, *Annual Report 2009-2010* (Abu Dhabi: EAD, 2010), p. 14.

[173] Interview with Christopher Davidson, June 2009.

1999 and currently chairs a large number of relevant environmental bodies.[174] In 2009, al-Mansouri won the GCC's award for Best Environmental Personality in the UAE.[175]

In the 1990s and early 2000s, the FEA's and ERWDA's relationship was characterised by a lack of cooperation and fierce competition 'for both funding and recognition as a driving force of environmental issues'.[176] As stakeholders have noted, when the need arises, the UAE exhibits a culture of establishing committees to persuade, or even 'force', the different institutions to work together. If an issue is 'important', higher committees are formed from the top executives of each relevant entity.[177] As the issue of environmental sustainability policymaking began to climb on the government agenda, the late 2000s saw a large number of new committees, including: a federal Kyoto committee,[178] two other UNFCCC-related committees,[179] a national climate change committee,[180] and numerous emirate-level committees, such as the energy demand side management committee and the permanent committee for water and agriculture of Abu Dhabi.[181] This culture of committees, grounded in the (neo)traditionalist ideal of consensus-based decision-making, does not, however, avoid inter-institutional competition, as will be shown below.[182]

The years 2007-2010 marked a turning point in Abu Dhabi's environmental governance. Writing in 2007, O'Brien et al. concluded, regarding the UAE's environment-related organisational infrastructure, that 'there is little evidence of a momentum coming from within either Abu Dhabi or indeed the UAE that is sufficiently large as to be either described as political will or likely to induce political will…'.[183] Already in 2008, a UAE-based expert perceived a clear, increasing government interest towards climate change-related issues, but federal-level coordination and knowledge and know-how were still lacking.[184] Around this time, a new dynamism began to emerge in Abu Dhabi's environmental governance and policymaking owing to the participation of new actors,

[174] *AMEinfo* (18 March 2009).
[175] EAD, *Annual Report 2009-2010*, p. 16.
[176] O'Brien et al., "New Paradigm", p. 241.
[177] Interviews with climate change policy expert at the EAD, October 2010; Tanzeed Alam, Climate Change and Sustainability Manager, EWS-WWF, Abu Dhabi, October 2010.
[178] Phone interview with a UAE-based climate policy expert, June 2009.
[179] CDM-DNA UAE, "DNA UAE", [http://www.cdm-uae.ae/portal/menu.authority.aspx]. Accessed on 28 December 2010.
[180] Interview with Rob Bradley, Senior Climate Policy Advisor, Energy and Climate Change Directorate, Ministry of Foreign Affairs, Abu Dhabi, 27 October 2010.
[181] Interview with Tanzeed Alam, October 2010; *Environment Agency – Abu Dhabi*, Press release (13 January 2010).
[182] Although this might not always be admitted to external observers. Personal observation based on interviews in Abu Dhabi and Dubai in 2008-2010.
[183] O'Brien et al., "New Paradigm", p. 249.
[184] Interview with UAE-based climate policy expert, Dubai, October 2008.

including Masdar (a government-owned company), the Urban Planning Council, and the Ministry of Foreign Affairs. This momentum was accompanied by the increasing activeness and professionalism of the EAD, which not incidentally moved, in 2010, into the same premises as Mubadala (owner of Masdar), the UPC and the Abu Dhabi Executive Affairs Authority, all of which are also under the control of Sheikh Mohammed bin Zayed.

Environmental regulation, planning, and policies

The previously marginal importance given to environmental issues in the UAE, and the consequently uncoordinated approach, has not only been reflected in the late establishment of environmental authorities and their weak relative weight in federal and local-level decision-making, but also in the lack of attention given to regulatory mechanisms, enforcement of legislation and sustained planning. Until the very late 2000s, a command and control approach prevailed in the UAE's environmental policy; economic instruments and awareness raising being less common.[185] Most of the UAE's environmental legislation was originally initiated by the UNDP and came into force only during the late 1990s and 2000s.[186] The most important environmental laws are the law on the protection of the marine environment (Law 23/1999), the law on the preservation of the environment (Law 24/1999) and the law on wildlife trade (Law 11/2002).[187] Raouf has praised the UAE's environmental legislation as the most developed of the GCC member states, noting that the government has actively sought to bring both local and federal legislation up to international standards.[188]

Despite the existence of legislation, implementation and enforcement thus far can be deemed dubious, an obvious example being the significant negative impact on the marine environment, particularly related to Dubai's land reclamation projects in the 1990s and 2000s. These were described in a UN study as 'particularly destructive', accompanied with 'minimal environmental management attempted to mitigate negative impacts'.[189] Moreover, environmental laws exist both at local and federal levels, and duplication of efforts and resources is a problem in this area as well. In the early 2000s, with the new federal legislation in place, some saw a 'clear move toward consistency across the

[185] Raouf, *Economic Instruments*, pp. 21; 133-134.
[186] Aspinall, "Environmental Development", p. 294; O'Brien et al., "New Paradigm", p. 208.
[187] Launay, *Situational Assessment*, pp.70-71.
[188] Raouf, *Economic Instruments*, p. 94.
[189] H. Rezai, Hamid et al., "Coral Reef Status in the ROPME Sea Area: Arabian/Persian Gulf, Gulf of Oman and Arabian Sea" in Wilkinson, Clive (ed.), *Status of Coral Reefs of the World: 2004*. Volume 1 (Australian Institute of Marine Sciences, 2004), p. 164; *Gulf News* (30 October 2005). Lack of implementation also mentioned by environmental expert in Dubai (phone interview, March 2009).

federation'.[190] Still, even in 2007, a lack of clear organisational infrastructure and division of labour to institute, monitor and enforce environmental legislation was recorded by others.[191]

Due to the development imperative, the development of oil resources was long (and still is) seen as a priority that overrode environmental issues, which were mainly ignored. In the first decades of the federation's independence this attitude resulted in important marine-based environmental degradation. Even the FEA, although entrusted more influence and power by legislation, was reported to have lacked both human and financial resources, rendering its impact and capability to carry out initiatives as marginal.[192]

A major grey area in environmental monitoring and enforcement exists even today in the area of the energy industry, as ADNOC, 'a kingdom in itself', plays by its own rules. According to the SPC's environmental advisor, ADNOC has its own sustainability initiative, energy efficiency efforts and marine environment protection programmes, as well as environmental codes that are even stricter than some international regulations.[193] An expert at the EAD has implied that the agency has no power over the oil giant in the sphere of environmental issues, mentioning the company's special status as the source of problems.[194] Illustrative of the implications of ADNOC's self-enforcing role for policy coordination is how in 2008, the SPC refused to participate in the emirate's Environment, Health and Safety Management System (EHSMS) on the grounds that 'the ADNOC group of companies implements the EHSMS according to international standards and reports directly to the Executive Council'.[195]

Industries and real estate developments have also been overlooked according to some reports from 2007, which note that none of Abu Dhabi's recent major diversification projects (including the aluminium smelter with Dubal, an expansion of the airport, two new ports and industrial zones, and the tourism industry-related infrastructure and real estate projects) had been 'supported by environmental measures to mitigate any negative

[190] Aspinall, "Environmental Development", pp. 278; 292.
[191] O'Brien et al., "New Paradigm", p. 234.
[192] Ibid., pp. 233; 243.
[193] Interview with Lubna Al Ameri, Environment Advisor, Health and Safety Division, Supreme Petroleum Council, Abu Dhabi, October 2009.
[194] According to the expert, (due to the magnitude of the company and its environmental impact,) the EAD is forced to (try to) work with ADNOC. Interview with climate change policy expert at the EAD, Abu Dhabi, October 2009.
[195] EAD, *Policies and Regulations of Abu Dhabi Emirate, United Arab Emirates* (Abu Dhabi: EAD 2008), p. 37.

effects'.[196] It is generally agreed that Abu Dhabi has both the funds, and the advantage of a previously slower pace of development than Dubai, to 'get it right' in sustainable development. However, in 2007-2009, perhaps reflecting the changing dynamism in both emirates, there was divergence in close observers' views on which had a more proactive attitude towards environmental issues.[197]

Starting in 2006-2007, important changes began taking place in environmental planning in Abu Dhabi, as environmental sustainability entered the government's agenda. According to one interpretation, the rise of domestic energy security as an issue elevated environmental issues to a new level of priority, and the government, led by crown prince Mohammed, began pushing sustainability and environmental considerations into all policy sectors. Currently, the competent authorities are required to report to him on their performance in these areas.[198] Despite their state-of-the-art design, however, the new planning and policy frameworks, discussed further below, are still at pilot or even drafting stages. Hence, the success of their implementation remains to be evaluated in the years and decades to come.

In the area of strategic planning, a national environmental strategy and action plan was prepared in 1997-2000 by the FEA and local UN agencies, and a strategy for combating desertification was approved in 2003.[199] However, in the late 2000s, federal-level planning all but disappeared, as by the end of 2010 the Ministry of Environment and Water had not published (in English at least) a single environmental plan or strategy.[200] At the Abu Dhabi level, the opposite has happened; in the 2000s, EAD launched two five-year emirate-level environmental strategies, for 2003-2007 and 2008-2012. The current Environment Strategy for the emirate outlines 13 strategic priorities, including water resources, air quality, development of a climate change framework and a waste management policy, biodiversity, environmental awareness, organisational efficiency, and better communication.[201] In 2002, the EAD established the Abu Dhabi Global Environmental Data Initiative (AGEDI), aimed at improving the quality domestic environmental data for decision-making purposes and enhancing coordination between the main public stakeholders. AGEDI also published the

[196] O'Brien et al., "New Paradigm", p. 210.
[197] Crisis in Dubai and the rise of environmental issues in Abu Dhabi. Interview with UAE-based climate policy expert, October 2008; phone interviews with Dubai-based journalist and environmental expert, March 2009; O'Brien et al., "New Paradigm", p. 210.
[198] Interview with Nawal Al Hosany, October 2010.
[199] UNCCD, "Action Programmes", [http://www.unccd.int/actionprogrammes/asia/asia.php#national]. Updated on 1 April 2010; and EAD, "Strategies", "Regulations", [http://www.soe.ae/Abu_ Themespage.aspx?m=414]. Accessed on 2 August 2009.
[200] Correspondence with Tanzeed Alam, Climate Change and Sustainability Manager, EWS-WWF, March 2011.
[201] Updated in 2009 for 2009-2013. EAD, *Entity Strategic Plan 2009-2013* (Abu Dhabi: EAD, 2009).

first State of the Environment report for Abu Dhabi in 2006.[202] Finally, in 2009, a team in the EAD, led since 2010 by recently-appointed assistant secretary general Razan Khalifa al-Mubarak, began elaborating the Abu Dhabi Environment Vision 2030. The vision will cover issues such as climate change and air quality, biodiversity, and enforcement and regulation.[203]

Around 2007, with sustainability emerging as a global trend in architecture, both Dubai and Abu Dhabi began incorporating emirate-wide sustainability aspects into their building codes and urban planning.[204] In 2007, the emir of Dubai, Sheikh Mohammed bin Rashid Al Maktoum announced a green building code, to be enforced in all buildings constructed in the emirate starting from 2008. As a consequence of the financial crisis, however, this decision was significantly downgraded and postponed, according to some estimates, by four years. The failure has been attributed to Dubai's attempt to introduce legislation before having the required coding systems and organisational structures in place.[205] Abu Dhabi's Masdar City, announced in 2007, is the UAE's first large-scale attempt at the full-scale incorporation of sustainable building, which seeks to set an example for the entire region. Despite its innovativeness, without emirate-wide regulation, Masdar's direct sustainability impact would have, nevertheless, ultimately risked remaining mainly limited to the walled community.

Plan Abu Dhabi 2030 and Estidama

In 2007, with the previous urban plan dating to the late 1980s, its conceptual and physical limits being reached, and the population of the city of Abu Dhabi expected to rise to over 3 million in 2030 (as a result of the gradual opening in land ownership laws and increasing public investment in tourism, real estate and other areas of the new economy), the Urban Planning Council (UPC) published a visionary proposal for what the city should look like in a generation's time. Reflecting a lesson learned from Dubai's exponential, largely unregulated growth, and lack of sustained long-term planning, the Plan Abu Dhabi 2030: Urban Structure Framework Plan stresses the need for coordinated growth and is grounded on three components of sustainability. Sustainable resource use (efficiency, lower use of non-renewables and active exploration of renewables) is also among the objectives.[206]

[202] Abu Dhabi Global Environmental Data Initiative, [http://www.agedi.ae/]. Accessed on 3 August 2009.
[203] Interview with climate change policy expert at the EAD, October 2010.
[204] Even some of the smaller emirates, including Ras al-Khaimah (with its Gateway City), announced similar projects inspired by Dubai and Abu Dhabi.
[205] *Khaleej Times* (3 November 2010). 4 years: interview with Dr Yousef Al Horr, President, BQDRI, Doha, November 2010.
[206] Abu Dhabi Urban Planning Council, *Plan Abu Dhabi 2030*, pp. 6; 19-20.

In addition to an environmental framework policy, described in the Plan Abu Dhabi document, an important part of the plan is Estidama ('sustainability' in Arabic), a sustainability framework that concentrates specifically on sustainable buildings and communities. Originally an EAD initiative, the UPC took over Estidama in 2008.[207] Said to receive important backing from the government,[208] Estidama has developed its own green building rating system, essentially an adaptation of the American LEED system, based on pearls. It was incorporated into the UPC's planning approval and permitting processes in 2010. From 2011, all new projects must achieve at least one Pearl and government-funded buildings two Pearls.[209] A planner involved in setting up Estidama saw the framework as part of the local government's economic and energy diversification and emission cut plans and pointed out the advantages of setting the emirate's development guidelines now rather than building first.[210] Masdar was involved as well; according to the company's associate director of sustainability, the company had a lot of input in the code from the beginning, and Masdar City functioned in many ways as a pilot for Estidama. Prior to Masdar, awareness surrounding sustainable construction had been low, even to the point of considerable resistance.[211] While in sustainable buildings economic advantages are mainly achieved through energy and water efficiency, in a country where these are highly subsidised, government regulation will remain key to 'incentivising' implementation.

The grandiose future plans of Abu Dhabi, including Masdar, however have their critics; as an independent environmental report on the Middle East has noted, whilst 'in the past, short-term planning was a major obstacle to environment and sustainable development policy[-]making… [t]oday, some attempts go to the opposite extreme, ignoring pressing current environmental challenges while setting long[-]term grand plans'.[212]

Domestic climate policy decision-making structures

At the emirate level, Abu Dhabi's Masdar and EAD have been the pioneers in pushing environmental sustainability and climate change-related considerations onto the local-level political agenda. Particularly, Masdar was active in influencing certain national policy

[207] Interview with climate change policy expert at the EAD, October 2009.
[208] Phone interview with Aysha Abu Shahab, Associate Planner, Abu Dhabi Urban Planning Council, November 2009.
[209] Abu Dhabi Urban Planning Council, "About us", [http://upc.gov.ae/]. Accessed on 28 December 2010. Plans also included establishing an Abu Dhabi Green Building Council in cooperation with the EAD. Abu Dhabi Urban Planning Council, *Plan Abu Dhabi 2030*, pp. 138-139.
[210] Phone interview with Aysha Abu Shahab, November 2009.
[211] Interview with Nawal Al Hosany, October 2010.
[212] Tolba and Saab (eds.), *Arab Environment*, p. XXI.

positions in the context of the international climate negotiations in 2008-2010.[213] Also in the energy sector, Masdar has influenced the regulatory framework because of its projects in the fields of renewable energy (requiring feed-in-tariffs), energy efficiency of buildings, waste-to energy[214] and environmental sustainability in general.

In the international climate negotiations, leadership of the UAE delegation was contested in 2010 (see also chapter 6.2.2), as the title of the National Focal Point for the UNFCCC was transferred from the Ministry of Energy, which had held it since 1992, to both the Ministry of Foreign Affairs and Ministry of Environment and Water in 2010. Among the institutions that have been participating in the UNFCCC there have reportedly been big egos and competition. Revealing of the confusion and rivalry over policy leadership was the fact that two ministers (Rashid bin Fahad and Sheikh Abdullah), instead of one, participated in the UN climate change conference in Mexico in late 2010.[215]

Despite the Ministry of Environment officially being in charge of the country's external climate policy formation, the dynamic Foreign Ministry-based Directorate of Energy and Climate Change (DECC), officially acting as the secretariat, quickly took a lead role, with its head Sultan al-Jaber acting as the UAE's main negotiator. The DECC, established in 2010, is modelled on similar departments in the UK and Denmark, but does not include an energy department. Eventually, according to some, it might evolve into a ministry. In 2009, inspired by a victory over the headquarters of the International Renewable Energy Agency (see chapter 6.2.1), according to close observers, Sheikh Abdullah wanted to become involved in the Copenhagen UN climate conference, which was the highest profile climate change conference to date (gaining attendance from various heads of state), as well as in the ensuing high-level political agreement. It was also envisioned by the Foreign Ministry that its non-sector specific mandate—and most likely also clout due to being led by a member of Bani Fatima—would enable the DECC to be seen as more neutral and exert more power over the different sectors throughout the federation.[216]

As of the end of 2010, the DECC was still a young and small organism, employing a little over a dozen, and its impact on the UAE's and Abu Dhabi's domestic and international

[213] Personal observations in UNFCCC conferences in 2008-2009 and from local press in 2010.
[214] Interview with Nawal Al Hosany, October 2010.
[215] EAD, "Governance", [http://www.soe.ae/Abu_themespage.Aspx?m=259]. Accessed on 5 August 2009; *The National* (7 December 2010).
[216] The DECC was in 2010 described by two stakeholders as 'doing the [Ministry's] work'. Interviews with carbon expert at Masdar, October 2010; UAE-based climate expert, Abu Dhabi, October 2010.

level climate policies will remain to be seen, not least because of the prevalence of the 'committee culture', but perhaps even more importantly because of the continuing importance of oil to the economy. As a UAE-based journalist noted, climate policy goes only so far as it does not conflict with the interests of ADNOC and other important parties in Abu Dhabi.[217]

Environmental sustainability and awareness-raising

Although environmental sustainability is extremely difficult to quantify, let alone convert into fair, comparable indexes that take into account, for example, the different climatic conditions of countries, there are a few well-known international listings. While the results are good general indicators, what is more interesting in the case of the UAE is the way these have been perceived by the external image-conscious leaderships of Dubai and Abu Dhabi.

The 2005 Environmental Sustainability Index of Yale and Columbia Universities ranked the UAE as the 110th of a total of 146 countries. Environmental Performance Indexes of 2006, 2008 and 2010 of the same universities ranked the federation as 47th(/133), 112th(/149) and 152nd(/163). In the 2010 index, compared to its Middle East neighbours, the UAE fared the worst.[218] The WWF's Ecological footprint index is another biannual, internationally known, indicator of stress per capita on the use of natural and ecological resources. Since the beginning of the footprint calculations in 2000, the UAE has received the world's highest ecological footprint. According to the 2010 index, in 2007, each average UAE inhabitant required 6 planet Earths to sustain his/her lifestyle.[219] Although the impact of the 2008 economic crisis and the post-2007 sustainability and mitigation initiatives of Abu Dhabi do not yet show in report, their positive impact might well be offset by Abu Dhabi's industrialisation and growth, and increasing domestic energy and natural resource consumption.

Low rankings in international comparisons, and consequently media, have been perceived by the UAE's leadership as harmful to the country's otherwise positive international reputation. This was the case particularly at the height of the 'Dubai model'. Also, low

[217] Interview with UAE-based journalist, Abu Dhabi, October 2009.
[218] The 2006 index was a pilot. According to the EPI page, 'The 2010 Environmental Performance Index... ranks 163 countries on 25 performance indicators tracked across ten policy categories covering both environmental public health and ecosystem vitality.' SEDAC, "The Environmental Sustainability Index", [http://sedac.ciesin.columbia.edu/es/esi/]. Accessed on 28 December 2010; SEDAC, "The Environmental Performance Index", [http://sedac.ciesin.columbia.edu/es/epi/]. Accessed on 28 December 2010.
[219] WWF, *Living Planet Report 2010*, p. 36.

environmental rankings fundamentally run counter to the 'greening project' initiated by Sheikh Zayed, which, as Ouis expressed it, 'has been tremendously successful in creating a global image of being a modern, environment-friendly society'. Moreover, as she argues, Sheikh Zayed's legacy of '"rolling back the desert" is promoted as a source and symbol of national pride' and 'is closely linked to the legitimisation of power for the ruling sheikhs and the political system of paternalism that has come to be termed Zayedism'.[220] Alternately, as an Emirati environmentalist put it, 'the UAE has realised it has to keep up with the changing times'; the state had come to recognise that to conquer its place as a global business hub, 'it has to lead in sustainability' and transparency.[221]

Dubai (highly dependent on its external image) and Abu Dhabi (the homeland of Sheikh Zayed) took the international criticism most seriously, despite it being based on a report by a Western NGO undoubtedly with a political agenda if its own.[222] After the publication of the 2006 Living Planet Report, in October 2007, the UAE government and the local branch of WWF, the Emirates Wildlife Society (EWS), established a project titled Al Basma Al Beeiyah (Ecological Footprint), one objective of which was to recalculate the country's ecological footprint by producing more accurate national statistics. Although initially claimed by the government that the 2006 data for the UAE was incorrect,[223] the new data produced by Al Basma Al Beeiyah for the 2008 report did not change the country's ranking. Most interestingly, the project represented a unique teaming-up of the government with an environmental (I)NGO. Furthermore, this cooperation has not only been extended, but it has grown; as a result of the realisation that a large share of the footprint came from the domestic sector, the EAD envisaged with the EWS/WWF the broadest and most visible environmental sustainability awareness campaign so far, Heroes of the UAE.[224] The EWS/WWF has also been consulted on a number of occasions by government institutions.[225] As the ultimate display of impact on decision-making, the long-term managing director of the EWS/WWF, Razan al-Mubarak, was appointed as the assistant secretary general of the EAD in 2010.

Generally in the UAE, the limited number of environmental NGOs, practically all of which have been co-opted by the government, have concentrated on education and awareness-

[220] Ouis, "Greening the Emirates", pp. 337-338; 343. Quotes: pp. 337-338; 343.
[221] E-mail interview with Habiba Al Marashi, Chairperson, Emirates Environment Group, October 2010.
[222] 'Political agenda' suggested by Dr Benno Boer, Programme Specialist, Sustainable development, UNESCO, Doha, November 2010 (interview).
[223] *Gulf News* (19 March 2008).
[224] See: [http://www.heroesoftheuae.ae/en].
[225] Interview with Tanzeed Alam, October 2010.

raising through one-issue campaigns (recycling, beach clean-ups, tree planting) and lectures, while not seeking to influence government policies. ENGOs in Abu Dhabi include the Emirates Natural History Group (established in the early 1970s, mainly Western expatriates), the Environment Friends Society (1991, Emiratis), the Commission of Environmental Research of the Environment Friends Society (1999)[226] and the EWS/WWF (2001, professional NGO, under the patronage of Sheikh Hamdan bin Zayed).[227] All except the EWS represent a traditional conservationist approach rather than a broader, more modern thinking that incorporates issues like sustainable development and climate change. As a new phenomenon, in the late 2000s, a few individuals, like the Green Sheikh of Ajman, have emerged as role models for young Emiratis.[228]

Environmental awareness in the UAE has been generally very low and only a small share of the population has been engaged in the ENGOs' activities. The EAD's annual awareness and behaviour survey from 2009 indicated that awareness and 'positive behaviour' among Abu Dhabi residents had slightly increased from the previous year.[229] Also, it is generally acknowledged that the fact that a large segment of the population resides in the country on a temporary basis lowers their interest in acting in a more sustainable manner. Furthermore, the formerly nonexistent 'infrastructure for environmental sustainability', such as recycling facilities and public transport, has also hindered sustainability efforts of even the most conscious residents.[230]

In general, until the very late 2000s, the direction of awareness-raising has mainly been top-down and the government has mainly supported single issues, such as the UAE-wide ban on plastic bags by 2012.[231] One visible form has been the patrimony-exuding high-profile environmental awards, including the Zayed Prize (US$1m)[232] and the Zayed Future Energy Prize (managed by Masdar, US$2.2m).[233]

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[226] Ouis, "Greening the Emirates", pp. 341-343.
[227] The Emirates Environment Group from Dubai also very active and visible. On the business side, the Emirates Green Building Council is also located in Dubai.
[228] Green Sheikh is Sheikh Abdulaziz al Nuaimi, the nephew of Ajman's ruler. Also Haidar Taleb, who travelled across the seven emirates in a solar-powered wheelchair in 2010, EEG's Habiba Al Marashi and EWS/WWF's Razan al-Mubarak.
[229] 48.9% to 55.3% and 43.8% to 44.4%. EAD, *Annual Report 2009-2010*, pp.72-73.
[230] Abu Dhabi has begun implementing recycling facilities and is building the required reprocessing infrastructure. Personal conversations and observations in Abu Dhabi in February 2010.
[231] *Gulf News* (4 July 2009).
[232] Established in 1999 by the Emir of Dubai, Sheikh Mohammed bin Rashid. Zayed International Prize for the Environment, [http://www.zayedprize.org.ae/]. Accessed on 28 December 2010.
[233] Zayed Future Energy Prize, [http://www.zayedfutureenergyprize.com/]. Accessed on 28 December 2010.

Particularly in the 1990s, business, the oil industry especially, was the main patron of local ENGOs and has, according to Ouis, played a leading role in promoting Emirati environmentalism.[234] In 2009, a survey of 32 UAE-based companies displayed an increasing awareness of environmental issues and 'motivation for action'.[235] Construction companies, however, are not generally considered to be interested in environmental sustainability and greenwash abounds, although some companies, including TDIC and Aldar, have sought to build a greener image.[236] It is in this sector where the UAE's developmental priorities—economic sustainability, growth and diversification, overriding environmental sustainability—are the most manifest.

4.3 Domestic responses to climate change

By 2010, important developments had taken place in Abu Dhabi in alternative energy and environmental sustainability-related policy, plans and projects. The most significant of these was the Masdar Initiative, launched in 2006, which in itself acted as a thrust for further projects. While many initiatives and policies are currently underway, these still lack content and implementation. The two cases chosen for this study—the Masdar Initiative and the nuclear programme—are among the most tangible and advanced of these developments.

4.3.1 Vulnerability, adaptation and mitigation

Physical, social and economic impacts of climate change

As a country with a hot and arid climate with low-lying, highly populated coastal zones, the UAE is extremely vulnerable to climate change. As a show of pioneering in the Gulf context, it has published in the late 2000s three country-specific studies on the potential negative impacts of climate change: two national communications (1NC and 2NC) to the UNFCCC,[237] produced by the Ministry of Energy, and a three-part study, published by the

[234] Ouis, Greening the Emirates", p. 342.
[235] Ecoventures, *The State of Environmental Initiatives Among UAE Companies* (Dubai: 2009), p. 3.
[236] E. Taelman, "Saadiyat Island Tourist Development Project: Dredging in an Ecologically Sensitive Area", *Terra et Aqua*, issue 116 (2009), pp. 3-11; ALDAR, "About Aldar", [http://www.aldar.com/about_aldar.en]. Accessed on 28 December 2010.
[237] Of the six GCC states, only Bahrain and Saudi Arabia have submitted their 1NCs to the UNFCCC.

EAD and prepared by the American branch of the Stockholm Environment Institute.[238] The 1NC, from 2007, defines the country's coastal zones, water resources, dryland ecosystems, agricultural production, human settlements, public health, and energy infrastructure as 'highly sensitive to climatic changes'.[239] The 'already hot climate will become even hotter putting additional stresses on a variety of systems', with average annual temperature possibly reaching 33ºC by 2100, compared to 22 ºC in 1961-1990. Climate change-associated sea-level rise is also seen as posing 'significant risks for the UAE's investment-intensive coastal zones', in the form of inundation, erosion and flooding.[240] Moreover, together with the over-extraction of groundwater resources and the resulting saltwater intrusion, rising temperatures and potentially lower rainfall would further increase the need for desalinated water and significantly undermine agricultural self-sufficiency policies.[241]

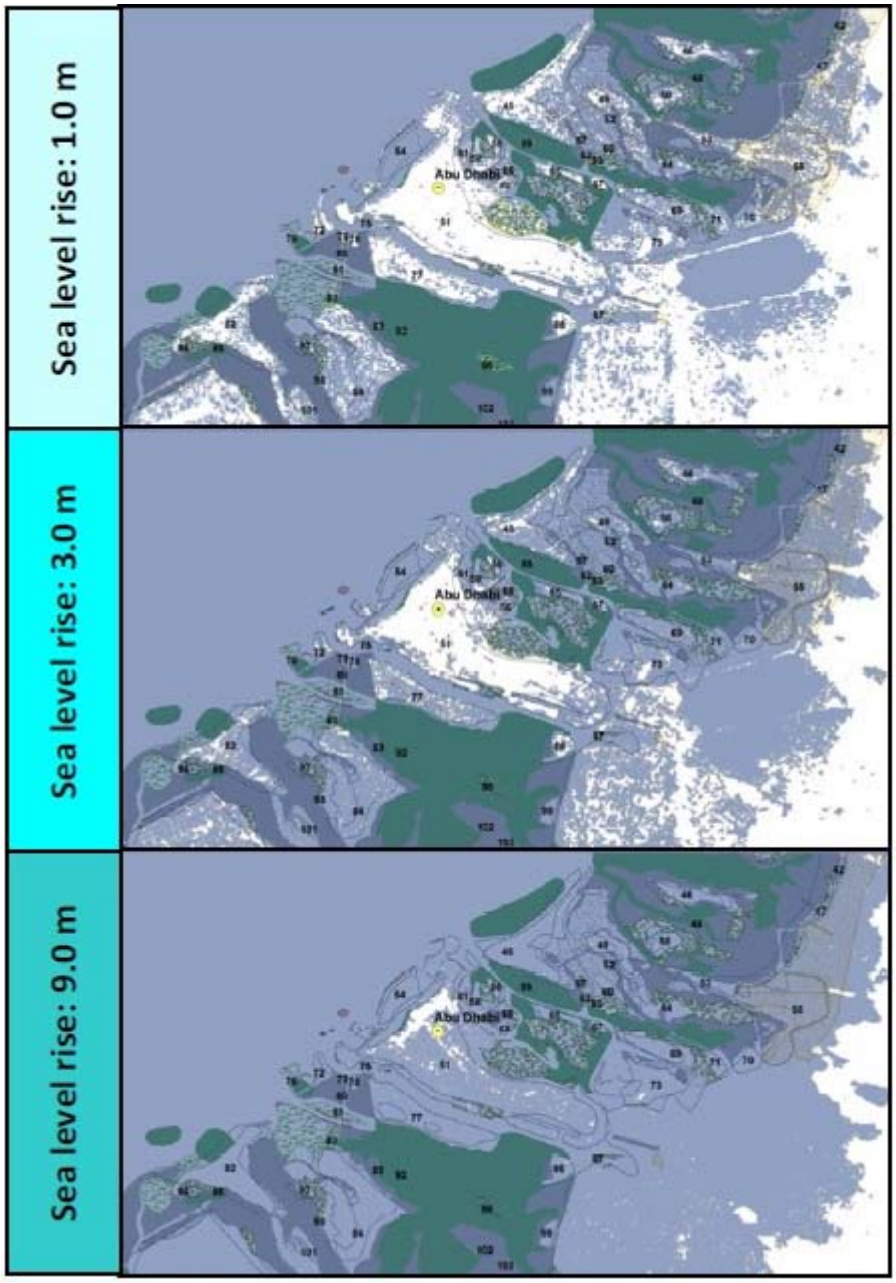
The extensive EAD study from 2009 focuses on the impacts of climate change on the UAE's coastal zones and Abu Dhabi's water resources and dryland ecosystems, as well as related vulnerabilities. The study points out that Abu Dhabi's ambitious coastal development plans, including an underground rail and the Saadiyat Island, will need to account for coastal seawater intrusion, and calls for cost evaluations relating to the negative impact of sea-level rise on tourism and other coastal infrastructure-dependent sectors.[242] The study notes that impact on 'irrigation water requirements may be large'. However, it holds current water consumption patterns and rising demand as more serious threats, as the impacts of climate change are hard to determine yet due to mixed results from precipitation models. Recognising the sustainability paradox of Sheikh Zayed's legacy, the study also notes that despite bearing an important cultural value, 'serious consideration will [be] needed in determining the costs and benefits of continuing to green the desert, given the challenges of climate change'.[243]

The UAE's 2NC, from 2010, predicts more conservative temperature rises: 2.1-2.8ºC by 2050 and 4.1-5.3ºC by 2100. It points out that in addition to sensitive ecological subsystems, 85% of the UAE's population and 90% of infrastructure are located on the coasts. The report predicts land losses of 1-6% (1,555-5,000 km^2) of the UAE's territory

[238] The EAD and Stockholm Environment Institute participated actively in both NCs.
[239] Ministry of Energy of the UAE, *Initial National Communication,* p. 11.
[240] Ibid., pp. 36-38; 47-49.
[241] Ibid., pp. 38-40.
[242] The 9 m scenario accounts for possible accelerated ice cap melting. EAD, *Climate Change*, p. 43.
[243] Ibid., pp. 98-99; 117.

by 2100 (in case of 1-9 m sea-level rise), which would move Abu Dhabi's shoreline southward by 25-30 km, as shown in figure 4.1.[244]

Figure 4.1. Impact of projected sea-level rise on Abu Dhabi according to the EAD.[245]



Indeed, a World Bank study from 2007 classifies the UAE as the second most vulnerable country in the MENA region to sea-level rise, with around 1% of the country's land area,

[244] Ibid., *Second National Communications*, pp. 25; 27-29; XIII.
[245] Ibid. p. 28.

5% of its population and 2% of the GDP impacted in a 1-metre scenario.[246] Another study from 2009, by a Lebanese NGO, predicts an impact on over 50% of the UAE's population in the case of a 5-metre sea-level rise.[247]

The UAE's national communications also estimate the economic impacts of international climate change response measures, underlining the country's dual vulnerability. The 1NC mentions both the vulnerability of the country's oil, power and desalination infrastructure to both temperature and sea-level rise, and economic vulnerability to effects of emission cuts under Kyoto, citing several previous studies, all of which project revenue or welfare losses, even with the implementation of Kyoto's flexibility mechanisms.[248]

The 2NC presents an impact study commissioned by the EAD, which includes six policy scenarios that run up to 2025. It finds that there will be little change in international oil demand at tax rates below US$90/bbl and that international climate policy in the next decades will only have limited effects on oil markets. Even with US$180/bbl tax levels, the study projects demand levels of over 80% of the 0-carbon tax scenario. This, according to the communication, leaves the oil producers with a 'window of time in which to prepare for the deeper cuts that could come later'.[249]

It is clear that without the simultaneous domestic changes taking place in climate change-related perceptions of Abu Dhabi's key environmental elite members, and a shift in the locus of policymaking from the Ministry of Energy to institutions more genuinely worried about climate change, this kind of a study would never have been published, as it pulls the rug out from under the OPEC bloc's demands on compensation for economic losses in the international climate regime (see chapter 6). OPEC's own model from the late 1990s estimated income losses of 3.1% of the UAE's GDP by 2010 from the implementation of the Kyoto Protocol's emission cuts.[250] Needless to say, the 2008 financial crisis was the trigger for the plummeting oil prices, not mitigation measures.

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[246] Bahrain was not included in the study. S. Dasgupta et. al., *The Impact of Sea Level Rise on Developing Countries: A Comparative Analysis.* World Bank Policy Research Working Paper 4136 (Washington D.C.: World Bank, 2007), pp. 18-20.
[247] E. Ghoneim, "A Remote Sensing Study of Some Impacts of Global Warming on the Arab Region" in M. K. Tolba and N. W. Saab (eds.), *Climate Change: Impact of Climate Change on Arab Countries* (Beirut: Arab Forum for Environment and Development, 2009), p. 36.
[248] Ministry of Energy of the UAE, *First National Communication*, pp. 47-48.
[249] Ibid., *Second National Communications*, pp. 34-35.
[250] Barnett et al., "Will OPEC Lose?", p. 2085.

Resource scarcities, related vulnerabilities and adaptation measures

As discussed above, power supply might become an issue as early as the 2010s for even Abu Dhabi, if both the demand and supply sides are not promptly addressed by the government. While nuclear energy is promising to deliver only by the 2020s, oil can always be burned as an emergency supply should natural gas not be available from domestic reserves or the regional/international markets. More serious problems, however, could emerge in the longer term in the areas of water and food security in the absence of swift policy measures.

Except for hydrocarbons, Abu Dhabi is poor in other natural resources and has only modest amounts of minerals other than hydrocarbons. Rainfall is extremely scarce, on average 78 mm annually, and deserts constitute 93% of the total land area. The emirate's harsh climate and increasingly scarce water resources render its water and food security crucial issues to survival of the state and its inhabitants.[251] There are no lakes or rivers in Abu Dhabi or the UAE, nor does the federation share groundwater resources with neighbouring countries. Hence, transboundary water disputes are not an issue, unlike in the Levant. Estimates on the federation's water availability in the early 2000s ranged between 50-400 m^3 per capita, but by 2007, due to population growth, they had gone down to 35 m^3.[252] This is considerably below the internationally accepted limit of water scarcity of 1,000 m^3. In 2008, groundwater (mostly fossil, or non-renewable) was enough to supply 71% of Abu Dhabi's total water demand; the shares of desalinated water and treated wastewater were 24% and 5%, respectively.[253]

The UAE's water use patterns are extremely unsustainable; approximately 26 times greater than the available renewable freshwater resources, and total demand is increasing fast due to population and economic growth, irrigation, and bad management of the resource.[254] Abu Dhabi currently has 25,000 farms and 220 areas defined as forests, with the latter increasing dramatically since the 1990s. 'Greening the desert' and irrigation (agriculture, forestry and plantation) consumes over 80% of the total water used in Abu Dhabi.[255]

[251] FAO, *Aquastat online database*, [http://www.fao.org/nr/water/aquastat/dbase/index.stm]. Accessed on 29 December 2010. Abu Dhabi Tourism Authority, "Country Size", [http://www.visitabudhabi.ae/en/uae.facts.and.figures/country.size.aspx]. Accessed on 29 December 2010.
[252] Nimah, Musa N., "Water Resources" in M. K. Tolba and N.W. Saab (eds.): *Arab Environment: Future Challenges.* Report of the Arab Forum for Environment and Development (Beirut: AFED, 2008), p. 65; Brown and Crawford, *Rising Temperatures*, p. 11; FAO, *Aquastat*.
[253] WAM, "EAD warns".
[254] Ministry of Energy of the UAE, *First National Communication*, p. 39; EAD, *Climate Change: Executive Summary* (Abu Dhabi: EAD, 2009), p. 7.
[255] EAD, *Climate Change: Executive Summary*, p. 7.

Nonetheless, agriculture only accounts for around 1% of the federation's GDP.[256] Also, domestic use is extravagant: on average 550 litres per day per person, with villa dwellers using up to 1,760 litres per day.[257] The UAE's green areas and golf courses are also a major source of water consumption.[258] According to the EAD, at present consumption rates, Abu Dhabi's directly usable groundwater aquifers will deplete in 20 years.[259]

Also, short-term water insecurity is acute: Abu Dhabi depends on six desalination plants for drinking water, and the federation's strategic water reserves are sufficient for only two days.[260] In 2010, Abu Dhabi awarded a US$430m project for an Arab-South Korean consortium to build the world's largest underground water reservoir for long-term storage of 26 mcm of desalinated water (enough for 9 days with 2009 rates). Diminishing groundwater resources, and fears over the security of the country's desalination infrastructure (due to natural or oil disasters or military or terrorist attacks) were reported among the motives, and some analysts linked the plans to crown prince Mohammed, 'a strategist and a military man'.[261]

Over time, the UAE's dependence on desalination is set to grow and might become more challenging, as the discharges of hyper-saline water not only are a danger to the local marine environment but, together with rising temperatures, may also make desalination increasingly more expensive.[262] According to the EAD's estimate, even with new desalination capacity, Abu Dhabi's water demand would be three times more than available supplies by 2050.[263] Most alarmingly, ADWEC projected in 2009 that the existing production capacity would not be enough to meet demand as early as 2012.[264]

Water management so far has been lax: a law regulating water use dating back to 1981 has, according to Federal National Council members, not been enforced. The constitution also complicates coordinated efforts by federal institutions, as it grants sovereignty over water

[256] National Media Council, *UAE Yearbook 2010*, p. 57.
[257] UAE average. Villa dwellers' use in Abu Dhabi: 270-1,760 l/d. *The National* (21 June 2009b).
[258] In Dubai, a single golf course requires 1.3 million m^3 per year, equivalent to the consumption of 15,000 inhabitants. *The National* (7 May 2009).
[259] EAD, "Water resources".
[260] Five big plants in Abu Dhabi and one in Fujairah (supplying for Abu Dhabi). Interview with Mohamed Dawoud, Manager, Water Resources Department, EAD, Abu Dhabi, October 2010. Reserve data for 2007. EAD, "Water resources"; *The National* (22 June 2009).
[261] *Reuters* (20 December 2010).
[262] R. Richer, *Conservation in Qatar: Impacts of Increasing Industrialization*, CIRS Occasional Paper (Doha: Georgetown University, 2008), p. 6; EIU, *The GCC in 2020: Resources for the Future* (London, EIU, 2010), p. 14.
[263] EAD, *Climate Change: Executive Summary*, p. 7.
[264] EAD, "Water resources".

resources to the individual emirates.[265] In addition to the agricultural sector, household consumption is an increasing hindrance to conservation, due to inadequate pricing. This was noted in the Abu Dhabi Water Resources Master Plan produced by the EAD in 2009, which also saw that a reform in both environmental and water management was necessary, and recommended the establishment of an Abu Dhabi Water Council for strategic planning and development.[266] Leakages are also a major problem in the arid country. Currently up to 30% is estimated to be lost throughout the distribution system.[267] Among implemented policy measures to increase resilience and water security, the 1NC mentioned new desalination and wastewater treatment plants and recharge dams (in the Northern Emirates), restoration of *falaj* (irrigation) systems, and studying salt-tolerant crops (due to the brackishness of groundwater).[268] In 2010, policy measures included constraints on the extent of agriculture, technical savings, and reducing leakages through a new plumbing code and a specific programme. Supply side measures included increasing desalination capacity. There are also plans to increase the share of recycled water that is used (from 50-60% to 100%).[269] On the demand side, measures are soft, concentrating on government-funded water-saving devices and awareness-raising, rather than using pricing instruments to curb consumption.

Food security, closely related to water security, is also crucial from a national security perspective. At the time of the world food price crisis of 2007-2008, the UAE's food imports were reported to total US$14.2bn, contributing importantly to general inflation. Consequently, in 2008, the Abu Dhabi Fund for Development declared it would develop 30,000 hectares of farmland in Sudan as part of 'a broader strategy to secure food supplies' in Africa, Asia (Vietnam and Cambodia) and South America.[270] In 2008 alone, several land agreements were reported, including 400,000 hectares of land rights bought 'by the UAE' in Sudan and 324,000 ha by the Dubai-based Abraaj Capital in Pakistan.[271] On the domestic side, a major soil survey by the EAD from 2009 found that in theory 200,000 ha, in addition to the 77,000 ha already cultivated, could be used for agriculture, although this is not likely to happen in practice due to domestic water security considerations.[272]

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[265] *The National* (10 November 2010).
[266] EAD, *Abu Dhabi Water Resources Master Plan* (Abu Dhabi: EAD, 2009), pp. 18-24.
[267] EAD, "Water resources".
[268] Ministry of Energy of the UAE, *First National Communication,* pp. 39; 42.
[269] Interview with Mohamed Dawoud, October 2010.
[270] *Reuters* (1 July 2008); E. Woertz, "Food Inflation in the GCC Countries", *Gulf Monitor,* 2 (2008), pp. 16; *Gulf News* (9 July 2008).
[271] J. Braun and R. Meinzen-Dick, *'Land grabbing' by Foreign Investors in Developing Countries: Risks and Opportunities.* IFPRI Policy Brief 13 (International Food Policy Research Institute: 2009).
[272] *The National* (18 May 2010).

Agricultural imports equate to important virtual water imports. A six-month strategic food reserve of 14 commodities has also been under preparation since the 2008 crisis,[273] and in late 2010 Abu Dhabi announced the establishment of a government-owned trading house, Abu Dhabi Sources, for securing food supplies internationally. Press reports also recorded an emirate-level food security strategy in the planning, as well as plans to build storage silos in Fujairah for security of supply in the event of Iran blocking the Strait of Hormuz.[274] In 2010, the farmland leases were reported to continue, but information on their extent and successfulness in terms of rendering crops was scarce. In the future, the moral dimension of this 'land grab' will be a big question, potentially impacting negatively both food security in the host countries as well as relations between the UAE and the host countries. As a foretaste, in 2009, a province in Pakistan banned deals between UAE-based private investors and local farmers amid concerns over the latter group's rights.[275]

In relation to sea-level rise, adaptation strategies considered in Abu Dhabi in 2010 included developing strategic information systems for coastal zones and 'win-win strategies' that would incorporate both adaptation and (economically) sustainable development, such as protected areas and enhancing awareness of coastal developers and real estate entrepreneurs.[276] Presently at least, the UAE has financial capability to adapt, either by building flood barriers, moving inland, or through land reclamation. Fortunately, Abu Dhabi's urban plan largely concentrates on developing the city inland. Even so, the publication of the EAD's vulnerability study from 2009 is a courageous act, as the psychological effects of impact scenarios on potential international investors might be repellent, particularly in the case of reclaimed land projects. It demonstrates the difference in mentality between Abu Dhabi, which is seeking to portray a genuine concern over the impacts of climate change, and land rent-dependent Dubai, where a similar study is not likely to be published in the near future. In general, the UAE is still lacking cross-sectoral and ministerial cooperation for 'addressing the challenges posed by climate change', as implied by the EAD report.[277]

Contribution to climate change and mitigation actions and policies

As noted in chapter 3.3, the UAE's total estimated CO_2 emissions (138 Mt in 2007) are small on the global scale, and the country's historical responsibility low (if measured by

[273] *The National*, (1 March 2010a).
[274] *Financial Times*, 16 November 2010.
[275] *Reuters* (1 September 2009).
[276] Ministry of Energy of the UAE, *Second National Communication*, p. 29.
[277] EAD, *Climate Change*, p. 57.

domestic emissions), but growth of emissions has been fast in past decades, and per capita figures are estimated to be among the world's highest (32 t in 2007). Apart from two outdated national GHG emission inventories (1994 and 2000) presented in the UAE's national communications to the UNFCCC and an unpublished study by an international consultancy for Masdar (which estimated the federation's total GHG emissions at 112 Mt CO_2e in 2005[278]), there is scarce systematic, nationally produced and verified, up-to-date data on the UAE's emissions. As one of the few available sources, ADNOC reports its own GHG emissions from operations having declined from 23.3 Mt in 2004 to 22.4 Mt in 2008, despite expansion projects.[279] If these are correct, in 2007 the government conglomerate produced around 17% of the federation's total emissions, and can be estimated to have produced over half of Abu Dhabi's emissions. An ecological footprint calculation by Al Basma Al Beeiyah from 2010, which found that in 2006, 83% of the UAE's footprint was constituted by CO_2 emissions, revealed for the first time the large share of households in the country's footprint; 57% in 2006. Businesses and industry came next, with 30%, and the government third, with 12%.[280] In order to produce accurate data on GHG emissions to serve as a basis for policymaking, Abu Dhabi started working on an action plan for an inventory for 2010, expected to be ready by 2012.[281]

Up to the mid-2000s, only a few concrete larger-scale mitigation actions in the UAE were taken as a result of policies in the energy and transport sectors, the most significant ones probably being reducing gas flaring by 78% in 1995-2007 and a pilot scheme including gas-run vehicles.[282] In 2005, Kazim affirmed that 'the strong opposition to developing renewable sources of energy [had] been fading in recent years'.[283] Some small-scale solar energy projects were implemented, including: 33 GSM base stations (total 600 kW), pay phones (around 29 kW), cell enhancers (around 9 kW), 46 aviation obstructing warning lights (5 kW), and an 850 kW wind turbine on the Sir Bani Yas island of Abu Dhabi.[284] In 2007, spurred by Saudi initiative, the UAE pledged US$150m to a US$750m clean tech fund formed by the four GCC OPEC member states.[285] Also, starting in 2007, the UAE's

[278] Communication from EWS/WWF on 16 January 2011.
[279] ADNOC, *Health, Safety & Environment Report 2009* (Abu Dhabi: Supreme Petroleum Council, 2008), p. 26.
[280] Other: 1%. EWS/WWF et al., *UAE Ecological Footprint Initiative* (2010), pp. 4-5.
[281] Interview with climate change policy expert at the EAD, October 2010.
[282] ADNOC, *HSE Report 2008*, p. 16; ADNOC, "Energy to the Consumer", [http://www.adnoc.ae/content.aspx?newid=47&mid=47]. Accessed on 30 December 2010.
[283] A. M. Kazim, "Assessments of Primary Energy Consumption and its Environmental Consequences in the United Arab Emirates", *Renewable and Sustainable Energy Reviews*, 11 (2007), p. 440.
[284] H. Doukas et al., "Renewable Energy Sources and Rationale Use of Energy Development in the Countries of GCC: Myth or Reality?", *Renewable Energy* 31 (2006), p. 766. Kazim, "Primary Energy", pp. 440-441.
[285] OPEC, Statement to the United Nations Climate Change Conference (COP13), Bali, 14 December 2007.

individual emirates, with Abu Dhabi in the lead, became increasingly interested in the opportunities offered by the Kyoto Clean Development Mechanism (CDM). Starting with a landfill gas project in Sharjah, followed by a number of proposals by Masdar, a part of which were approved by the Executive Board of the CDM, by the end of 2010, the UAE had four registered small and medium size CDM projects and five more in validation. Their total expected annual GHG reductions corresponded to 575 kt of CO_2 equivalent (the equivalent of around 18,000 'UAE resident's emissions'), worth US$9.5m at December 2009 carbon (CER) prices.[286]

The first record of a climate change-related strategy is from the UAE's first national communication to the UNFCCC in 2006. It stressed the importance of pursuing economic development priorities as well as the country's developing country status (and hence lack of emission reduction obligations under the UNFCCC), and proposed a number of win-win measures that would both cut emissions and enhance growth. As a clear sign of a lack of concern or interest towards the effort, these were described as an 'initial set of attractive strategies in an effort to demonstrate solidarity with the international community [and] … to contribute to the process'. Notably, no alternative energy plans were presented. A national action plan was outlined as consisting of strengthening the executive committee on climate change (chaired by the Ministry of Energy) and institutional capability, developing a climate change information centre, and raising public awareness.[287]

With the economy reliant on fossil fuel exports, a stable domestic energy situation, climate change still in the margins of the international energy debate, and the UAE's developing country status and its membership of the OPEC bloc in the international climate regime (see chapter 6.1), there was no real impetus for taking more proactive domestic mitigation actions. Starting from 2006, however, in a time span of just five years, the situation changed radically, particularly in Abu Dhabi. While the exact moment and motives are perhaps impossible to define, the initial push was clearly given by the decision of crown prince Mohammed bin Zayed to make alternative energy technologies, which are knowledge-intensive and future-oriented, a key part of Abu Dhabi's diversification drive.[288] This decision was embodied in 2006 in the establishment of the Masdar Initiative, the topic of the following subchapter. A number of related, coalescing factors also

[286] J. Fenhann, "CDM pipeline", UNEP Risoe Centre. Excel chart, [http://cdmpipeline.org/]. Updated on 1 January 2011; World Bank, *State and Trends of the Carbon Market 2010*, (Washington D.C.: Carbon Finance at the World Bank, 2010), p. 14. Emission data for 2007: World Resources Institute, *CAIT 8.0*.
[287] Ministry of Energy of the UAE, *First National Communication,* chapters 4 and 5.
[288] Interview with Rob Bradley, October 2010.

arguably weighed in, ranging from the increasing precariousness of the domestic energy situation to the emerging negative environmental impacts of the 2000s' fast growth and the rise of climate change on the international agenda.

In 2009, as a consequence of a successful whirlwind campaign led by Masdar and foreign minister Sheikh Abdullah, Abu Dhabi won status as the headquarters of the recently established International Renewable Energy Agency (discussed in chapter 6.2.1). Important changes started taking place in the elite's attitudes towards alternative energies, environmental sustainability and climate change.[289] Also, the UAE had become conscious of the image impact of its environmental performance, and its top leaders, including Sheikhs Mohammed and Abdullah bin Zayed in Abu Dhabi, and even Mohammad bin Rashid Al Maktoum in Dubai, perceived a need to take a bold approach to the country's high per capita emissions.[290] Moreover, with new studies on the potential physical impacts of climate change on the country, the issue of response measures declined, at least in relative importance.[291]

In Abu Dhabi, need for a climate policy emerged. According to some views, this was linked to the emirate's goal to be among the world's top governments. The Executive Council, led by Sheikh Mohammed, wanted Abu Dhabi to take a pioneering role in climate change mitigation while simultaneously keeping actions voluntary. As a result, in 2008, it asked the EAD to draft a climate policy or a strategic action plan for the emirate, which would include incentive-based instruments rather than numeric targets. The message, according to stakeholder accounts, was 'don't push it' so as not to overload the government with commitments. The policy/plan was to consist of four areas: observation networks, mitigation, adaptation and capacity building and cover the water, transport, electricity and waste management sectors.[292] The final draft was presented by the EAD to national and local stakeholders in May 2009.[293] The same year, according to EAD experts, a federal-level policy was also being developed, or at least planned. The Abu Dhabi-level strategy, however, was never published, firstly due to the low expectations over the Copenhagen climate summit in December 2009 and, secondly, due to the takeover of the federation's climate policy in early 2010 by the newly-established DECC in the Ministry

[289] See e.g.: Waleed El Malik quoted in: *The National* (17 May 2008).
[290] Interview with Nawal Al Hosany, October 2010. Names added by the author.
[291] Interview with Dr Waleed Al Malik, Legal Advisor, EAD, Abu Dhabi, October 2009 (personal views).
[292] Interview with climate change policy expert at the EAD, October 2010.
[293] EAD, *Annual Report 2009-2010*, p. 36.

of Foreign Affairs, which incorporated it into its work on a federal-level policy/strategy.[294] The strategy, not yet published at the time of writing, is expected to cover all sectors, including energy (oil/gas) and transport, and include mitigation programmes.[295] One important element will be a renewables target of 7% of installed power generation capacity by 2020. Initially an Abu Dhabi target from early 2009, linked to the Masdar Initiative and its investment plans, the target was adopted at the federal level in 2009-2010, although only as a set of ministerial announcements. Two Abu Dhabi-based climate policy experts asserted in 2010 that the UAE would be unlikely to take on any economy-wide emission targets, let alone commit to these internationally, due to the difficulty of predicting future growth; nevertheless, the UAE would not use its non-Annex I (developing country) status as an excuse not to do anything.[296] While the 7% target has been considered by many renewable energy experts as too easily attainable relative to the available time and financial resources, it has often been defended by local authorities as the first target to emerge from the Gulf region and as a show of goodwill and proactive behaviour from a large oil producer. As a high-level official in the Ministry of Foreign Affairs has noted, renewables in the UAE simply do not make economic sense yet.[297]

A change in rhetoric also took place. In 2009, climate change mitigation was mentioned for the first time in the official UAE Yearbook, which stated that the country 'has a significant role to play in seeking ways to mitigate the impact of fossil fuels on our planet'.[298] The 2NC from 2010 noted that climate change demanded urgent and decisive action, which was a 'moral obligation to our children and their progeny' and that the UAE 'as an oil-exporting country, [had] already begun [its] journey towards sustainable development by introducing new thinking, new frameworks, and new partnerships for reducing [its] carbon footprint'.[299] In early 2010, EAD secretary general al-Mansouri named water supply, pollution and climate change as Abu Dhabi's priorities.[300]

In 2009-2010, as awareness began to grow, officials from the Ministry of Environment and the EAD quoted a number of domestic initiatives and policies with mitigation outcomes (but which had not necessarily been initially devised for this purpose): using natural gas for

[294] Interviews with Waleed El Malik, October 2009 (personal views); anonymous climate change expert at the EAD, Abu Dhabi, October 2010.
[295] Interview with anonymous climate change expert at the EAD, October 2010.
[296] Interviews in October 2010 with Rob Bradley; carbon expert at Masdar.
[297] Discussion in an executive seminar titled *Beyond Copenhagen: Environmental Diplomacy at Crossroads*, Zayed University and the MoFA of the UAE, Abu Dhabi, 4 May 2010. Chatham House rule applied.
[298] National Media Council, *UAE Yearbook 2009*, pp. 122-123.
[299] Ministry of Energy of the UAE, *First National Communication*, p. 1.
[300] Internal memo of the Finnish Ministry of Foreign Affairs, 4 February 2010.

electricity generation; aiming to have 25% of Abu Dhabi's government fleet running on compressed natural gas (CNG) by 2012; some of Dubai's *abras* running on CNG; the zero flaring (goal) of Abu Dhabi's gas industry; Dubai's metro; a surface transport master plan in Abu Dhabi and planning of a federal transport policy; a federal green building code; nuclear energy, expected to produce 20% of Abu Dhabi's power; Masdar City with its renewable energy projects; and an energy policy for Abu Dhabi to be published in 2011, including demand side measures.[301] A number of individual sustainable building projects were also announced starting from around 2008[302], and many emirates (but not Abu Dhabi) lowered their electricity and water subsidies to curb consumption. The UAE was even known to have given development assistance to Pacific countries for climate change adaptation and to Africa for renewables. Although good actions were many, their implementation was described as uncoordinated, and the big picture remained largely undocumented by the competent authorities.[303]

In a presentation at the Bonn II meeting of the UNFCCC in August 2010, the key mitigation initiatives of the UAE were defined, for the first time in an international context, as: clean fossil fuels (pilot project in CCS), nuclear energy (four 1.4 GW reactors), renewable energy (7% of electricity generation by 2020), energy efficiency (green building regulations and appliance standards), Masdar City, public transport infrastructure (metro in Dubai, planned in Abu Dhabi and Union Rail) and education and awareness programmes.[304]

As a concrete policy implication of Al Basma Al Beeiyah's footprint breakdown, described above, the EAD and the EWS/WWF jointly set up the awareness campaign 'Heroes of the UAE' to change the existing energy and water consumption patterns.[305] Moreover, the initiative developed with the Masdar Institute an electricity and water scenario model for Abu Dhabi, which showed how the emirate could cut its CO_2 emissions by 11-38% by 2030 from BAU. Notably, this was not a government initiative, as similar calculations are politically very sensitive in the context of the UNFCCC where small developing countries seek to balance their developmental needs with actions that show goodwill without giving

[301] Interviews with Dr Saad Al Numairy, Environmental Advisor, Ministry of Environment and Water, Dubai, October 2009; climate change policy expert at the EAD, October 2010.
[302] Including the Abu Dhabi World Trade Centre, Masdar Initiative's headquarters, the Shams Tower at the Yas Island F1 race track, and the TDIC's headquarters. In Dubai, Dubai World adopted the LEED in 2008.
[303] Interview with UAE-based climate expert, October 2010.
[304] T. Al Zayoudi, "Key UAE Mitigation Initiatives", Mitigation side event, Bonn climate talks, 1 August 2010.
[305] EWS/WWF et al., *UAE Ecological Footprint Initiative*, pp. 4-5.

away too much too early. However, the scenario study did show—without incorporating social or economic cost calculations—that significant deviations from BAU emissions, estimated at over 180 Mt in 2030 (compared to slightly over 40 Mt in 2005), could be achieved with a mix of planned developments and energy and water supply demand policies.[306] It also provided the government with an important policy tool, a chain of events previously unseen in any Middle Eastern country, let alone a GCC OPEC member state.

4.3.2 Case study: Masdar[307]

> We cherish our environment because it is an integral part of our country, our history and our heritage. On land and in the sea, our forefathers lived and survived in this environment. They were able to do so only because they recognised the need to conserve it, to take from it only what they needed to live, and to preserve it for succeeding generations (Sheikh Zayed bin Sultan Al Nahyan, 1998).[308]
>
> Masdar was launched in April 2006, rooted in the principles of resource conservation and sustainable development practiced by the UAE's first President and Founding Father, Sheikh Zayed bin Sultan Al Nahyan (Sultan al-Jaber, CEO, 2010).[309]

Setting Abu Dhabi's Masdar Initiative apart from similar climate change-related developments in the region's other monarchies is its focus on alternatives to fossil fuels. The scale of the project is also without regional precedent or comparison. Masdar's role as a catalyst to most of Abu Dhabi's renewable energy, climate change and environmental sustainability-related policy developments of the late 2000s is so crucial that it requires not only an examination of its first years of existence, including successes and problems, but also a deeper analysis of its functions in the vision of Abu Dhabi's green elite.

Sunny skies: the original plan 2008-2009

There is little information as to the exact origins of the Masdar Initiative, but according to close sources, the idea came from Sultan al-Jaber and three Lebanese consultants (Khaled

[306] Ibid., pp. 6-7.
[307] Large parts of the first, third and fourth parts of this subchapter have been published in: M. Luomi, "Abu Dhabi's Alternative-Energy Initiatives: Seizing Climate-Change Opportunities", *Middle East Policy*, 16 (2009), pp. 105-109.
[308] Speech to mark the UAE's first Environment Day, February 1998 quoted in: Zayed Future Energy Prize, 'Sheikh Zayed', [http://www.zayedfutureenergyprize.com/en/about-the-prize/background/the-vision/sheikh-zayed.html]. Accessed on 4 February 2011.
[309] Sultan al-Jaber in: EWS/WWF, *Dar al Khair*, 24 (2010), p. 6.

Awad, Ziad Tassabehji and Osama Nader) who presented the idea to Mubadala.[310] At a rhetorical level, references are often made to the initiative being an extension of the legacy of Sheikh Zayed.[311] The Masdar Initiative, or later known simply as Masdar, is owned by the private joint stock company Abu Dhabi Future Energy Company (ADFEC), fully under Mubadala, set up by Sheikh Mohammed bin Zayed in 2002. Also dubbed as Sheikh Mohammed's investment vehicle, Mubadala's purpose is to advance economic diversification in the emirate of Abu Dhabi through a diverse portfolio in sectors such as energy, aerospace, real estate, technology, infrastructure and services.[312]

Initiated in 2006, Masdar (Arabic for 'source') comprises a set of projects in the fields of alternative energy and carbon management, including research and development. According to the original plans, it would culminate in a 'totally green city' of 40,000 residents and 1,500 businesses in 2016. Its four main aims are to diversify the economy, maintain and expand Abu Dhabi's position in global energy markets, transform the emirate into a developer and exporter of energy technology, and contribute to sustainable development.[313]

Masdar consists of five main units: property development, a research institute, industries, utilities and asset management, and carbon management. Signalling the government's support, in 2007, CEO Sultan Ahmed al-Jaber, Masdar's most visible and influential figure, was quoted as saying anecdotally that the initiative had 'an unlimited budget for renewable energy projects'.[314] In January 2008, the Abu Dhabi government announced a US$15bn-investment in the initiative.[315] Of the five units, Masdar City, the CCS operations of the carbon unit, and the photovoltaics production unit were to receive the most funding. By mid-2009, Masdar had built up a portfolio that included companies and projects over the entire technology life cycle, and had already invested US$3bn in its alternative energy and sustainability projects domestically and abroad, with an aim to reach US$10bn by 2015.[316]

[310] Interview with carbon expert at Masdar, October 2010.
[311] See CEO al-Jaber's quote above. Also, for example, Masdar City brochure from 2009, accompanied by a picture of Sheikh Zayed, cites the speech by Sheikh Zayed quoted in the beginning of this subchapter.
[312] Mubadala, [http://www.mubadala.ae/]. Accessed on 28 July 2009.
[313] S. Nader, "Paths to a Low-Carbon Economy – the Masdar Example", *Energy Procedia*, 1 (2009), p. 3952; Masdar, "Introduction", [http://www.masdar.ae/]. Accessed on 29 July 2009.
[314] *Gulf News* (28 October 2007).
[315] *Masdar*, Press release (9 February 2008).
[316] *Arabian Business* (9 June 2009).

The most visible aspect of the initiative, Masdar City, ranges over an area of 6 km^2 next to the Abu Dhabi international airport. Launched officially in May 2007, with a virtual cornerstone laid in February 2008, it is declared to be the world's first carbon-neutral, zero-waste and car-free city. It was originally envisaged to become fully powered with renewables (mainly solar energy), with all waste recycled, and cars replaced by public transport and rapid personal transit vehicles, placed under a 7-metre platform on which the city would stand. Other sustainability features include reduced use of water, recycled grey water, reduced installed power capacity, and urban planning adapted to the local culture and climate.[317]

Masdar City's budget was announced in February 2008 at US$22bn, US$4bn of which would be funded by Masdar and the rest expected to come through foreign investment and various financial instruments. The city was expected to add over 2% in Abu Dhabi's GDP and, based on 2008 energy prices, was estimated to save the equivalent of US$2bn in oil by the mid-2030s.[318] The city also incorporates a conscious effort at systematically scaling up and integrating advanced renewable technologies.[319] Moreover, it will function as a free zone and has promised to create over 70,000 jobs.[320] Originally, the city was also designed to attract wealthy expatriates interested in this unique niche of the high-end real estate market.

The Masdar Institute of Science and Technology (MIST), established with the Massachusetts Institute of Technology, was set up in order to attract both foreign companies and know-how to the emirate. Research concentrates on a wide range of alternative-energy technologies and policies, and the institute aims to grow into a 120-faculty, 800-student institution by the late 2010s.[321] The first Master's degree programs began in 2009; PhD programs are expected to start in 2011.[322] Another research-related endeavour is the building of an innovation centre around the Ecomagination concept of General Electric as a part of a US$8bn joint agreement between Mubadala and GE signed

[317] Nader, "The Masdar Example", pp. 3953-3954; R. Tompkins, Presentation at Arabian Peninsula business event, Finpro, Helsinki, 29 April 2009.
[318] *Masdar*, (9 February 2008).
[319] Nader, "The Masdar Example", 3952-3952.
[320] *Masdar*, (9 February 2008).
[321] *The National*, (14 May 2008).
[322] Masdar Institute of Science and Technology, [http://www.mist.ac.ae/]. Accessed on 28 July 2009; MIST triptych brochure from 2008.

in July 2008. As the first corporate tenant of the city, the centre will concentrate on developing energy efficient products and raising awareness of energy conservation.[323]

The industries unit (later changed to Masdar PV) concentrates on the development and production of photovoltaic (PV) solar energy technologies and energy. The main investment of the unit has been in Masdar PV, a company established in April 2008 with the aim of rising to the global top-three of the industry. With a total of US$2bn to be invested in the endeavour, an initial US$230m investment included the construction of a manufacturing plant in Germany.[324]

The utilities and asset management unit (later split into Masdar Power and Masdar Venture Capital) seeks to build a portfolio of different renewable and alternative energy operating assets and invests in companies with promising technology and intellectual property profiles. The first investment vehicle of the unit is the US$250m Masdar Clean Tech Fund, which was launched in November 2006 in cooperation with Credit Suisse, Consensus Business Group and Siemens. It has bought strategic equity stakes in clean energy, water and environmental technology companies.[325] The unit has also engaged with Spanish Sener in a US$1.2bn joint venture, Torresol Energy, to build solar plants in Spain,[326] and invested US$175m in the Finnish wind-turbine manufacturer WinWinD, the largest foreign industrial investment in Finnish history.[327] In October 2008, after Shell had withdrawn from the massive British wind energy project, the London Array, complaining of rising costs and low government incentives, Masdar joined the energy companies E.ON and DONG Energy by buying a 20% share in the project.[328]

Domestic production of concentrated solar power (CSP) is another target area. The flagship project in this sector is the Shams 1, a 100 MW CSP plant to be built in the Western region of Abu Dhabi.[329] In May 2009, a 10 MW photovoltaic system—at the time the MENA region's largest, worth US$50m—was connected to the electricity grid in Abu Dhabi.[330] In early 2008, plans for building the world's first commercial hydrogen power

[323] *General Electric*, Press release (20 January 2009); *Reuters* (22 July 2008).
[324] *Masdar PV*, (18 March 2009).
[325] Z. Tassabehji, "Masdar – opportunity!". Presentation at Arabian Peninsula business event, Finpro, Helsinki, 29 April 2009. In early January 2010, Masdar and Deutsche Bank launched a new US$265 million clean tech fund. *The National* (19 June 2010).
[326] Masdar, "Activities", [http://www.masdar.ae/]. Accessed on 29 July 2009.
[327] J. Varjotie, Presentation at Arabian Peninsula business event, Finpro, Helsinki, 29 April 2009.
[328] *The National* (16 October 2008).
[329] Masdar, "Activities".
[330] *Gulf News*, (1 June 2009).

plant, costing US$2bn, were announced. The 420 MW plant was planned to be constructed with Hydrogen Energy, a joint venture between BP and Rio Tinto. In addition to producing hydrogen from natural gas, it would also capture the carbon dioxide produced in the process and inject it back into depleting oil fields for enhanced recovery. The plant should capture 1.7 million tonnes of CO_2 per year, equal to the emirate's domestic transport sector's emissions.[331]

Masdar's carbon management unit is geared to attract Kyoto Clean Development Mechanism (CDM) projects and carbon capture and storage (CCS) technologies and projects. The unit's quantitative goal has been to cut emissions by 30 million tonnes of CO_2 annually by 2020, decreasing Abu Dhabi's carbon footprint by a third.[332] In December 2010, the complete tentative CDM portfolio of the unit consisted of 6 projects (registered or at validation), a substantial number compared to the other emirates and GCC states. The emission reductions and financial returns expected from Masdar's first registered seven-year CDM project, the 10 MW PV solar energy plant, are a modest 15 kt of CO_2e, valued at less than US$300,000 per year at late 2009 prices.[333] Masdar has also engaged in energy projects and cooperation agreements with countries in the MENA region, including a wind farm and a fuel switching project in Egypt and an emission reduction agreement with Bahrain's National Oil and Gas Authority.[334]

In 2008, Masdar announced plans to develop an emirate-level network for enhanced oil recovery that would become the world's largest single integrated CCS project, including 300 km of pipelines. The first phase of the US$3bn project was expected to capture 5-6.5 million tonnes of CO_2 from a steel plant, a conventional power plant, the hydrogen power plant and a future aluminium smelter by 2013. Moreover, each injected tonne could add 2.5-3 barrels of oil to oilfield production.[335] In November 2009, ADNOC began testing the injection of CO_2 in the Rumaitha field in collaboration with Masdar. Adma-Opco, the offshore gas company, has also been conducting tests.[336] Even if the clearly overoptimistic schedule is only in some way successful, not only will the network increase oil production,

[331] *BP*, Press Release (21 January 2008).
[332] Wilén *Arabiemiraatit*, p. 10; Nader, "The Masdar Example", p. 3955.
[333] Fenhann, Joergen, "CDM pipeline", updated on 1 January 2011. However, substantially down from 16 in April 2009. Tassabehji, "Masdar – opportunity!".
[334] See e.g.: *Reuters* (17 February 2010); *Masdar*, Press release (20 January 2010); *Arabian Business* (22 June 2009).
[335] *The National* (11 June 2008; 10 December 2008); *Reuters* (18 November 2008); *UAE Interact* (29 October 2008).
[336] *The National* (19 January 2010a); *Petroleum Economist* (4 November 2010).

but it will save for domestic consumption natural gas that is conventionally used for injection.

Two other Masdar-related concepts, running since 2008, the incredibly successful World Future Energy Summit (WFES) and the Zayed Future Energy Prize, are geared mainly at drawing global investor and media attention to Abu Dhabi's new industries and the leadership's major plans and accomplishments.

Clouds emerge: doubts over support 2010

Starting from 2009 and materialising in 2010, Masdar found itself amidst major crisis as a consequence of, among other things, the global financial crisis, over-optimistic assumptions, hasty marketing, colossal promises, rushed implementation, and most likely also bad recruitment choices. Details on the scale of problems that had been mounting were never revealed to the press despite rumours being rife, and the internally brewing crisis was managed in Dubai'esque style.

The financial crisis took its toll, as real estate prices plummeted, making Masdar City's high-tech developments economically unfeasible. Also, the bust in oil prices reduced the amount of government funding available for risky low-return test bed projects. In addition, foreign companies' willingness to commit did not turn out to be as strong as expected, presumably partly because of the global economic downturn.[337]

One of Masdar's major mistakes, however, had been that too much reliance was placed on technologies that were not yet ready or could not be implemented on the city site.[338] Technical problems began emerging as early as 2008, as tests revealed that because of the high temperatures and dust, PV solar panels were operating at less than 40% of advertised maximum capacity.[339] According to press sources, the 10 MW plant in Masdar City built in 2009 was actually producing only 2-3 MW. [340] At the solar plant, a group of workers is in charge of manually cleaning dust from the panels, and it is planned that machines will eventually take over this role. Also, delays were caused by the fact that the labour force hired for the city's construction, mainly originating from India, Pakistan and Sri Lanka, was not appropriately skilled or qualified to use the special materials and technologies with which the Masdar Institute building was equipped. Many lessons were learned along the

[337] Correspondence with Matti Lassila, Finnish Ambassador to Abu Dhabi, January 2011.
[338] Interview with Nawal Al Hosany, October 2010. 'Mistake' is the author's own analysis.
[339] *The National* (12 November 2008).
[340] *Utilities-ME* (8 November 2010).

way. For example, wind turbines, originally in the master plan, could not be set up on the city area because of restrictions due to the vicinity of the airport.[341]

A major impediment to wider-scale implementation of solar energy in Abu Dhabi and the UAE was the lack of feed-in-tariffs (subsidies) or other types of policies making solar more competitive against fossil fuels. In 2009, Masdar PV, a subsidiary of the Abu Dhabi government firm, was to build a plant at Taweelah. However, in 2010, according the company's chief executive, construction had been delayed because the government had not yet created the regulations to support a domestic market.[342] Also, the financial crisis and a sharp drop in the price of a competing technology reduced the competitiveness of Masdar's choice, thin film PV.[343]

2010 was a year of major turmoil for the entire company. In early 2010, in addition to major personnel cuts in Abu Dhabi,[344] two Masdar senior executives, Tassabehji and Awad, left the company, while a six-week rethink of the project's original plans was ordered by CEO al-Jaber.[345] In May, Masdar PV dismissed both its CEO and COO; in June, Masdar Institute's head of research quit his job, and in July, the Institute's provost resigned for 'personal reasons'.[346]

Rhetoric, according to which all visionary projects required constant reviewing, entered the picture, as rumours regarding Masdar's future grew. According to al-Jaber, 'Masdar is by definition a work in progress. Our development activities constantly inform the way we manage and evolve our projects.'[347] Over the summer, he assured the press and international audiences that the company was not scaling back its plans and that the UAE was on track to deliver the 7% renewables target.[348]

The year 2010 was characterised by reviews of the entire project, most importantly of the Foster + Partners master plan. In January 2010, Masdar officially dropped its aim to

[341] Conversation with Masdar City site employee, Abu Dhabi, October 2009.
[342] *The National* (1 March 2010b).
[343] Correspondence with Craig Field, Corporate Communications Specialist, Qatar Solar Technologies, January 2011.
[344] Conversations in Abu Dhabi in May 2010.
[345] *Arabian Business* (28 February 2010).
[346] *Greentech Solar* (7 May 2010); *Bloomberg* (21 June 2010); *The Chronicle of Higher Education* (2 August 2010).
[347] *Arabian Business* (28 February 2010).
[348] *UAE Interact* (30 June 2010); *Arabian Business* (26 July 2010).

complete the City development by 2016.[349] An oft-repeated phrase by Masdar executives in 2010 became the promise: 'the vision remains the same'.[350] In the summer of 2010, a high-level Masdar executive felt that Masdar PV had 'lost a lot of trust and drive' because of CEO al-Jaber's need to 'move very carefully'.[351] The new master plan of Masdar City was announced in October 2010, with the completion date of the first phase pushed to from 2013 to 2015 and the completion date of the entire project to 2020-2025.[352] In late 2010, rumours circulated that Masdar was possibly considering switching the aim of making the City 'carbon neutral'—a substitute to the even more ambitious 'zero-carbon' of the very first plan—to 'low carbon'. This, if realised, was regarded by UAE-based renewable energy experts as disastrous for Masdar's international image.[353] Indeed, indications of this were given by Sheikh Abdullah in his speech to the Cancún climate conference in December 2010, in which he described Masdar City as 'a cutting edge low-carbon urban centre'.[354] By December 2010, the budget of the City had been cut by over a fourth, from US$22bn to US$16bn. Cancellations included, among other things, the pod transport system, elevating the entire project on a platform, and the plan to install solar panels on all roofs. Also, it was decided that construction would proceed in a more phased manner, by neighbourhoods.[355]

It is impossible to ascertain whether crown prince Mohammed's support for CEO al-Jaber and the green utopia were at any point at stake as the result of the difficulties in delivering fast results, as typically expected in a rentier economy. At least in early 2010, Mohamed's support was assured by energy minister al-Hamli in private discussions to be very strong.[356] Abu Dhabi's government, however, is known to include elements that do not consider Masdar as important. These supporters of the old economy, according to some views, will need to see before believing that the initiative can play a role in economic diversification.[357]

[349] *The National* (4 January 2010).
[350] See e.g.: *Utilities-ME* (8 November 2010). The argument went that since Masdar was established in times of relatively low oil prices, this served as proof that the post-2008 slump in oil prices was not going to lead to budget cuts.
[351] Correspondence with Dennis Kumetat, LSE, August 2010.
[352] *Utilities-ME* (8 November 2010).
[353] Personal observations and conversations, Masdar City, Abu Dhabi, October 2010.
[354] Sheikh Abdullah bin Zayed Al Nahyan, statement in joint high-level segment of COP and CMP, 16th Conference of the Parties, UNFCCC, Cancún, 9 December 2010.
[355] *The National* (1 December 2010).
[356] Internal memo of the Finnish Ministry of Foreign Affairs, 4 February 2010.
[357] Interview with Masdar Institute faculty member, Abu Dhabi, October 2008.

There were of course positive developments, as many projects still proceeded as planned. Just to mention a few: in the autumn of 2010, the first part of the Masdar Institute in Masdar City opened for students. In June 2010 Masdar announced a US$600m deal with French Total and Spanish Abengoa to build the Shams 1 (100 MW solar plant) by 2012.[358] Also a sign of endorsement by the Emirati community, the first private donation, 1 million dirhams (US$270,000), was given to the Masdar Institute by a national in late 2010.[359] Moreover, the perception-changing impact of Masdar, together with the increasing attractiveness of the solar industry made two other Abu Dhabi government-owned investment companies interested in the sector: the International Petroleum Investment Company partnered with German and US companies to build CSP stations in the UAE, South Africa and Spain, and the Abu Dhabi National Energy Company (Taqa) formed strategic partnerships with French and Spanish companies to develop wind farms.[360] Even the re-evaluation was seen in a positive light by Masdar's insiders, one arguing that this was a sustainable move, as it enabled the company to separate successes from areas that needed development.[361] Most importantly, however, signalling a recognition of Masdar's central role in the country's emerging climate policy (and hereby providing an official role for Masdar in it), in February 2010, CEO al-Jaber was named the head of the new Directorate of Energy and Climate Change, established in the Foreign Ministry, with the titles Assistant Minister for Foreign Affairs and Special Envoy for Energy and Climate Change of the UAE.

Masdar's functions

It still remains to be seen what Masdar is envisaged to become and what functions it is expected to play in Sheikh Mohammed's vision of Abu Dhabi. The official narratives of Masdar, often repeated in commercial material and by the company's representatives, can be grouped under three themes: its myth of origin, its economic function and its environmental motivations. First of all, according to the company, Masdar reflects Sheikh Zayed's vision and is a natural continuation of his environmental legacy. Also, Abu Dhabi's experience in the oil industry gives it a comparative advantage in alternative energies. Second, it is said that Masdar is an important part of Abu Dhabi's diversification strategy: the industries it incorporates will establish a new economic sector and transform the emirate into a global leader in and exporter of sustainable energy technologies, reversing the flow of high technology and ultimately transforming Abu Dhabi into a post-

[358] *The Telegraph* (10 June 2010).
[359] *The National* (28 December 2010).
[360] *The Grid/The National* (18 February 2010).
[361] Interview with Nawal Al Hosany, October 2010.

oil economy by the twenty-second century. Third, the initiative's spokesmen and government officials have repeatedly stated that Masdar shows Abu Dhabi's serious commitment and regional leadership in both climate-change mitigation and energy security. They also stress Masdar's complementarity to Abu Dhabi's energy and economic security interests, framing the initiative as proof of a rentier state's ability to engage in long-term planning and an oil exporter's ability to be green.[362]

Clearly, the functions of the Masdar Initiative are as multidimensional as the project itself. The fact that the impulse to establish Masdar came from inside Mubadala indicates that it is, first and foremost, another part of Sheikh Mohammed's new economy, aimed at diversifying Abu Dhabi's fossil-fuel-based rentier state. However, some of Masdar's elements, such as the massive CCS projects, are likely to provide important support to the old, oil-based rentier economy, and others, such as renewables and real estate, will boost Abu Dhabi's 'neo-rentier' economy.

If Masdar wants to lead the creation of a sustainable knowledge-based sector of the economy, hiring locals and building up permanent human capital are crucial. As of 2010, due to the lack of domestic know-how, a large part of Masdar's key staff still consisted of expatriates, and only a small percentage of students at the Masdar Institute were Emiratis.[363]

It will also remain to be seen how eco-conscious Emiratis will be by the time the first residential units at Masdar City are finished. Awareness has risen rapidly, but according to a survey conducted by Masdar, while some Emiratis were very interested, others saw that it was not meant for the nationals' needs and complained that Masdar is more outward-focused than inward.[364] This serves as an indication of Masdar's strong regional prestige orientation and catering to Western audiences' value systems, but it also shows that Abu Dhabi's 'monarchy' had made a 'pre-emptive strike' by taking the leadership in environmental sustainability before the younger, and more environmentally savvy generations grow older.

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[362] Sources include the Masdar Initiative's web pages; Masdar-related brochures from 2008 and 2009, a Masdar City presentation in Helsinki in April 2009, ADNOC's CEO Yousef Omair bin Yousef in *Time Magazine*,
February 13, 2008, and Sultan al-Jaber in *The National*, May 29, 2008.
[363] Conversations with Masdar Institute staff and students. Masdar City, Abu Dhabi, October 2010.
[364] Interview with Nawal Al Hosany, October 2010.

As to energy policy, Masdar is the largest single cluster of investments in renewables and other alternatives to fossil fuels in the region. The comparative advantages achieved from decades of experience in the fossil-fuel industry and the scaling up of technologies might provide additional support for the project's success. Most importantly, however, without Abu Dhabi's oil resources and massive windfall profits from the 2000s, enabled by the small size of the national population engaged in the rentier bargain, Masdar would never have materialised. As the rise and fall of oil prices in the late 2010s revealed, Masdar continues to be heavily dependent on the medium-term success of Abu Dhabi's rentier economy, as well as political support from the upper echelons of power.

Future prospects

If trust and confidence at the highest levels are maintained through successful performance, Masdar has the potential to reinvent Abu Dhabi as a solar energy power, both in terms of technology and energy exports. However, in the medium term, Masdar's role in domestic energy security will remain marginal. While the share of renewables in Abu Dhabi's domestic electricity capacity is set to rise to 7% by 2020, solar energy is still seen mainly as a supplement to help ease peak-load supply during summer months.[365] However, given that the first nuclear plant is expected to be operational at the earliest around 2017, Masdar's solar energy installations could still play a relatively important role in alleviating the federation's energy crisis, if promptly implemented.

Although the company does not have a defined authority in the UAE's international-level climate policy, climate change is one of the central motives of the 'Masdar narratives', as described above. A former Masdar executive has stated that one of the motives behind the project was that 'Abu Dhabi wanted to show that it's aware of its carbon footprint today'.[366] Additionally, the 7% renewables target was the most ambitious and clearest formulation of a domestic climate policy in the Gulf so far. Also, in a decade or two, CCS will potentially yield significant emission reductions.

Accusations of Masdar being merely a green façade, a Disneyland[367] that will allow the rest of Abu Dhabi and the UAE to continue business as usual, are, however, pertinent. Most of the renewable energy projects will be related to Masdar City itself and will therefore not contribute to the energy mix in the rest of the emirate, let alone the

[365] Al-Jaber, quoted in: *Mubadala*, Press release (2 July 2007).
[366] Khaled Awad in: *NPR,* Web article (5 May 2008).
[367] Referring to criticism in: *New York Times* (25 September 2010).

federation, especially if renewables do not receive any subsidies or made a compulsory element in buildings through stricter building codes. Total UAE energy demand is still expected to grow significantly. Massive industrial and real estate projects are being planned and constructed, further increasing domestic GHG emissions. Without enhancing energy efficiency and placing curbs on demand, this growth will both undermine the positive impact of renewable and clean 'future energies' and continue to challenge domestic energy security.

4.3.3 Case study: nuclear energy[368]

Against the expectations of many, starting in 2007, the foundations of the world's fastest emerging civilian nuclear power programme were laid out in Abu Dhabi with the crucial help of external powers. Finding itself amidst an energy crisis and with no prior domestic technical expertise, the government decided to outsource the entire programme. The fast implementation schedule, which envisages the completion of four 1.4 GW reactors by 2020, will require strong political will, solid financial support and a high level of engagement from the top of the ruling family. Due to international concerns over proliferation, Abu Dhabi has chosen to emphasise transparency, non-proliferation, and trust-building, as the core of its internationally communicated intentions. Support of key international actors, principally the United States, has enabled Abu Dhabi to access the best technologies and start implementing the programme at record speed. Moreover, the US strategy to portray the country's modus operandi as a 'model' for the region, and the world, has provided the government with important regional prestige opportunities.

This subchapter analyses how the UAE's nuclear programme came about; why the attitude of the Western powers turned from reluctant to eager; and how a nuclear programme in the Middle East came to be labelled as a model.

The nuclear choice

According to a high-level official, the UAE (or more precisely Abu Dhabi) government, first started considering nuclear energy in 2006, when an inter-agency energy planning committee of Abu Dhabi was mandated to produce a more accurate estimate of future

[368] Parts of this subchapter have been previously published in: M. Luomi, "Abu Dhabi's Alternative-Energy Initiatives", pp. 109-112.

demand for electricity and water in the emirate. Soon after, the mandate of this Energy Working Group was extended to the entire federation and included charting the feasibility of different technological options to meet future demand.[369] Simultaneously, since around 2007, France and the United States became increasingly involved in promoting nuclear energy as an option for the UAE. The visit of President Sheikh Khalifa to France in July 2007 laid the foundation for bilateral nuclear cooperation. On President Sarkozy's initiative, the two presidents agreed to finally put into effect a 1980 agreement on the peaceful use of nuclear technology. An American nuclear consultancy also began working for a branch of the Abu Dhabi government since late 2007. In March 2008, after a rapid series of consulting, negotiations and bilateral agreements, the UAE's Supreme Council of Rulers approved a memorandum, submitted by foreign minister Sheikh Abdullah, which explained the motivations and principles of the country's potential plans to develop a peaceful nuclear energy programme.[370]

The contents of the memorandum were released in April 2008 in a white paper titled The Policy of the UAE on the Evaluation and Potential Development of Peaceful Nuclear Energy, which stressed the exclusively peaceful nature of the UAE's intentions, alongside the need to develop additional sources of electricity to meet increasing demand. It also underscored the principle of maximum transparency and renounced domestic enrichment of nuclear fuel on the basis of economic infeasibility and international proliferation concerns.[371]

The rapidly rising demand for electricity, which according to a study commissioned by President Sheikh Khalifa, would increase by 165% by 2020 (see chapter 4.1.2), was presented as the main factor behind the decision. The study showed that natural gas would be able to supply only half the needed capacity and renewables 7%, at most. Moreover, the Nuclear White Paper noted that despite their 'logistical viability', burning crude oil or diesel for electricity production would 'entail extremely high economic costs, as well as a significant degradation in the environmental performance of the UAE's electricity sector'. Similarly, coal was discarded as a viable option, according to the paper, as environmentally unfriendly and involving 'thorny issues related to security of supply'.[372] A high-level UAE official has later clarified that while coal is commercially competitive, its carbon intensity

[369] Phone interview with Hamad Ali Al Kaabi, November 2010.
[370] *Khaleej Times* (21 July 2007); *EIU ViewsWire* (28 May 2008); Government of the UAE, *Policy on Peaceful Nuclear Energy*.
[371] Government of the UAE, *Policy on Peaceful Nuclear Energy*, pp. 2; 9.
[372] Ibid., p. 1.

alone was almost sufficient for withdrawing it as an option. An additional concern was dependence on imported coal, which would amount to 'multiple shipments every week' through the geostrategically critical Strait of Hormuz,[373] which in theory at least could be blocked by Iran. In addition, the policy paper noted that 'stacked against the above options, nuclear power-generation emerged as a proven, environmentally promising and commercially competitive option which could make a significant base-load contribution to the UAE's economy and future energy security'.[374]

Establishment of the programme

The seriousness of Abu Dhabi's plans was confirmed in June 2008, when a call for initial bids for the construction of the first four reactors, through joint ventures, was announced.[375] In July 2009, the local implementing authority presented a short list of three consortia (French, U.S.-Japanese and South Korean),[376] and in December 2009, KEPCO, the South Korean was chosen with an offer of US$20.4bn.[377]

According to the Emirates Nuclear Energy Corporation (ENEC), the four factors supporting the choice were economics, security of supply, environment and industrial development.[378] While the possibility of military motives influencing the UAE's choice to start up a nuclear energy programme can never be excluded, the economic justification deserves attention for many reasons. Luciani, for example, has pointed out several economic reasons that have emerged since the mid-2000s, including: diminishing non-utilised crude oil production capacity, the growth of petrochemical industry, the fact that nuclear energy is among the cheapest sources of base load electricity, as well as the considerations of opportunity cost.[379] Also, rising energy demand from emerging economies like China and India was starting to weigh in, and as a consequence, international projections were considerably ratcheted up. For the Gulf monarchies, these changing assumptions regarding long-term oil prices around 2005-2006 have also been said to have led to a change of heart towards nuclear power.[380]

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[373] Phone interview with Hamad Ali Al Kaabi, November 2010.
[374] Government of the UAE, *Policy on Peaceful Nuclear Energy*, p. 1. As a whole, Abu Dhabi's decision to choose nuclear energy, as it is presented to the world, hangs on a single paragraph of its 15-page Nuclear White Paper, as paraphrased above.
[375] *Emirates Business 24/7* (23 June 2008).
[376] *MEED* (7 July 2009).
[377] *Financial Times* (27 December 2009).
[378] *Emirates Nuclear Energy Corporation*, Press Release (27 December 2009).
[379] G. Luciani, "The Gulf Countries and Nuclear Energy", *Gulf Monitor*, 6 (2007).
[380] Working group on *the Nuclear Question in the Middle East: Regional Perspectives*. Georgetown University School of Foreign Service in Qatar, Doha, 7 November 2010.

Maintaining absolute transparency and the highest possible security and quality standards is seen as the vital condition any Gulf state will have to fulfil if it wishes to have a nuclear-energy programme. Accordingly, the five main principles of the UAE's policy were outlined as: transparency, non-proliferation, safety and security, conformity and working with the IAEA and working with friendly nations and expert organisations.[381] A number of key elements, such as competent staff, and assistance for setting up a nuclear law and the necessary regulatory institutions, are available only from abroad.[382] The UAE's peaceful intentions were repeatedly stressed by the government, along with calls for Israel to sign the Nuclear Non-Proliferation Treaty (NPT)—arguably to please the Arab street—and Iran to continue cooperation with the IAEA.[383] In October 2009, going beyond the NPT, the UAE issued an energy law that outlawed domestic enrichment of uranium.[384] The country is a member of the NPT (1995) and the IAEA Safeguards Agreement (2003); and in 2009 it signed the Additional Protocol to the Safeguards Agreement.[385] The government white paper implies that long-term storage of nuclear waste on national soil is not the preferred option.[386] The UAE has also supported the establishment of an international nuclear fuel bank as a safeguard for countries that do not enrich uranium domestically, and it donated US$10m to the American Nuclear Threat Initiative administered by the IAEA.[387]

Hamad Ali al-Kaabi, appointed as ambassador to the IAEA in 2008, is a key figure in the nuclear programme.[388] Based in the Foreign Ministry, he was responsible for the feasibility study and consequent 2008 white paper, and has been involved in all bilateral discussions with potential supplier countries, acting as the main interlocutor on behalf of the UAE government.[389] Another visible figure in the nuclear issue has been foreign minister Sheikh Abdullah, the public face of lobbying for international approval of the UAE's nuclear plans. David Scott, former director of the US National Security Council in the region, and

[381] Government of the UAE, *Policy on Peaceful Nuclear Energy*, p. 1.
[382] Seminar on *Enhancing the EU-GCC relations within a New Climate Regime: Prospects and Opportunities for Cooperation.* Gulf Research Centre and Centre for European Policy Studies, Brussels, 26 February 2009.
[383] *Gulf News* (19 October 2008).
[384] *The Wall Street Journal* (4 October 2009).
[385] Also the Convention on Nuclear Safety, the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. The UAE also accepted the amendment to the Convention on Physical Protection. Government of the UAE, *Policy on Peaceful Nuclear Energy*, p. 3; *The National* (2 August 2009).
[386] But does not exclude the option. Government of the UAE, *Policy on Peaceful Nuclear Energy*, pp. 9; 10.
[387] A high-level US diplomat (conversation, Helsinki, September 2008) suggested the idea was his.
[388] A young Emirati with a background in nuclear engineering. World Nuclear Association, "Nuclear Power in the United Arab Emirates", [http://www.world-nuclear.org/info/UAE_nuclear_power_inf123.html]. Updated in July 2009.
[389] ECSSR, "H.E. Ambassador Hamad Ali Al-Kaabi, Profile", [http://www.ecssr.ac.ae/]. Accessed on 7 August 2009.

currently the director of economic affairs at the Executive Affairs Authority, is said to be the key expatriate behind the programme.[390]

The Emirates Nuclear Energy Corporation (ENEC) was set up in 2008 as the responsible implementing authority with an initial budget of US$100m.[391] In October 2008, ENEC appointed the American company CH2M Hill (which also manages Masdar City) as the managing agent of the nuclear programme with a 10-year contract.[392] A Federal Authority for Nuclear Regulation (FANR) and an international advisory board were also set up, with a senior US regulator leading the former and Hans Blix the latter.[393] Although the nuclear programme will rely heavily on contractor services for technological expertise for the foreseeable future, Khalifa University is planning degrees in nuclear science and engineering with European and American colleges.[394] Indicating full ownership of the programme, all the consulting contracts have been signed with the government of Abu Dhabi instead of the central government.[395]

As an indicator of earned credibility, in 2008 the UAE was already declared by a leading international security institute as the most likely Arab country to first produce nuclear energy.[396] As of the end of 2010, despite the global economic downturn of the late 2000s, plans regarding production capacity apparently continued to be based on high electricity demand growth projections. The four reactors the Korean consortium has agreed to build in Braka, over 300 km from the city of Abu Dhabi,[397] have an extremely ambitious schedule, given that in 2008 the federation still not did have any of the needed legal, institutional or infrastructure framework in place. The plan is to have the reactors operating in 2017-2020, one starting each year. According to a UAE-based nuclear regulator's estimate, 'everything needs to work for the schedule to hold'.[398]

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[390] Personal conversations in Abu Dhabi in 2009-2011 and e.g. *Wall Street Journal* (2 April 2009).
[391] World Nuclear Association, "The United Arab Emirates". The company was officially established by a Presidential decree in December 2009.
[392] *MEED* (14 October 2008).
[393] Federal Authority for Nuclear Regulation of the UAE, "Director General's message", [http://fanr.gov.ae/en/article/about-fanr/director-general-message.html]. Accessed on 2 January 2011; *UAE Interact* (23 February 2010).
[394] *Wall Street Journal* (2 April 2009).
[395] Blanchard and P. Kerr, *The United Arab Emirates Nuclear Program and Proposed U.S. Nuclear Cooperation*, Congressional Research Service (Washington D.C., 17 July 2009), p. 4.
[396] IISS, *Shadow of Iran*, p. 55.
[397] *Emirates Nuclear Energy Corporation*, Press release (22 April 2010).
[398] Interview with Christer Viktorsson, Deputy Director General for Operations, the Federal Authority for Nuclear Regulation of the UAE, Abu Dhabi, May 2010.

The external supporters

The major global suppliers of nuclear technology and fuel have engaged in supporting and promoting the nuclear option to the UAE government and at the same time sought to win a stake in the multibillion-dollar project. The United States has eagerly used the case as a carrot for Iran demonstrating the benefits of complying with internationally agreed standards on nuclear development. By taking advantage of this opportunity, the UAE managed not only to gain the confidence of relevant international powers, it also succeeded in pitching them against each other in competing for significant business opportunities.

Negotiations with the French government and the Bush administration in the latter half of 2007 confirmed that both countries were interested in promoting nuclear energy in the UAE. An agreement on peaceful nuclear cooperation with France was signed in January 2008, when three French companies (Areva, Suez and Total) also signed a partnership agreement with Emirati counterparts proposing the construction of two reactors.[399] Understandably, observers have seen the nuclear issue as being linked to the French military base which was inaugurated in Abu Dhabi in May 2009, purportedly a product of France's aspiration to secure its commercial interests in the region and even to contain the Iranian threat.[400]

The United States, under presidents Bush and Obama, has been a strong supporter of the UAE nuclear programme. A bilateral memorandum of understanding (MoU) was signed in April 2008, but due to the transition of power in the US administration, the signing of the so-called 123 agreement was delayed until January 2009.[401] The agreement was finally accepted by the US Congress in October 2009, after delays caused by concerns about non-proliferation issues and rule-of-law and human-rights violations, including a torture case involving Sheikh Issa bin Zayed Al Nahyan, half brother of Sheikhs Khalifa and Mohammed.[402] The 30-year treaty allows companies to practice nuclear trade in the two countries, but the United States reserves the right to withdraw if its terms are violated.[403]

The UAE has also signed MoUs with the United Kingdom (May 2008) and Japan (January 2009), and an agreement with South Korea (June 2009). As early as 2005, South Korea and

[399] World Nuclear Association, "The United Arab Emirates".
[400] *The Gulf* (June 8, 2009).
[401] *Stratfor*, (15 January 2008); *Los Angeles Times* (16 December 2008). The agreement receives its name from the section 123 of the US Atomic Energy Act. Blanchard and Kerr 2009, *Proposed Nuclear Cooperation*, p. 8.
[402] *New York Times* (21 May 2009).
[403] *Associated Press*, (8 July 2009).

the UAE had reportedly explored the possibility of constructing a small pressurized water reactor.[404] While the major global suppliers have similarly sought to court other states in the region, so far the UAE programme is advancing the most rapidly, as table 4.1 shows.

Table 4.1. Timeline of the UAE's nuclear programme.[405]

1995	Signing of the IAEA Nuclear Non-Proliferation Treaty
2003	Signing of the IAEA Nuclear Safeguards Agreement
2003	Signing of the IAEA Physical Protection of Nuclear Material Convention
2006	Commissioning of the GCC joint nuclear feasibility study
20 April 2008	Launch of the Nuclear White Paper
21 April 2008	Signing of a Memorandum of Understanding with the US
June 2008	Request for initial bids for Abu Dhabi's first batch of reactors
7 August 2008	Contribution of US$10m to an international fuel bank initiative
16 January 2009	Signing of a nuclear cooperation agreement with the US
8 April 2009	Signing of the Additional Protocol to the IAEA's Safeguards Agreement
21 June 2009	Signing of a nuclear cooperation agreement with S. Korea
July 2009	Receiving of bids from three short-listed consortia for four nuclear reactors
1 August 2009	Joining a number of IAEA conventions
September 2009	Announcement of a three-month delay in awarding the nuclear deal
4 October 2009	Approval of federal legislation establishing the regulatory authority FANR, banning domestic enrichment and reprocessing
16 December 2009	Entry into force of the US-UAE nuclear cooperation agreement
23 December 2009	Official launch of Abu Dhabi's nuclear energy company ENEC
27 December 2009	Selection of KEPCO to build the first four reactors, total capacity 5.2-5.6 GW
22 February 2010	Establishment of the International Advisory Board
24 February 2010	Signing of a nuclear safety cooperation agreement with the US
17 March 2010	Announcement to establish the educational Gulf Nuclear Energy Infrastructure Institute in Abu Dhabi
April 2010	Announcement of Braka as ENEC's preferred site choice
May 2010	Granting of environmental permit by the EAD to ENEC at Braka
9 July 2010	Granting of site preparation licence by FANR to ENEC at Braka
28 December 2010	Submission of licence application for Braka units 1 and 2 by ENEC

[404] *Khaleej Times* (15 May 2008); *Stratfor* (16 June 2009); IISS, *Shadow of Iran*, p. 53.
[405] *Reuters* (27 December 2009); *Wall Street Journal* (27 May 2010); *The National* (28 December 2009a; 10 August 2010); *Khaleej Times* (11 November 2010); *UAE Interact* (28 December 2010).

The Emirati-Korean deal has additional benefits for both sides: despite lacking the ability to provide the UAE with geopolitical support, unlike the other two other final bidders, the South Koreans were lauded by ENEC's CEO for having 'dedicated a highly experienced team… [and] shown a serious commitment to transferring the knowledge gained from Korea's 30 years of successful nuclear industry operation'.[406] Developments in the area of bilateral cooperation after the Korean consortium won the bid in December 2009 have confirmed the expectation that the cooperation would increase trade deals in other sectors as well: at the end of 2009, Mubadala and the Korean Ministry of Knowledge economy announced an agreement on promoting joint projects between Masdar and Korean renewable energy and technology companies.[407] In October 2010, Abu Dhabi awarded a Korean-Japanese consortium a gas power plant deal worth US$1.4bn.[408] Moreover, the nuclear project is estimated to require a cooperation of close to 100 years,[409] indicating that this was only the prelude to enhanced bilateral relations between the two countries.

The eagerness of suppliers to provide the UAE with the needed technology was undoubtedly directly linked to the strong non-proliferation safeguards the UAE attached to its policy. Everything was done by the book, and beyond. The process through which the UAE's nuclear policy was developed included multi-stakeholder consultations both at the domestic and international levels: after determining the viability of nuclear energy for the UAE, the government developed a set of guiding principles, which were later embedded in the White Paper, and conducted a study of international best practices in the industry, as mentioned above. Before formally endorsing the nuclear policy, the government engaged in consultations with a number of supplier countries (France, the US, the UK, Russia, China, Japan, Germany and South Korea) and the IAEA. In developing a high-level strategy for pursuing the development of the nuclear programme, the UAE followed the IAEA's guidance and the agency's *Milestones* document.[410] A resulting 'Roadmap document', shared with the IAEA, included a feasible schedule for construction, recommendations on the needed order of actions (with site selection highlighted), and the establishment of the required institutions and passing of the needed legislation.[411] What followed since was an impressively well-thought out foundation for a federal framework,

[406] *Emirates Nuclear Energy Corporation*, (27 December 2009).
[407] *The National* (28 December 2009b).
[408] *The National* (19 October 2010).
[409] Khaldoon al-Mubarak, ENEC Chairman, quoted in: Emirates Nuclear Energy Corporation, (27 December 2009).
[410] Hamad Al Kaabi, *Challenges Faced by Developing Countries in Nuclear Power Deployment: UAE Approach.* Presentation in an IAEA meeting (27 October 2009).
[411] Phone interview with Hamad Ali Al Kaabi, November 2010.

in which Abu Dhabi could build its four nuclear reactors, and possibly many more, at a world record speed.

Despite having won the confidence of key Western powers, many observers still argue that the programme could increase the possibilities of a regional nuclear race. Other concerns have included terrorist attacks and domestic political instability. The UAE does not have a completely clean record in non-proliferation; according to US and UN officials, Dubai was a central transfer point for the Pakistani nuclear scientist A. Q. Khan in the illicit sale of nuclear technology to Libya and North Korea in the 1990s. Dubai, in addition to its thriving trade with internationally embargoed Iran, and hosting many Iranian banks, has also been alleged to have been the transit point for military and dual-use material to the country.[412]

As a show of intent, the UAE reported in 2009 it had closed dozens of Iranian companies and blocked illegal shipments of goods destined for Iran. Also, Abu Dhabi, with its less warm relations with Iran, pledged to put pressure on authorities in Dubai for assuring its external supporters.[413] A stronger export control law by the UAE from 2007 was boosted by amendments in 2008 and with the formation of a committee on commodities subject to import and export control in 2009.[414]

Regional geopolitics and prestige-seeking

There is a complex strategic calculus behind the UAE's nuclear programme: security apprehensions concerning Iran's intentions, the three-island dispute, and the Iranian population in Dubai—in addition to the mutual desire of the US and Abu Dhabi to present a counter-example to Iran's handling of its own nuclear programme. The UAE's head start on Saudi Arabia can be seen as one means of boosting its position within the GCC. While declaring support to the GCC joint viability study, the UAE government's white paper implicitly affirms both a strong determination to pursue a national programme, independent of the often difficult regional cooperation, and a will to raise its regional status as the first Middle Eastern state to operate a civilian nuclear-energy programme with the full approval of the IAEA.[415] Arguably, Saudi Arabia will be keeping a close eye on Abu Dhabi, as it might perceive the programme as an attempt to weaken its relative power vis-

[412] Blanchard and Kerr, *Proposed Nuclear Cooperation*, p. 10.
[413] *Wall Street Journal* (2 April 2009); IISS, *Shadow of Iran*, p. 55.
[414] Embassy of the UAE in Washington D.C., "Export Control and Combating Terror Financing", [http://www.uae-embassy.org/business-trade/trade-export/export-control]. Accessed on 2 January 2011.
[415] Government of the UAE, *Policy on Peaceful Nuclear Energy*, pp. 1, 13

à-vis both the GCC and its Western allies. Also, if external suppliers and their developing country partners replicate the 'UAE model', the country will always constitute a reference point, a 'gold standard',[416] to which other countries' programmes will inevitably be compared.

Future prospects

Towards the end of 2010, the prospects for the timely implementation of the nuclear programme appeared good. The long-term projections on the price of oil, Abu Dhabi's financial surpluses, the current domestic energy security situation, and the political determination shown by the local government, aided by the authoritarianism of the state (which can considerably speed up the decision-making process), are all factors confirming this assessment. While international pressure to cut greenhouse gas emissions was not the main motive for launching the ambitious programme, if implemented, the nuclear-energy capacity will push the country significantly towards lower carbon intensity and lower per capita emissions.

Since domestic debate on the topic has been non-existent, the government now has a head start in 'educating' public opinion. Due to the co-opted local civil society, fortunately from the government's perspective, significant domestic opposition to nuclear energy is unlikely to evolve in the future. International support for the programme, in turn, will be secured as long as the UAE keeps to its principles of complete operational transparency, safety, security and cooperation with the relevant international non-proliferation bodies.

The main domestic challenges arguably arise from the rentier mentality of the state and its citizens: human resources, institutional infrastructure and wide-scale implementation all require consistent and long-term planning and implementation. A major sustainability issue will be the emiratisation of the fully outsourced programme. In 2010, a FANR official estimated that during the operation phase, around 500 people will be needed to run the programme.[417] In addition to this, the regulatory authority, with close to 100 employees in 2009, might also have to wait for a long time before being able to hire a sufficient number of skilled nationals. Also, similarly to Masdar, while acquiring technical expertise only requires international approval and interest, the success of the UAE's nuclear-energy programme will require the sustained political support and financing of key ruling-elite

[416] *Gulf News* (16 January 2009).
[417] In addition to perhaps 10,000 construction workers, a couple of thousand people would be needed to support the programme in the establishing phase. Interview with Christer Viktorsson, May 2010.

members so as to deliver on the grandiose promises laid out in the early master plans. As of 2010, the nuclear energy programme seemed to have escaped Masdar's 'fate' of financial crisis-related delays, indicating its immediate importance for the government.

Along with the French military base, the UAE withdrawal from the GCC currency union in 2009,[418] and the various dimensions of the strategic branding of Abu Dhabi by Sheikhs Khalifa, Mohammed and Abdullah bin Zayed, the nuclear programme should also be understood as a part a so far extremely successful external strategy to raise Abu Dhabi's profile and gain prestige both among regional peers and internationally. Abu Dhabi's prestige-seeking, however, might still be set back by a number of issues including: the authoritarianism of the political system and the serious problems with freedom of speech and rule of law (including the torture case mentioned above); Dubai's past as A. Q. Khan's transit point and close relations with Iran; tensions with neighbouring countries (which might in the future prompt the UAE to leave the NPT); the preferential treatment loophole (a minute in the 123 agreement, which grants the UAE the right to demand renegotiation of the agreement, should better conditions be granted to any other state in the Middle East in the future); and the uncertainty over the adoption of the UAE's model: as the year 2010 showed that Jordan and Saudi Arabia, for example, weren't looking to give up their right to domestic enrichment.[419]

[418] *Arabian Business* (20 May 2009).
[419] See e.g.: S. Squassoni and K. Hon Chung, "Nuclear Choices in the Middle East", *Nuclear in Focus blog*, Center for Strategic and International Studies website (14 October 2010). [http://csis.org/blog/nuclear-choices-middle-east]; *Arabian Business* (16 June 2010).

5 Qatar's energy security and climate change responses

Qatar, the owner of the world's third largest natural gas reserves has, since the mid-1990s, gained world-renown for its unique foreign-policy alignment and innovative branding endeavours. Early investments in liquefied natural gas production capacity have brought unprecedented wealth and economic stability. The plentiful natural gas has also been sufficient for domestic demand, rendering Qatar the only Gulf monarchy that did not face gas shortages in the late 2000s.

As the decade drew to a close, power in Qatar was concentrated in the hands of Emir Hamad bin Khalifa Al Thani, and a handful of his closest allies and family members, none of whom exhibited a strong personal interest in climate change mitigation or environmental sustainability. Also, environmental institutions in Qatar were weak and lacked capacity to take on such a multifaceted challenge as climate change. The beginning of a gradual revolution of the international energy economy was, however, not lost on the elite. Nor were environmental 'unsustainabilities', created by the rentier bargain, left unexposed. Endowed with time and resources, what emerged from Qatar in the late 2000s was a prudent, piecemeal approach to all these pressures, most clearly embodied in the bottom-up technology development approach of the Qatar Science and Technology Park.

5.1 Case-specific background

5.1.1 Political economy and stability

Subregional geopolitics (external environment)

Qatar, located on the western coast of the Persian Gulf, spanning an area of 11,521 km^2, is among the smallest states in the region. According to the 2010 census, it had a population of 1.7 million, of which less than 14% are estimated to be citizens. The main towns in terms of population and economic activity are Doha, with roughly half of the total population, and the industrial cities of Mesaieed and Ras Laffan.[1] Despite its tiny size and

[1] EIU, *Qatar: Country Profile*, pp. 2; 11; 26; Qatar Statistics Authority, "Qatar Census 2010", [http://www.qsa.gov.qa/QatarCensus/Census_Results.aspx]. Accessed on 3 January 2011.

population, in 2009, Qatar owned 2.0% and 13.5% of the world's known oil and natural gas reserves and accounted for 1.5% and 3.0% of global production, respectively.[2]

The country's small size and abundant fossil fuel reserves make Qatar a potential future target for its larger regional neighbours' geopolitical ambitions, including those of Iran and Saudi Arabia. Due to demographic limitations, maintenance of a credible and reliable military deterrent is impossible; 70% of the country's army of 13,000 consists of expatriates, according to some estimates.[3] Qatar has therefore sought direct and indirect external security guarantees, mainly from the United States. It has also applied a host of innovative 'soft security strategies' to prove to the world that it should continue to exist as a sovereign state.

Qatar's current security strategy can be described as being based on a range of strategies: the military presence of external allies, engaging regional neighbours and major external trade partners in large joint ventures in the energy sector, inventive branding for prestige purposes, and cultivating relations with numerous states and non-state actors. What distinguishes Qatar from its small GCC neighbours, who use similar balancing strategies to varying degrees, is its perceptibly distinct foreign policy alignment; while Qatar's foreign relations doctrine stresses neutrality and non-alignment, in practice this means maintenance of diplomatic ties with as many countries as possible, including large, mutually hostile players, like the United States or Israel and Iran.[4]

The strongest pillar of Qatar's security strategy is US protection; Qatar presently hosts the region's largest American air force base, Al-Udayd and another CENTCOM base.[5] Qatar and the United Kingdom continue to maintain close ties, and Qatar's importance as a foreign investor and gas supplier to the UK has been increasing in the past years.[6] Relations with Russia, the other gas giant, have warmed up considerably after the assassination of a Chechen leader in Doha in 2004, and the political aftermath.[7] [8] Since the

[2] BP, *Statistical Review of World Energy*.
[3] EIU, *Qatar: Country Profile*, p. 10.
[4] U. Rabi, "Qatar's Relations with Israel: Challenging Arab and Gulf Norms", *Middle East Journal*, 63 (2009), pp. 443; 445. Quote from p. 443.
[5] EIU, *Qatar: Country Profile*, p. 9; Rabi, "Qatar's Relations", p. 453. Also, the UK is known to have a squadron based at Al-Udayd. Correspondence with Christopher Davidson, August 2010.
[6] See e.g.: *The Peninsula* (15 November 2010).
[7] A month after the assassination Qatar released two Russians who were accused of Zelimkhan Yandarbiyev's murder. According to Katz, in 2005-2006, Russian-Qatari relations began improving. See: M. N. Katz, "Russia and Qatar", *Middle East Review of International Affairs*, 11 (2007), pp. 1-6.
[8] Qatar and Russia, along with Iran and other natural gas producers, also belong in the Gas Exporting Countries Forum, established in 2001, the liaison office of which Qatar hosts.

late 2000s, Qatar has also forged increasingly closer trade ties with China.[9] According to a CIA estimate from 2005, Qatar's military expenditure was 10% of the GDP, proportionally the second highest in the world.[10]

Perhaps most significantly for Qatar's survival, it has recognised the paramount importance of maintaining good working relations with Iran, with which it shares the massive North/South Pars offshore field, the world's largest deposit of non-associated natural gas.[11] The rationale behind this choice seems obvious, as the former is dwarfed by the latter in size, and because of the crucial importance of the gas deposit to Qatar's economy. Qatar has used a wealth of diplomatic means to show its neighbourly intentions towards Iran, and maintains that Iran has the right to peaceful nuclear power.[12] Since 1996, Qatar has also maintained cold peace-like relations with Israel, but the difficulty of this relationship, vis-à-vis regional and domestic audiences, has become apparent in Qatar's repeated retreats from a complete normalisation of ties; most recently evidenced by the 2009 closure of Israel's trade office in protest against the War on Gaza.[13]

Qatar's geostrategic location has also enabled it to emerge as a regional mediator and peacemaker, especially since 2006. Qatar's regional mediation efforts that have included Lebanon, the Palestinians, Yemen and Sudan are, according to most observers, rather a question of prestige and emerging from the shadow of Saudi Arabia than an ultimate objective. These efforts, often involving large sums of money aimed at appeasing the different sides, are a part of Qatar's general foreign policy style of branding, regional 'mavericking' and diplomatic balancing, and creating a distinct regional identity and function.[14] Qatar has also sought a presence and visibility in intergovernmental fora, including a term in the UN Security Council in 2006-2007 and the infamous Doha Development Round of the World Trade Organisation, which began in 2001.[15]

Prior to the 1995 coup by the former Emir's son, Qatar is said to have lacked a 'clearly defined foreign policy agenda' and followed Saudi Arabia in practically all areas of

[9] See e.g.: *China Daily* (25 June 2008); *QNA* (14 July 2010).
[10] After Oman. Central Intelligence Agency, *The World Factbook. Qatar*, [https://www.cia.gov/library/publications/the-world-factbook/geos/qa.html]. Accessed on 23 December 2010.
[11] J. Dargin, *The Dolphin Project: The Development of a Gulf Gas Initiative*, NG 22 (Oxford: Oxford Institute for Energy Studies, 2008), p. 1.
[12] *Gulf Times* (25 February 2009); *Kuwait News Agency* (31 December 2010).
[13] Rabi "Qatar's Relations", p. 449; *Haaretz* (16 January 2009).
[14] Phone interview Qatar-based academic, November 2008.
[15] EIU, *Qatar: Country Profile*, p. 8.

policymaking.[16] Since then, however, the new Emir Sheikh Hamad bin Khalifa Al Thani, enabled by the discovery of the North Field, has sought a clearly distinct foreign policy.[17] The two countries' relations have been difficult since the early 1990s, becoming markedly tense after a series of events in the mid-1990s, including the 1995 coup and 1996 countercoup attempt, which Saudi Arabia and Abu Dhabi have been accused of supporting.[18] However, a rapprochement between the two countries began in 2007, allegedly as a consequence of the escalating US-Iranian tensions over Iran's nuclear programme.[19] Qatar is thought to have initiated the reconciliation, because of the need for more backing for its balancing with Iran and its wish to build a gas pipeline to Kuwait, a project which Saudi Arabia has previously blocked.[20]

Qatar's relations with its other GCC neighbours are relatively good: the relationship with Abu Dhabi has improved after 1996, partly due to the Dolphin Project, and relations with Oman and Kuwait are close.[21] Qatar's and Bahrain's over 50-year dispute over the Hawar Islands was solved in 2001.[22] Since then, a bilateral Joint Supreme Committee has been set up, but due to bickering on both sides, the construction of a 40-km causeway linking the two countries has been re-announced several times.[23]

Similarly to Abu Dhabi, and Dubai, Qatar has engaged foreign companies in its gas production through joint ventures, the largest ones being the liquefied natural gas (LNG) companies QatarGas and RasGas. The latter one consists of a total of seven operating companies from France, the US, Japan, the Netherlands and the UK.[24] Qatar has also pursued a similar strategy with its regional neighbours: due to the vulnerability of a fossil fuel export strategy that is completely reliant on the Strait of Hormuz, the pipeline exports to Qatar's neighbours act as a backup plan for a war scenario. The Dolphin Gas Project, which is 51% owned by Abu Dhabi's Mubadala and 24.5% by Total and Occidental Petroleum each, has been carrying Qatari gas to the UAE and Oman since 2007 and 2008,

[16] Rabi "Qatar's Relations", pp. 444-445.
[17] Dargin, *The Dolphin Project*, pp. 1-2.
[18] Ibid., p. 19; Rabi, "Qatar's Relations", p. 445.
[19] EIU, *Qatar: Country Profile*, p. 9; *New York Times* (4 January 2008).
[20] J. Dargin, "Qatar's Natural Gas: The Foreign-Policy Driver", *Middle East Policy*, 3 (2007), p. 140.
[21] EIU, *Qatar: Country Profile*, p. 10.
[22] Fatima Al-Sayegh, "The UAE and Oman: Opportunities and Challenges in the Twenty-First Century", *Middle East Policy*, 9 (2002), p. 137, footnote 48.
[23] *MEED* (11-17 June 2010).
[24] EIU, *Qatar: Country Profile*, p. 9. Rasgas is 70% owned by QP and 30% by ExxonMobil. Also the GTL projects Oryx and Pearl are joint ventures with foreign partners.

respectively, well below international prices, indicating a calculus with other than purely economic motives on Qatar's side.[25]

Another dimension of Qatar's foreign policy—and economic strategy—is branding, or 'creating a unique niche', described by Petersen as one of the main survival strategies of small states.[26] By constructing images of a neutral state, regional leader in media freedom (by hosting Al Jazeera) and conflict mediation, a venue for international conferences and sports events (such as the 2006 Asian Games and the 2022 FIFA World Cup), and a hub for international air transport, Qatar seeks to place itself on the global map so as to consolidate its existential legitimacy.

Fossil fuel-based economy (internal environment)

Qatar is a strong rentier state, similarly to Abu Dhabi. It is an extremely wealthy, small high-income developing country with the world's third largest proven natural gas reserves and 13th largest oil reserves. In 2006, after less than a decade of exports, it surpassed Indonesia as the world's largest LNG exporter.[27] In 2002-2008, according to the Economist Intelligence Unit, Qatar's economy grew at an impressive average rate of 13.4% per year.[28] Growth has been predominantly government-led and, arguably due to the LNG sector and the 'relative strength' of gas prices, Qatar also managed to weather the global financial crisis exceptionally well, with an estimated growth of 11% in 2009.[29] By 2014, Qatar is planning to invest US$31bn in gas infrastructure development and other energy and industry projects.[30]

In 2009, although ranking only 68th in the world in terms of the size of the economy, Qatar's GDP per capita was US$88,700-121,000 (depending on the estimate), which placed the country as the most or second most affluent in the world.[31] Again, as in the case of Abu Dhabi, due to the rentier bargain, the GDP/capita of an average Qatari national is several times higher.

[25] Dargin, *The Dolphin Project*, p. 9.
[26] J. Peterson, "Qatar and the World: Branding for a Micro-State", *Middle East Journal* 60 (2006), p. 741.
[27] Reserves at end of 2009. BP, *Statistical Review of World Energy*; *MEED* (5 June 2009).
[28] EIU, *Qatar: Country Profile*, p. 17.
[29] Abdullah al-Attiyah quoted in: *Reuters* (10 January 2010); *MEED* (5 June 2009).
[30] *Gulf Times* (27 July 2010).
[31] Estimates. GDP rank and upper figure of GDP/capita: Central Intelligence Agency, *The World Factbook,. Qatar*; lower figure of GDP/capita: IMF, "World Economic Outlook Database", October 2009, [http://imf.org/external/pubs/ft/weo/2009/02/weodata/index.aspx].

The country's first oil well was drilled in 1939, but production only began after the Second World War in 1949. After peaking in the late 1970s, production rates emerged in 1991 as a result of a new discovery, Al Khaleej. Because of the lesser value given to the lower-priced natural gas, its exploitation began only in 1991, mainly as a consequence of a need to find a long-term replacement for the maturing oil reserves.[32] Oil and natural gas have been the prime contributors to Qatar's economic development, although the relative importance of the former is decreasing.[33] In 2002-2008, according to IMF statistics, the oil and gas sector's share of GDP was on average 58%, and in 2008, hydrocarbon exports totalled 92% and petrochemicals 4% of exports.[34] Estimates of Qatar's oil export revenues vary widely: US$19.2-25.9bn in 2007 and US$26.2-37.6bn in 2008.[35]

Natural gas plays an extremely vital role in the country's present and future development. Qatar's LNG export programme was initiated during the 1997 bust in oil prices.[36] Revenues have been rising fast: from US$2.6bn in 2002 to US$17.6bn in 2008.[37] In 2008, Qatar's total gas revenues (according to MEED at US$33bn) surpassed oil revenues for the first time.[38] As in the case of other GCC oil monarchies, the comparative advantage achieved from cheap energy sources has supported development of heavy industries, like iron and steel, petrochemicals and cement. The major energy and heavy industries are concentrated in the two industrial cities north and south of Doha.

Qatar's only sovereign wealth fund, the Qatar Investment Authority (QIA), with an estimated size of US$85bn in 2010, was established in 2005. Due to its young age, it is considerably smaller than similar funds of other GCC OPEC monarchies. The rather opaque QIA invests both internationally and domestically (non-energy assets) with an aim to increase economic diversification in Qatar by the late 2000s.[39] The QIA also owns the Qatari Diar Real Estate Investment Company (Diar), which has invested in Europe and increasingly in Asia.[40] Famous investments in Western key institutions include the purchase of 20% of the London Stock Exchange in 2007 and a 7% share of the

[32] Kéchichian, *Power and Succession*, p. 189; EIU, *Qatar: Country Profile*, p. 17; Dargin, *The Dolphin Project*, pp. 13; 16.
[33] EIU, "Qatar: Energy Report".
[34] IMF, *Qatar: Statistical Appendix 2010.* IMF Country Report No. 10/62.
[35] Lower estimate, value of exports: IMF, *Qatar: Statistical Appendix*. Higher estimate, net revenue: US EIA, "OPEC Oil Export Revenues", August 2010 [http://www.eia.doe.gov/cabs/OPEC_Revenues/Factsheet.html].
[36] US EIA, *Qatar*; EIU, *Qatar: Country Report, December 2010* (London: EIU, 2010), p. 5.
[37] Estimate. IMF, *Qatar: Statistical Appendix*.
[38] *MEED* (5 June 2009).
[39] Sovereign Wealth Fund Institute, "Qatar Investment Authority", [http://www.swfinstitute.org/swfs/qatar-investment-authority/]. Accessed on 30 December 2010. Score 5 of to on the Linaburg-Maduell Transparency Index.
[40] *Reuters* (2 November 2009).

Volkswagen Group in 2009.[41] In 2008, with the aim of boosting Qatar's food security, the QIA established Hassad Foods, which invests in agricultural, livestock and food companies. In 2010, QIA was reported to have reviewed its strategy 'to focus more on commodities, food, energy and water'.[42]

The non-fossil fuel economy

In essence, Qatar's main development challenges are the same as those of the other GCC states, including sustaining the economy through diversification, and increasing the skills and competitiveness of the national workforce. Diversification from oil to natural gas began already in the early 1990s, and the government currently has a lofty goal of increasing the share of the non-energy sector from 39% in 2008 to 80% by 2015.[43] This will most likely not be achieved due to the recent expansions in the country's gas sector, despite the fact that in early 2010, MEED reported US$300bn worth of projects either planned of under way. Also, in December 2010 Qatar won the 2022 FIFA World Cup bid, which will create further infrastructure needs and speed up the implementation of existing ones.[44] Qatar has also actively sought to increase private and foreign investment in its non-energy sectors.[45] It is currently faring incredibly well; in 2009, UNCTAD ranked it as the world's 13th largest foreign direct investment recipient.[46] In addition to economic diversification, government spending indicates a focus on the needs of the national population. For example, in the fiscal year 2008-2009, 32% of Qatar's budget was earmarked for infrastructural projects, but also 21% for education and 10% for healthcare.[47] Government spending indeed heavily drives domestic development and it also functions to create and distribute wealth among the small but growing national population.

Qatar's quest to diversify its economy has taken a number of forms, many of which are tightly interlinked with its foreign policy strategy. Branding, with its economic diversification aspects, is particularly apparent in the areas of: media; air industry, conferences, events, tourism and sports; construction and real estate; and education and healthcare (tourism), including the numerous mega-projects in these areas.[48]

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[41] *Reuters* (21 September 2009); *The Peninsula* (29 August 2009).
[42] UNCTAD, *World Investment Report 2010. Investing in a Low-Carbon Economy* (Geneva: United Nations, 2010), p. 27.
[43] Oxford Business Group, *The Report: Qatar 2009*, [http://www.oxfordbusinessgroup.com/product/report/report-qatar-2009]. Accessed on 15 May 2010; IMF, *Qatar: Statistical Appendix*.
[44] *MEED* (5-11 February 2010); conversations in Doha, 10 January 2010.
[45] Central Intelligence Agency, *The World Factbook, Qatar*.
[46] US$8.7bn, the second largest in West Asia, after Saudi Arabia. UNCTAD, *World Investment Report 2010*.
[47] *Gulf Times* (1 April 2008).
[48] See also: Peterson, "Branding"; Rabi, "Qatar's relations", p. 458.

Since the late 1990s, there have been heavy investments in the gas infrastructure and, as the amount of foreign labour has increased, also housing.[49] A number of infrastructure mega-projects are being constructed or planned. These include the US$26bn Qatar Railway, expected by the mid 2020s; the US$14bn New Doha International Airport, by 2011; the US$7bn New Doha Port; the Qatar-Bahrain Causeway; and the US$2.6bn Energy City, aimed at hosting international energy companies.[50] In 2004, similarly to many of its neighbouring monarchies, Qatar passed a law (No. 17/2004) that allowed the right to usufruct for non-nationals for a period of 99 years in a number of pre-determined areas. Two mega-projects in the real estate sector are taking advantage of this possibility; the 4-square kilometre US$14bn Pearl-Qatar and the US$7bn Lusail city development, are together expected to provide housing for 240,000 wealthy buyers.[51] Heart of Doha (renamed in 2010 as Musheireb) is a prime example of a neotraditional project; advertised as reclaiming Qatari identity and tradition and developed by Dohaland, under the Emir's wife Sheikha Mozah, it includes 226 new buildings in the old centre of Doha with a price tag of US$5.5bn.[52]

Under the Qatar Foundation, founded in 1995 by Sheikh Hamad and his wife Sheikha Mozah bint Nasser al-Missnad, the ambitious Education City and Qatar Science and Technology Park are being developed. The Education City, with a budget of several billion dollars,[53] and hosting the campuses of prestigious American and Canadian universities, such as Georgetown, Texas A&M, Carnegie Mellon and Weill Cornell, has received a wealth of positive international attention in the 2000s. In addition to the stated aim of transforming Qatar into a knowledge economy,[54] the project can be argued to embody strong elements of branding, education tourism and the effort to create a new economic sector.

Despite the ambitious diversification plans, it is very clear that rent from fossil fuels and income from petrochemicals and real estate will remain the motors of the economy and

[49] EIU, *Qatar: Country Profile*, p. 22.
[50] *Al Jazeera English* (22 November 2009); *The Peninsula* (26 October 2009); *MEED* (5-11 February 2010); *Arabian Business* (11 February 2010).
[51] The Energy City is part of the Lusail development. *Arabian Business* (15 September 2010); United Development Company, "The Pearl-Qatar", [http://www.udcqatar.com/English/OurVentures/ThePearlQatar/Pages/default.aspx]. Accessed on 4 January 2011; EIU, *Qatar: Country Profile*, p. 26.
[52] *Al Bawaba* (14 January 2010).
[53] US$8,25bn, according to MEED (5-11 February 2010).
[54] See e.g.: Government of Qatar Planning Council, *Turning Qatar into a Competitive Knowledge-Based Economy: Knowledge Economy Assessment of Qatar* (World Bank, 2007).

will continue to shape decisions and influence outcomes of government policies and actions for the coming decades.

Demographics and reform pressures

Since 2005, when Qatar's total population according to the World Bank was 885,000, annual population growth rates have been over 10%. From a small town-size total population of 45,000 in 1960, Qatar has in five decades attained a medium-size capital, a number of major industries and a population of 1.7 million.[55] The UNDP estimates that in 2005, Qatar had the world's highest share of immigrants of the total population, 80.5%,[56] while the EIU places the share of nationals at 14% in 2009.[57]

Rapid population growth in the 2000s has been a direct consequence of Qatar's vast hydrocarbon wealth and the massive diversification drive combined with a minuscule local population, unwilling to work for the private sector and often without the skills to match the market's needs. The number of low-wage workers, coming mainly from South Asia, has been growing particularly fast, both absolutely and proportionally: in 2004, manual labourers accounted for 25% of the population, but in 2008 their share was at 57%. The numerous construction projects, including the mega-projects mentioned above, have created a vicious circle of increasing housing demand. In 2010, some analysts predicted that the completion of many mega-projects in the early 2010s would slow down the rate of immigration, but solely in light of what Qatar has promised as the host of the 2022 FIFA Cup, including 12 cooled football stadiums and a high-speed rail and metro system, this looks unlikely.[58] Due to these projects and the large share of construction workers, volatile in nature, future demographic growth projections are extremely difficult to make. Even Qatar's long-term urban master plan is not based on any future population estimates, unlike that of Abu Dhabi.[59]

Despite the existence of Qatarisation policies, it is apparent that it was not possible to enforce these in the 2000s,[60] and it is unlikely that foreign labour will be made redundant

[55] World Bank, *World Development* Indicators; Qatar Statistics Authority, "Qatar Census 2010".
[56] The UAE, with 70.7%, ranked second. UNDP, *Human Development Report 2009. Overcoming Barriers: Human Mobility and Development* (New York: United Nations Development Programme, 2009), p. 143.
[57] EIU, *Qatar: Country Profile*, p. 11.
[58] The construction workers need housing and building housing requires more workers. *MEED* (5-11 February 2010); *Construction Week Online* (4 December 2010).
[59] Conversations in Doha, 10 January 2011. According to MEED (5-11 February 2010), The Gulf Research Center has estimated 1.9 million by 2015 and the Qatar Statistic Authority 2.5 by 2030.
[60] See e.g.: M. Kamrava, "Royal Factionalism and Political Liberalization in Qatar", *The Middle East Journal*, 63 (2009), pp. 406-407.

by them, nor by natural population growth of Qatari nationals, for many decades. While the ratio of males per females among the Qatari adult population is even (1.03), due to the large male labour element, among non-Qataris it jumps to 5.78 males per female (in 2008).[61] Qatar's national population, however, is growing. Based on UN estimates, the average natural increase rate of the population in 2005-2008 was 10.0-11.5, equating to around 10-13,000 persons per year, which arguably roughly equates to the number of new jobs the government should be creating annually for Qatari nationals in less than two decades' time.[62]

So far, due to the government's massive financial resources, it has not been an impossible task to employ the willing and able from among the small national population, estimated at 240,000 in 2010.[63] The rate of unemployment among Qataris is, however, high: only a third of all working-age females and two-thirds of males are employed. In 2008, according to the Statistics Authority, the share of Qataris in the total workforce was 12%.[64] The public sector, one of the main channels of welfare allocation, is the main employer of nationals, representing 58% of the government departments' workforce. In 2008, the private sector, which employed 78% of the total labour force, was composed almost completely (99.5%) by non-nationals. Only 7% of employed Qataris worked for the private sector.[65]

Qatar's political system is a de facto absolute monarchy. It has repeatedly been classified by the Freedom House survey as 'not free' (see chapter 3.1). Similarly, the Economist Intelligence Unit democracy index of 2008 categorised Qatar as an authoritarian state, ranking 144th out of a total of 167 countries, only three places ahead of the UAE. Qatar fared well, on regional standards, in the category of government functioning and in civil liberties, while scoring particularly unsatisfactorily in all the other categories that measured political participation and culture. According to the EIU, this was due to the lack of national elections and the 'Al Thani family's near-total domination of politics'.[66] After its

[61] Qatar Statistics Authority, "Population and Social Statistics. Labor Force Sample Survey", December 2008, [http://www.qsa.gov.qa/Eng/publication/other_publication.htm]. Accessed on 15 March 2010.
[62] Because of an absence of consistent data it is impossible to estimate the share of youth of the Qatari population to predict future pressures on the labour market. With UN data (World Bank, *World Development Indicators*) it is, however, possible to have a general growth estimate by examining the natural increase of the population, equal to population growth in the absence of migration.
[63] For the figures, see chapter 3.1 and above.
[64] Qatar Statistics Authority, "Labor Force Sample Survey".
[65] Qatar Statistics Authority, *Labor Force Sample Survey Results, 2008: Analytical Summary*, Population & Social Statistics Department (Doha: QSA, 2009 or 2010).
[66] Government functioning: third after Kuwait and the UAE; civil liberties: second among Arab states, after Lebanon. EIU, *Qatar: Country Profile*, p. 7; "Index of Democracy 2008".

independence in 1971, Qatar has held three municipal elections (in 1999, 2003 and 2007), but despite promises by the Emir since 1998, and a new constitution in 2005, preceded by a referendum—which implies parliamentary elections for the Majlis al-Shura—these had not taken place by 2010.[67]

In current-day Qatar, the top ruling elite faces little or no pressure to increase political liberalisation. Suggested explanations point towards the same factors and strategies as in the case of Abu Dhabi, including: autonomy of the state due to oil/gas revenues,[68] the rentier bargain and related patronage networks; small size and homogeneity of the national population;[69] immaterial legitimacy resources (such as political modernity) created and sustained by the ruling elite, partly supported by the state coffers; state-building through institutions staffed by loyalists to the Emir and the establishment of a direct line of succession; and, in general, clever power balancing at all levels, from regional to intra-elite.[70]

5.1.2 Energy security

Security of demand

> … I expected the price of oil to go down one day because we already suffered from this after 1973. When the oil price went up we became so rich. People bought a lot of things and they travelled every summer. Then the oil price went down and everything shrank. Since then, I have sought to avoid letting this happen again. (Sheikh Hamad bin Khalifa Al Thani, 2009).[71]

The Emir Sheikh Hamad has been described as the mastermind behind the strategic decision to develop Qatar's natural gas resources into a financial and political asset that would both ensure the continuation of external rent after the depletion of Qatar's oil revenues, and secure international interest in the country's stability.[72] Since the 1970s, Qatar's gas production had been growing steadily, but in the 2000s it exploded, from

[67] L. Bahry, "Elections in Qatar: A Window of Democracy Opens in the Gulf", *Middle East Policy*, 6 (1999), pp. 118-119; EIU, *Qatar: Country Profile*, pp. 4-5; 8.
[68] As a consequence of the marginalisation, or buying out, of merchants and co-opting of dissidents. Kamrava, "Royal Factionalism", p. 404.
[69] Ibid., p. 405-406; 417; Rabi, "Qatar's Relations", p. 444. Shia are a minority, according to Bahry ("Elections, p. 126"), 7-12% in 1999, and they are treated fairly by the government. There are no *biduns*, or stateless people.
[70] Kamrava, "Royal Factionalism", pp. 403-404.
[71] Interviewed in: *Spiegel International* (29 March 2009).
[72] Dargin, *The Dolphin Project*, p. 2.

23.7bn m^3 in 2000 to 89.3bn m^3 in 2009, according to BP. This represented roughly a four-fold increase in a decade. In 2008, owing to exports via the new Dolphin pipeline, tiny Qatar accounted for the world's second largest increment in gas supply (36% of global total).[73] The small population and energy demand translates to an ability to export most of the gas and oil produced: in 2008, the country's energy self-sufficiency ratio was 5.2, according to the IEA—almost twice the Middle East average.[74]

Qatar's plentiful gas resources and small population place it in a strong position in terms of long-term economic sustainability. Unlike in the other OPEC GCC states, the gas reserves provide a buffer for potential losses incurred from decreases in the global price or demand for oil, both short and long term.[75] Moreover, there are several options for Qatar to market its gas: LNG, pipeline exports (Dolphin),[76] domestic markets, and gas-to-liquids (GTL).[77]

In 2009, Qatar was estimated to have some 25 trillion m^3 of proven natural gas reserves, which are expected to last, at current production rates, nearly 300 years.[78] This has led to some speculating that Qatar might become the 'Saudi Arabia' of LNG and natural gas exports.[79] The gas reserves equal to approximately 160bn bbl of oil,[80] roughly six times Qatar's oil reserves. Qatar has planned its gas capacity expansions accordingly. Most of the gas is located in the gigantic North Field, discovered in 1971. However, there are 'profound' uncertainties relating to the field's total volumes, potentially impacting Qatar's ability to deliver in the longer term. In 2005, a moratorium was placed on the field for studying its optimal development and also to determine possible damage to long-term productivity inflicted by current exploitation.[81] The moratorium is expected to last at least until 2014.[82]

Qatar's LNG is exported mainly to Asia: South Korea (30%), Japan (29%), India (22%) and, Spain (12%), received the largest shares in 2008.[83] In 2009, Qatar started exporting to

[73] BP, *Statistical Review of World Energy*.
[74] Middle East average: 2.7. IEA, *Energy Balances, Non-OECD*.
[75] Natural gas is expected to become a major transitional fuel both for energy and transport, partly replacing coal and oil.
[76] According to the US EIA (*Qatar: Country Analysis Brief*), Qatar's gas exports in 2008 were at 56.6bn m^3, about 70% of which were LNG exports and 10% was exported through the Dolphin pipeline.
[77] See: Dargin, *The Dolphin* Project, p. 14.
[78] BP, *Statistical Review of World Energy*.
[79] Dargin, "Qatar's Natural Gas", p. 136.
[80] EIU, *Qatar: Country Profile*, pp. 11-12.
[81] US EIA, *Qatar*; Dargin, *The Dolphin Project*, pp. 1; 6; 48. The IEA estimates the total volume of the North Field/South Pars at 40-50 tcm. IEA, *World Energy Outlook 2008* (Paris: OECD/IEA, 2008), p. 298.
[82] *The Pioneer* (November-December 2009), p. 7.
[83] US EIA, *Qatar*.

China and the UK as well.[84] Given that Asia's consumption of hydrocarbons is projected to keep rising for the coming decades, the current trade relationships, including those with Europe, place Qatar in a good long-term market position, despite the early 2010s' gas glut caused by new discoveries of unconventional gas in North America.[85]

The national oil company, Qatar Petroleum (QP), established in 1974 after the nationalisation of the oil sector in the wake of the 1973 oil crisis, is fully owned by the Qatari state. In addition to QP's own operations, oil is produced under development and production-sharing agreements with foreign companies.[86] The main market of Qatari oil is Asia, with Japan as the largest importer, as in the case of Abu Dhabi.[87]

Qatar's oil production first peaked in 1973, at 0.57m bbl/d, but began rising again in the 1990s, reaching a record of 1.38m bbl/d in 2008 (equal to roughly half of Abu Dhabi's production).[88] The existing reserves, however, are maturing and enhanced oil recovery is being considered for various fields.[89] Qatar's remaining oil reserves in 2009 were, depending on the estimate, 15.2-26.8bn bbl,[90] and the remaining reserve life 37-55 years, with 2008 production levels.[91] Similarly to the moderate OPEC producers Saudi Arabia and Abu Dhabi, Qatar has indicated that its 'right price' ranges in US$70-80/bbl.[92]

Security of supply and domestic demand management

Qatar's domestic energy consumption, similarly to that of the other GCC states, has for decades been dominated by natural gas and oil. Energy and water demand have been growing fast as a consequence of the 2000s' growth and high per capita consumption rates. Arguably due to the abundance of natural gas, as of 2010, Qatar did not have any concrete near-term plans regarding large-scale development of alternative sources of energy, such as nuclear or solar. The abundance has also led to an exclusive focus on the supply side, with

[84] K. Johnson, "Gas pains: China, Qatar and the competition for natural gas", *Environmental Capital*, Wall Street Journal Blog, 28 October 2009, [http://blogs.wsj.com/environmentalcapital/2009/10/28/gas-pains-china-qatar-and-the-competition-for-natural-gas/]; EIU, *Qatar: Country Report*, p. 8.
[85] According to the EIA, as of 2009, the two LNG operators, RasGas and QatarGas, had 11 trains online and three more were expected by 2011. US EIA, *Qatar.*
[86] EIU, *Qatar: Country Profile*, pp. 17-18.
[87] US EIA, *Qatar*.
[88] 1.345bn bbl in 2009. BP, *Statistical Review of World Energy*.
[89] US EIA, *Qatar.*
[90] Lower est.: Oil & Gas Journal from: US EIA, *Qatar.* Higher est.: BP, *Statistical Review of World Energy*.
[91] Lower estimate: Central Intelligence Agency, *The World Factbook, Qatar*. Higher estimate: BP, *Statistical Review of World Energy*. The EIU (*Qatar: Country Profile*, p. 11) gives an even higher estimate: 87 years at 2008 production levels.
[92] *Reuters* (20 March 2010).

little done to improve energy efficiency, or lower consumer subsidies on electricity and water.

Qatar's main domestic source of energy is natural gas (70% of total primary energy consumption in 2009[93]), which is used for electricity generation, desalination and as the petrochemical industry's feedstock. Qatar does not import energy, and the domestic energy mix was still in 2010 completely dominated by domestic fossil fuel sources (oil and gas). Unlike other Gulf monarchies, Qatar does not have to use oil for domestic power provision.[94]

Qatar's power and water infrastructures are described as 'comparatively modern' due to their liberalization in 2000.[95] Production is taken care of by the Qatar Electricity and Water Company (QEWC), established in 1990, while planning, implementation, transmission and distribution are the scope of the regulator, Kahramaa. The QEWC is only 43% owned by the government, while the rest is owned by companies and individuals.[96] The share of water and electricity in the government's total expenditure in 2007/08 was reported as only 1.7% (US$450m).[97]

Domestic energy consumption has grown extremely fast during Qatar's independence.[98] In the late 2000s, power demand increased by around 12% per year, even during the economic crisis, which hit Qatar's economy less hard. There are plans are to more than double the capacity from 4,480 MW in 2009 to 10,850 MW by 2014.[99] While capacity might not be a problem, domestic availability of gas beyond 2013, due to export commitments, is a growing concern.[100] In 2009, the shares of domestic consumption were 14% and 24% of total oil and gas production, respectively, leaving Qatar still with an impressive margin in both sectors.[101]

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[93] BP, *Statistical Review of World Energy.*
[94] Natural gas has been the exclusive source of power supply at least since the 1990s. Oil is used mainly for transportation. IEA, *Energy Balances, Non-OECD.*
[95] *MEED* (28 March 2010c).
[96] Qatar Electricity and Water Company, "About Qatar Electricity & Water Co.", [http://www.qewc.com/Web.nsf/aboutqewc?OpenPage]. Accessed on 6 January 2011.
[97] Estimate. IMF, *Qatar: Statistical Appendix*.
[98] Total electricity generation increased from 315 GWh in 1971 to 9,100 GWh in 2000 and 21,616 GWh in 2008. IEA, *Energy Balances, Non-OECD*.
[99] Different figures exist for capacity. According to the EIU's estimate, this 'should be sufficient to meet the needs of Qatar's growing population and industrial base'. EIU, "Qatar: Energy Report".
[100] *MEED* (28 March 2010c).
[101] BP, *Statistical Review of World Energy.*

Because of the abundance of natural gas and the lower opportunity cost of domestic use, there have been few incentives for the government to diversify into alternative sources. Even though there are no concrete plans in sight for nuclear or solar, these are nevertheless held as future options by the government. Already in 2007, a small National Centre for Nuclear Information was set up, indicating Qatar's increasing interest in the energy source.[102] Kahramaa's 30-year demand forecast from 2008, prepared by a Dutch consultancy, included both options. The utility, however, has implied that it would choose either nuclear (in the case of high demand) or solar, but not both, while all future plans would be accompanied by expansions in gas-fuelled electricity capacity.[103] In 2009-2010, a feasibility study on solar energy for desalination (equivalent of 3,500 MW) was commissioned by the Qatar National Food Security Programme, and another one was drafted on nuclear power (comparing the benefits of a uni- and multilateral programme) by Kahramaa and the Ministry of Environment.[104] While there is no urgent need for additional energy, nuclear and solar would serve as important means of source diversification and emission cuts in Qatar's domestic energy palette.

Unlike the other Gulf monarchies, Qatar does not have a major domestic energy demand challenge at hand, but signs of trouble are in the air: per capita consumption of energy in Qatar is the highest in the world.[105] While the consumption patterns of a large segment of residential consumers are extremely elevated, the energy and heavy industries also contribute to the figure considerably: in 2006, according to QP, the oil and gas industry, flaring, and petrochemical sector together consumed 69% of total energy usage.[106] As a sign of the impact of growing domestic consumption on future exports, in 2007, gas blocks originally reserved for a cancelled GTL project were reassigned to a domestic gas project.[107]

Despite extremely scarce conventional water resources, cheap energy and desalination have enabled Qatar to enjoy the questionable honour of having per capita consumption

[102] Under the local environmental authority SCENR. *The Peninsula* (4 November 2007).
[103] *MEED* (8 February 2010).
[104] The studies had not been made public by the end of 2010. Oxford Business Group, *The Report: Qatar 2010* (London: OBG 2010), p. 139; *The Peninsula* (5 October 2010).
[105] 19.5 tonnes of oil equivalent in 2007, according to the World Resources Institute (*CAIT 8.0*), while the GCC average was 7.8 toe and global average 1.8 toe.
[106] Ali Hamed Al Mulla, *Chapter 4: Climate Change and Human Development in Qatar: Issues, Challenges and Opportunities.* Unpublished, drafted for Qatar's Second Human Development Report (2009), p. 10.
[107] IEA, *World Energy Outlook 2008*, p. 300.

rates that rank among the highest in the world: 675 litres per day in 2009.[108] Qatar's first desalination plant was commissioned in 1953. Total production of desalinated water has massively increased, tripling between 1995 and 2008 when the country had four major plants and produced a total of 312 million m^3. In the late 2000s, Qatar has made large investments in new production capacity and technologies: in 2009, water and power network expansions and upgrades totalled US$1.9bn.[109] Nevertheless, simultaneous fast population growth caused water production per capita to decrease slightly, to around 200 m^3 (around 500 l/d/person) in 2008.[110] However, this was still in abundance. According to some estimates, Qatar's total annual production capacity could reach around 540 million m^3 by 2011.[111]

As in the other GCC states, subsidies are arguably among the most important hindrance to natural resource conservation in Qatar, in addition to creating important financial and opportunity costs. Electricity and water are supplied to Qatari nationals free of charge and sold to industries, non-Qataris and commerce at heavily subsidised prices; QR0.07-0.14/kwh (US$0.02-0.04, for example 4-7 times less than the 2008 consumer price in Finland) and QR4.4-5.2/m^3 (US$1.2-1.4). In 2003, the government paid QR829m (US$228m) in water subsidies, of which 63% went to Qataris.[112] Al-Mulla estimates that the residential sector accounts for 80% of all electricity usage.[113] Because of the cheap gasoline prices (US$0.19-0.22/l in 2008)[114] and weak public transportation networks, use of private vehicles is high, especially among Qataris. In 2007, Qatar had the highest car density rate in the Middle East.[115]

In 2006, the United Nations ESCWA and Qatar agreed on cooperation in energy efficiency, and the former drafted a study on the potential for improvement. The study, published in 2008, concluded that the possible savings were 19% in total fuel consumption, 22% in summer peak load and 1.3 Mt in CO_2 emissions. Yet, in 2010, no signs of implemented energy efficiency measures were visible despite Kahramaa assurances that

[108] Hassan Ibrahim al-Mohannadi, deputy chairman of the Permanent Population Committee cited in: *MENAFN* (19 March 2009). OECD data from World Bank.
[109] *Arabian Business* (5 November 2009).
[110] General Secretariat for Development Planning (GSDP), *Second HDR*, pp. 40-42.
[111] Converted from MIGD. *MENAFN* (23 February 2010).
[112] Electricity data, for December 2009: EIU, "Qatar: Energy Report". Water data, for 2005-2008: GSDP, *Second HDR*, p. 48. Electricity price for Finland: *Energiateollisuus*, Press release (22 January 2009).
[113] Al Mulla, *Climate Change*, p. 14.
[114] 90 and 97 octane gasoline. IMF, *Qatar: Statistical Appendix*.
[115] 467/1,000 people (on par with many European countries), with a total population figure of 0.8 million. OPEC, *World Oil Outlook 2010*, p. 84.

the outcomes could be taken into account.[116] Efforts to curb consumption by regulations have been half-hearted: in 2008, a law was passed that determined a QR1,000-10,000 (US$275-2,750) fine for using tap water to wash cars and yards. Local newspaper articles, however, suggest that enforcement is mainly symbolic and intended for awareness-raising.[117]

Qatar's regional gas exports

Qatar has since 2007 exported gas through the Dolphin pipeline. Due to the low returns, the pipeline can also be seen as a political, or even a prestige project.[118] Under a 25-year supply agreement, as of 2008, 56.6 million m^3/d of gas are exported via the Dolphin from Qatar's North Field to the UAE, and 5.7 million m^3/d are exported again to Oman, for a price of US$1.25-1.30/Mbtu (totalling close to US$1bn/year).[119] In comparison, in 2007, international prices fluctuated between US$6-10/Mbtu, and in 2009-2010 at US$3-4/Mbtu.[120] Not only does Qatar therefore incur an important opportunity cost from selling gas on the regional market instead of exporting it as LNG to destinations in Asia and Europe, but it also indirectly subsidises the UAE's industrialisation and Oman's oil production (in the form of EOR), while allowing these to continue exporting LNG for profitable prices.[121] This, together with the North Field moratorium, and the rising domestic demand said to be taking 'increasing precedence in any future gas allocation', means that Qatar is not willing to increase its exports through the Dolphin pipeline to its maximum capacity of 90.6 million m^3/d despite calls by the UAE.[122]

As a consequence of the limited supply through Dolphin, Dubai has built an LNG terminal. Supplies of Qatari LNG for summer peaks under agreements dating to 2008 were expected to commence in 2011.[123] In 2009, Qatar and Kuwait were in talks on LNG exports, but disagreements on the terms of the contract led to Kuwait signing a deal with Shell instead.[124] In addition to piped and shipped gas, the GCC Interconnection Power Grid will

[116] United Nations, *The United Nations Regional Commissions and the Climate Change Challenges* (New York: UN, 2009), pp. 65; 69.
[117] See e.g.: *Gulf Times* (28 December 2008).
[118] The Dolphin project emerged from the vestiges of a GCC-wide gas pipeline plan: the project was initially proposed by Qatar in 1989, but stalled because of Saudi opposition and Bahrain's withdrawal. Dargin ("Qatar's Natural Gas", pp. 139-140) interprets that Qatar wishes to raise its regional status with the pipeline project that finally materialised with Abu Dhabi, Dubai and Oman.
[119] Volumes: Dolphin Energy, "Core customers and volumes". Prices: IEA, *Betwixt*, pp. 9-10.
[120] Henry hub spot prices. Dargin, *The Dolphin Project*, p. 9; *MEED*, (11-17 September 2009); US EIA, "Natural Gas Weekly Update", 16 December 2010, [http://tonto.eia.doe.gov/oog/info/ngw/ngupdate.asp].
[121] Dargin, *The Dolphin Project*, pp. 9-11.
[122] Ibid., p. 48 (quote); EIU, *Qatar: Country Profile*, p. 19.
[123] *Gulf Times* (7 December 2010).
[124] See: *Bloomberg* (3 July 2009).

enable Qatar to sell any existing surplus electricity to its neighbours. In 2009, with the original motive unclear, Qatar told Kuwait it had no surplus to export despite an original deal of 500 MW, while in 2010, Qatar began selling Bahrain 150 MW of electricity for two hours per day.[125]

5.2 Domestic level structures and dynamics

Qatar is ruled by the Al Thani, a dynastic monarchy which, despite internal strife, has come to gain an exceptionally strong hold on power in the state's institutions. However, due to two coups during the country's short independence,[126] a national patriarchal figure similar to Sheikh Zayed of the UAE, has not emerged in Qatar. Nor is there a 'patron of the environment' amongst the contemporary Qatari elite, which can be partly explained by the concentration of power in the hands of five people, none of whom has seen it as being in his/her interests to take up the environmental agenda. Part of the explanation for the lesser attention of the elite to environmental issues, including climate change, lies in the small (globally relative) population and economic resources, which restrict the amount of sectors to which the government can extend its legitimacy-building (vis-à-vis domestic audiences) and branding efforts (vis-à-vis external audiences). The consequences of this situation for environmental governance have been significant, as this area of policymaking continued to remain a marginal one even in the late 2000s when Qatar began updating its state institutions to meet the standards of a 'modern state'.

5.2.1 Decision-makers and related structures

Top decision-makers

As noted by Nakhleh, 'the history of Qatar and the history of the family of Al Thani have been inseparable'.[127] Since 1868, Qatar has been ruled by an Al Thani, and since 1995—the period of interest for this study—by Emir Sheikh Hamad bin Khalifa Al Thani.[128]

[125] *The Peninsula* (8 July 2009; 6 September 2010). Duration of the contract not cited.
[126] Herb, *All in the Family*, p. 109.
[127] E. A. Nakhleh, "The Creation of Qatar' by Rosemarie Said Zahlan", Review, *International Journal of Middle East Studies,* 16 (1984), p. 295.
[128] J. Crystal, *Oil and Politics in the Gulf: Rulers and Merchants in Kuwait and Qatar* (Cambridge: Cambridge University Press, 1995), pp. 30-31.

Qatar's governance in the 2000s[129] can be described as a pyramid, at the top of which is Sheikh Hamad, and directly underneath him four persons: heir apparent Sheikh Tamim bin Hamad Al Thani; prime minister Sheikh Hamad bin Jassim Al Thani; the emir's second wife Sheikha Mozah bint Nasser al-Missnad; and energy and industry minister Abdullah bin Hamad al-Attiyah.

In 1995, Sheikh Hamad, who is said to have been running the country's day-to-day affairs already for some years prior, deposed his father, Sheikh Khalifa bin Hamad Al Thani in a bloodless and widely supported palace coup, while the latter was on holiday in France. Previously, Sheikh Hamad had served as the commander in chief of the armed forces (1972), heir apparent and minister of defence (1977), prime minister (1978) and chairman of the newly-established Supreme Planning Council, in charge of economic and social policies (1989).[130] After having survived at least one serious counter-coup attempt by his father in 1996, he has slowly consolidated his power during the late 1990s and 2000s through economic development and promises of political liberalisation (see chapter 5.1.1). In addition to retaining his military posts, the current Emir's control also extends over the police and internal security forces.[131]

Sheikh Tamim bin Hamad, crown prince since 2003, when his older brother renounced the title, is Sheikh Hamad bin Khalifa's fourth oldest son. He does not hold a ministerial portfolio but has been given an increasing, albeit still limited, role in government and holds a number of other high-level posts, including chairmanship of the QIA, deputy commander-in-chief of the Armed Forces, and oversight of the dynamic General Secretariat of Development Planning, which reports directly to him. Until 2008, he was also the chairman of the Supreme Council for the Environment and Natural Reserves.[132] Furthermore, Sheikh Tamim is responsible for an increasing part of the security agenda and some 'emiri duties', such as issuing decrees, and state strategy, including launching the Qatar National Vision 2030 planning document.

[129] In January 2011, al-Attiyah was replaced by Mohammed Saleh al-Sada and 'promoted' as the head of the Emiri Diwan.
[130] Kéchichian, *Power and Succession*, pp, 202; 208.
[131] Carnegie Endowment, "Qatar", Arab Political Systems, [http://www.carnegieendowment.org/publications/?fa=41362]. Accessed on 6 January 2011.
[132] Qatar Investment Authority, "FAQs", [http://www.qia.qa/QIA/faq.html]. Accessed on 6 April 2010; Amiri Diwan, "H.E. the Heir Apparent", [http://www.diwan.gov.qa/english/heir_apparent/default.htm]. Accessed on 6 January 2011.

A distant cousin and close ally of the Emir since at least the 1990s, Sheikh Hamad bin Jassim Al Thani has served a long career as the head of different high-level state institutions and ministries. He has been foreign minister since 1992 and prime minister since 2007.[133] As the front figure of Qatar's dynamic and independent foreign policy, Sheikh Hamad bin Jassim's style and outspokenness have attracted criticism by other Arab states, especially Saudi Arabia.[134] In addition, he is the CEO of the QIA.[135] According to diplomatic sources, Sheikh Hamad bin Jassim is also in charge of Qatar's investment, business, property and real estate sectors, Al Jazeera television network and Qatar Airways.[136]

Sheikha Mozah bint Nasser al-Missnad is the Emir's second wife, but Qatar's 'First Lady'.[137] She has taken a prominent role alongside her husband in leading the liberalisation and modernisation of Qatar, and has profiled herself as being especially involved in the areas of education, culture and health. Sheikha Mozah is the chairperson of the Qatar Foundation, president of the Supreme Council for Family Affairs and vice president of the Supreme Education Council. She also leads charity projects both domestically and internationally, and holds a number of international titles.[138] Observers have noted that since her office does not have a constitutional position, there are no solid guarantees for the next Emir's wife to play a similar role in the affairs of Qatar.[139]

Energy and industry minister (until January 2011) Abdullah bin Hamad al-Attiyah is a close adviser to the Emir.[140] He also serves as the deputy prime minister (since 2007) and the chairman of Qatar Petroleum (1992-2011). Coming from one of Qatar's most powerful families, he is a long-term government official and held the energy minister's post since 1992, with water and electricity issues attached to his portfolio in 1999. Al-Attiyah reportedly attended OPEC meetings since 1972 and served as the organisation's

[133] Kéchichian, *Power and Succession*, pp. 216-217. According to Kéchichian (ibid. p. 202), the cooperation dates back to the Supreme Planning Council, established in 1989.
[134] E.g.: EIU, *Qatar: Country Profile*, p. 5.
[135] Qatar Investment Authority, "FAQs".
[136] Conversation in Doha, November 2009.
[137] Bahry, "Elections", p. 122.
[138] HH Sheikha Moza Office, "Biography", [http://www.mozahbintnasser.qa/Her%20Highness/Biography/Pages/default.aspx]. Accessed on 6 January 2011.
[139] According to diplomat sources, Sheikha Mozah has been encouraging Sheikh Tamim to take a more prominent role in the culture and education sectors so as to ensure the continuity of her work in the future. Conversations in Doha, November 2009.
[140] EIU, *Qatar: Country Profile*, p. 6.

conference president on several occasions.[141] Alongside Emir Hamad, al-Attiyah, who also has a reputation for his outspokenness, was the mastermind of Qatar's LNG programme.[142]

Other important personalities include finance minister Yousef Hussain Kamal, also in charge of the day-to-day business of the QIA and chairman of RasGas; Mohamed Saleh al-Sada, appointed in a government reshuffle in 2007 for the new post of minister of state for energy and industrial affairs;[143] Dr Ibrahim Ibrahim, a long-time economic advisor to the Emir, who has since 2006 served as secretary general of the General Secretariat for Development Planning (GSDP); and Sheikh Hamad bin Jabor bin Jassim Al Thani, director of the GSDP and a relative of prime minister Sheikh Hamad bin Jassim.

Decision-making structures and dynamics

Despite the constitution from 2005 stating that the country's 'political system is democratic' (Art. 1), Qatar is an absolute monarchy, with the Emir holding both de facto legislative and executive powers and exerting wide powers on the direction and pace of development, modernisation and liberalisation in the country. As Kamrava has described, the 'largely benignly autocratic' system includes persisting 'shaykhly patterns of rule', such as 'centralized, often personalized, decision-making, the lack of accountability and transparency, and a reliance on patronage networks'.[144] Qatar's Council of Ministers, chaired by the prime minister, is the supreme executive authority, which takes care of the functioning of the ministries and administration generally. The Emir appoints and dismisses the ministers and ratifies all draft laws and decrees drafted by the Council of Ministers.[145] Ministerial posts, and particularly important ones, are mainly occupied by members of Al Thani, altogether eight out of twenty as of 2008.[146]

Political parties and labour unions are not allowed in Qatar, and even the establishment of apolitical professional associations and societies is greatly restricted. The Advisory Council (Majlis al-Shura), established in 1972, consists of 35 appointed members,

[141] Ministry of Foreign Affairs of Qatar, "His Excellency Abdullah Bin Hamad Al-Attiyah", [http://english.mofa.gov.qa/get_gov_info.cfm?id=36] Accessed on 6 April 2010; Kéchichian, *Power and Succession*, p. 200; *APS Diplomat Operations in Oil Diplomacy* (30 October 2000).
[142] IHS Global Insight, "Long-serving oil minister bows out after completing Qatar's LNG, oil expansion" (19 January 2011), [http://www.ihsglobalinsight.com/SDA/SDADetail19766.htm].
[143] *The Telegraph* (28 June 2008); *Gulf Times* (4 April 2007).
[144] Kamrava "Royal Factionalism", pp. 402-403.
[145] Ministry of Foreign Affairs of Qatar, "Council of Ministers", [http://english.mofa.gov.qa/details.cfm?id=44]. Accessed on 10 April 2010. The legal system is based on Shariah principles, but influenced by Egyptian civil law. Carnegie Endowment, "Qatar".
[146] *Gulf Times* (2 July 2008).

generally notables, and has no legislative powers.[147] A permanent constitution, which entered into force in 2005, stipulates the creation of a 'new' 45-seat parliament under the name Advisory Council that will have two thirds of its members elected by direct elections and the rest by the Emir.[148] The parliament is, nevertheless, considerably limited by the new constitution in terms of independence and efficacy and, when eventually established, it will still allow for the 'ruling family to maintain its hegemony over policymaking'.[149] The promises of parliamentary elections, given since 1998, have been postponed several times, most recently in 2010, to 2013. At the municipal level, Qatar is divided into ten administrative districts, and the Central Municipal Council of 29 members has an advisory role as the nationwide municipal body.[150]

In addition to consolidating the inheritance of the country's rule among his male descendants in the constitution (Art. 8), Sheikh Hamad bin Khalifa set up the Council of the Ruling Family in 2000. Chaired and appointed by the Emir, the Council decides on the salaries of the ruling family and when power—in case of death or disability—is transferred from the incumbent Emir to the heir apparent (Art. 15).[151] In addition to this 'neopatrimonial structure building', Kamrava has suggested that Sheikh Hamad bin Khalifa has created new posts and parallel state institutions, such as the Qatar Foundation, so as to maintain his allies in the most important positions and diminish the likelihood of challenges from other factions within the ruling family.[152]

In 2008, in what has been described as a drive away from councils and general secretariats, seven new ministries were created, including the Ministries of Environment and International Cooperation. Also, the General Secretariat for Development Planning has since its establishment in 2006 grown into an influential entity, led by Sheikh Hamad bin Jabor Al Thani (director general) and Ibrahim Ibrahim (secretary general). In 2009, despite its small size, Qatar had in total 14 ministries, 8 councils, 20 authorities and 9 other state institutions.[153]

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[147] EIU, *Qatar: Country Profile*, pp. 5-6; Carnegie Endowment, "Qatar"; Kamrava, "Royal Factionalism", p. 417.
[148] Ministry of Foreign Affairs of Qatar, "The Constitution", [http://english.mofa.gov.qa/details.cfm?id=80]. Accessed on 10 April 2010.
[149] Kamrava, "Royal Factionalism", p. 420; EIU, *Qatar: Country Report, January 2010* (London: EIU, 2010), p. 4.
[150] Carnegie Endowment, "Qatar".
[151] Ministry of Foreign Affairs of Qatar, "Constitution"; Kamrava, "Royal Factionalism", p. 414.
[152] Kamrava, "Royal Factionalism", pp. 414-415. See also: Hertog, "Shaping the Saudi State".
[153] Hukoomi, "Directory", Qatar e-Government, [http://www.gov.qa/wps/portal/directory/directory/]. Accessed on 10 April 2010.

Unlike in the UAE, where natural resources are controlled at the local level by the individual emirates, Qatar's Ministry of Energy is a domestically powerful ministry. Until 2011, it was led by one of Qatar's top figures, Abdullah al-Attiyah, who simultaneously headed Qatar Petroleum and represented Qatar in the OPEC's meetings and other international energy fora. The Ministry of Environment, similarly to the UAE, is a young and weak institution, with a young and weak minister, Sheikh Abdullah bin Mubarak al-Midhadi, and consequently little or no sway over other ministries. These relative powers and the interplay of the two ministries—or lack thereof, as will be shown in the following—is not just indicative of the importance that Qatar's top ruling elite bestow on energy and heavy industries, even when it is at the expense of environmental sustainability. It is also at the root of the explanation for Qatar's policies and negotiating positions in the context of the international climate regime.

5.2.2 Environmental and climate change-related governance

Decision-making and institutions

Environmental governance in Qatar is relatively new in terms of institutions and continues to figure low on the government agenda, always ultimately preceded by considerations of economic development in the energy, infrastructure and construction sectors. There are no powerful elite personalities identified as leading the agenda. The continued dominance of the energy and industrial sectors over environmental issues in their respective spheres, and the weakness and low level of performance of the new Ministry of Environment, has hindered the development of an effective, competent and overarching environmental authority. Also resulting from this situation, top-down efforts to integrate environmental sustainability and climate change considerations in cross-sectoral policymaking, and to raise awareness on these issues, have also been weak.

Despite the lack of a clear leader figure in environmental sustainability, interviews with local and Qatar-based stakeholders confirmed that the following persons and institutions are associated with 'green qualities': Emir Hamad bin Khalifa and his wife Sheikha Mozah, as the driving forces behind the Qatar National Vision and Qatar Foundation's energy and environment-related research developments, respectively; the Ministry of Environment and minister Abdullah al-Midhadi; the Ministry of Energy and Industry/Qatar Petroleum and minister Abdullah al-Attiyah; and the heir apparent Sheikh Tamim, as the

patron of Qatar's food security programme.[154] Also, 'lower-ranking' local environmental (sustainability) pioneers include Saif al-Hajari, the chairman of the Friends of the Environment Centre and the Qatar Foundation's vice chairman; Issa al-Mohannadi, CEO of Dohaland (under QF) and chairman of the Qatar Green Building Council; and Yousef al-Horr, chairman of the Barwa and Qatari Diar Research Institute, which has launched a local sustainable building system.

During the past three decades, Qatar's official environmental governance structures have been gradually upgraded, but their capacity has always lagged behind the country's fast development, leaving them insufficiently empowered. The Permanent Environment Protection Committee (PEPC) established in 1981, was replaced in 2000 by the Supreme Council for the Environment and Natural Reserves (SCENR), the tasks of which were taken over in 2008 by the newly-established Ministry of Environment.[155] There are also records of an environmental department, established under the Ministry of Municipal Affairs and Agriculture in 1994, the tasks of which were to monitor and mitigate pollution and conduct related studies and environmental impact assessments, and an Environmental Technical Committee (ETC), comprising all major industrial companies.[156] The PEPC and the ETC, both under the Ministry of Municipalities and Agriculture, served mainly as discussion forums for legislation and regulations. A UN report from 1999 lamented that despite many promising projects and programmes, the PEPC lacked financial and human resources for their implementation.[157] The competences of the SCENR were considerably extended from this, and they officially included: the formulation of policies, formulation and enforcement of legislation, monitoring and mitigation of pollution, management of environmental impact assessments, wildlife protection and monitoring activities, awareness raising, and operation of a national environment database.[158] The Ministry of Environment, established in 2008, covers the same main functions as the SCENR, including

[154] Interviews in Doha in November 2010 with: Aziza Al Khalaqi, Social Researcher, Department of Social Development, GSDP; Qatar-based renewable energy experts; Yousef Al Horr; Qatar-based renewable energy expert; Katrin Scholz-Barth, CEO, Katrin Scholz-Barth Consulting; Sam Pickering, Managing Director, BluuGreen Qatar; Richard Leete, Director, Department of Social Development, GSDP; Qatar-based PR specialist.
[155] GSDP, *Second HDR*, p. 19.
[156] United Nations, *Johannesburg Summit 2002. Qatar Country Profile* (UN, 2002), p. 11. Data in the profile is from 1994-1996.
[157] UNEP, *Overview of Land-Based Sources and Activities Affecting the Marine Environment in the ROPME Sea Area*, UNEP Regional Seas Reports and Studies No. 168 (United Nations Environment Programme, 1999), p. 50.
[158] GSDP, *Second HDR*, p. 19; Embassy of the State of Qatar in Washington D.C., "Environment Affairs", [http://www.qatarembassy.org/environment.asp]. Accessed on 11 April 2010.

responsibility for protecting the environment, endangered wildlife and natural habitats, but has many new task areas.[159]

Before its replacement, the SCENR had a staff of 600, half of whom were involved in surveillance. According to Richer, the capacity of the Council was not sufficient, and it was not able to keep pace with the large number of environmental impact assessments (over 1,000 in both 2006 and 2007) resulting from the increasing development activities.[160] Perhaps partly owing to the short existence of the organism, a report by the GSDP from 2009 still described it as 'under-resourced in terms of staff and expertise'.[161] By the end of 2010, however, the Ministry's total staff had grown to a massive 2,700, of which 1,400 were Qataris.[162] Despite this, stakeholders have characterised the Ministry as having an extremely low responsiveness, being reactive rather than proactive, not working '100%', and even working less effectively than the SCENR.[163]

Until 2008, the SCENR was led by chairman Sheikh Tamim bin Hamad (heir apparent), and secretary general Khalid Ghanem al-Ali. The minister of environment since then has been Abdullah bin Mubarak al-Midhadi. His youth and the fact that he does not come from Al Thani or another powerful family imply that the Ministry is not among the most powerful in the cabinet. The Ministry's short existence obviously also contributes to its limited clout.

In addition to the Ministry, a handful of other institutions engage in environmental governance: Qatar Petroleum's Health Safety and Environment (HSE) department works with environmental conservation, sustainable development and oil spill response preparedness, among other things, relating to the company's operations. QP also has a sustainable development department.[164] The General Secretariat for Development Planning (GSDP), established in 2006, provides general coordination for Qatar's strategic development planning, and has incorporated environmental sustainability goals in its long-

[159] Hukoomi, "Ministry of Environment", Qatar Government Online, [http://www.gov.qa/]. Accessed on 11 April 2010; interview with Aziza Al Khalaqi, November 2010.
[160] Richer, *Conservation*, pp. 11-12.
[161] GSDP, *Second HDR*, p. 86.
[162] Includes institutions under the Ministry. Correspondence with Aziza Al Khalaqi, Social Researcher, Department of Social Development, GSDP, January 2011.
[163] Interviews in November 2010 with Benno Boer; Qatar-based PR specialist; Aziza Al Khalaqi. Based on personal experience, the Ministry is extremely opaque and elusive in terms of access to information.
[164] Qatar Petroleum, "Health Safety & Environment", [http://www.qp.com.qa/en/homepage/qpactivities/qpoperations/environmentandsociety/20-1719777058.aspx]. Accessed on 12 January 2011; interview with Dr Ali Hamed Al-Mulla, Manager, Corporate Environment and Sustainable Development, Qatar Petroleum, Doha, October 2009.

term strategic document.[165] Furthermore, the industrial cities of Mesaieed and Ras Laffan, under QP, as well as the land reclamation real estate project The Pearl, developed by UDC, function as 'mini states within a state', conducting their own environmental planning, monitoring, and even regulation.[166]

Environmental regulation, planning and policies

Despite the gradual build-up of an environmental institutional and regulatory framework since the 1980s and in the 2000s, by the end of the decade, implementation still remained incomplete. Most likely Qatar's first law in the area of environment was law no. 4/1981, which established the Permanent Environment Protection Committee.[167] In 2002, an environmental law of 75 articles was enacted.[168] Other laws include law no. 4/2002 on the hunting of birds and reptiles, law no. 31/2002 on protection from radiation, law no. 19/2004 on the protection of wild fauna and flora and its natural habitats, and executive by-law no. 4/2005 on environmental protection. There have also been Emiri decisions calling for the protection of the marine environment.[169] Moreover, the permanent constitution states: 'the State shall preserve the environment and its natural balance in order to achieve comprehensive and sustainable development for all generations'.[170]

Environmental impact assessments (EIA) have been carried out in Qatar since the 1980s and were made compulsory to all development projects, including industrial projects, in 2002.[171] Raouf sees this as an indication of 'environmental considerations slowly becoming part of the planning process',[172] while minister of environment Abdullah al-Midhadi has described the shift as a reflection of the vision of Emir Sheikh Hamad.[173] In practice, however, serious problems in the implementation of EIAs persisted in the late 2000s; according to some observations, although guidelines had existed for 15 years, there was still no strong enforcement. In 2007, of the over 1,000 projects that were submitted to the SCENR, only 5% did not pass.[174]

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[165] Sheikh Hamad bin Jassim bin Jabor Al Thani, speech in the seminar *Towards Qatar's National Strategy: Issues and Challenges*, 28 October 2008, Doha.
[166] Interview with Qatar-based PR specialist, November 2010.
[167] Raouf, *Economic Instruments,* p. 89.
[168] Ibid., pp. 89-90; 137; Embassy of the State of Qatar in Washington D.C., "Law No. 30 of 2002", [http://www.qatarembassy.net/law%20of%20environment%20protection.asp] Accessed on 23 April 2010.
[169] GSDP, *Second HDR*, p. 19.
[170] Ibid., *Qatar National Vision*, p. 30.
[171] F. B. Chaaban, "Air Quality" in M. K. Tolba and N. W. Saab (eds.), *Arab Environment: Future Challenges*, Report of the Arab Forum for Environment and Development (Beirut: AFED, 2008), p. 57.
[172] Raouf, *Economic Instruments*, p. 36.
[173] Interviewed in: Oxford Business Group, *The Report: Qatar 2009*, p. 239.
[174] Richer, *Conservation*, p. 11; interview with Qatar-based PR specialist, November 2010.

The existence of regulatory mechanisms has not implied their full enforcement. Richer has noted that problems include lack of regulatory and monitoring capacity and insufficient compensatory measures: 'development has taken place at such a fast rate [that] there is simply a lack of capacity in regulatory and monitoring bodies to help guide the growth' and, further, 'the mitigation costs assigned to industry often involve funding research projects, and conservation programs but may not result in remediation of the environment itself'.[175] Qatar's second human development report, issued by the GSDP, also mentions institutional and human capacity constraints as a major challenge. Other problems in achieving sustainable development include lack of policy and regulatory controls, gaps in data, research, and implementation of sustainability plans.[176]

Apart from the environmental law from 2002 and the EIAs, the Ministry of Environment seems to have few other regulatory tools. There are no economic incentives or disincentives promoted by the state, not even major state-sponsored environmental prizes like in the UAE. The GSDP notes that regulatory and managerial bodies have been established quickly and Qatar has joined a number of international treaties in the area of sustainable development, but still, the country 'faces numerous challenges in its transition to sustainable development and putting theory into practice, especially on account of its institutional and human capacity constraints'.[177]

Importantly, indicative of the paramount importance of the oil and gas industry to the country's economy, similarly to ADNOC, Qatar Petroleum self-monitors and enforces environmental performance in the entire hydrocarbons sector, including its own operations.[178] The company's HSE Regulation Authority is responsible for 'developing and harmonizing the norms and standards in the [h]ydrocarbon sector [and has] an auditing role throughout the industry in the state of Qatar, including air quality issues'.[179] A further factor limiting the scope of action of the Ministry of Environment is the fact that a fourth of Qatar's factories have been built before 2005. These installations fall outside the Qatari law, meaning that they need not follow environmental standards until the end of a transitional phase, in 2014.[180]

[175] Richer, *Conservation*, pp. 2; 12.
[176] GSDP, *Second HDR*, pp. 19; 21.
[177] Ibid. Quote from p. 21.
[178] Raouf, *Economic Instruments*, p. 90.
[179] Division for Sustainable Development, *CSD-14/15 Thematic Profiles: Industry* (UN, 2007), p. 1; *Atmosphere* (UN, 2007), p. 2.
[180] Environment minister al-Midhadi in: *RasGas Magazine,* issue 29 (2010), p. 8.

All this implies that, although a number of departments that were under other Ministries were moved under the new Ministry of Environment,[181] it has little or no authority over the hydrocarbon and industrial sectors, which—as in the other Gulf monarchies—are the largest sources of pollution, emissions and environmental degradation in the country. For example, an external scientific report from 2004 found that the best areas for coral growth, located around QP's main oil and gas terminal island, Halul, 'are subject to significant human impact including dredging for harbour construction and marine outfalls'. Very high coral mortality from bleaching and human impacts since the mid-1990s was reported especially in areas close to the coast.[182] Also, the carbon footprint of the hydrocarbon industry is massive: around 70% of Qatar's greenhouse gas emissions in 2006.[183]

Indeed, the Environment Ministry's narrow scope of influence is a strong indication of the low importance of environmental sustainability concerns relative to the industries and other state decision-making institutions. It also reveals a weak interest on the part of the ruling elite in tackling environmental problems and suggests that the reasons for the establishment of the Ministry have stemmed partly from elsewhere than rising concern over the importance of environmental considerations on the state agenda. Rather, the Ministry's role can be seen as part of the ruling elite's state- and image-building efforts, the latter aimed at projecting concern over the environment to external and environment-conscious internal audiences.

The Qatar National Vision 2030

In the latter part of the 2000s, as part of ongoing public sector reform, Qatar's Planning Council, the predecessor of the GSDP, led by Hamad bin Jabor Al Thani, started looking at a way of linking the different government agencies' projects under one strategic umbrella, similarly to, but more comprehensively, than other GCC countries at the time.[184] Simultaneously, it was realised that Qatar's development in the previous years had been unsustainable and the country was in many ways 'under stress'.[185] Out of this perceived need to simultaneously control growth, diversify the economy, and develop a national knowledge economy, the GSDP drafted Qatar's first major strategic long-term planning document and first sustainable development plan, titled The Qatar National Vision 2030.[186]

[181] Correspondence with Aziza Al Khalaqi, January 2011.
[182] Rezai et al., "Coral Reef Status", p. 164.
[183] Al Mulla, *Climate Change*, p. 11.
[184] Interview with Qatar-based PR specialist, November 2010.
[185] Interview with Richard Leete, November 2010.
[186] Interview with Qatar-based PR specialist, November 2010.

Somewhat unlike Abu Dhabi's planning documents, Qatar's Vision, published in 2008, comes across as primarily a document written for and targeted at Qataris. It emphasises the creation of a knowledge-based economy by investing in education and health systems, and infrastructure. It stresses Qatarisation and the promotion of national values and culture, calls for wise investment of fossil fuel revenues, and pledges support for entrepreneurship and innovation through the provision of funding for research. It also emphasises intergenerational justice. The Vision is based on the three/four pillars of sustainable development.[187]

Although the GSDP officially has only an advisory role, the Vision has the support of the highest authorities; it was brought to the government by heir apparent Sheikh Tamim and approved by the Emir. Other key persons involved in the process were the GSDP's secretary general Ibrahim Ibrahim and Prime Minister Hamad bin Jassim.[188] In the spirit of Qatar's new constitution, the Vision stresses the ownership of the document by the Qatari people. Promises of continuing consultations with all stakeholders, including the civil society, have also been given.[189]

Regarding the environment, the Vision recognises the adverse environmental impacts of Qatar's recent fast and partly uncontrolled growth, but fails to set these ahead of the development imperative: it admits that 'even with Qatar's best efforts, it is impossible to entirely avoid harming the environment, given a development pattern that depends in its early stages on oil, gas, petrochemicals and heavy industries'. The document establishes that neither economic development nor protection of the environment should be sacrificed for the sake of the other, and offers advanced technologies and avoidance of rapid, unplanned growth as the solutions to this dilemma.[190]

The National Vision is also the first strategic document in which Qatar's climate change-related goals are formulated as:

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[187] GSDP, *Qatar National Vision 2030*, p. 3.
[188] Interview with Elina Lehtinen, Communications Manager, Crisis Management Initiative, formerly based in Qatar, Helsinki, June 2010.
[189] GSDP, *Qatar National Vision 2030*, p. 34. Initiated in 2006, the strategy process included consultations with all major national stakeholders, such as ministries and major hydrocarbon companies. Also, the National Development Strategy process included stakeholder consultations. *GSDP*, Press release (5 February 2009).
[190] GSDP, *Qatar National Vision 2030*, pp. 8; 30-33. Quote from p. 8; Sheikh Hamad bin Jabor bin Jassim Al Thani, speech in seminar *Towards Qatar's National Strategy: Issues and Challenges*, 28 October 2008, Doha.

- Encouragement of regional cooperation to put in place preventive measures to mitigate the negative environmental effects of pollution arising from development activities.
- A proactive and significant regional role in assessing the impact of climate change and mitigating its negative impacts, especially on countries of the Gulf.
- Support for international efforts to mitigate the effects of climate change.[191]

The document as a whole is largely descriptive in style and does not include any numerical or quantitative goals. The document's purpose is to serve as the basis for shorter term National Development Strategies, the first of which (2011-2016), consisting of 14 sector strategies (one of which pertains to the environment), with specific actions and targets, was expected for publication in 2011.[192] Exactly how far the National Vision's climate change goals will be reflected in Qatar's external policies and domestic initiatives is yet to be seen.

Domestic climate policy decision-making structures

A national committee on climate change has officially existed since 2007, first under the SCENR and then the Ministry of Environment. In addition to this and other UNFCCC-related institutions (discussed in chapter 6.3), by the end of 2010, there had been no major visible institutional or policy evolution in relation to climate change in Qatar. As will be demonstrated in chapter 5.3, unlike in Abu Dhabi where non-oil sector institutions have increasingly taken over the climate agenda, the lack of an environmentalist patron-figure and the disinterest of (the leadership of) the Qatari Ministry of Energy and Industry in alternative energies and energy efficiency had far-reaching implications for Qatar's climate change-related decision-making. This in turn influenced not only domestic level developments in this sphere, but the country's external climate policy positioning as well.

Environmental sustainability and awareness-raising

Due to Qatar's weak tradition of statistical data gathering and aggregation, and its small population, only a few comparative data sets of the country's current environmental performance exist.[193] The 2010 Environmental Performance Index of Yale and Columbia classified Qatar as the 122nd of 163 countries, ahead of Oman (131), Bahrain (145) and the UAE (152). Qatar scored particularly well (88/100 points) on environmental health, which includes factors that influence public health, such as access to sanitation and water, air quality and the impact of environmental factors on human health. However, on the

[191] GSDP, *Qatar National Vision 2030*, p. 33.
[192] Interviews with Richard Leete, and Aziza Al Khalaqi, November 2010.
[193] The quantitative measuring of sustainability in Qatar is challenging: the build-up of national sustainable development data and indicators only began in the mid-2000s, and the lack of statistical data and small population, sometimes lead to the country's exclusion from international rankings.

ecosystem vitality side, which measures human impact on the environment and environmental policy measures, Qatar gained only 10 points out of 100.[194] In 2010, the WWF's Ecological Footprint Index ranked Qatar, appearing for the first time in the study, as second worst in the world (10.51 global hectares per capita), almost side by side with the UAE (10.67 gh), which has held the first place since 2000.[195] A fair and comparable assessment of Qatar's (un)sustainability, however is difficult to achieve. As a report by the GSDP noted, data on environmental sustainability in the country is partial and weak and 'much more work is required to close existing data gaps, improve their timeliness and to develop indicators that better reflect the situation in Qatar'.[196]

Qatar's second Human Development Report,[197] published by the GSDP in 2009, is a relatively frank portrayal of the environmental problems and challenges the country faces. The report notes how Qatar's uncontrolled and rapid development—spatial growth, natural resource use and high population growth—is behind most of these challenges and warns that, if left unaddressed, these issues could halt or reverse important development achievements.[198] The report stresses balancing economic and environmental goals for the sake of intergenerational equity, or maintaining a high level of welfare for future generations. It recommends a number of new policies and policy frameworks, most importantly an integrated and comprehensive sustainable development policy framework that includes national marine policy; a national climate change policy (with management of greenhouse gas emissions and incentives for industries to move towards a low-carbon future); a water master plan, and a national policy regulating energy use and promoting investments in new technologies, including renewables.[199]

While Qatar's First Human Development Report from 2006 states that the country's marine environment has been 'noticeably affected' by continuous development since the onset of oil exploration and population growth, and coral reefs having been 'subjected to devastation' in the early 2000s,[200] the Second Human Development report is careful not to explicitly mention or estimate the scale of damage inflicted by the fast development of the

[194] SEDAC, "Environmental Performance Index".
[195] WWF, *Living Planet Report 2010*, p. 36.
[196] GSDP, *Second HDR*, p. 23.
[197] Qatar's first Human Development Report was published in 2006 by the Planning Council. Although more comprehensive in terms of topic choice, it lacks systematic analysis and a meaningful set of policy recommendations.
[198] GSDP, *Second HDR*, pp. 16; 27.
[199] Ibid., pp. iv; 1-4; 60; 121-135.
[200] Planning Council of Qatar, *Human Development Report: The State of Qatar 2006* (Doha: The Planning Council/UNDP, 2006), p. 56.

late 2000s, only naming a number of megaprojects with environmental impacts.[201] Rezai et al. and Richer provide a considerably more critical, albeit snapshot view, of their negative impacts on Qatar's marine environment. In general, Richer notes that a large part of coastal development projects lack 'appropriate impact assessments or restoration plans'.[202]

The Second Human Development Report notes that 'achieving sustainable development necessitates a change in mindset and in consumption and production patterns', pointing towards the crucial role of the government in setting regulations and incentives for encouraging this change. Areas to be tackled include the institutional capacity of regulatory bodies and management agencies, scientific expertise, skills of the labour force, implementation of programmes, transparency and accountability of decision-making, access to information and open dialogue.[203] Throughout the report, lack of information and scientific data emerges as a central problem for the analysis of sustainability in general.[204]

In the late 2000s, awareness of environmental sustainability and climate change in Qatar was generally still very low. At the government level the Ministry of Environment has been tasked with awareness-raising and education in environmental issues, but work and activities have so far been rather limited in scope, visibility and quantity.[205] In addition to being the front-runners in environmental protection,[206] the energy industry and private companies have been slightly more active in terms of organising one day campaigns, training events, and seminars on a range of topics. However, consistent action has remained narrow and plenty of greenwash still takes place; Qatalum's aluminium smelter, inaugurated in 2010 and dubbed one of world's most efficient and environmentally friendly smelters, uses up to 1,350 MW of energy—equal to the capacity of a large nuclear power plant.[207]

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[201] GSDP, *Second HDR*, pp. 73; 78-80.
[202] Rezai et. al., "Coral Reef Status", p. 164; Richer, *Conservation*, p. 7.
[203] GSDP, *Second HDR*, pp. 21; 24.
[204] Ministry of Environment-industry partnerships are suggested as one potential solution. Ibid., pp. 86-89.
[205] A newspaper search, covering the news archives of Gulf Times and The Peninsula from 2004 until mid-2010, found some conferences and one-day events and campaigns that were co-organised with private companies, but neither the SCENR nor the Ministry of Environment were generally visible in these media. Moreover, there are no environmental prizes handed out by the government.
[206] Interviews with Benno Boer, November 2010; Richer, *Conservation*, p. 16; 19. According to Boer, the oil companies have pioneered in environmental protection in the Gulf, partly due to concerns over desalination facilities.
[207] *AMEinfo* (12 April 2010). The newspaper search (see footnote above) confirmed this: most activities recorded were organised by both private and government-owned companies. These included a number of beach clean-ups, tree planting events and other one-day awareness campaigns, seminars and conferences, and competitions and awards. Many of the awareness events were organised by local branches of international companies and embassies of foreign nations.

Both top-down awareness raising by official authorities, and bottom-up actions conducted by companies and associations, are facile and harmless in the sense that they are self-limiting—they do not touch upon sensitive topics, such as industrial pollution or the unsustainability of the local lifestyle. Furthermore, similarly to the other small Gulf monarchies, awareness-raising efforts are complicated by the large and diverse expatriate segment with a loose attachment to the country due to generally short periods of residence.

There are a handful of NGO-like environmental organisations, formed by either 'important' nationals or Western expatriates, which leave the majority of the population (Qataris and Asian expatriates) outside of their reach. Qatari organisations under the patronage of Sheikha Mozah, at least in theory, enjoy an informal channel of influence. Expatriate organisations, because of the nature of the rentier bargain, are likely to remain in the margins of influence vis-à-vis the government.

Established in 1992, the Friends of the Environment Centre was founded and is led by chairman Saif al-Hajari, who is also the vice chairman of the Qatar Foundation and who holds a number of other senior positions. The centre's activities have included environment awards, programmes, and campaigns for schools, including an annual Flower Each Spring campaign since 1999.[208] The Qatar Green Building Council (established in 2009) is another semi-private organization, established by Issa al-Mohannadi, the CEO of the real estate developer Dohaland, Qatar Foundation's subsidiary, which has Sheikha Mozah as its honorary president. By mid-2010, the council had mainly organised seminars and was aiming at becoming a support service for international sustainable building certification programmes.[209] Qatar Green Center, a subsidiary of the Ministry of Environment,[210] established in 2005 and led by Abdullah bin Mohammed al-Kuwari, concentrates on landscaping, gardens and litter reduction. Quite contrary to the contemporary understanding of environmental sustainability in Qatar's climatic conditions, the centre seeks to increase the amount of green spaces (trees and plants) in the country.[211] Finally, among the few Western expatriate non-governmental organisations in the environmental field are the Qatar Natural History Group (1978), which is mainly focused on arranging monthly lectures and fieldtrips on a large range of topics, and the more recent and smaller

[208] The Friends of the Environment Centre, [http://www.fec.org.qa/]. Accessed on 20 June 2010.
[209] *Arabian Business* (28 February 2009); *QGBC*, Press release (6 July 2009).
[210] Formerly under the Ministry of Municipal Affairs and Agriculture.
[211] Both the Friends of the Environment Centre and Qatar Green Centre have considerably more material on their Arabic websites than on the English ones, which indicates a focus on Qatari audiences. Qatar Green Center, [http://www.qgreen-clean.com/]. Accessed on 20 June 2010.

Sustainable Qatar (2008), which consists of a group of educators, and concentrates more specifically on professional networking while seeking to engage with Qataris as well.[212] UNESCO too (early 1970s) has organised activities in the areas of recycling and environmental awareness.[213] In 2010, the water and electricity utility Kahramaa held campaigns on water and energy savings.[214] Local dignitaries have also made financial contributions for conservation, including a US$1m donation from Sheikha Jawaher bint Hamad bin Suhaim Al Thani, wife of the heir apparent Sheikh Tamim, to Birdlife International in 2008.[215]

In the absence of reliable polls, only anecdotal evidence is available on environmental and climate change awareness among Qataris, which has been described by local observers as low, mostly attributable to their current lifestyles. Expatriates have also been described as becoming easily detached from their formerly more sustainable consumption patterns, similarly to Abu Dhabi. However, Qatari youth was viewed as becoming increasingly interested and active in this respect.[216]

5.3 Domestic responses to climate change

By the end of 2010, despite its high vulnerability to climate change, relatively little happened in Qatar in terms of climate change governance, institution-building, and domestic policies and measures. Unlike Abu Dhabi, which had by then successfully branded itself as the clean energy leader of the Gulf and had already begun moving towards implementation in the deployment of alternative energies and technology transfer, Qatar had taken a more gradual approach. With abundant gas reserves, there was little rush, and due to the limited 'elite human resources', the areas of focus needed to be carefully hand-picked. Half-intentionally, half involuntarily, the climate change, alternative energy and environmental sustainability-related projects and initiatives that began appearing in Qatar in the latter part of the 2000s were clearly distinct from those in Abu Dhabi. At the turn of the decade, with the Qatar Foundation-linked technology park

[212] Qatar Natural History Group, [http://www.qnhg.org/]. Accessed on 20 June 2010; Sustainable Qatar, [http://sustainableqatar.pbworks.com/]. Accessed on 20 June 2010; interview with Katrin Scholz-Barth, November 2010.
[213] Interviews with Benno Boer, November 2010.
[214] To enforce the law No. 26 from 2008 on conservation of water and electricity. *The Peninsula* (7 June 2010).
[215] *Gulf Times* (14 May 2008).
[216] Interviews in November 2010 with Benno Boer; Katrin Scholz-Barth.

representing the most important cluster of related efforts, the contours of the big picture in Qatar's climate change puzzle were only starting to appear.

5.3.1 Vulnerability, adaptation and mitigation

Physical, social and economic impacts of climate change

Country-specific data for Qatar, particularly regarding potential societal impacts of climate change, is extremely scarce: the state has not submitted any national communications to the UNFCCC, no comprehensive country-specific impact studies exist, and existing information on Qatar's historical climatic patterns is scarce and contradictory.[217]

A report by the World Bank from 2007 classifies Qatar as the most vulnerable Arab country and the third most vulnerable developing country in terms of impact on land area by sea level rise, with projections ranging between 3% and 13%. Qatar's economy also ranks among the most vulnerable to sea level rise, with 2% of the country's GDP at risk in a 1-metre scenario and 3-5% in a 3-metre scenario. Furthermore, the report predicts that over 10% of Qatar's population would be impacted by an extreme case of sea level rise (at 5 m).[218] A report by a professional Arab ENGO places this last estimate at 50%.[219]

The GSDP's documents from 2008 and 2009 recognise the multiple challenges of resource scarcity, environmental degradation and climate change. The National Vision document lists among Qatar's future environmental challenges: diminishing water and hydrocarbon resources, pollution and environmental degradation, and the potential impacts of climate change on coastal developments.[220] The Second Human Development Report includes as the main climate change-related risks and vulnerabilities: flooding and loss of land area; damage to the marine environment; water stress; food insecurity; strong dependency on the oil and gas sector; inability to transform into a low carbon economy; high cost of long-term adaptation; inappropriate education and training; and health risks.[221] Detailed studies, however, do not exist, and local experts have called for an assessment on the potential

[217] Richer (*Conservation*, pp. 6-7) and Al Mulla (*Climate Change*, p. 14) cite studies that record a significant increase in extreme weather events since the mid-20th century, and either a 0.1°C temperature increase in the 20th century or 0.3°C increase since the 1970s, depending on the source.
[218] 1-metre SLR scenario: 3%; 3m: 8%; 5m: 13%. Dasgupta et. al. *Impact of Sea Level Rise*, pp. 18-20; 41.
[219] Ghoneim, "Impacts of Global Warming", p. 36. Increasing salinity of fresh water reserves is also a consequence of seawater intrusion. GSDP, *Second HDR*, p. 112.
[220] GSDP, *Qatar National Vision 2030*, p. 30.
[221] GSDP, *Second HDR*, pp. 111-112.

impacts of climate change, adaptation strategies and policies, and high resolution climate change scenarios that would serve a small country like Qatar.[222]

No major studies exist on the potential economic impacts of climate change on Qatar (as is the case for most states), but there are a number of modelling studies on the potential economic impacts of 'response measures', or international mitigation policies and measures. Despite presenting a mixed picture of Qatar's vulnerability, they generally point towards the country's natural gas reserves as being a strong asset in countering these potential future impacts.

In 1997, Kassler and Paterson predicted GDP losses of close to 5% of BAU for Qatar by 2010.[223] The OPEC's own model from the late 1990s suggested that Qatar would be the most vulnerable of all member states to the negative impacts of response measures, with GDP losses of 3.3% (US$400m) in 2010.[224] Similarly, a Chatham House report from 2005 ranked Qatar among the most vulnerable oil exporting countries to the impacts of Kyoto Protocol implementation, due to the country's high dependence on energy exports.[225] In 2004, Ahmed and Maslamani examined a number of models that estimated the adverse impacts of response measures from the implementation of the Kyoto Protocol for Qatar and found significant variation between models, dependent on how implementation is managed by the Annex I countries.[226] Finally, al-Mulla, surveying existing studies in 2009, reached the conclusion that the implementation of Kyoto Protocol would 'unquestionably' result in adverse economic impacts on Qatar.[227] Evidently, none of these losses were visible in 2010, and as the studies cited above also note, Qatar's gas abundance and its massive export scheme, as well as the high GDP per capita, will be important factors in offsetting any future impacts. The global application of Kyoto's flexible mechanisms and/or the adoption of carbon taxes are expected to lead to natural gas being preferred over oil and coal. Also, Qatar has the ability to increase diversification through energy intensive industries as a further 'mitigation' strategy.[228]

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[222] Al Mulla, *Climate Change*, pp. 15-16; quoted in: *The Peninsula* (28 January 2009).
[223] Kassler and Paterson, *Energy Exporters*, p. 38.
[224] Barnett et al., "Will OPEC Lose?", pp. 2084-2085. Quoting the OPEC World Energy Model.
[225] Chatham House, *OPEC and Climate Change*, p. 20.
[226] A. Ahmed and M. Al Maslamani, "Anticipated Economic Costs and Benefits of Ratification of the Kyoto Protocol by the State of Qatar", *Climate Policy*, 4 (2004), pp. 75-80.
[227] Al Mulla, *Climate Change*, pp. 17-18, quoting, inter alia: Barnett and Dessai, "Articles 4.8 and 4.9", p. 234.
[228] Barnett et al., "Will OPEC Lose?", p. 2086; Chatham House, *OPEC and Climate Change*, p. 20; Ahmed and Maslamani, "Anticipated"; Al Mulla, *Climate Change*, p. 18.

The Second Human Development Report mentions that 'infrastructure investments to adapt to the long-term impacts of climate change on the environment, economy and society are expected to be very high'. Also, diversification to a low-carbon economy will require 'significant investments'. Due to Qatar's dependence on exports of fossil fuels and energy intensive products, its export income, according to the report, is expected to decline in the long term, especially if importing states impose border taxes. The country's economic situation significantly might worsen if declining revenues coincide with the need to invest in adaptation or diversification, with potential negative impacts on Qatar's food and water security and human development in general.[229]

Resource scarcities, related vulnerabilities and adaptation measures

As mentioned above, in the late 2000s, Qatar was the only Gulf monarchy that did not suffer from domestic energy supply shortages.[230] It is also very unlikely that Qatar will suffer from domestic energy insecurity in the near future. Nevertheless, as in the case of the UAE, Qatar has major future challenges in the areas of water and food security.

Qatar has extremely scarce water resources which are vastly overexploited. It has some underground aquifers, but no lakes or rivers, and one of the world's lowest precipitation rates (20-150 mm/year).[231] Depending on the source, Qatar has from less than 100 to less than 200m^3 of natural water resources per capita per year, which is clearly below the water poverty line of 1000m^3 per capita and among the lowest in the Arab world.[232] Overexploitation of groundwater has been traced to as early as the late 1960s, caused by the increasing number of farms, which was in turn prompted by government investments in the sector.[233] In 2002, Qatar's water stress index was 157%, meaning that the country's renewable water reserves were exhausted and non-renewables were being exploited. In the late 2000s, depending on the source, the water abstraction rate was 4-6 times the natural groundwater recharge rate.[234] Desalination, which has been used since 1954, provides for practically all domestic water usage. Over half of all water used is either desalinated

[229] GSDP, *Second HDR*, p. 112.
[230] Even Saudi Arabia suffered from power disruptions. *The National* (29 June 2009a).
[231] GSDP, *Second HDR*, pp. 40-42.
[232] Lower estimate: Nimah, "Water Resources", p. 65. Higher estimate: GSDP, *Second HDR*, p. 39.
[233] Richer, *Conservation*, 9; GSDP, *Second HDR*, p., 49.
[234] M. A. Dawoud, et. al., "Using Renewable Energy Sources for Water Production in Arid Regions: GCC Countries Case Study" in A. M. O. Mohamed (ed.), *Arid Land Hydrogeology: In Search of a Solution to a Threatened Resource*, Vol. IV, DARE Series (London: Taylor & Francis, 2006), p. 121; Richer, *Conservation*, 6; FAO, *Aquastat*; GSDP, *Second HDR*, p. 44.

seawater or treated wastewater. From 1990 to 2010, Qatar raised its desalination capacity from 307,000 to around 1 million m^3/d (see also chapter 5.1.2).[235]

In a water scarce country, short term water security is a major priority. Around the mid-1990s, Qatar's total potable water storage was 1.1 million m^3, which equated to three days' supply.[236] In 2008, the GSDP estimated storage capacity at 2 million m^3, which it described as 'insufficient to provide full water security'.[237] In 2010, Kahramaa ordered a feasibility study for its Water Security Mega Reservoirs scheme, which envisages a linkage between two desalination plants and five reservoirs, with the aim of providing for one week's emergency supply, extendable to one month under rationing, sometime in the near future.[238]

In the long term, water security could also be compromised if capacity does not follow with demand growth. In the 1990s, water production grew by an average of 7% per year.[239] No time series for water consumption growth for the 2000s were available, but according to a British estimate, summer water consumption increased by 7% from 2008 to 2009.[240] In 2009, Kahramaa estimated that Qatar's water demand would rise by roughly 50% over the next decade.[241]

As a result of continued food self sufficiency policies agriculture is the major consumer of water: it consumes 74% of freshwater use while contributing only 1% to the GDP. By 2007, as a consequence of government incentives for farmers, the number of farms in Qatar had risen to over 1000 from 338 in 1975. Since water for irrigation is free and pumping costs are minimal, there are no saving incentives for the farmers.[242] Agriculture is not an important source of income in Qatar, even for the native population, as the around 16,000 people employed by the sector in 2007 were all non-citizens.[243]

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[235] Qatar also imports small amounts from Saudi Arabia. GSDP, *Second HDR*, pp. 40-42; IMF, *Qatar: Statistical Appendix*; Ali Saif Al Malki, Head of Water Networks at in Kahramaa quoted in: *Gulf News* (12 July 2010); World Bank, *A Water Sector Assessment Report on the Countries of the Cooperation Council of the Arab States of the Gulf*, Report No. 32539-MNA (Water, Environment, Social and Rural Development Department, MENA Region, 2005), p. 13.
[236] United Nations, *Qatar Country Profile*, p. 23.
[237] GSDP, *Second HDR*, p. 46.
[238] *MEED* (5-11 March. 2010).
[239] World Bank, *Water Sector Assessment*, p. 22.
[240] *Qatar Tribune* (29 June 2010). Citing a survey by Companies and Markets.
[241] *MEED* (5-11 March. 2010).
[242] Al Mulla, *Climate Change*, p. 16. In 1993, according to the UNEP, agriculture contributed 5.7% to the GDP. UNEP, *Land-Based Sources*, p. 47.
[243] EIU, *Qatar: Country Profile*, p. 17.

In addition to consuming huge quantities of groundwater, current agricultural patterns create a number of problems for water and food security, including soil salinisation, land degradation and saltwater intrusion into the remaining fossil water resources.[244] As a result of the overexploitation of groundwater, mainly by agriculture, salinity increased from 1971 to the mid-2000s by 67-100%.[245] Moreover, if temperatures rise, evapotranspiration and water demand for agriculture, and areas for grazing that rely on irrigation will increase, creating ever larger stress on water provision.[246] Possible agricultural expansion prompted by the new Qatar National Food Security Programme (see below) would further raise water demand by over a million cubic metres per day, which would have to 'inevitably be met through desalination'.[247] As a government report from 2002 aptly points out, Qatar's pursuit of food self-sufficiency 'should be balanced against the loss of strategic groundwater resources and other environmental impacts'.[248]

Another factor contributing to water consumption is pricing. According to a long-standing government policy, as noted above, Qataris do not pay for water and non-Qataris pay a subsidized price.[249] In the 1950s and 1960s, the government attempted to establish a pricing system in Doha for services, including water, but due to the poor economic situation of most Qataris at the time, and the belief that water is a gift from God, people refused to pay. Later on, as oil wealth began to accrue, the need to collect payments from the nationals receded.[250] The Second Human Development Report notes that 'there is little awareness of the extreme scarcity of potable water or of the substantial cost in producing desalinated water, and therefore no incentive to curb use'.[251] Among other reasons for the culture of wastage have been mentioned: lack of education of foreign servants who come from water rich countries, lack of educated personnel for efficient water management, and sparse, often only Arabic-language awareness campaigns.[252] As a consequence, Qatar has an extremely high per capita water consumption level, despite all potable water being desalinated: 419 l/d according to the FAO in 2007 and 675 l/d according to al-Mohannadi

[244] Richer, *Conservation*, pp. 6; 8; Al Mulla, *Climate Change*, p. 16; GSDP, *Second HDR*, p. 48.
[245] Gulf Research Center, *Green Gulf*, p. 52; United Nations, *Qatar Country Profile*, p. 23.
[246] In addition to plantations, golf courses also require larger amounts of water. Al Mulla, *Climate Change*, p. 16.
[247] 296 million gallons/d. *MEED* (5-11 March. 2010).
[248] United Nations, *Qatar Country Profile*, p. 24.
[249] QR4.4-5.2/m^3 as of 2005. GSDP, *Second HDR*, p.48.
[250] H. Al Mohannadi et al., "Residential Water Demand in Qatar, An Assessment", *Ambio*. 32 (2003), p. 364.
[251] United Nations, *Qatar Country Profile*, p. 24; GSDP, *Second HDR*, p. 48.
[252] Al Mohannadi et al., "Residential Water", p. 363.

in 2009.[253] Qatar's houses, villas and palaces consume astronomical amounts of water, ranging from 14,000 l/d for a house without a garden to 20-35,000 l/d for each of Qatar's 639 palaces in 2003.[254] Finally, losses from transmission and distribution are a major contributor to water consumption. In 2007, Kahramaa estimated that 45% of total water consumption was lost due to the 'corrosive soil, poor installation techniques and maintenance, and improper design'.[255]

The GSDP has aptly remarked that 'Qatar's water crisis is essentially a crisis of governance'.[256] Management has always focused on the supply side of water security, with large amounts invested in desalination.[257] Plans to formulate a management and development strategy with a vision to 2050 were initiated in the mid-2000s, but have not yielded results.[258] For a long time, Qatar's water strategy has consisted of using groundwater for agriculture and producing desalinated water for potable supply.[259] Treated sewage effluent is also used for forage crop irrigation and landscaping.[260] With subsidy cuts apparently ruled out, reducing the cost of desalination is seen by the Ministry of Environment as one of the main challenges.[261]

Demand side management has been the focus of many policy recommendations as early as in the 1990s,[262] and in 2003, al-Mohannadi recommended a tighter legislative framework and a tariff system, the income from which could be used towards renewable energy sources for the water industry.[263] The Second Human Development Report from 2009 boldly called for a revision of the subsidised water and electricity supply policy.[264] One of the few, half-hearted actions taken to address the issue has been law from 2008 banning the use of potable water for washing cars or cleaning public yards by a hose (see chapter 5.1.2).

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[253] Municipal water withdrawal. FAO, *Aquastat*; Hassan Ibrahim Al Mohannadi, deputy chairman of the Permanent Population Committee of Qatar cited in: *MENAFN* (19 March 2009). In 2002, the OECD countries' per capita consumption was 150-300 litres/day. OECD data from World Bank.
[254] Al Mohannadi et al., "Residential Water", p. 363.
[255] GSDP, *Second HDR*, p. 48.
[256] Ibid., p. 61.
[257] Al Mohannadi et al., "Residential Water", p. 364.
[258] Launched by the Permanent Water Resources Committee. *The Peninsula* (23 November 2006); GSDP, *Second HDR*, p. 55.
[259] United Nations, *Qatar Country Profile*, p. 23.
[260] GSDP, *Second HDR*, p. 43.
[261] *MENAFN* (28 April 2010).
[262] See e.g.: United Nations, *Qatar Country Profile*, p. 23.
[263] Al Mohannadi et al., "Residential Water", p. 366.
[264] GSDP, *Second HDR*, pp. 21; 61.

Use of recycled wastewater began in Qatar in as early as 1971: two large treatment plants account for most of the output, 290,000 m^3/d in 2005, and a third one is expected to increase the total capacity to 532,000 m^3/d by 2012.[265] While the share of recycled wastewater produced from potable water is currently proportionally higher than in Abu Dhabi, it is still only about one-third, due to losses through garden irrigation, car washing, leakages, and industries and suburbs that are not linked to the wastewater system.[266] Private sector participation in the wastewater sector, generally thought to increase efficiency, began in 2006.[267]

In the case of food security, despite aiming at self sufficiency, Qatar is extremely dependent on imports of several key staples: 98% of consumed wheat and rice, for example, are imported.[268] According to the second Human Development Report, Qatar imports 90% of its food, which may lead to 'severe supply problems in the future' if climate change advances, causing a decline in global agricultural production while the world's population continues to grow. Moreover, increases in domestic production are significantly limited by Qatar's small territory and restricted water supply options.[269] According to a Syrian research institute, in 2005, 5% of Qatar's land was arable. In 2008, a fifth of this was being cultivated.[270] Population growth will only increase Qatar's vulnerability in this area: according to some estimates, the value of the country's food imports could triple by 2020, from US$0.9bn in 2007 to US$3.3bn.[271]

In the 1990s, Qatar launched several projects to enhance its water security by importing water through pipelines from neighbouring countries, but all were eroded due to regional instability, domestic security concerns, and technical and economic considerations. Another option studied, without positive results, was the artificial recharging of groundwater aquifers.[272] With the 2007-2008 global food crisis, food security emerged as a

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[265] Ibid., p. 43.
[266] In Abu Dhabi, roughly a fifth of produced desalinated water is recycled. *UAE Interact* (22 March 2009); GSDP, *Second HDR*, p. 43. The share has decreased significantly during the past decade: according to the World Bank (*Water Sector Assessment*, p. 16) in 2000, 33% of potable was treated and 70% of treated wastewater was reused.
[267] *MEED* (5-11 March. 2010).
[268] Mahendra Shah, director of the QNFSP cited in: *Arabian Business* (2 June 2010).
[269] GSDP, *Second HDR*, p, 112. In the 1990s, Qatar produced 70% of its summer vegetables and 40% of winter vegetables. United Nations, *Qatar Country Profile*, p. 17.
[270] Summary in: Qatar National Food Security Programme, "Survey of arable land", [http://www.qnfsp.gov.qa/programme/agriculture/geographic%20summary/survey-and-arable-land]. Accessed on 15 January 2011.
[271] EIU, *Resources for the Future*, p. 16.
[272] GSDP, *Second HDR*, p. 55. For example, in the 1990s, Qatar and Iran negotiated over importing irrigation water from Iran's Karun river. United Nations, *Qatar Country Profile*, pp. 23-34.

new priority on the government agenda,[273] and Qatar became active, along with other Gulf monarchies, in the so-called foreign-farmland grab. In November 2008, Qatar signed a controversial land lease agreement for fruit and vegetable cultivation in an area of 40,000 hectares in Kenya, in exchange for a US$2.3bn loan for building a second deep-water port in Kenya for future imports to Qatar. The purchase attracted fierce criticism from local conservation groups, community leaders and international analysts, and it was accused of both threatening local ecological diversity, and being morally wrong, given that Kenya is a recipient of international food aid.[274]

In 2008, the Qatar Investment Authority established Hassad Food, an agricultural finance company with an initial capital of US$1bn and the aim of achieving national food security.[275] In August 2009, following international criticism directed mainly at Gulf food investors, labelling the late 2000s' land grab as neocolonialism, Hassad Food's chairman announced that the company would be investing in stakes in agricultural companies instead of land purchases; the company did not 'want to be in a situation where the rich are taking away food and land of the poor'. Two months later, however, the company proceeded to sign a US$100m deal to develop 8,000 ha of farmland in Sudan.[276] Hassad Food also has a presence in Australia and Mozambique and has announced plans to develop poultry farms and construct pilot greenhouses in Qatar. By late 2010, the company and its subsidiaries had completed a number of farm expansions and other projects in the country.[277] Qatar has also reportedly leased 100,000 ha of land in the Philippines and set up a US$1bn joint agriculture fund in Vietnam.[278]

Furthermore, in late 2009, the government launched the Qatar National Food Security Programme, under the Office of the Heir Apparent (Sheikh Tamim), tasked with the preparation of a comprehensive food security policy by 2012, which will include measures for both increasing domestic food production and securing import supplies. The programme includes a task force of 17 government entities which will focus on reducing import dependency through implementing solar desalination for agricultural purposes and

[273] Youssef Kamal, Qatar's finance minister cited in: *Financial Times* (19 November 2009).
[274] *The National* (5 June 2009); Braun and Meizen-Dick, *Land Grabbing*, p. 2.
[275] Hassad Food, "Strategic focus", [http://www.hassad.com/Aboutus/strategicfocus/tabid/67/Default.aspx]. Accessed on 14 August 2010. The company's chairman, as of 2010, was Nasser Mohamed Al Hajri, a senior Qatari banker.
[276] *Reuters* (11 August 2009).
[277] *Australian Financial Review* (8 March 2010); *QNA* (22 December 2009); *AMEinfo* (3 June 2009).
[278] Reports also include a rice deal with Cambodia and talks with the US, Brazil, Argentina and Turkey. *The Guardian* (2 December 2008); Braun and Meizen-Dick *Land Grabbing* (comprehensive table); *Reuters* (3 September 2008); EIU, *Country Report: Qatar, February 2010* (London: EIU, 2010), p. 12.

supporting arid land agriculture research.[279] As in the case of Abu Dhabi's Masdar City, technological limitations, however, are likely to be a significant barrier between plans and actual implementation, as large-scale solar desalination is currently far from feasible with the existing technologies.[280]

Despite negative impact scenarios of potential climate change-induced sea level rise, as of 2010, there was still no evidence of government adaptation plans or measures for safeguarding the country's coastal settlements and infrastructure.

Contribution to climate change and mitigation

Although Qatar's per capita CO_2 emissions (48.8 t in 2007) are the highest of the world, the country's total and historical contributions (0.19% and 0.06% in 2007) are very small on a global scale.[281] However, total emissions (55.6 Mt in 2007[282]) are growing fast as a consequence of the expansion of the hydrocarbons industry and economic and population growth, with the associated housing and energy requirements. While the World Resources Institute (WRI) presents the most complete and comparable data sets on Qatar's greenhouse emissions, recent local estimates, which are also possibly in this case more accurate, allow for a closer look at the sources of emissions.

Until the 1980s, Qatar's total CO_2 emissions were extremely modest. Between 1990 and 2005, due to huge expansions in energy production and economic and population growth, Qatar's GHG emission growth was the fourth fastest in the world, on average 8.5% per year, while the MENA and GCC averages were 4.0% and 5.0% per year, respectively.[283] Especially since the late 2000s, Qatar's high per capita emissions, which according to the WRI in 2007 were 50% higher than those of the UAE (ranking second), have been the source of much unwanted international attention and the impetus for defensive submissions of views to the UNFCCC (see chapter 5.3). In addition to the small population, outdated population statistics may be another factor bloating the figure.[284]

[279] QNFSP, "About us", [http://www.qnfsp.gov.qa/about-us/]. Accessed on 15 January 2011; *The Peninsula* (17 November 2009).
[280] See: GSDP, *Second HDR*, p. 56. Also: Conversations in Doha, 9 January 2011.
[281] World Resources Institute, *CAIT 8.0*. For a methodological note on emissions, see chapter 1.4.
[282] Ibid.
[283] Ibid.
[284] Nb. WRI data is based on estimates.

Qatar's first national effort at measuring its greenhouse gas emissions (1NC),[285] although finished in 2009, had not been published as of the end of 2010. Unpublished data from the inventory, however, reveals a significant increase in emissions between 2001 and 2006—the years for which data was compiled—and shows that most of Qatar's emissions originate from the hydrocarbons industry. Reflecting the fast growth and industrialisation, according to the inventory, Qatar's total GHG emissions rose by 147% between 2001 and 2006, while per capita emissions declined, due to the population increase, by around 89%. Notably, the figures are even higher than estimates by the WRI. Whereas in Abu Dhabi, ADNOC was estimated to produce over half of the total emissions (see chapter 4.3.1), based on Qatar's inventory, the oil and gas industry alone accounted for almost 70% (58.9% upstream, 10.6% downstream) of total GHG emissions in 2006.[286] Despite the absence of data for years 2007-2010, it can certainly be asserted that the doubling of the population from around 900,000 to 1.7 million, and the coming online of a number of LNG trains, brought about a record-high growth in Qatar's total emissions during this period.[287]

A rare snapshot of a small GCC state's energy consumption patterns, the inventory shows also the important impact of reducing gas flaring: despite a three-fold absolute growth in emissions from oil and gas operations between 2001 and 2006, both the amount and share of flaring dropped dramatically, from 18.1 Mt of CO_2e (44.6%) to 11.7 Mt (19.6%).[288] While a massive gas recovery project came online at al-Shaheen in the latter part of the 2000s, bringing considerable reductions in flaring (2.5 Mt/CO_2e/year), the gas industry kept expanding throughout the late 2000s, resulting, according to the World Bank, in only slight overall reductions.[289] In 2009, Qatar was the first GCC state to join the World Bank's Global Gas Flaring Reduction Partnership, established in 2002, with a national aim of achieving zero flaring by 2010—which obviously was not achieved.[290]

Qatar's most important mitigation project to date has been the al-Shaheen flaring gas recovery project with Danish Maersk Oil. The project was registered as a UN Clean Development Mechanism project in 2007, and its annual GHG reductions would have been

[285] First national communication for the UNFCCC.
[286] Total GHG emissions: 40.6 Mt (2001), 59.8 Mt (2006). Per capita GHG emissions: 67.7 t (2001), 59.8 t (2006). Al Mulla, *Climate Change*, pp. 8-12.
[287] E.g.: GSDP, *Second HDR*, p. 105. Trains: US EIA, *Qatar: Country Analysis Brief* (US EIA: January 2011). Note: The 2011 version is referred to in only this paragraph; 2009 version is used elsewhere.
[288] Al Mulla, *Climate Change*, pp. 9-11.
[289] World Bank Global Gas Flaring Reduction, "Estimated Flared Volumes from Satellite Data, 2005-2009", [http://go.worldbank.org/G2OAW2DKZ0]. Accessed on 26 February 2011.
[290] *The News Flare*, No. 8 (2009), p. 3; GSDP, *Second HDR*, p. 118.

worth US$41m at 2009 prices, had Qatar sold them.[291] In 2010, the Ras Laffan Industrial City initiated a US$1bn project to minimise gas flaring at LNG berths.[292] In the latter part of the 2000s, a number of other initiatives emerged in the areas of clean tech and renewables R&D and investments, which came to characterise climate change-related efforts in Qatar in this period. Most of these were linked to the Qatar Science and Technology Park (QSTP) under the Qatar Foundation, which will be discussed below. Recently implemented small-scale solar projects have included street lights for a waste management facility in Ras Laffan and bus shelters on Doha's Corniche.[293] In early 2010 there were press reports of a mystical US$1bn solar power plant, envisaged by 'around 25 local and international investors'. By the end of 2010, however, reports of the project had not reappeared.[294]

In addition, there were some announcements of high-level cooperation: in 2007, Qatar, similarly to the UAE and Kuwait, pledged US$150m to the Saudi-initiated OPEC clean tech fund. In 2008, the Qatar Investment Authority invested £150m in a £250m joint clean energy and technology fund with the British government.[295] In 2010, the energy ministries of Qatar and the United States signed an MoU on technology cooperation in renewable and alternative energies.[296]

In the area of sustainable building, local developers Barwa and Diar developed a set of green building norms which they pledged to implement as of late 2009.[297] Also, as of 2010, Qatar Cool provided district cooling for 47 residential and commercial towers in the West Bay area of Doha, and the company will ultimately provide cooling for the entire Pearl island development.[298] In addition to the large-scale solar desalination ambitions of the QNFSP under Sheikh Tamim, Qatar's winning bid for the 2022 FIFA World Cup includes 12 futuristic outdoor stadiums, which will have solar panels and the 'world's first' carbon neutral cooling system.[299] On the downside, even if the country's new construction and megaprojects will be green or sustainable by any criteria, they will still require large

[291] J. Fenhann, "CDM pipeline", updated on 1 December 2010, as of which QP had not issued any credits.
[292] *Gulf Times* (19 September 2010).
[293] *The National* (15 April 2010).
[294] E.g.: *Saudi Gazette* (7 January 2010).
[295] OPEC, Statement to COP-13; *Carbon Trust*, Press release (2 November 2008).
[296] *Gulf Times* (26 February 2010).
[297] *Gulf Times* (18 November 2009).
[298] Qatar Cool, "Our customers", [http://www.qatarcool.com/ourcustomers.php]. Accessed on 17 January 2011.
[299] *The National* (29 April 2010).

amounts of energy and resources to construct, also emitting large amounts of CO_2 in the construction phase.

Qatar has no official climate policy, but as mentioned above, the National Vision 2030 document contains three related aspirational aims.[300] As the Second Human Development Report's topic choices indicate, the GSDP regards water security and climate change mitigation and adaptation, in addition to the marine environment, as priority areas for Qatar's sustainability policies. The report also lists a number of actions as Qatar's responses to climate change, including: the Qatar National Vision 2030; investments by the Qatar Science and Technology Park and the Qatar National Research Fund; participation in the Kyoto Clean Development Mechanism; the national committee for climate change; participation in OPEC's clean tech fund; education; and air quality and emissions monitoring actions.[301] The report urgently calls for an integrated and 'viable national policy' that aims at managing emissions, transition risks and climate change vulnerabilities.[302] Al-Mulla, in turn, argues that Qatar's CO_2 emissions could be significantly reduced without compromising economic growth, especially in the oil and gas, energy use and transportation sectors, through energy conservation, efficiency and 'adjust[ing] the value structure of the society'. Both al-Mulla and the GSDP point out that implementation of mitigation measures will need coordination by relevant government institutions and cooperation among multiple stakeholders.[303]

Whereas beginning from around 2007, the leaderships in Abu Dhabi, and also to some extent in Dubai, felt the need to address the high domestic natural resource consumption and greenhouse gas emissions (both due to the increasing domestic energy insecurity and environmental degradation and image considerations), top elite in Qatar did not share this sentiment. Firstly, there was no high-level elite member available to take up this niche of patronage, in other words, there were no elite members with a clear environment-related vision. Moreover, neither were there other important domestic actors with a vested interest in a 'greener' image (such as those involved in Masdar in Abu Dhabi), nor had there emerged a sufficient number of domestic projects in the area of alternative energies and technologies, to have transformed alternative energies, environmental sustainability or climate change mitigation into a 'national interest'. As a consequence, there was no pressure to draft a domestic climate change strategy, or even announce a renewable energy

[300] GSDP, *Qatar National Vision 2030,* p. 33.
[301] Ibid., *Second HDR*, p. 116.
[302] Ibid., pp. 1; 119; 121-123.
[303] Al Mulla, *Climate Change*, pp. 12-14; GSDP, *Second HDR*, p. 121; 124.

target. Owing to Qatar's robust domestic energy security situation, there was no urgent need for nuclear energy or other alternatives either.

In general, natural gas has been the 'perfect excuse' for Qatar: not only does it provide domestic energy security, but it has also allowed the elite to evade accusations regarding the high per capita greenhouse gas emissions. The fact that natural gas is the cleanest fossil fuel, and that most of Qatar's emissions come from the export industry, formed the core of Qatar's external climate policy, led by the Ministry of Energy and Industry, as will be shown in chapter 6.3.

Despite the strong position of al-Attiyah's Ministry, the future leadership of Qatar's climate governance was still wide open as of the end of 2010. While al-Attiyah was active in promoting natural gas, clean fossil fuel technologies, and even renewables and energy efficiency,[304] Sheikh Tamim and his food security programme might still emerge as the domestic pioneer in renewables. Another possibility is that Sheikha Mozah's Qatar Foundation, through its R&D-driven approach, will spur a gradual but in many ways more sustainable response to the challenges of the newly emerging global energy paradigm.

5.3.2 Case study: the Qatar Science and Technology Park

Due to its centrality in Qatar's climate change-response of the late 2000s, the focus of this subchapter is on the Qatar Science and Technology Park (QSTP) and its projects. The chapter shows how the Park and its mother institution, the Qatar Foundation, generated the most advanced early efforts at enhancing Qatar's capabilities and actions in the areas of alternative energy, environmental sustainability and climate change. Situated directly under the patronage of Sheikha Mozah, these projects were carefully designed so as to not step too intrusively into energy minister al-Attiyah's sphere of power. With their heavy focus on building domestic expertise and technology know-how, the projects are a direct reflection of the Foundation's broader goal of building a knowledge-based society. Taking the slow road might turn out to be more sustainable than buying existing technology and models of implementation. The big question, however, remains whether this is still too slow.

[304] See e.g.: *Doha Carbon and Energy Forum*, Press releases (8 and 10 November 2010).

Qatar Foundation and QSTP

Established in 1995, post-coup, by Emir Sheikh Hamad bin Khalifa, the Qatar Foundation for Education, Science and Community Development is officially characterised as 'a vehicle to convert the country's current, but temporary, mineral wealth into durable human capital'.[305] Kamrava describes the Foundation as 'by far the most comprehensive and ambitious of… government-controlled NGOs', through which both the state-society links are strengthened and the power of the Emir is consolidated. Institutions like the Qatar Foundation, according to Kamrava, also function, by the help of their 'deliberately vague' status, as 'penetrative arms of the state [in] typically potential centres for the formulation of anti-state anger',[306] such as academia.

Sheikha Mozah bint Nasser has been Qatar Foundation's chairperson since its establishment.[307] The vice chairperson, Saif Ali al-Hajari is also the chairman of the Friends of the Environment Centre. Due to Sheikha Mozah's patronage, Qatar Foundation's resources have been described as 'seemingly limitless'.[308] By 2010, the Foundation comprised over 30 member organisations in the areas of education, science and research, community development, and business joint ventures. These included institutions as varied as a riding academy, a children's channel, a solar technology venture, a national research fund, and a faculty of Islamic studies.[309] The Foundation has also b(r)ought to Qatar branch faculties of well-known American universities that offer scholarship-sponsored degree programmes for both Qataris and non-Qataris.[310] Facilities for the universities are free of charge and operational costs are fully covered by the Foundation.[311] Most of the Foundation's member institutions are located in the Education City, inaugurated in 2002, which comprises a 14 km^2 campus on the outskirts of Doha and is dotted with architectural masterpieces by world-famous architects.

Knowledge-economy building is at the core of the Qatar Foundation's activities. Since around 2007, there were plans to establish three specialized, multidisciplinary research institutes that would be both managed and staffed by the Foundation. The QF Research Division, set up in 2007, selected three fields in which research should be focused: health,

[305] Qatar Foundation, [http://www.qf.org.qa/]. Accessed on 27 August 2010.
[306] Kamrava, "Royal Factionalism", pp. 407; 415.
[307] Kéchichian, *Power and Succession*, p. 217.
[308] Kamrava, "Royal Factionalism", p. 407.
[309] Qatar Foundation, [http://www.qf.org.qa/]. Accessed on 27 August 2010.
[310] Virginia Commonwealth (since 1998), Weill Cornell Medical College (2002), Texas A&M (2003), Carnegie Mellon (2004), Georgetown School of Foreign Service (2005), and Northwestern University (2008). Ibid.
[311] See e.g.: *Virginia Commonwealth University*, Press release (25 June 2002).

computing, and energy and the environment. According to the plan, the Qatar Environment and Energy Research Institute, the most important of the three, would complement the work of oil companies' R&D centres at the Qatar Science and Technology Park and research by Texas A&M. The institute's niche area would hence be to investigate commercially promising energy technologies, with an eye to constructing a pilot plant, and to conduct research on climate change-inducing and otherwise harmful contaminants. Attention would also be paid to the handling of chemicals and waste disposal in Qatar, described by the Research Division's annual report 2009 as 'not at an international standard'.[312] According to press statements from late 2010, the institute would start its work in January 2011 with three top US scientists as partners.[313]

The Qatar Science and Technology Park: energy and sustainability developments

Technology development is another key area of the Foundation. Qatar Science and Technology Park (QSTP), the Education City's R&D-oriented business incubator, was initiated in 2002 by Sheikha Mozah and inaugurated in March 2009.[314] Its aim is to advance the commercialisation of the City's innovations and further Qatar's economic diversification, create jobs, build up local knowledge industries and help build Qatar's 'post-carbon economy'. This is done by seeking to attract foreign research institutions and companies to establish a presence or a joint venture in Education City where they can interact with and take advantage of the foreign universities and related human resources present on campus.[315] The Park concentrates on the same three fields as the above mentioned younger research institutes: health sciences, ICT technology, and energy and environment. Of these, energy is the largest area in terms of funding. Research endeavours in this field are divided into two clusters: hydrocarbons, and alternative energy, mainly solar.[316]

The QSTP is a free zone that allows for 100% foreign ownership of companies, but no land ownership. Companies are allowed to lease their premises, currently for a period of 1-20 years. The QSTP itself does not engage in research, but offers the facilities, services, and

[312] Qatar Foundation Research Division, *Annual Report 2008/9* (Doha: Qatar Foundation, 2010). pp. 22-23.
[313] Abdelali Haoudi, Qatar Foundation's vice president for research quoted in: *Gulf Times* (11 November 2010).
[314] *QSTP*, Press release (22 February 2009).
[315] Qatar Foundation, [http://www.qf.org.qa]. Accessed on 27 August 2010; Qatar Science and Technology Park, "Press pack", (undated), [http://www.qstp.org.qa/files/pdf/QSTPPressPack.pdf] Accessed on 31 August 2010.
[316] T. Maini, speech "Qatar's Investment in Research & Development for the Post-Carbon Era" in the *All Energy Conference*, Aberdeen, 20 May 2009.

networking and commercialisation support.[317] By 2009, according to a press release, over US$800m had been committed to the Park: US$600m by the Qatar Foundation and the rest by partner companies.[318] In 2010, the QSTP listed on its website 27 member companies, and the announced aim was to raise the number to 50 by 2012.[319] The QSTP's executive chairman, Tidu Maini, is an Indian-born businessman and academic who served as the Imperial College's pro rector for public and corporate affairs from 2002 until 2007 when he was recruited by Sheikha Mozah. Maini is also Sheikha Mozah's technology and science advisor.[320]

During the late 2000s, the QSTP quickly grew into Qatar's (small) centre of gravity in the areas of technology development of carbon capture and storage (CCS) technologies, energy efficiency, alternative energy and technologies, and sustainable building standards. In the area of solar energy the Park is already involved in research in both ends of the value chain: through its polysilicon project and through its solar technologies testing programme.[321]

In June 2008, QSTP, Qatar Petroleum, Shell and Imperial College announced a 10-year joint research collaboration that will study carbonate reservoirs and CCS technologies in Qatar. The US$70m project, carried out by Qatar Carbonates and the Carbon Storage Research Centre at Imperial College London, is jointly funded by QP and Shell, with 'support from the QSTP'. As part of the agreement, the Faculty of Engineering of the Imperial College has recruited new academic staff, including 20 PhD students and 20 post-doctoral researchers, some of whom are Qataris. The aims of the project are to build Qatari engineering capacity in the areas of enhanced oil recovery and CCS.[322] Still at its early stages in late 2010, no date for carbon injection demonstration projects had been confirmed, according to an expert at the Centre, but a decision on a start-up date was 'imminent'.[323]

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[317] Interview with Dr Eulian Roberts, CEO, Qatar Science and Technology Park, Doha, November 2010; Qatar Science and Technology Park, "Introduction to QSTP". 17 June 2010.
[318] *QSTP*, (22 February 2009); Qatar Science and Technology Park, "Press pack".
[319] Qatar Science and Technology Park, "Current members", [http://www.qstp.org.qa/output/page54.asp] Accessed on 2 September 2010; Qatar Science and Technology Park, "Press pack".
[320] *Imperial College*, Press release (18 September 2001); Qatar Science and Technology Park: "Bio: Dr. Tidu Maini",[http://www.qstp.org.qa/files/pdf/Bio-TM-Mar08.pdf]. Accessed on 29 August 2010.
[321] Maini, "Qatar's Investment".
[322] *Imperial College*, Press release (9 June 2008); Quote from: Imperial College, "Qatar Carbonates and Carbon Storage Research Centre", [http://www3.imperial.ac.uk/qatarcarbonatesandcarbonstorage]. Accessed on 30 August 2010.
[323] Correspondence with Dr Iain MacDonald, programme manager, Qatar Carbonates and Carbon Storage Research Centre, August 2010 and January 2011.

Energy efficiency is another field where expertise is developed. Chevron Qatar Energy Technology, an affiliate of Chevron Corporation, announced in February 2009 that it would establish the Centre for Sustainable Energy Efficiency at the QSTP. The centre would focus on solar power, lighting, and cooling technologies designed for the local climate. Capacity building for Qataris and cooperation with local authorities, property developers and architects are also among the aims of the centre. The centre was expected to open in late 2010, and plans were to invest total US$20m over a period of five years.[324]

In March 2009, to mark the inauguration of the Park, the QSTP and GreenGulf, a Qatari-Saudi company led by CEO Omran al-Kuwari, launched an experimental facility to study solar-to-electricity conversion methods in Qatar. In its first phase, the project will test the performance of different solar technologies in Qatar with total systems installed at approximately 500 kW. The plant will eventually supply the rather small amount of electricity it produces to some of the QSTP's buildings.[325] In April 2010, GreenGulf and Chevron announced they would carry on the project jointly. The construction of a 35,000m^2 test site was expected to begin in late 2011. Under the joint study agreement, both sides will invest up to US$10m in the project over a period of 2-4 years. Also, the company developed jointly with Abu Dhabi-based Environmena a 700 kW rooftop PV system for Qatar's National Convention Centre, expected to go online in 2011.[326]

In March 2010, the QF and the German SolarWorld established Qatar Solar Technologies, a joint venture that will convert natural gas into polysilicon, which can be used as material for solar panels. The company is 70% owned by the QF, 29% by SolarWorld and 1% by Qatar National Bank. The initial investment was valued at US$500m, which is clearly the largest investment in renewable energy technologies in Qatar's history. The first part of the venture will see the construction of a polysilicon plant in Ras Laffan, expected to begin in 2011. The plant is the first in its kind in the Middle East and will have a capacity of 4,000 tonnes/year, which is large for a start-up company. The venture is also expected to create 300 new jobs. According to the company's representatives, the strengths of the endeavour include a strong international demand for the product, domestic availability of cheap electricity and Qatar's location between the growing markets in Asia and Europe. In the

[324] *Chevron*, Press release (17 February 2009).
[325] *GreenGulf*, Press release (18 March 2009).
[326] Also, in April 2010, GreenGulf, the German SolarWorld and Qatar Solar Technologies launched a project consisting of installing solar panels in four Qatari schools. *QSTP*, Press Release (25 April 2010); *GreenGulf*, Press release (24 April 2010); correspondence with Omran Al Kuwari, CEO, GreenGulf, February 2011.

absence of domestic demand, however, the factory's output will be sold outside Qatar, mainly to Germany.[327]

Smaller-scale alternative energy projects within the QSTP framework have included a feasibility study for producing aviation fuel from algae. In 2009, QSTP was also assisting two academic institutions in research on the solar-cracking of methane for hydrogen generation.[328]

Sustainable or green building is another area covered by the Park's activities. By 2010, there were two QSTP members working in the sector: TCE Consulting Engineers, and the Barwa and Qatari Diar Research Institute. The former, part of the Indian TATA Group, announced in 2008 it would invest US$12m in developing integrated software for sustainable buildings and a blueprint for a solar thermal power station over a period of five years. The company's small research facility was planned to have a staff of 14.[329]

The Barwa and Qatari Diar Research Institute (BQDRI) was established in June 2009 as part of Barwa Knowledge, the corporate social responsibility platform of Barwa Real Estate Company, together with the QIA-owned Qatari Diar Real Estate Investment Company. The research institute, lead by a former Barwa executive, Yousef al-Horr, engages in research and education and training for the construction industry. In April 2009, the two developers, together with the American TC Chan Centre for Building Simulation and Energy Studies, launched the Qatar Sustainable Assessment System (QSAS), a performance-based sustainability rating system devised for Qatar's climatic and other conditions. The system prioritises energy and water consumption, as well as cultural and economic value considerations, and awards local building materials and architecture inspired by Qatari heritage. In addition to administering the QSAS, BQDRI engages in a range of sustainable building-related research topics and consulting and training services, and was in 2010 also planning to work on a Regional Sustainability Assessment System for GCC and the Middle East. As an innovative approach, the BQDRI was planning to include incentives for projects in Lusail City in the form of increased land allocations in relation to the number of stars they receive. However, as of late 2010, the institute was still only

[327] Longer-term plans also included the establishment by Qatar Solar Technologies of a research centre at the QSTP. Interview with Craig Field, Corporate Communications Specialist and Narasimha Raghavan, Director of Business Development, Qatar Solar Technologies, Doha, November 2010.
[328] In 2009, chairman Maini signalled that the Park was interested in expanding into the area of 3rd generation biofuel technologies, in which algae are included. Maini, "Qatar's Investment".
[329] QSTP, Press release (7 October 2008).

'working with the carrot', and an eventual incorporation of the QSAS in the local construction code was still mostly based on anticipation and hearsay, although a committee for this purpose had been mandated by prime minister Hamad bin Jassim.[330]

Unlike Abu Dhabi's Estidama, which is an adaptation of the American LEED system, QSAS is a result of extensive international benchmarking. The new system was well received by not only the two founding developers, but also by other Qatari institutions. In November 2009, Barwa and Qatari Diar announced they would apply QSAS to all new projects.[331] Lusail City, developed by a Qatari Diar subsidiary, will be the first development to apply QSAS.[332] The 128 apartment buildings of the Barwa City development in Doha will also receive a QSAS rating. In May 2010, the Public Works Authority Ashghal made a similar announcement regarding its public building projects. The same year, BQDRI signed an MoU with Kahramaa on 'the provision of measures to create a sustainable built environment'.[333]

In 2010, sustainability-focused QSTP member companies also included the environmental consulting company AES International Consultants and four major energy giants: ConocoPhillips, ExxonMobil, Shell and Qatar Petroleum. AES International Consultants will study development and environmental models suitable for Qatar and provide training, education and consulting services for private and public entities in the country. ConocoPhillips is establishing its Water Sustainability Centre that will concentrate on industrial and municipal water sustainability, particularly methods for treatment of water from oil production and refining.[334] ExxonMobil Research Center Qatar, the company's only research facility outside the US, was announced already in 2004, with a planned investment of US$20-25m over its first five years. In 2010, this investment was increased to US$60m by 2014. The centre concentrates on LNG technologies, sustainable water management of the industrial processes, and carbonate reservoirs. In 2008, Shell opened its Research and Technology Centre and, has announced spending plans of up to US$100m through to 2018. Projects include two joint endeavours on synthetic jet fuel for aviation with a consortium of partners. Qatar Petroleum's Research & Technology Centre, with a

[330] *QSTP*, Press release (17 June 2009); *Construction Week Online* (10 April 2009); interview with Yousef Al Horr, November 2010.
[331] Ibid.; *Gulf Times*, (18 November 2009).
[332] The Diar subsidiary involved in the BQDRI is the Lusail Real Estate Development Company. BQDRI, *Lusail; QSAS Fact Sheet*, [http://www.bqdri.org/doc/QSAS%20Lusail%20fact%20sheet.pdf]. June 2010. Energy City, part of the Lusail City development, however, will apparently be built according to LEED standards.
[333] *BQDRI*, Press releases (16 March 2010; 27 May 2010; 30 May 2010).
[334] Qatar Science and Technology Park, "Current members".

budget of US$75m over its first five years, works mainly in the area of upstream oil and gas operations, but the environmental impact of energy industries, energy efficiency, impact of climate change, and implementation of the Kyoto Protocol are also on the centre's agenda.[335]

In addition to those linked to the QSTP, there are a number of sustainability-related developments under the Qatar Foundation, including a university-based research institute, research partnerships with domestic and foreign institutions, and a number of construction projects seeking sustainable building certification under the US LEED rating system. In 2003, when Texas A&M University Qatar opened in Education City, the university established a Sustainable Energy Research Laboratory, which has been studying, among other things, the use of solar power for the production of hydrogen.[336] Sheikh Tamim's food security programme (QNFSP) is also conducting research on solar and water technologies with Qatar Foundation, QSTP, Qatar University, and Texas A&M.[337] A partnership between King Abdullah University of Science and Technology and QF was announced in 2010. The aim is to form a mutually complementary regional hub in scientific and research activities, including in the areas of environment and energy.[338] In 2010-2011, Qatar Foundation is starting a recycling scheme for all its buildings. A total of 800 tri-bins will be installed, and training for focal points and cleaning staff at each centre will be undertaken. Reprocessing of the waste was still under negotiation as of spring 2010. In 2010, there were also a number of smaller sustainability campaigns and projects taking place at the residence halls of Education City.[339] Headway was made into state-level cooperation when the US Department of Energy signed an MoU with QSTP in February 2010 on co-developing projects in the areas of energy efficiency, carbon capture and storage and solar technologies.[340]

Sustainable building developments with links to the Qatar Foundation include a number of buildings at Education City and QF subsidiary Dohaland's Musheireb 'revitalisation' project. There are reports of a QF board declaration from as early as 2004-2005 to seek LEED certification for all buildings at Education City.[341] Some steps in this direction were

[335] Maini, "Qatar's Investment"; *QSTP*, Press releases (31 May 2004; 2 April 2008; 11 April 2010).
[336] Texas A&M Mechanical Engineering Research, "Research Laboratories", [http://meen.qatar.tamu.edu/research/2233.aspx]. Accessed on 30 August 2010.
[337] *The Foundation*, Issue 16 (2010), p. 5.
[338] *Qatar Researcher*, Issue 2 (2010), p. 3.
[339] *Qatar Foundation Telegraph* (25 March 2010), pp. 1-2; 4.
[340] *Gulf Times* (26 February 2010).
[341] *MEED* (18 September 2009).

taken since the late 2000s: a residence hall complex, expected to be finished in 2011, is seeking platinum certification with features such as zero waste, motion-sensitive lighting, solar panels and grey water filtration.[342] Also, the Qatar National Convention Centre, designed by the world-famous Japanese architect Arata Isozaki, located in the Education City, is aiming at LEED gold certification. The US$1.2bn centre is expected to open in 2011 and its rooftop solar panels will produce 12.5% of the building's energy requirements.[343] The Musheireb project, announced in 2009 and to be completed in 2016, with a price tag of US$5.5bn and an extension of 35 hectares with 226 buildings, will also seek LEED gold certification. The project includes an underground section, with pedestrian areas planned to reduce car use.[344]

The QSTP's functions

Official press material and speeches spell out the Qatar Science and Technology Park's role and function in the Qatar Foundation's grand strategy and, more widely in the Qatari economy. In the words of chairman Maini, in relation to the wider objectives of the Qatar Foundation, while 'Qatar is seizing an extraordinary opportunity by laying a foundation of an ambitious educational and research program to become a world leader in specific technologies', QSTP is an 'engine for accelerating our research' that will focus on 'areas of national priority and where we have value to add to the effort'.[345] The Park's press material declares:

> Qatar Science & Technology Park's purpose is to help build Qatar's 'post-carbon economy'. It does this by attracting companies and institutes from around the world to develop and commercialise their technology in Qatar. […] QSTP aims to be a recognised international hub for research, innovation and entrepreneurship.[346]

Despite the obvious differences between the QSTP and Abu Dhabi's Masdar Initiative, these two make for an interesting comparison. Differences are evident at least in the level of funding, breadth of activities, scope of investments, speed of implementation and importance given to R&D. While the QSTP focuses on a number of sectors, instead of one, the Park's scale and dimensions are clearly smaller, with US$600m committed to the Park by the Qatar Foundation by 2009. Masdar, in turn, by mid-2009 had already invested US$3bn in alternative energy and sustainability projects both domestically and abroad.[347] The QSTP's focus is heavily on small-scale, bottom-up technology and knowledge

[342] *The National* (15 April 2010).
[343] *Gulf Times* (9 September 2009).
[344] *Construction Week Online* (25 May 2009).
[345] Maini, "Qatar's Investment".
[346] Qatar Science and Technology Park, "Press pack".
[347] *Arabian Business* (9 June 2009).

transfer: projects concentrate on research and development (or 'technology development'[348]) and these are undertaken by institutions and other joint ventures that have a presence on the Park's premises. Masdar is aiming at working with a more diverse combination of subsectors, technologies and projects, including clean tech funds and foreign investments, a domestic PV industry and different types of solar energy plants and installations, carbon capture and storage and CDM projects, hydrogen energy applications, real estate and research. While Qatar's strategic decision has been to not move quickly into pilot projects and large-scale implementation, Abu Dhabi's Masdar has lost no time, even despite the 2008 financial crisis. QSTP's pilot projects, like GreenGulf's 500kW solar testing site and the Shell carbonate reservoirs project, are still relatively smaller and at very early stages compared to those in Abu Dhabi, such as the 10MW PV plant and the CCS pilot project with ADNOC.[349] Moreover, as a final differentiator, due to their distinct business models and foci, the QSTP and Masdar do not directly compete with each other at the level of technologies or business niches.[350]

The importance that QSTP gives to R&D and 'domestic' innovation is the clearest difference between it and Abu Dhabi's Masdar. According to Qatar-based stakeholders' views, the 'content of the work' is much more important for QSTP than Masdar and that the former has taken the best, while the latter 'accepts anyone'.[351] The Park's nearly 27 member institutions are a testament to a consistent and hitherto successful strategy of seeking to attract foreign technological expertise to Qatar, and to the fact that as part of the Qatar Foundation the QSTP is, above all, aimed at knowledge-economy building. Meanwhile, in 2008-2010, despite enormous media attention, Masdar struggled to sign deals with tenants.

On a more detailed level, the QSTP has so far had a clearly heavier focus on alternative energy R&D than on its commercialisation, which, according to the company's representatives, in the case of solar energy, is an indication of a premeditated strategy 'not to rush in', ordered by minister al-Attiyah.[352] The carbonate research project with the Imperial College follows a similar logic of starting with increasing the amount of context-specific knowledge and research before proceeding to implementation. Another aspect of

[348] Term used by the QSTP. Interview with Eulian Roberts, November 2010.
[349] However, *if* plans hold, many QSTP projects will enter implementation stage in the first half of the 2010s.
[350] Interview with Qatar-based renewable energy experts, November 2010.
[351] Interviews in November 2010 with Qatar-based technology expert; Qatar-based renewable energy experts.
[352] *Gulf Times*, (26 April 2010).

QSTP's approach is its emphasis on entrepreneurship.[353] Qatarisation is also included in the objectives: although there is no numerical target, according to CEO Roberts, building capacity and employment for educated Qataris is an important aspect.[354]

In a broader social context, the QSTP's investments in alternative energy and technologies, according to Maini, serve multiple additional purposes in addition to their technology objectives, namely: domestic energy security, energy efficiency, and climate change mitigation. Having internalised Qatar's official position regarding international attention on the country's high per capita emissions and Qatar's responsibility for its emissions, Maini has assured that, although not agreeing with the emissions accounting criteria, Qatar is 'looking very seriously at clean energy'.[355] Among the QSTP member companies, however, there are different voices; for example, GreenGulf's CEO al-Kuwari has argued for the importance of establishing 'a strong body of renewable energy resources' in Qatar as part of both becoming 'a knowledge centre for solar technology and renewable energies' and reducing the high emissions.[356] In general, however, environmental considerations, including climate change, are not (portrayed as) the primus motor of QSTP's alternative energy and environmental projects, and they receive a clearly narrower role in the official discourse. Abstract expressions, such as 'meet[ing] the challenges of climate change' have been mentioned by the executives only in connection with the solar panel testing project.[357]

On a strategic level, a number of QSTP-related energy and sustainability projects are declared to be responses to the National Vision 2030 document. Examples include the Carbonates and Carbon Storage Research Centre ('the importance of [the centre's work] for the State of Qatar is acknowledged in the Qatar National Vision 2030 report Advancing Sustainable Development'[358]) and the BQDRI ('sustainable development is one of the key principles stated in Qatar National Vision 2030 […] As two of the largest real estate conglomerates, BARWA and Qatari Diar are entrusted with realizing Qatar's vision for a

[353] The model is based according to QSTP's chief executive Eulian Roberts, 'not only on technical talent, but also on business talent'. *SciDevNet* (14 March 2007).
[354] Interview with Eulian Roberts, November 2010. Establishment of technology companies by nationals is encouraged through funding and in cooperation with the Ministry of Business and Trade. Tidu Maini quoted in: *Qatar Today* (10 March 2009).
[355] Maini, "Qatar's Investment". Also the Second HDR presents a case for consumption-based carbon accounting instead of a production-based one in the framework of the UNFCCC. GSDP, *Second HDR*, p. 110.
[356] Omran al-Kuwari quoted in: *GreenGulf* (24 April 2010).
[357] Tidu Maini quoted in: *Gulf Times* (15 October 2009).
[358] Imperial College, "Qatar Carbonates and Carbon Storage Research Centre".

beautifully built environment, high indoor environmental quality, new sustainable communities…'[359]).

Establishing and maintaining patronage, and through this, legitimacy, are important elements in the discourse of QSTP and its member institutions. The solar energy trials' launching press release attributed the project's patronage to Sheikha Mozah.[360] In a speech given by BQDRI director Yousef al-Horr on the QSAS at an award-giving ceremony for sustainable development initiatives, in turn gave credit to Emir Hamad.[361]

'Intra-elite legitimacy-building' is another dimension of patronage-attribution employed, as exemplified by a speech by energy minister al-Attiyah at the signing of the 10-year agreement between Qatar, Imperial College and partners. In the speech he commended both the 'wise directives' of Emir Sheikh Hamad and Sheikha Mozah for being 'a driving force in Qatar's quest for excellence education and scientific research'.[362]

Yet another form of legitimacy-building is the justification of contemporary sustainability programmes with a neotraditional environmentalist discourse that imitates an imagined premodern, Bedouin-inspired environmentalism, identically to the UAE's Sheikh Zayed. Sheikha Mozah is quoted to have said on the Musheireb project:

> Reflecting on our history, it is clear that communities in Qatar have always been close knit. People lived and worked together in harmony with the climate, with the land and with each other. We had our own ways of dealing with our environment which was sustainable and human in scale, often building our homes together as a family. These unique achievements have nurtured our society and made us strong, and they should be treasured. This inspires everything we do at [Dohaland] as reflected in our first project, Musheireb.[363]

While as of 2010, the QSTP had clearly taken the vanguard position in climate change-related sustainability efforts in Qatar, it was still an isolated example, somewhat reminiscent of Hertog's 'island of efficiency',[364] and its economy-wide impacts can therefore be expected to stay limited as long as climate change and sustainability remain without attention from high-level ruling family members, and therefore in the margins of government's agenda. For both economic diversification and domestic energy security, the

[359] BQDRI, "Barwa & Qatar Diar Research Institute (BQDRI)" Press kit [http://www.bqdri.org/index.php?page=press-kit]. Accessed on 6 September 2010.
[360] *GreenGulf*, (18 March 2009).
[361] Yousef Al Horr's speech quoted in: *BQDRI*, Press release (18 November 2009).
[362] *Imperial College* (9 June 2008).
[363] Musheireb, "Her Highness message", [http://musheireb.dohaland.com/]. Accessed on 6 September 2010.
[364] S. Hertog, *Princes, Brokers, and Bureaucrats: Oil and the State in Saudi Arabia* (New York: Cornell University Press, 2010), e.g. p. 56.

Park's role and significance will arguably remain marginal, at least for the foreseeable future. An important contribution to Qatar or region-specific knowledge can be expected in the mid-term from the QSTP's member institutions through work in energy efficiency and CCS-related knowledge and possibly, in the longer term, in solar technologies. Also, if successful in developing cutting-edge energy and sustainability technologies, QSTP-based companies and Qatar could in the future achieve a regional market position in this economic niche. While Masdar has undoubtedly caught the world's attention and inspired the local elite to ride its success to a further consolidation of this specific sector of the economy, the QSTP is still just a small piece in the big puzzle of Sheikh Hamad's National Vision.

The spirit at QSTP, seems to be that Qatar has chosen a different path: as a manager of one of the Park's member institutes noted in a personal communication in reference to Qatar and Abu Dhabi: 'I am sure you know the story of the tortoise and the hare'.[365] Fundamentally, however, Qatar's approach to alternative energy and sustainability-related technologies shares the same fundamental paradox as all Qatar Foundation-linked attempts at turning Qatar into a knowledge economy; expectations are high, but results will take a long time to become visible. Here, the rentier mentality, manifested through expectations of fast results with little effort, and the small number of Qataris, are the worst enemies. As a technology park, QSTP's continuity will ultimately depend on its success in securing the companies it hosts after their current investing commitments (presently 10 years at most) and lease terms end. At least financial resources will not be the issue, but other factors might work against the ambitious plans, such as the slow state bureaucracy and decision-making processes,[366] the above-described cocktail of strong and weak institutions, lack of appropriate regulation and subsidies for renewables, and in general the overriding importance of fossil fuels in Qatar's economy. Through the QSTP, Qatar is trying to build alternative energy and sustainability expertise the hard way. If it succeeds, the tortoise will indeed have beaten the hare.

[365] Personal correspondence, August 2010.
[366] E.g. interview with Qatar-based renewable energy expert, November 2010.

6 The small GCC monarchies in the international climate regime

Throughout the two-decade long history of the international climate regime, under the United Nations Framework Convention on Climate Change (UNFCCC), the OPEC group, led by Saudi Arabia, opposed mitigation measures that would potentially harm oil exporting countries' external revenues. Generally regarded as close supporters of the Saudi position, the small Gulf monarchies have not been previously examined in this context. After presenting the dynamics of the most relevant reference groups and the role and positions of the most important actor for the five small Gulf states in the period from 1995 to 2010, this chapter examines in detail the external climate policies of the United Arab Emirates and Qatar. Most importantly, it demonstrates how, in the case of the UAE, changes at the domestic level (Abu Dhabi) interacted with the international level, creating new foreign policy priorities. This led, in 2009-2010, to the emergence of a new policy leadership that reformulated the country's alignment and priorities in the climate regime. Simultaneously in Qatar, due to the strong ownership of external climate policy by the energy sector, in the absence of major domestic developments in the area, the country's external climate policy remained as static as ever.

6.1 The small Gulf states and group dynamics in international climate negotiations

The small GCC states' reference groups

All small Gulf monarchies have acceded or ratified both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The five joined the UNFCCC in 1994-1996, and the Protocol shortly after it entered into force, in 2005-2006.[1] Under this framework, also referred to as the international climate regime, the main reference groups of the five small Gulf states have been: the GCC, OPEC, the G77+China group, OAPEC and, to some extent, the Arab League (see also chapter 2.4). The locus of policy coordination and position formation from the small Gulf states' point of view lies within the first three of these groups.

[1] Years of accession/ratification of UNFCCC/KP: Bahrain: 1994/2006; Kuwait: 1994/2005; Oman: 1995/2005; Qatar: 1996/2005; and the UAE 1995/2005.

There is extremely scarce literature available on the dynamics of GCC coordination, and due to its opacity, the group has generally been portrayed as 'well-disciplined, with a unified policy' and its smaller member states echoing Saudi statements.[2] Stakeholders and personal observations confirm this to be only partly true. Small GCC states' negotiators describe coordination among the bloc's members as primary compared to other reference groups. According to a Bahraini delegate, the country supports Saudi Arabia in all decisions.[3] Kuwait is also a near-guaranteed supporter of Saudi Arabia, but due to its OPEC membership and stronger negotiating capacity, it can be argued that it supports Saudi Arabia due to reasons of interest alignment rather than of conformity. Despite often supporting Saudi statements, Qatar and the UAE's negotiators have assured that their countries do not *follow* the Saudi position and that Saudi Arabia has never imposed its will on the smaller states. A UAE negotiator pointed out an occasion when the UAE and Qatar deviated from the Saudi position. Still, the UAE and Qatar (like the other three small GCC states) have admitted to often providing silent support to positions or statements presented by Saudi Arabia. This presumably happens either when the countries' perceived interests are aligned or when deviating would entail a higher political cost. In the case of the UAE, conformity has been described as having reached the point where Saudi Arabia would feel comfortable with signing on behalf of the UAE in support of a position.[4] An Omani negotiator has confirmed that there are differences in opinion among the states; Oman for example, unlike the four GCC OPEC states, does not support the inclusion of CCS[5] in the Kyoto's Clean Development Mechanism (CDM[6]).[7] There are a number of instances in which small GCC states have supported Saudi Arabia even when this has been against their interest in one way or another. A clear example is the UAE's support in the late 2000s to Saudi/OPEC positions that are perceived by other parties as obstructionist, while Abu Dhabi simultaneously sought international credibility for its alternative energy leadership aspirations.

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[2] Depledge, "Striving for No", p. 17. First quote from: Benito Müller, *Framing Future Commitments: A Pilot Study on the Evolution of the UNFCCC Greenhouse Gas Mitigation Regime,* EV 32 (Oxford: Oxford Institute for Energy Studies, 2003).

[3] Interview with a Bahraini delegate, 'Bonn 2' UNFCCC climate conference, Bonn, June 2009.

[4] Interview with UAE-based climate expert, October 2010.

[5] Carbon capture and storage (CCS) is a series of technologies used for capturing CO_2 and injecting it into storage spaces like ageing oil reservoirs. It is commonly seen as a way to extend the era of fossil fuels.

[6] CDM is one of the flexibility mechanisms under the Kyoto Protocol. Its purpose is to advance sustainable development in developing countries and assist developed countries to meet their emission targets. The inclusion of CCS under the CDM would mobilise large sums for the development/deployment of this technology.

[7] E.g.: interviews with Waleed El Malik, October 2009 (personal views); Ali Hamed Al Mulla, October 2009; Ibrahim Ahmed Al Ajmi, Director-General of Climate Affairs, Ministry of Environment and Climate Affairs of Oman, Poznan, December 2008.

The OPEC group, although more heterogeneous in terms of its members' interests, is also an important reference group for the small Gulf monarchies as it aggregates its member states' common economic concerns, most importantly relating to the issue of potential negative impacts of international mitigation policies and measures (or 'response measures').[8] Notably, Oman and Bahrain are not members of this group—but Dubai takes part through the UAE. While often described as a Saudi vehicle of obstructionism, the OPEC group's generally tight discipline gives all its members added clout. The group has been described as a key player, at one point even as securing a leadership, in the G77 since the late 1990s.[9] Historically, within the diverse group of developing countries, OPEC and the Alliance of the Small Island States (AOSIS) have often been at loggerheads due to their often extremely divergent views regarding the aim and purpose of the Convention.[10] The G77+China is a group to which all five small monarchies belong and which represents the developing world's voice vis-à-vis the developed world. Despite their high income status the small GCC states are classified as developing countries in the Convention and are vehemently unwilling to give up this status.[11] Both in the G77+China group and the negotiations in general, the small Gulf states' participation is primarily framed by the GCC and OPEC coordination.

The OAPEC group's policy positions have been described by one observer as mostly formulated by Saudi Arabia and Kuwait and also as dominating the Arab states' common position.[12] The Arab League member states' coordination due to the divergent interests and the strength of coordination among the oil-exporting states is generally weak.[13] As of 2010, Arab states' ministers had issued three joint declarations on climate change, all of which still were lacking noticeable implementation: the Abu Dhabi Declaration on Environment and Energy (2003), the Arab Ministerial Declaration on Climate Change (2007) and the Statement on Climate Change issued by the Council of Arab Ministers Responsible for the

[8] E.g. Interviews in October 2009 with Ahmad Majed Al Naqbi, Director of Petroleum Department, Ministry of Energy, Abu Dhabi; Lubna Al Ameri; Waleed El Malik (personal views); Ali Hamed Al Mulla. The OPEC is an organisation, which does not negotiate, but provides logistical support for its member states. Chatham House, *OPEC and Climate Change*, p 10.
[9] Depledge, "Striving for No", pp. 15; 17-18; Chatham House, *OPEC and Climate Change*, pp. 6; 9; Dessai, *Role of OPEC*, p. 16.
[10] Luomi, *Bargaining*, p. 6.
[11] Due to expected associated additional commitments under any other system of classification.
[12] Correspondence with Arab climate change policy expert, April 2010. Stakeholders interviewed were vague about all types of coordination.
[13] Interviews with Wael Hmaidan, Director, IndyACT, Poznan, December 2008; long-term climate negotiator of a small Gulf state, May 2010.

Environment (2009). The influence of oil exporting countries on the content of the declarations is noticeable, although possibly slightly declining.[14]

Similarly to most developing countries, Arab delegations (including those of small GCC states) have mainly been small.[15] Arguably, due to low domestic political prioritisation, lack of human resources and the wide plethora of issues on the negotiating agenda, the resource-poorer Arab states in particular have found it difficult to engage in the negotiations. Even UAE negotiators have noted the same problem in relation to the large number of parallel meetings.[16] The consequent unpreparedness has led to vague positions and vulnerability to outside influence. Throughout the past two decades, Saudi Arabia has been the only Arab state attending the UNFCCC meetings with well-prepared, vocal and large delegations, which has increased the importance of its position for the other Arab countries participating with a less defined agenda and a weaker mandate. Saudi Arabia has a lot of permanent legal and technical expertise and its negotiators have been characterised as skilful and very strategic, especially with the issue of response measures. Besides their explicit or implicit support for Saudi or O(A)PEC states' positions, other Arab states have generally been engaged in only some agenda items: in 2008, Algeria was described as active when it came to carbon capture and storage (CCS) and Egypt pro-adaptation because it feared the submergence of the Nile delta due to rising sea-levels.[17]

The participation of the small Gulf states in the coordination of policies and positions under the UNFCCC framework has had different forms and intensities. In 2008, a long-term observer described them as generally 'invisible and quiet' and particularly Kuwait and Qatar as using the same rhetoric as the Saudis.[18] The most active ones in the plenary meetings have been the three OPEC member states: Kuwait (especially in the late 1990s), Qatar and the UAE.[19] In existing literature, Kuwait is often mentioned as the second leading state in the OPEC core negotiation group, with identical positions to those of Saudi

[14] Based on an analysis in: M. Luomi, *Ilmasto- vai öljypolitiikkaa? Lähi-idän arabimaiden ilmastopolitiikan selitysten jäljillä*, Working Paper No. 62, (Helsinki: FIIA, 2009), pp. 18-19.
[15] Based on a search through the official lists of participants to the Conferences of Parties 9-16 of the UNFCCC.
[16] Interviews in October 2009 with Ahmad Majed Al Naqbi; Lubna Al Ameri.
[17] Presentations of Katherine Watts, Climate Policy Officer, Climate Action Network Europe, and Wael Hmaidan, IndyACT, NGO side-event, UNFCCC COP-14, Poznan, 11 December 2008; J. Barnett, "The Worst of Friends: OPEC and G77 in the Climate Regime", *Global Environmental Politics,* 8 (2008), pp. 5-6.
[18] Interview with Kati Kulovesi, Editor, Earth Negotiation Bulletin (IISD), Poznan, December 2008.
[19] Based on a count of appearances in the IISD Earth Negotiations Bulletins in 1996-2008. Nb. the bulletins only cover the most important aspects of the negotiations.

Arabia.[20] The two non-OPEC states, Bahrain and Oman, have been even less active, with extremely small delegations and, when expressing their views, generally standing in line with GCC OPEC states' proposals and positions.[21]

Saudi Arabia and the OPEC group[22]

In order to detect any divergence by the UAE and Qatar from the Saudi-OPEC position, it is necessary to establish the Saudi position and role in the climate regime and examine it alongside the OPEC position. Fortunately, due to its candidness, Saudi Arabia's interests, demands, strategy and tactics in the negotiations have been relatively well studied.[23] Notably, however, the Saudi position is often hard to distinguish from the OPEC position, as the latter is extensively influenced by the former.

Saudi Arabia's clout in the international climate negotiations under the UNFCCC framework is much greater than its total greenhouse gas emissions would suggest (1.26% in 2007).[24] This is because Saudi Arabia, as explained earlier (see chapter 2.4), has perceived international action to abate climate change as a bigger threat to itself than climate change as such. An ambitious agreement to cut CO_2 emissions has therefore not been considered in the country's interests by the energy sector officials in charge of the Saudi climate policy. Depledge has convincingly argued that Saudi Arabia's influence in the climate regime stems from a long-term strategy of obstructionism: obstructionists fear the agreement others might reach and therefore join negotiations so as to prevent it from emerging.[25] Many observers have also convincingly argued that Saudi Arabia's main motive in the negotiations has been to slow down the process.[26] For example, after opposing the establishment of the Kyoto Protocol, Saudi Arabia, along with its OPEC peers, only acceded it after it had become clear that the treaty would enter into force, in 2005-2006, indicating a strategic motive for the accession.[27] The kingdom is also known to

[20] Kassler and Paterson, *Energy Exporters*, p. 87; Aarts and Janssen, "Shades of Opinion", p. 337. Insufficient literature on the Kuwaiti role largely prevents a distinction between Saudi and Kuwaiti positions.
[21] Based on archival records and personal observation (three meetings of the UNFCCC in 2008-2009) and interviews: the International Institute for Sustainable Development maintains an archive of its daily reports of all UNFCCC meetings since 1995. Only main statements and developments, however, are covered.
[22] Parts of this section have been published: in Luomi, *Bargaining*.
[23] E.g.: Barnett, "Worst of Friends", p. 4; Depledge, "Striving for No", pp. 13; 20-27; Dessai, *Role of OPEC*, pp. 23-24.
[24] World Resources Institute, *CAIT 8.0.*
[25] Depledge, "Striving for No", pp. 9-11; 17. Saudi Arabia acceded to the UNFCCC in 1994.
[26] E.g. Dessai, *Role of OPEC*, pp. 20; 26; interview with Kati Kulovesi, December 2008.
[27] Depledge, "Striving for No", pp. 11-12.

have close connections with the United States and shares parallel interests with its oil industry, both within and outside the UNFCCC framework.[28]

The 'discrimination' against carbon dioxide and fossil fuels is a recurring Saudi theme that reflects the country's disapproval of any constraints on global oil consumption. To that end, throughout the early 1990s, the country, together with Kuwait and the rest of the OPEC, concentrated on stressing the scientific uncertainty of the anthropogenic causes of climate change. In late 1996, the focus shifted to the adaptation side. Since then, calls for compensation for potential losses in oil revenue have been one of the main pillars of the Saudi/OPEC negotiating position.[29] This demand is rooted in article 4.8 of the Convention, which states that parties 'shall give full consideration' to actions necessary 'to meet the specific needs and concerns' of developing countries, including oil revenue dependent countries, 'arising from the adverse effects of climate change and/or the impact of the implementation of response measures'. Also, articles 2.3 and 3.14 of the Kyoto Protocol state that Annex I parties shall strive to implement policies, measures and commitments in a way that minimises adverse social, environmental and economic impacts on developing countries.[30] OPEC's demands regarding the response measures issue are argued to have significantly hindered progress with regard to the entire adaptation agenda, as the OPEC members have exploited the consensus mechanism applied in all decision-making, linking progress on the agenda to progress on response measures.[31] Saudi Arabia and other OPEC states are also well known for seeking to 'smuggle' the response measures issue into as many parts of the agenda as possible.[32]

On a more rhetorical level, studies that predict economic losses for the OPEC states and calls for economic compensation have been persistently applied as a rhetorical tool by the groups' member states throughout the history of the climate regime. For example in 2005, Saudi Arabia implied that it should receive a lump sum payment of US$100-200bn to offset economic losses caused by Annex I (developed country) response measures in 2000-2030.[33] Despite this, the OPEC states have come to understand the practical and political

[28] Ibid, pp. 11;20; Barnett, "Worst of Friends", pp. 2-4.
[29] Kassler and Paterson: *Energy Exporters*, pp. 98-99; Chatham House, *OPEC and Climate Change*, p. 7.
[30] OPEC states interpret these articles to mean they should be compensated for losses in oil revenue.
[31] E.g.: Dessai, *Role of OPEC*, p. 3.
[32] E.g. interview with Kati Kulovesi, December 2008. See also: H. McGray, "From Copenhagen to Cancun: Adaptation", *World Resources Institute*, 13 May 2010, [http://www.wri.org/stories/2010/05/copenhagen-cancun-adaptation/].
[33] Presidency of Meteorology and Environment of Saudi Arabia, *First National Communication: Kingdom of Saudi Arabia* (PME, 2005), p. 121.

unfeasibility of their demand[34] and, behind the rhetoric, are known to instead demand technology transfer (CCS), as well as other less tangible issues, like assistance to economic diversification.

In the late 2000s, the Saudi negotiating position evolved around four main pillars. In addition to opposing all measures that would limit the global demand for and price of oil, and calling for compensation for losses in oil revenue, two new issues that had emerged in 2005-2007 were: promoting so-called clean fossil fuel technologies, particularly CCS, as a win-win solution, and opposing any commitments or targets for developing countries and differentiation within the existing developing country group.[35]

Around the mid-2000s, when carbon capture and storage rose on the negotiating agenda as a new potential tool for emission reductions, practically all OPEC members began actively promoting it both as a technology transfer item and as a new methodology under the Kyoto's CDM, so as to make R&D and pilot projects economically feasible.[36] In addition to the potentially massive removals of CO_2, the oil exporting countries wish to gain parallel benefits, namely offsetting part of the development costs of the technologies and applying CCS simultaneously for enhanced oil recovery.[37]

Because of the need for developing countries also to curb their emissions to prevent dangerous climate change,[38] during the negotiations on the post-2012 climate treaty (roughly in 2007-2009), a major political issue was whether high income developing countries, including the three small GCC OPEC member states, should 'graduate' to Annex I or a similar group of countries with binding emission caps. However, the criteria for 'dividing' the G77 group were highly disputed and the developing countries were strongly against any binding caps because these were seen as 'a potential cap on their growth'.[39]

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[34] Barnett et al., "Will OPEC Lose?", p. 2086.
[35] Luomi, *Bargaining.* The paper is based on an extensive analysis of Saudi Arabia's submissions of views to the UNFCCC and statements recorded in the IISD archive in 2009.
[36] Businesses and OPEC states consider large-scale deployment of CCS, as well as R&D and other initial stage developments, as 'currently uneconomical'. I. Vormedal, "The Influence of Business and Industry NGOs in Negotiation of the Kyoto Mechanisms: the case of Carbon Capture and Storage in the CDM", *Global Environmental Politics*, 8 (2008), p. 52.
[37] Economic mitigation potential: 200-2,000 Gt by 2100 according to the IPCC as cited by: OPEC, *World Oil Outlook* (2008), pp. 8-9; 45-47.
[38] Climate science and future predictions on emission trajectories show that the developed countries alone cannot prevent dangerous climate change even by cutting their emissions to zero.
[39] J. Lewis and E. Diringer, *Policy-Based Commitments in a Post-2012 Climate Framework* (Arlington: Pew Center on Global Climate Change, 2007), p. 1.

The institutional and human dimensions

A major contributor to the importance of the GCC coordination and the largely uniform positions has undoubtedly been the activeness and dominance of oil-related institutions, as well as key individuals representing them. At least until 2009, all GCC states' UNFCCC policies, according to a UAE negotiator, were lead by their respective energy ministries.[40] The most important role has been played by the Saudi oil sector (Ministry of Petroleum and Mineral Resources), which dominates the country's position. Throughout the 2000s, roughly half of all Saudi delegates have come from this sector. Apart from reflecting the kind of emphasis Saudi Arabia gives to the issue of climate change, this also determined the kinds of interests represented.[41] Furthermore, there are a number of long-term negotiators in the GCC OPEC states' negotiating delegations, many of whom come from the energy sector (ministry or national oil company), who have long, personal-level relationships with other GCC negotiators with similar backgrounds, and who, due to coming from similar institutions, tend to agree with each other.[42] Arguably, the four GCC OPEC member states' oil sector representatives are also better informed and organised than their colleagues from other sectors, owing to their participation in the OPEC and OAPEC groups' coordination. It must be noted, however, that in the late 2000s there were some signs of potential change, as in 2008 the Kuwait Environmental Public Authority took over the leadership of the national climate change committee from the Ministry of Oil,[43] and in 2010 the coordination of the UAE's UNFCCC position was moved from the Ministry of Energy to the Ministries of Foreign Affairs and Environment and Water.

Sources of potential GCC divergence from the Saudi position

Although the importance of the GCC for its member states, both in terms of cooperation and as a common voice, was arguably in decline in the late 2000s,[44] there was still in most cases general conformity in the states' UNFCCC policies and positions. There are, however a number of areas in which Saudi interests concerning the international climate regime and those of individual small Gulf monarchies do not align. With the simultaneous

[40] Interview with Ahmad Majed Al Naqbi, October 2009.
[41] UNFCCC lists of participants for COPs in 2002-2010.
[42] Interviews with Qatari negotiator, Doha, October 2009; UAE-based climate expert, Abu Dhabi, October 2010. Saudi Arabia's lead negotiator Mohammed al-Sabban has participated in all Conferences of the Parties of the UNFCCC.
[43] Correspondence with Atif al-Jumaili, Manager, International Relations, Kuwait Petroleum Corporation, 14 March 2011.
[44] Due to problems in e.g. the common currency project.

signs of fragmentation in the G77+China group, as well as in the OPEC,[45] these are expected to become increasingly visible in the early 2010s.

Firstly, Bahrain and Oman have substantially less oil (revenues) than the four GCC OPEC member states. These two would therefore arguably benefit more in the long term from the advancement of the adaptation agenda than from compensations for response measures-related losses. However, Bahrain and Oman arguably lack both political will and technical capacity to participate more actively in the regime, for example through the CDM.[46] The three small GCC OPEC states are in a slightly different position, as they have sufficient funds to quickly mobilise major projects and plans, if they wish to. While there are many uncertainties associated with future global demand of all fossil fuels, Qatar, which has a small population and is gaining an increasing proportion of its external revenues from natural gas (considered as a transitional fuel), arguably has less to be concerned about than Saudi Arabia (with mainly associated or sour gas reserves[47]). Kuwait will remain a question mark for some time due to its chronic domestic political crisis and few developments in the late 2000s in the area of alternative energies and technologies. As for the UAE, being associated with the climate regime's main obstructionist has arguably, since 2007, presented it with an image dilemma: if Abu Dhabi wants to be seriously considered as the alternative energy leader of the Gulf, having OPEC as the primary reference group is not very helpful.

Although the material interests in the UNFCCC of the three small GCC OPEC states have mainly related to the response measures agenda, there are arguably a number of 'positive' resources associated with the international climate regime that they—and also to some extent Oman and Bahrain—could tap into. These include at least: funds and technology transfer through projects under the CDM, energy security and efficiency and economic diversification through embracing a low(er)-carbon development trajectory, and intangible legitimacy resources and prestige offered by proactive policies, for example gaining the status of the region's climate champion.[48] The CCS/CDM issue is a controversial one, as despite the expected emission reductions, many parties and groups have argued against its

[45] E.g. personal observations in the Copenhagen climate conference, December 2009.
[46] At the end of 2010, neither had any accepted CDM projects. Bahrain barely participates in the negotiations. Oman, the exception of a few individuals, has not been very active either. Based on personal observation, archives of the IISD Earth Negotiations Bulletins on UNFCCC meetings in 1995-2008 and official lists of participants from Conferences of Parties in 2000-2010.
[47] US EIA, *Saudi Arabia: Country Analysis Brief* (US EIA: January 2011).
[48] M. Luomi, *Oil or Climate Politics? Avoiding a Destabilising Resource Split in the Arab Middle East,* Briefing Paper No. 58 (Helsinki: FIIA, 2010), p. 8

inclusion.[49] It should be pointed out, however, that if CCS becomes somehow included in the post-2012 period, the Gulf monarchies also stand to gain a new source of external rent.

Until the end of 2010, despite showing an increasing interest in both the direct and indirect material benefits associated with the climate regime, pressures emanating from the regional level still seemed to weigh higher in the small Gulf monarchies' calculations than any benefits from building a more independent policy. Indeed, there are still important foreign policy dependencies, most clearly in the case of Bahrain.[50] However, starting from the mid-2000s, there have been such changes in the international relations of the small Gulf states that following Saudi Arabia's lead in all arenas is not any more self-evident.[51] Examples include Qatar's independent foreign policy (see chapter 5.1.1) and Abu Dhabi's competition with the Saudis (see chapter 4.1.1).

As will be demonstrated below, in the case of the UAE, changes in state behaviour in international climate talks, despite having a strong link to domestic priorities, do not in some cases solely emanate from this environment but are also influenced by changes in the international and regional contexts and elite perceptions of the country's role in them. Conversely, as will be shown further below, in the case of Qatar, a static policy can be maintained, despite a breakaway foreign policy orientation and a favourable security of demand position, due to the lack of a domestic impetus for change.

6.2 The UAE/Abu Dhabi and the international politics of climate change

In the case of Abu Dhabi, the growing conflict between the passive, Saudi-conforming climate 'policy' on the one hand, and the domestic developments and the external pressures ensuing from its hosting of the IRENA headquarters on the other, came to be seen in 2009 by high-level elite members as a potential external image issue for the state. This led to a fast, albeit a careful, realignment in the UAE's external climate policy, starting from 2010.

[49] E.g. Latin American countries and environmental NGOs. Vormedal, "CCS in the CDM", pp. 52-53.
[50] Due to e.g. a jointly owned oilfield. EIU, *Bahrain: Country Report, July 2008* (London: EIU, 2008), p. 4.
[51] Interview with Tarik Yousef, October 2008.

6.2.1 Case study: the IRENA campaign[52]

In 2009, Abu Dhabi successfully campaigned to host the headquarters of the International Renewable Energy Agency (IRENA). This was the first example of how perceptions of key elite members regarding the international energy and climate-change agendas rapidly changed as a consequence of realising the international political capital produced by Masdar.

In January 2009, IRENA was established in Bonn. Originally a German initiative,[53] its mission is to support and advance the use of renewable energy in both industrialised and developing countries. Its establishment was widely seen as a result of discontent with the International Energy Agency in promoting renewable energy.[54] Among the 75 countries that signed the establishing treaty were four OPEC member states: Algeria, Iran, Nigeria and the UAE, the latter announcing it would compete to host the headquarters of the organization. Other candidates were Austria, Germany and Denmark.[55]

By June 2009, the membership of the agency had risen to 136, and the UAE had already secured supporting statements from numerous countries and high-level personalities, such as Ban Ki-Moon, Rajenda Pachauri of the Intergovernmental Panel on Climate Change and Amr Moussa.[56] The vote for hosting IRENA was supposed to take place in late June 2009 in Sharm El Sheikh, Egypt. At the last moment, the two remaining contenders, Germany and Austria, withdrew (Denmark having withdrawn a few days earlier), recognizing that the majority of votes (between 92 and 101) were already secured by the UAE. Abu Dhabi was declared the winner; runner-up prizes were given to Vienna and Bonn, which were chosen to host IRENA's interorganisational liaison office and a technology and innovation centre, respectively.[57]

From the Western countries' perspective, the placement of IRENA's headquarters in Abu Dhabi was a symbolic move, as they hold the participation of developing countries in

[52] Parts of this subchapter have been published in: M. Luomi, "Abu Dhabi's Alternative-Energy Initiatives", pp. 112-115.
[53] World Council for Renewable Energy, "The long road to IRENA – A Chronology", [http://www.wcre.de/en/images/stories/pdf/irena_chronologie.pdf]. Accessed on 21 January 2011.
[54] See e.g.: *BusinessGreen*, (26 January 2009).
[55] Preparatory Commission for IRENA, *Report of the First Session of the Preparatory Commission*, IRENA/PC.1/SR (27 January 2009), p. 3.
[56] *The National* (10 June 2009); *Gulf News* (29 June 2009).
[57] The meeting was attended by 55 Emirati delegates, reflecting the importance given by the government to the issue. *The National* (30 June 2009a).

climate-change mitigation as vital.[58] However, victory was secured by the votes of developing countries, which form the majority in IRENA. Abu Dhabi's success can also be attributed to a campaign capitalizing on the good international publicity for Masdar and portraying the UAE as a catalyst for the introduction of renewable energy in the developing world.

Abu Dhabi's campaign

Although the candidacy for the headquarters of IRENA was made in the name of the UAE, with foreign minister Sheikh Abdullah representing the country, the bid was purely that of Abu Dhabi and Masdar; the other main figure behind the campaign was Masdar CEO Sultan al-Jaber. The campaign consisted of sending different ministers and delegations to tour over 100 countries over a period of just a few months. Additional pleas were made in UN meetings in New York and in a ministerial meeting of the Non-Aligned Movement in Havana. The case for the UAE was formulated through a few main arguments coupled with substantial financial promises. The UAE was said to be no less than 'geographically, politically, economically, financially and technologically in a good position' to win the bid.[59] It was noted that the Middle East had not yet hosted an international organisation. It was also argued that Abu Dhabi and Masdar would set an example that would encourage other developing countries to see the advantages of renewable energy and related technologies. Masdar City provided an attractive platform for the organisation, and the initiative itself was used for providing proof of Abu Dhabi's commitment to the cause. The official campaign declared that Abu Dhabi's candidature signalled that 'even oil-producing and developing nations can and should participate in embracing renewable technologies'.[60] Moreover, the UAE was the first state to ratify IRENA's statute, in mid-June 2009.[61]

Abu Dhabi's offer included plans to build the headquarters in Masdar City, in a green building that will also host Masdar's headquarters when finished in 2012. The emirate promised to cover all the building and operating costs of the agency as well as underwrite an allowance for conference facilities and the employees' immigration fees. Financial promises totalled US$135m, of which US$70m was in cash, the rest coming from in-kind support. Annual loans of US$50m through the Abu Dhabi Fund for Development were also

[58] Many Western states, including Australia, Finland and the United States, also gave their vote to Abu Dhabi. *Gulf News* (24 June 2009); *The National* (29 June 2009b).
[59] Sheikha Lubna al-Qasimi, minister of foreign trade of the UAE, quoted in: *Gulf News* (19 June 2009).
[60] IRENA@UAE, "The Future is Here", PowerPoint presentation, [http://www.irenauae.com/]. Accessed on 15 July 2009; *The National* (19 April 2009; 6 May 2009; 21 June 2009c; 1 July 2009); *Gulf News* (1 May 2009).
[61] *WAM* (18 June 2009).

offered for IRENA-approved projects in developing countries during the period 2009-2015. The package also included 20 scholarships for IRENA-recommended students at the Masdar Institute. The offer submitted by Germany, considered generally as the toughest competitor for Abu Dhabi, included only US$6 million for setting up the agency and US$3-4.5m for annual operating costs.[62] Ironically, Abu Dhabi's oil wealth may have been the deciding factor in its victory over Europe's leader in renewable energy, which had originally envisioned the organization.

Motivations and prospects

Above all, Abu Dhabi's IRENA campaign should be seen as an effort to raise the emirate's international profile. Whereas the existence of Masdar was undoubtedly a precondition for candidacy, the visibility and synergy gains are obvious. Turning the IRENA headquarters contest into a North-South issue undoubtedly played a key role in securing the majority of votes. From an international energy-security perspective, some argued, Abu Dhabi's victory was a sign of willingness to cooperate and engage in a dialogue with the energy-consuming countries, also indicating a concern for climate change.[63] Abu Dhabi's bid is an example of skilful interest aggregation among the developing countries, rarely seen in the past, and arguably it also reflects the country's rising foreign policy and diplomatic capability. The UAE's high-level whirlwind campaign took competing bidders Austria and Germany completely by surprise. The victory has said to have been a 'seminal experience' for the UAE and a source of pride for foreign minister Abdullah.[64]

Moreover, Abu Dhabi, yet again, took advantage of the benevolent green-energy giant narrative that turned the very contradiction of its being one of the world's largest oil exporters into a publicity asset. Even the UAE's weak environmental record and its high ecological footprint and per capita greenhouse-gas emissions were turned into assets by the campaigners who argued that the headquarters should be placed in a country that still has a lot of work to do in enhancing its environmental record but has already shown a positive effort.[65]

Abu Dhabi's campaign was followed closely by the local press in June and July 2009. The government-owned The National ran a number of articles covering the campaign as well as an opinion article by Masdar's CEO Sultan al-Jaber, who attributed Abu Dhabi's victory to

[62] *The National* (30 June 2009a; 10 July 2009c).
[63] *MEED* (1 July 2009).
[64] Interview with Rob Bradley, October 2010; *Gulf News* (28 June 2009).
[65] *The National* (8 July 2009).

a successful campaign and the UAE's leader's commitment to sustainable development through the Masdar Initiative.[66] The environmental legacy of Sheikh Zayed was yet again brought up as an example of Abu Dhabi's continuous long-term commitment to environmentalism. The campaign website included a citation from Sheikh Zayed on the importance of conservation in the UAE's heritage, linking this to his achievements in wildlife conservation and Abu Dhabi's zero-gas-flaring policy and to the more recent Masdar-related developments.[67] Al-Jaber also hailed the legacy in the local press: 'The IRENA success is the natural harvest of what our late leader, Sheikh Zayed, planted'.[68]

The victory also came to mark a major watershed in the UAE's climate policy. According to a Foreign Ministry stakeholder, the IRENA campaign opened foreign minister Abdullah's eyes to how important climate change had become internationally. It also brought the UAE's delegation into contact with a number of new countries, particularly in Africa and the Pacific, some of which said that they considered the UAE's support of some OPEC positions in the UNFCCC problematic. As a consequence, in early 2010, the UAE associated itself with the controversial Copenhagen Accord, which Saudi Arabia rejected. The move was meant as a high-level diplomatic sign that the UAE intended to take an independent role in the climate regime.[69] The IRENA victory is also said to have been one of the main reasons behind the establishment of the Directorate of Energy and Climate Change under the Foreign Ministry; it was then seen that the country needed a common, solid stand towards the UNFCCC, in other words, Abu Dhabi's green leadership realised they had to 'talk the talk and walk the walk'.[70]

Certainly, the placement of IRENA's headquarters in Masdar City will not only assure the agency of robust financial support and a state-of-the-art building; it will also increase the chances of Masdar's longer-term survival, as well as that of alternative energy and mitigation projects and policies in general, by adding pressure on the emirate to deliver on its promises. The presence of IRENA will also raise the prominence of those in the ruling elite who are pushing for renewables and more sustainable energy policies as a complementary source for oil-based growth. By 2010, all the other small GCC states had

[66] Ibid.
[67] IRENA@UAE website, "Sustainability is a foundation of Abu Dhabi's heritage", [www.irenauae.com]. Accessed on 17 August 2009.
[68] *The National* (8 July 2009).
[69] Interview with Rob Bradley, October 2010.
[70] Interview with climate change policy expert at the EAD, October 2010.

also joined the agency, a small victory in terms of regional prestige. Only Saudi Arabia had not yet made up its mind.[71]

The first year and a half of the agency's existence in Abu Dhabi, however, demonstrated that there are at least three potential problems for the UAE's international credibility as an impartial host: firstly, IRENA is a universal organisation, with diplomatic representations eventually to be established in connection with the headquarters. The expected presence of Israel will both constitute a major headache and a litmus test of pragmatism for Abu Dhabi's elite.[72] Secondly, the strong role of Masdar and the Foreign Ministry, which have been providing the agency with logistical and other support, and that of the Abu Dhabi's government, currently paying nearly half of IRENA's budget,[73] will easily create the impression of a relationship of dependency between the agency and its host. Thirdly, and in relation to previous discussion, as an authoritarian system where statements going against the official state line in certain issues are not tolerated, the UAE will need to be able to prove to international audiences that the inner workings of IRENA will be respected, even if they go against the UAE's own policy.[74]

6.2.2 The UAE/Abu Dhabi in the UNFCCC

The UAE ratified the UNFCCC in 1995 and acceded to the Kyoto Protocol a decade later, in 2005. Due to Abu Dhabi's financial and technical resources, as well as its participation in the OPEC group's coordination, the emirate's dominance in formulating the UAE position is evident. The relatively small size of the country's economy and total GHG emissions make it a small player in the climate regime, and for a long time its only tangible contribution to the negotiations was in the form of supporting the Saudi/OPEC position. Until 2010, when the Ministry of Foreign Affairs took over the coordination of the UAE's position-formation, the UNFCCC was the only multilateral climate change policymaking forum in which the country, similarly to the other small GCC states, had participated. However, this all began to change around 2008 as new Abu Dhabi actors started weighing

[71] Not member, as of December 2010.
[72] Personal observation based on conversation in a Ministry of Foreign Affairs seminar, Abu Dhabi, May 2010.
[73] According to a plan from 2010, 42% in 2011. *The National* (20 October 2010).
[74] The interim director general resigned in October 2010, amidst rumours over the motives. One line of speculation related to her statements against nuclear power and CCS in the CDM. Personal conversations in Abu Dhabi in 2009-2010.

in on the country's position-formation as a consequence of the domestic-level developments described earlier. The successful IRENA campaign elevated the issue to a new level and, as of 2010, the UAE, led by the Foreign Ministry, had begun sending subtle signs of a more balanced position to come.

UNFCCC-related decision-making structures and responsibilities

The UAE set up the relevant national UNFCCC-related institutions and started preparing the documents required from non-Annex I parties since the mid-2000s, as part of a general trend in the Middle East. Lack of prior interest and required capacity were undoubtedly the reasons for this late timing.[75] The Designated National Authority (DNA) for the CDM, a precondition for participation in the mechanism, was established in 2004-2006, most probably due to Masdar, which played an instrumental role in the activation of CDM projects in Abu Dhabi.[76] Reflecting the UAE's 'culture of committees', the DNA consists of two organs: the National Higher Permanent Committee for the CDM, presided by the Ministry of Energy, and the CDM Executive Committee, the implementing organ, headed by the EAD. Both include local and federal level members, but are heavily Abu Dhabi-weighted.[77] According to stakeholder accounts, the EAD and Masdar had an instrumental role in operationalising the DNA. In 2006, after many years of delays, partly due to problems in data availability, a committee led by the Ministry of Energy presented the UAE's initial national communication to the UNFCCC. Although this 'Kyoto Committee' had been established in 2000, the process only gained momentum after the EAD hired the US branch of the Stockholm Environment Institute (SEI) to take over the task.[78] The second communication from 2010 was still officially produced under the Ministry of Energy's coordination. In addition to an emission inventory, the data gathering methodology of which has been criticised for being opaque,[79] it also drew from a study by the EAD (see chapter 4.3.1). The newest UNFCCC-related organ in the UAE is the National Climate Change Committee, headed by the Ministry of Environment since 2010, after a brief period during which it was unclear whether the clearly more capable new

[75] Mohamed Raouf, presentation in seminar on *Arab World Policy for post-2012 Negotiations*, IndyACT, Beirut, 15 October 2008.
[76] The years vary depending on the sources. See e.g.: EAD, *Policies and Regulations*, p. 20; *Environment Agency – Abu Dhabi*, Press release (22 January 2008); Majid Al Mansouri, "The Institutional Set Up: DNA; UAE", presentation at *The First International Conference on the Clean Development Mechanism*, Saudi Arabia. 19-21 September 2006.
[77] Al Mansouri, "Institutional Set Up"; CDM-DNA UAE, "DNA UAE"; UNFCCC, "Designated national authorities", [http://cdm.unfccc.int/DNA/index.html]. Accessed on 22 January 2011.
[78] EAD, *Policies and Regulations*, p. 20; interview with UAE-based climate change expert, Abu Dhabi, October 2010.
[79] Interview with UAE-based climate change expert, October 2010.

MoFA-based DECC would take charge.[80] The committee includes representatives from the Ministries of Energy, Environment and Water, and Economy, Abu Dhabi's Executive Affairs Authority and the Dubai Municipality.[81]

The UAE delegations in the UNFCCC

Reflecting a pattern common for OPEC member states, the UAE's delegation has always had a representation from the oil sector. Moreover, until 2010, when the Ministries of Foreign Affairs and Environment and Water took over,[82] the Ministry of Energy held the title of the National Focal Point.[83] However, the number of participants from other federal level institutions has almost always outnumbered the number of oil sector representatives in the UAE delegation. Abu Dhabi has been practically the only emirate to have local level institutions represented, including the Supreme Petroleum Council, the ERWDA/EAD and, since the late 2000s, Masdar, although not forming part of the official negotiating team.[84] The size of the UAE COP delegations has been relatively large for a developing country, ranging from 7-10 *reported* participants in 1995-1999, 7-18 in 2000-2008, and increasing to 36-40 in 2009-2010, partly due to IRENA and Masdar representatives being registered as part of the delegation.[85] In terms of holding chair positions or hosting UNFCCC workshops, the UAE's record reflects its relatively low-profile participation in the regime.[86] Remarkably, there are a few individuals who have remained on the lists of participants since the late 1990s or early 2000s until the present.[87]

The UAE's policy in the UNFCCC in 1996-2010

Due to the limited availability of material—which stems both from the UAE's small size and relative passiveness in the negotiations—in addition to interviews, the two main channels of information regarding the UAE's position are the daily Earth Negotiations

[80] Interview with climate change policy expert at the EAD, Abu Dhabi, October 2010. 'Clearly more capable' by author.
[81] Interview with Rob Bradley, October 2010.
[82] It is not common for counties to have two institutions as national focal points for the UNFCCC, let alone three individuals, like the UAE had as of 2010. UNFCCC, "National focal points", [http://maindb.unfccc.int/public/nfp.pl]. Accessed on 20 December 2010.
[83] In the early 1990s, the Ministry of Health chaired the UAE's UNFCCC committee. Interview with Ahmad Majed Al Naqbi, October 2009.
[84] Based on a survey of official lists of participants of COPs 1-16 (1995-2010). Nb. there are also other UNFCCC meetings than the COPs, although these usually draw the largest delegations. Also, the lists of participants do not necessarily equal to actual participants.
[85] Official lists of participants of the UNFCCC.
[86] Once co-chair of a contact group and vice president of the COP bureau, one workshop. IISD, *Earth Negotiations Bulletins*, 12 (2003; 2006); *AMEinfo* (4 September 2006).
[87] Personal observations at the COP-14 in Poznan in December 2008, 'Bonn 2' in June 2009, and Copenhagen 2009 indicated that the UAE was a passive participant in both negotiations, with the exception of Masdar's good visibility in the clean technology business sector—strictly separate from the ongoing negotiations.

Bulletins (ENB) of the IISD[88] and ministerial and high-level speeches. Of the roughly 30 mentions of the UAE in the ENBs in 1996-2010, the UAE primarily appears supporting statements by OPEC member states, most prominently Saudi Arabia. Most positions expressed or supported by the UAE, albeit not all, are identifiable with the following OPEC themes: uncertainty of climate science and obstructionism (1996); avoiding commitments (1997, 1998, 2009); impacts of response measures (1997-1998, 2000-2002, 2005, 2009-2010); bunker fuels[89] (2005); and inclusion of CCS under the CDM (2009-2010).[90] The UAE has also participated in at least two joint submissions of views by OPEC member states and other Arab oil exporters, in 1997 and 2008, both of which have expressed positions typical for OPEC states, as described above.[91]

In 2009, three UAE negotiators described the country's main interests in the negotiations as the impacts of response measures, the development of differentiation of the non-Annex I group, CCS, nuclear energy (as a new issue), continuation of Kyoto, and technology transfer, finance and capacity building from the developed countries. The negotiators were disappointed with the Annex I countries' lack of leadership and provision of support for the new commitments they were asking from developing countries. While the Energy Ministry's lead negotiator noted that 'everything the UAE does is for the protection of oil', an EAD adviser implied that in the response measures issue, the UAE was re-evaluating its existing practice of following the OPEC group. The latter also noted that domestic action without binding commitments, and even binding ones, if these were to be well supported by the developed countries, would be possible.[92]

Noteworthily, despite the central role of the Ministry of Energy in coordinating the UAE's activities vis-à-vis the UNFCCC, the COP ministerial speeches given by the UAE, of which a record was available, were delivered by other ministers and dignitaries.[93]

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[88] The ENBs are considered a consistent and unbiased source of information on the international climate negotiations. By the end of 2010, 498 ENBs had been published. Nb. not all issued statements by all parties are covered, neither are closed meetings.

[89] Opposing the discussion of aviation and maritime transport in the UNFCCC is also a common OPEC theme.

[90] IISD, *Earth Negotiations Bulletins*, 12 (1996-2010).

[91] UNFCCC, *FCCC/AWGLCA/2008/Misc.5/Add.2 (Part I)*, p. 8; UNFCCC, *FCCC/AGBM/1997/Misc.1/Add.1*, pp. 30-40.

[92] Interviews in October 2009 with Ahmad Majed Al Naqbi; Saad Al Numairy; Waleed Al Malik (personal views).

[93] While the ministerial level speeches, held in the COPs, reveal little on the negotiation behaviour of a country's delegation, they are useful for giving an indication on the issues the country wishes to emphasise to the international audiences at a given point in time. English simultaneous translations were available only for COP-3 (1997); COP-7 (2001) and COP-12 (2006). UNFCCC, "Webcasts and videos", [http://unfccc.int/press/multimedia/webcasts/items/5857.php]. Accessed on 27 January 2011.

Nevertheless, two speeches from the early years of the UAE's participation in the climate regime give a rather similar picture of the country's position, characterised by both typical developing country positions (right to development and rejecting new commitments) and OPEC-specific ones (response measures, CCS/CDM). In his speeches in Kyoto in 1997 and Marrakesh in 2001, minister for health and chairman of the Federal Environment Agency, Hamad Abdul Rahman al-Madfa (from Sharjah), among other things, referred to Sheikh Zayed's environmental leadership, referred to the developing countries' right to development and called for the establishment of a compensation mechanism for oil producing countries. In Nairobi in 2006, the new minister for environment and water, Mohamed Saeed al-Kindi (from Abu Dhabi), stressed again the UAE's commitment to sustainable development, the developing countries' development needs and the need to have progress in the adverse impacts issue and ensuring adequate finance and technology transfer from Annex I to developing countries. Al-Kindi also confirmed the UAE's support for the inclusion of CCS under the CDM.

Starting from 2007, the portrayal of the UAE as a proactive participant in the regime emerged as a new theme. In the Bali conference in 2007, ambassador Yousef Rashid al-Sharhan outlined the many developments that had taken place in the UAE since 2006, emphasising that the UAE wished to be seen as a responsible oil producer. He did, however also mention, response measures, and rejected additional commitments for the UAE. In Poznan in 2008, minister of the environment Rashid Ahmed bin Fahad (from Dubai) largely repeated Bali's dual message. In an interview, minister Fahad described the UAE's position as consisting of supporting the Bali Action Plan,[94] calling for Annex I to fulfil their obligations and supporting the CCS/CDM issue. The developing countries needed to develop and take advantage of their natural resources and the UAE would not be ready to take on any new obligations under a new pact.[95] In Copenhagen in 2009, minister Fahad outlined the UAE's position in a similar manner, but mentioned, for the first time, a federal renewable energy target of 7.5% of the UAE's 'overall usage of energy'.[96] Arguably as an indication of intra-elite consensus regarding the main issues on the UAE's

[94] A two-year roadmap agreed upon in the Bali conference in December 2007 that aimed at establishing an ambitious post-2012 climate treaty in Copenhagen in December 2009.
[95] Interview with Dr Rashid Ahmed bin Fahad, Minister of the Environment and Water of the UAE, Poznan, December 2008.
[96] Presumably referring to power production. Speech in Joint High-level segment of COP and CMP, 15th Conference of the Parties, UNFCCC, December 2010.

agenda, statements issued by ministers outside the UNFCCC context, in 2007-2009 for example, were surprisingly consistent, despite coming from different ministries.[97]

The year 2010 marked a new chapter in the UAE's engagement with the UNFCCC, as the Ministry of Foreign Affairs promptly took over the agenda, and began consciously but prudently distancing itself publicly from Saudi Arabia.[98] In February 2010, persuaded by the US and to the dislike of the Saudis,[99] the UAE associated itself with the Copenhagen Accord as the first OPEC state (later to be followed only by Algeria and Nigeria). In the association letter, minister of state for foreign affairs Anwar Gargash highlighted mainly familiar issues: namely the historical responsibility of Annex I countries, the right to development of developing countries and the need to minimise the adverse impacts of response measures. As a new issue—obviously arising from changes in the domestic energy agenda—the letter mentioned nuclear energy, in addition to CCS, in connection with flexibility mechanisms (CDM).[100] According to the senior policy advisor of the new Directorate of Energy and Climate Change of the MoFA, in late 2010, the UAE (now) wanted to be constructive and contribute something important to the negotiations. While the unit was waiting for more substantial policy guidance from the national climate change committee, it had already engaged in areas where this was possible, including the technology transfer mechanism.[101]

In December 2010, after a brief behind-the-scenes confusion over the leadership of the UAE's massive delegation in the Cancún COP-16,[102] the Foreign Ministry's—and Abu Dhabi's—de facto dominion over the country's external climate policy was publicly confirmed as Sheikh Abdullah delivered the UAE's high level speech, instead of environment minister Fahad. In addition to mentioning the UAE's domestic mitigation actions, Sheikh Abdullah emphasised, perhaps reflecting the mandate of his ministry, the country's international engagement in mitigation and adaptation, including (Masdar's) investments in renewables in Europe and pledges of US$350m in renewable energy

[97] E.g. speech by Sheikh Abdullah bin Zayed Al Nahyan 'The Future in Our Hands: Addressing the Leadership Challenge of Climate Change', New York, 24 September 2007. Minister of energy, Mohammed bin Dhaen al-Hamli quoted in: *UAE Interact* (3 February 2009; 23 April 2009). Rashid bin Fahad in: *The National* (23 April 2009).
[98] Personal observation based on conversation in a Ministry of Foreign Affairs seminar, Abu Dhabi, May 2010.
[99] The US persuaded a number of developing countries, including the UAE to associate with the accord. Saudi Arabia is said to have reacted negatively to the UAE's association. Interview with long-term climate negotiator of a small Gulf state, May 2010.
[100] Minister of State for Foreign Affairs of the UAE, Letter to Yvo de Boer, Ref. 3784 (14 February 2010).
[101] Interview with Rob Bradley, October 2010.
[102] Correspondence with eye-witness of the events in Cancún, 7 December 2010.

projects in developing countries and support for small island states. Most notably, while stressing a number of long-term positions, he did not refer to response measures in a single sentence.[103] Hosting a high-level reception during the conference he noted his country's 'active participation in Cancun mark[ed] a clear signal that [it] is keen to address the challenges of climate change in a collaborative and collective manner at the highest levels'.[104]

In conclusion, the principles and main aims of the UAE towards the UNFCCC, characterised by a largely passive approach and greatly influenced by Saudi Arabia and the OPEC group, remained impressively constant during the period from 1995 to 2009 (see table 6.1). The new green forces in Abu Dhabi, filtering into the UAE's 'high-level position' in the late 2000s, wished to demonstrate to the international community a concern for climate change and a willingness to do one's equitable share. On the other hand, even in 2010, the UAE still continued to support in the negotiations the long-term positions of its closest reference group, the OPEC.

This is also, essentially, the balance upon which the UAE's position will be set in the near future. Based on the developments in 2010 alone, it was still difficult to judge whether or not the visible departures from the Saudi/OPEC position were indications of a gradual but profound transformation in alignment in this context. It can be argued that, most probably, as long as the international political capital achievable from a constructive image will be perceived as high enough by Abu Dhabi's green elite, this side of the balance will remain heavier. Moreover, as of 2010, the UAE was already heavily involved in international arenas external to the UNFCCC, making a U-turn look increasingly unlikely.

[103] Statement in joint high-level segment of COP and CMP, 16th Conference of the Parties, UNFCCC, 9 December 2010.
[104] *UAE Interact* (12 December 2010).

Table 6.1. The UAE's main principles and aims in the UNFCCC in 1996-2009.

Principles:

- Common but differentiated responsibilities (historic responsibility of developing countries)
- No further commitments and right to development of developing countries
- Vulnerability of oil-producing countries arising from climate change and Annex I policies and measures

Aims:

- Compensation for oil-producing countries arising from climate change and Annex I policies and measures
- CCS as an accepted CDM methodology, CDM in general (since around 2006)
- Finance and technology transfer for developing countries (since around 2007)
- Continuation of the Kyoto Protocol (since around 2008)

Participation and engagement in non-UNFCCC fora

In 2009-2010, as a consequence of the international attention Abu Dhabi's alternative energy and environmental sustainability initiatives were gaining, the UAE became involved in a number of high-level working groups, forums and events, and found new international friends. In June 2009, in recognition of Masdar's international reputation, Masdar CEO al-Jaber was named as a member of the UN secretary general Ban Ki-moon's Advisory group on Energy and Climate Change, which prepared a summary report and recommendations on energy issues in the context of climate change and sustainable development.[105] A year later, in August 2010, the secretary general appointed Sheikh Abdullah in a High-Level Panel on Global Sustainability, which will seek to formulate a blueprint for low-carbon growth.[106]

After securing IRENA, Abu Dhabi quickly became the preferred location for a number of climate change-related events. These included a preparatory meeting for the first US-initiated Clean Energy Ministerial (CEM) in June 2010. The UAE is the only Arab country in the 23-member group, which includes all major economies, and it was also selected to

[105] *The National* (19 June 2009).
[106] *United Nations*, Press release ENV/DEV/1149 (9 August 2010).

host the second CEM in April 2011.[107] The capital was the location of the World Renewable Energy Congress of 2010 and it was selected for hosting the International Renewable Energy Conference in 2011 as well as the 33rd session of the Intergovernmental Panel on Climate Change. Masdar, not losing a single opportunity, labelled Abu Dhabi in 2010 already as 'a global centre for renewable energy partnership'.[108]

As a result of Sheikh Abdullah and Masdar's dynamism, the UAE also engaged with unexpected countries: during the Copenhagen climate conference in 2009, but separately from the UNFCCC context, Abdullah signed a joint statement with the foreign ministers of Cape Verde, Costa Rica, Iceland, Singapore and Slovenia, auto-titled as 'small points of green reference' within each states' own region. The declaration included phrases previously unheard from a GCC OPEC member state, including supporting international climate science and calling for a 2°C limit for global warming, and for international cooperation to tackle climate change-related environmental and security threats.[109] In 2010, Abu Dhabi invited Maldives President Mohamed Nasheed, one of the lead representatives of the small island states AOSIS group (often at loggerheads with the OPEC group), to speak at Masdar's World Future Energy Summit.[110]

As probably feared by most seasoned local stakeholders, the UAE's newfound role also began attracting calls for it to do even more, one of these coming from a lead author of a recent IPCC report. He opined in Abu Dhabi in 2009 that 'the UAE should work with developing countries to frame what the obligations of developing countries should be'.[111] Importantly, however, as stressed repeatedly by the UAE delegation in the UNFCCC context, while Abu Dhabi seems committed to raising the share of renewables in its domestic energy mix, committing to climate change mitigation at the international level is still considered impossible.[112] At least for the near-term future, the UAE will continue to

[107] Partly modelled from the G20, the 23 CEM participants account for over 80% of global energy consumption. *The National* (26 June 2010); Clean Energy Ministerial, [http://www.cleanenergyministerial.org/]. Accessed on 24 January 2011.
[108] WREC, [http://www.wrenuk.co.uk/wrecxi.html]. Accessed on 24 January 2011; *WFES*, Press release (30 October 2010).
[109] The statement did not mention response measures. Joint statement from the foreign ministers of the UAE, Cape Verde, Costa Rica, Iceland, Singapore and Slovenia, 9 December 2009.
[110] World Future Energy Summit, "2010 summit and exhibition", [http://www.worldfutureenergysummit.com/en/about-wfes/2010-summit-and-exhibition.aspx]. Accessed on 24 January 2011.
[111] *The National* (4 May 2009).
[112] *The National* (30 June 2009b).

maintain a strict and explicit separation between its ambitious and praiseworthy national level actions and its international commitments.[113]

6.3 Qatar in the UNFCCC

The GCC OPEC has undoubtedly been the primary reference group in determining Qatar's policies and behaviour in the international climate regime, even more pronouncedly than in the case of the UAE. Qatar's active role in the negotiations and its clear policies tell of an energy sector-dominated policy, concentrated on defending the country's main source of income and bluntly rejecting any calls for domestic mitigation by referring to the country's current role as a major exporter of 'clean' energy to the world.

UNFCCC-related decision-making structures and responsibilities

Qatar acceded to the UN Climate Convention in 1996 and the Kyoto Protocol in 2005. Immediately after this, Qatar set up its Designated National Authority (DNA), hosted by the SCENR.[114] Similarly to the case of Abu Dhabi, CDM-related expertise in Qatar has been mainly concentrated within one institution, namely Qatar Petroleum, presumably because of the company's massive al-Shaheen flaring gas recovery project, approved by the UN in 2007.[115] In 2007, linked to the project, QP established a CDM Department and a high-level QP CDM Committee, charged with establishing a Qatar Carbon Management Plan and engaging in project development, and with evaluation and monitoring at different levels.[116] In October 2007, an eight-member national climate change committee (NCCC) was re-established by decision of the heir apparent and SCENR chairman, Sheikh Tamim. It included members from the SCENR, Qatar Petroleum and the Office of the Heir Apparent, among others.[117] UN archives show that prior to this, the group had existed under the Ministry of Energy and Industry since at least 2002.[118] Since the Environment Ministry's establishment, the committee has been chaired by the respective minister and

[113] Interviews in October 2010 with carbon expert at Masdar; Rob Bradley.
[114] Under secretary general Khalid Ghanim Al Ali. UNFCCC, "Designated".
[115] Al Shaheen was Qatar's only CDM project until April 2010 when a small waste heat project (7 kt/year) at Ras Laffan was submitted for validation. See e.g.: *Gulf Times* (2 June 2006); Fenhann, "CDM pipeline" updated on 1 January 2011.
[116] Presentation by Adnan Fahad Al-Ramzani, Manager, CDM, HSE Regulation and Enforcement Directorate, Qatar Petroleum. *Lessons Learned from Al-Shaheen (ALS) Oil Field, Gas Recovery and Utilization Project* in Environmental Challenges in Gas Processing, Doha, 5 November 2008.
[117] *Gulf Times* (29 October 2007).
[118] The home institution of the National Team for Climate Change is mentioned in UNFCCC, *FCCC/SBSTA/2002/MISC.3*.

reports to this ministry.[119] As noted earlier, by the end of 2010, Qatar had not published a single national communication for the UNFCCC (see chapter 5.3.1).

The Qatari delegations in the UNFCCC

As is typical for OPEC member states, Qatar's official delegations to the UNFCCC have had strong representation from Qatar Petroleum and the Ministry of Energy and Industry. However, unlike the UAE and Saudi Arabia, where energy authorities have functioned as contact points for the Convention, the Ministry of Environment is officially Qatar's National Focal Point (similarly to Bahrain, Kuwait and Oman).[120] Pinpointing the dominant institutions in external climate policy-making is difficult due to the opacity of the process and its participants.[121] While Qatar's policy positions strongly indicate an oil sector-led policy, a QP negotiator, for example, has assured that no hierarchy exists in policy formulation, which takes place in the NCCC.[122] An analysis of the official delegations according to the lists of participants of the Conferences of Parties points towards two phases, namely the 1990s, when environmental authorities represented Qatar in the negotiations, and the 2000s, when the energy sector entered the picture. The size of Qatar's notified delegations in the 2000s varied between 5 in the early 2000s to 17 in the important Copenhagen meeting in 2009, and 40 in Cancún in 2010, roughly similar to those of the UAE.[123] In 1999-2007, the Qatari delegation was led by Mohammed Jassim al-Maslamani, a manager at the Ministry of Energy and QP, and in 2010 by energy minister al-Attiyah. As in the UAE, the Qatari delegation has included a number of long-term negotiators.[124] Moreover, in 2004, Qatar held the chair of the G77+China group, which granted it the right and responsibility to convey the group's common position.[125]

Qatar's policy in the UNFCCC in 1996-2010

Qatar's policy positions in the UNFCCC have not only been extremely stable, they have also been spelled out in great detail in seven submissions of views to the UNFCCC

[119] Al Mulla, *Climate Change*, pp. 6-7; interview of Abdullah al-Midhadi in: RasGas, "Qatar at the Crossroads", p. 9.
[120] UNFCCC, "National focal points".
[121] E.g. interview with Saif Al Naimi, Director, HSE Regulations and Enforcement, Qatar Petroleum, Doha, February 2011. Based also on personal experience as an observer in three UNFCCC meetings and on several and persistent meeting requests to stakeholders in Doha during 2008-2010. (See methodological note in chapter 1.4.)
[122] According to the negotiator, the members are at the same 'level of understanding', working for the interest of the state. Interview with Qatari negotiator, October 2009.
[123] Based on official lists of participants to COPs 1995-2010.
[124] Based on official lists of participants to COPs 1996-2009.
[125] Also, head negotiator al-Maslamani, held the vice president's title in COP-7 and energy minister Abdullah al-Attiyah chaired the UN Commission on Sustainable Development (CSD-15) in 2007. IISD, *Earth Negotiations Bulletin*, 12 (1996).

secretariat in 2001-2009.[126] In addition, Qatar's frequent appearance in the Earth Negotiations Bulletins, as well as a number of high-level speeches, enforce the image of a static policy, almost identical to that of Saudi Arabia and certainly in line with typical OPEC positions, natural gas constituting the only noticeable difference.

Qatar's first three submissions, from 2001-2002, were centred on seeking a special status for natural gas.[127] One of the submissions, a detailed 20-page presentation on the economic and environmental benefits of natural gas in 'global energy decarbonisation strategies', illustrated the impact of Qatar's gas industry on the country's total greenhouse gas emissions, with an eye to exempting the country from responsibility for its high emissions.[128] The four more recent submissions, from 2006 and 2009, set the country's position on a wide range of topics, namely CCS, response measures, and the broad architecture of the post-2012 climate deal, still under negotiation at the time of writing. A submission from 2006 confirmed Qatar's support for CCS as an approved CDM methodology, noting that technologies with such mitigation potential (15-55% of cumulative global mitigation by 2100) should not be excluded, and emphasised the necessity of external funding.[129] A submission from 2009 emphasised the importance of the response measures issue for Qatar and mentioned again natural gas as a 'win-win' fuel.[130] The other submissions from 2009 clearly spelled out Qatar's position on the main issues under discussion in relation to the Bali Action Plan, agreed upon in 2007, which forms the basis for the negotiations on long term cooperative action under the UNFCCC, namely: (1) general principles; (2) shared vision (long-term global goal), (3) mitigation and (4) adaptation.[131]

(1) As with OPEC countries generally, Qatar stresses the UNFCCC as the only guiding framework and source of principles for all present and future climate actions and that any outcome should be based on the principles of common but differentiated responsibilities (CBDR), historical responsibility of the developed countries, and equal treatment of all

[126] In terms of submissions of views, Qatar has been the most active of the small GCC states, with 7 documents submitted in 2001-2009. UNFCCC, "Documents", [http://unfccc.int/documentation/documents/items/3595.php]. Accessed on 17 October 2010.
[127] UNFCCC, *FCCC/CP/2001/MISC.1*, p. 104; *FCCC/CP/2001/MISC.1/Add.1*, p. 2.
[128] The paper argued for a 'beneficiary pays principle' instead of the 'polluter pays principle'. UNFCCC, *FCCC/SBSTA/2002/MISC.3*, pp. 16-35.
[129] UNFCCC, *FCCC/KP/CMP/2006/MISC.2*, pp. 31-32.
[130] UNFCCC, *FCCC/KP/AWG/2009/MISC.4*, p. 12.
[131] Views on technology transfer, finance and capacity building are also presented, but Qatar's positions do not generally differ from those presented in 2009 by the G77+China, which stress that financing should mainly come from the Annex I countries and it should be mainly public, and calling for finance and technology transfer to be governed by the COP (instead of donor-controlled organisms). IndyACT, Arab position matrix, 8 October 2009. Unpublished; UNFCCC, *FCCC/AWGLCA/2009/MISC.4 (Part II)*, p. 76.

greenhouse gases. Qatar also strictly opposes differentiation within the developing country group, particularly on a GDP or GHG per capita basis, 'which are detrimental to Qatar', and stresses that efforts by developing countries 'must respect foremost their legitimate right and priorities for sustainable development'. The text notes that attempts to pass mitigation responsibilities to so-called '"relatively developed" developing countries is counterproductive and must not be pursued any further'.[132]

(2) Regarding the shared vision, Qatar's position is typical for an OPEC state in its shunning of any numerical goals for emission reductions by 2020 or 2050. Qatar also advertises its opposition to 'efforts to impose trade-related regulations… under the disguise of sectoral approaches',[133] potentially harmful to energy intensive exports from developing countries.

(3) In mitigation, Qatar demands a clear distinction between the commitments of developed countries and mitigation actions of developing countries, and mentions the response measures issue.[134]

(4) As for adaptation, Qatar stresses its vulnerability, as defined in articles 4.8 and 4.9 of the Convention, to the negative impacts of response measures and controversially argues that 'any new adaptation work programme must take into consideration the need to adapt to the impact of mitigation policies and measures'.[135]

Taken into account Qatar's small size, its participation, observed through the ENBs, has been extremely active: the generally very concise bulletins mention Qatar over seventy times during the past fifteen years.[136] The response measures issue is the most important issue for Qatar, if measured in terms of times mentioned (1997-2010). After this, the most highlighted issues have been the CCS/CDM question, along with technology transfer more broadly (2004-2010), and burden sharing and developing country commitments, in relation to maintaining Qatar's status as a developing country (1998-2009).[137] Additionally, the country has opposed discussing international maritime and aviation emissions (bunker

[132] UNFCCC, *FCCC/AWGLCA/2009/MISC.4 (Part II)*, p. 75; *FCCC/AWGLCA/2009/MISC.1/ Add.1*, pp. 16-17.
[133] Ibid(1), p. 75; ibid(2), p. 17.
[134] Ibid(1), p. 76; ibid(2), p. 16.
[135] Most other negotiating groups see this issue pertaining to mitigation only. Ibid (1), p. 75.
[136] Qatar, like the UAE, is first mentioned in 1996.
[137] IISD, *Earth Negotiations Bulletins* (1997-2010).

fuels) in the UNFCCC (2008-2010),[138] relating to protecting global oil demand. Also, some of Qatar's past positions are identifiable as obstructionism (1999; 2010), as defined above (see chapter 6.1).[139]

In addition to the ENBs, a background paper from 2009 by one of the country's negotiators outlines four central issues for Qatar in the post-2012 negotiations: continuing active participation in order to ensure that the country's interests are protected; avoiding commitments; response measures; and the CCS/CDM issue, as well as the functioning of flexibility mechanisms (e.g. CDM) more broadly.[140]

The central points mentioned in four high-level speeches from 2002-2010 do not differ significantly, although the speech from 2009, delivered by environment minister al-Midhadi (instead of an energy official) had a more proactive and less defensive tone.[141] Speaking in New Delhi in 2002, head of delegation Mohammed al-Maslamani mentioned the CBDR principle and the response measures issue and called for capacity building and technology transfer.[142] In his speech in Copenhagen in 2009, minister al-Midhadi stressed the need for urgent action and an international legal agreement. He outlined Qatar's mitigation actions and mentioned the need for additional funding from the developed countries, the CBDR and compliance of developing countries with their commitments. As a new theme, he mentioned greater international exchange of information and expertise for developing solar and other renewable energy projects and resources.[143] Curiously enough, similarly to the UAE where the environment minister led the delegation for a brief period and was then overtaken by a more powerful minister, al-Midhadi also led the Qatari delegation in COPs of 2008 and 2009 and, despite participating in Cancún 2010, was forced to step down due to the participation of energy minister al-Attiyah.

Al-Attiyah's speech from Cancún 2010 carried a sceptical tone towards international mitigation and a defensive tone towards Qatar's mitigation actions, noting that the country

[138] As well as the sectoral approach, if this is used to create trade barriers, relating to protecting Qatar's energy intensive industries. Ibid. (2008-2010).
[139] Ibid. (1999; 2010).
[140] Al Mulla, *Climate Change*, pp. 7; 18-19.
[141] English simultaneous translations were available only for COP-8 (2002); COP-9 (2003) and COP-15 (2009).
[142] UNFCCC, "Webcasts and videos". In Milan in 2003, he limited himself to describing Qatar's efforts in reducing the negative impacts of climate change: providing 'clean energy and natural gas to all parts of the world', using the best possible technologies, and spending on R&D for emission reductions, as well as developing GTL technologies for domestic economic diversification. Ibid.
[143] He defined as Qatar's actions: the US$150 million contribution to the OPEC energy and research fund, the al-Shaheen CDM project, and Qatar's regional and global natural gas exports. Ibid.

has already contributed 'more than any other country' through its clean energy exports and calling for the developed countries to fulfil their commitments.[144] Also, in statements outside the UNFCCC since 2008, al-Attiyah spoke with a critical tone of alternative fuels and called for compensation for response measure-induced revenue losses.[145] Arguably, al-Attiyah's scepticism over alternative energies[146] stems from his indignation over the scapegoating of oil and gas producers and a worry for the future of natural gas demand, as demonstrated in his speeches in 2009-2010.[147] It is possible that Al-Attiyah's belonging to an older generation than Sheikhs Mohammed and Abdullah bin Zayed also played a role in forming a world-view less amenable to the dangers of climate change and the possibilities of the low-carbon energy economy.

Remarkably, there has invariably been a more positive tune in Emir Hamad bin Khalifa Al Thani's comments in international fora where, in the late 2000s, he noted the need for cooperation and contribution by both developed and developing countries, described climate change as a serious threat, and spoke about the potential of solar energy.[148] Also, environment minister al-Midhadi has stressed the business opportunities for Qatar provided by low-carbon technologies, and the GSDP's National Vision 2030 document pledges 'support for international efforts to mitigate the effects of climate change'.[149]

In conclusion, the constancy of Qatar's positions in the international climate regime, as defined in table 6.2, is striking. Despite the Emir's broader vision of sustainability, embodied in the Qatar National Vision, the strong hold of the energy sector on the country's external climate policy and its long-term policy of alignment with Saudi Arabia (and Kuwait) in most issues[150] have resulted in weak representation of broader or opportunity-focused interests. During the observed decade and a half, the conservation of fossil fuel revenues remained the central theme and aim of Qatar's UNFCCC policy.

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[144] Ibid.
[145] *Gulf Times* (21 April 2008); *Bloomberg* (14 October 2009).
[146] Qatar-based renewable energy expert, Doha, 4 November 2010.
[147] *The Peninsula* (11 September 2009); *Bloomberg* (14 October 2009); *The National* (19 January 2010b).
[148] Sheikh Hamad bin Khalifa Al Thani's statements in the General Debate of the Sixty-Second Session of the United Nations General Assembly, New York, 25 September 2007; the General Debate of the Sixty-Fourth Session of the United Nations General Assembly, New York, 23 September 2009.
[149] Interview of Abdullah Al Midhadi in: Oxford Business Group: *The Report: Qatar 2009*, p. 239; GSDP, *Qatar National Vision 2030*, p 33; *Second HDR*, p. 123.
[150] Based on the ENB record, Qatar has generally either spoken with other countries, most generally Saudi Arabia, Kuwait and other Arab oil exporting countries, or supported another country, most commonly Saudi Arabia. Qatar has also spoken alone, and, during its chairmanship, on behalf of the G77 and China group.

Table 6.2. Qatar's main principles and aims in the UNFCCC in 1996-2010.

Principles:

- Common but differentiated responsibilities and historic responsibility
- Vulnerability of oil-producing countries arising from climate change and Annex I policies and measures
- No further commitments and right to development of developing countries and lack of responsibility for domestic emissions

Aims:

- Compensation for oil-producing countries arising from climate change and Annex I policies and measures
- A special status for natural gas (since 2001)
- CCS as an accepted CDM methodology, CDM in general (since around 2006)
- Equal treatment of all GHGs (at least since 2009)
- Finance and technology transfer for developing countries (late 2000s)

Participation and engagement in non-UNFCCC fora

As climate change and environmental issues became increasingly prominent in international affairs, in line with the government's goal of branding Qatar into a renowned venue for international meetings, the state became increasingly interested in hosting related events. Since the establishment of the Ministry of Environment it has hosted the Vienna Convention and Montreal Protocol on Substances that Deplete the Ozone Layer (COP-8/MOP-20) in 2008, and the Convention on International Trade in Endangered Species (COP-15) in 2010. In the Copenhagen climate change conference in 2009, Qatar offered to host the eighteenth conference of parties to the UNFCCC in 2012.[151] Taken into consideration that this meeting could be a culmination of the post-Copenhagen negotiating process for a global post-2012 climate change, Qatar's candidacy can also be interpreted as extremely astute farsightedness, as the new climate treaty, if successfully agreed upon, would bear Doha's name, as was the case in the current round of WTO negotiations that began in Qatar in 2001. Nevertheless, these developments obviously share only a weak link with Qatar's domestic environmental sustainability and climate change-related efforts, and they are therefore to be understood in the larger context of Qatar's external profile-building as a host for major global events.

[151] UNFCCC, "Webcasts and videos". The contestant was South Korea.

7 Conclusions

7.1 The small Gulf monarchies' vulnerabilities in the early 21st century

In the late 2000s, the small Gulf monarchies were simultaneously confronted by multiple pressures emanating from both the domestic and external environment. Arising, on the one hand, from natural resource scarcities and on the other, from the transformation of the global energy economy, which began to intensify around this time, these pressures constituted an important threat to the stability of these neotraditional rentier states' existing social contracts. Of the monarchies examined in this thesis, those with depleting fossil fuel reserves, including Bahrain and Oman, were struggling with lower per capita levels of rent and economic diversification, and could not afford to spend heavily on alternative energies and technologies or focus on environmental and natural resource conservation. Those with large remaining fossil fuel resources (Kuwait, Abu Dhabi and Qatar) are in a better position, both from a welfare and regime survival perspective, in the short and medium term. Despite this, they will need to skilfully invest the oil revenues of coming decades so as to continue to thrive in the post-oil era. However, the problem remains that the rentier system that lies at the very core of these polities' stability is inherently unsustainable, leaving the disbanding of the structural source of its inefficiencies (the rentier bargain) and liberalisation of the political system as the ultimate preconditions for truly sustainable development.

Domestic stability and sustainability and the new energy paradigm

Although fossil fuel revenues continue to be the largest contributor to GDP and its growth in all five states, the small Gulf monarchies exhibit varying degrees of rentierism, ranging from the strong rentier 'states' of Qatar, Abu Dhabi and Kuwait to the weaker or post-rentier 'states' of Oman, Bahrain, Dubai and the UAE's northern emirates. While the former group enjoyed plentiful hydrocarbon revenue surpluses almost all throughout the 2000s, banking them in sovereign wealth funds and investing in massive domestic infrastructure and economic diversification projects, the latter group had to focus all energies on seeking to replace dwindling revenues from depleting oil and gas resources with alternative sources of rent and income from new economic sectors so as to avoid dismantling the increasingly fragile ruling bargains.

In the late 2000s, per capita wealth in the five states was of EU average or higher, with Qatar and the emirate of Abu Dhabi distinguishable from the rest with GDP per capita levels estimated at over US$70,000. This wealth was extremely unevenly distributed among citizens, foreign workers and other expatriates, but also among nationals. In the special case of the UAE confederation, where over 90% of the country's fossil fuel wealth is under the sovereign control of the Al Nahyan family, wealth disparities between the individual emirates grew staggering.

In addition to oil price volatility, population and economic growth emerged in the 2000s as important factors diluting both the governments' rent allocation potential and domestic energy security, the latter of which also linked directly to the states' economic diversification capacity, as lack of electricity hindered construction and industrialisation development in a number of the less wealthy monarchies, particularly the UAE's northern emirates.

Despite the current status of the United States as the small Gulf monarchies' supreme external security guarantor, in the late 2000s, the latter managed to diversify their relationships in the areas of trade, energy exports and security. In addition to the multi-stakeholder oil and natural gas ventures of Abu Dhabi and Qatar, new ties were forged and interdependencies created with unexpected partners, such as France and South Korea. Geopolitical realities influenced domestic energy security choices: In the case of Abu Dhabi, one of the justifications given for choosing nuclear over coal was security of supply. In the Gulf context, even peaceful nuclear energy undeniably carries an implicit deterrence message. Furthermore, with the exception of Sharjah's attempts, geopolitical considerations have kept the UAE's other emirates from seeking natural gas from Iran.

Growth of the citizen population is a major factor weakening the rentier bargain in the medium and long term if the government does not manage to maintain economic growth and job creation at required levels. As the 2000s showed, fast growth of the total population can constitute an even more acute problem. The recent decade's population explosion, particularly in Qatar where the total population doubled in 2005-2010, placed a burden on the state's allocation capacity as natural resources, such as electricity, water and gasoline, were sold at highly subsidised prices to citizens and non-citizens alike. The vicious circle created by the 2000s' growth had a safety valve, namely the large, 'expendable' segments of the population (i.e. the non-nationals), as the economic downturn

that began in 2008 demonstrated. However, as long as the monarchies' development strategies are based on economic growth, policies aiming at proportionately smaller expatriate populations will remain a rhetorical tool for appeasing the nationals, similarly to the largely inefficient labour nationalisation strategies.

Although not the main focus of this thesis, the negative social consequences of the 2000s' growth were most apparent in the major influx of foreigners following the economic boom and the low rate of placement of nationals in the tens of thousands, or as in the case of Qatar and the UAE hundreds of thousands, of jobs created. Obviously, while in most cases the numbers of working-age nationals were simply not enough to meet demand, the rentier mentality, produced by the all-encompassing welfare state and characterised by high expectations regarding salary and career advancement and often a low work morale, greatly hindered the placement of nationals in positions evenly across the economy, creating a structural paradox for sustained economic diversification. The dilution of the national identity and persistent unemployment among the nationals are a growing source of political discontent, which has the potential to erupt in calls for political reform. Should the trend further strengthen as a consequence of the governments' ambitious economic diversification strategies, coupled with the necessity to maintain welfare benefits for the nationals, this is a possibility.

Authoritarianism has both positive and negative consequences for the Gulf monarchies' sustainability. As was shown by the case of Abu Dhabi's nuclear programme, concentration of power and the suppression of domestic political debate enabled a fast start to the implementation of four nuclear plants that will greatly enhance the energy security of the entire federation. On the other hand, the lack of freedom of speech poses a fundamental value dilemma: whether energy security considerations should precede democratic participation. Moreover, the arbitrary decision-making patterns, for example in environmental permitting, and the lack of independent local environmental NGOs keeping a check on the major polluters and other sources of environmental threats, are among the main reasons why most sectors and actors in the Gulf monarchies, despite claiming green credentials, have been able to continue their environmentally unsound practices, business as usual.

The price volatility and future demand for oil, and to some extent also natural gas, are the main external sources of economic vulnerability for the five states, but in the long term

particularly so for the three OPEC members (Kuwait, Abu Dhabi and Qatar), that have the largest fossil fuel reserves. There are numerous uncertainties associated with future demand for fossil fuels, caused by, among other factors: the energy security and efficiency policies of consumer states, the pace of economic growth, particularly in the major Asian economies, international climate change abatement policies, development of alternative energy and 'clean' fossil fuel technologies, and the impacts of climate change. Although oil is expected to remain an integral part of the global energy mix in the coming decades, there is high uncertainty. Demand estimates were constantly revised downwards throughout the latter half of the 2000s.

There are great differences in the sizes of proven oil and natural gas reserves of the monarchies: with less than 1% of the world's oil and gas reserves, oil production in Dubai, Bahrain and Oman has peaked and reserves are expected to last for two more decades at most. At the other end there are the three OPEC members, which together hold around 16% and 18% of proven global oil and natural gas reserves, respectively. These three monarchies' fossil fuel reserves are expected to last for at least a century at current production rates. Their interest in long-term demand security is therefore obviously stronger than that of Bahrain and Oman.

While previously the Gulf monarchies only had one energy security problem, namely the continuity of global demand for oil, the 2000s' growth pushed domestic energy security to the core of the government agendas. In the past three decades, reflecting fast socio-economic development, domestic energy consumption grew extremely rapidly in the five monarchies. Major drivers were the rising living standards, population and economic growth, reliance on desalination, natural resource subsidies, inefficiencies across the economy (ranging from building practices to industrial processes and consumption habits), enhanced oil recovery, gas flaring, and the energy and energy intensive industries. It was not until the late 2000s, however, when, due to a lack of timely investments in the development of domestic gas reserves, its availability for domestic use became a problem in all monarchies but Qatar. Gas imports from Qatar served as a partial solution for the UAE and Oman. The GCC electricity grid, expected to link all six member states starting from around 2012, will also alleviate peak load pressures. Nevertheless, the late 2000s' natural gas shortages prompted a number of important, high-level energy policy decisions and shifts in strategy across the region, with a number of long-term consequences.

In a country that is dependent on one or two energy resources for both energy supply and exports, domestic consumption naturally eats away at what could be exported. Highly subsidised domestic energy and water consumption also create both high direct expenditures and opportunity costs for the government. Around 2006-2007, as a consequence of gas shortages and oil-related opportunity cost considerations, the small Gulf monarchies began looking at alternatives to fossil fuels, most saliently nuclear and solar energy. Despite a GCC joint feasibility study launched in 2006, Abu Dhabi soon broke away, an event which evidenced the political and security impediments to sharing such sensitive technology and sensitive an issue for national security as power supply. As was shown by plans to install coal power plants in less wealthy monarchies (including Ras al-Khaimah and Oman), in the absence of sufficient financial resources and political clout, need and willingness were not sufficient conditions for initiating a nuclear energy programme.

Solar energy was still considered a supplementary and expensive source of energy, suitable mainly for peak load shaving. Despite announcements regarding the planning of hundreds of megawatts of capacity for the 2010s, only one larger-scale solar power implementation plan had been initiated by the end of 2010, led by Masdar with its 10 MW PV and 100 MW CSP plants. In countries used to extremely cheap energy, solar, for the time being, was perceived as mainly useful for generating green headlines and small-scale pilot projects.

Carbon capture and storage became another sought after technology as it is expected to extend the era of fossil fuels through both cutting the associated greenhouse gas emissions and liberating natural gas for other uses. As with alternative forms of energy, those monarchies with larger remaining reserves, and consequently more at stake, were the ones where R&D and pilot studies were initiated, that is Abu Dhabi and Qatar. Despite chronic domestic electricity supply shortages, Kuwait, as in many other policy areas, seemed to remain hostage to its deadlocked political liberalisation experiment, as it remained far behind its two OPEC allies in everything related to alternative energies and technologies, thus also revealing the limits of rentier state theories alone in explaining divergence in energy security responses among the monarchies.

In the late 2000s, the impact of energy subsidies on energy consumption levels became openly recognised. As found in a UAE study, in 2006, households were responsible for nearly two thirds of the federation's total natural and ecological resource consumption. As

a result, demand side management became included in the toolboxes of all other governments, except that of Qatar. Nevertheless, changes were gradual and used measures soft, so as to avoid disturbing the social contract too much at once.

The small Gulf states rank in international comparisons among the most environmentally unsustainable states in the world. This is caused partly by the harsh climate and scarce water resources, which make air conditioning and desalination a precondition for modern life in the region. However, at the root of the problem is the rentier system, which for the past decades has been inclined towards placing economic sustainability ahead of social and environmental sustainability.

As was demonstrated in this study, instability and unsustainability are built-in features of the small Gulf states' contemporary rentier systems. These pathologies are created and sustained by economic and political dependence on external rent and social dependence on a large mass of foreigners. During the past decade, overexploitation of domestic natural resources led in many cases to their uncontrolled and unexpected deterioration, which in turn created serious security issues in the areas of energy, water and food supply, and environmental sustainability more broadly.

The climate change issue

Coinciding with this local domestic energy and sustainability crisis was the rise of climate change into global awareness. This presented the monarchies, particularly the three stronger rentier states, with a dual challenge: firstly, around 2007, as evidence of the potential negative consequences of climate change world-wide became more defined with the advancing of climate science, global resolve on the need to cut greenhouse gas emissions grew stronger. This increased fears among countries highly dependent on oil revenues over their future source of income. Secondly, new climate change impact studies on the region became available, which increased awareness, and fears, of its potential physical consequences on the small Gulf monarchies, most saliently for coastal areas and agriculture. However, of all the monarchies, only Abu Dhabi realised that working for ambitious climate change mitigation does not necessarily entail giving up on oil producer-specific interests or economic development.

High per capita greenhouse gas emissions were another factor affecting the small Gulf monarchies' relationship with the international climate regime. While it was evident that

their contribution to climate change through their domestic emissions was minimal, representing roughly 1% of global emissions in 2007, their status as wealthy oil producers attracted a lot of unwanted international attention and created at least two types of responses: the UAE's two leading emirates Dubai and Abu Dhabi perceived the rankings as a serious image issue whereas Qatar opted for a defensive, if not slightly offended, stance.

7.2 The domestic-level responses of Abu Dhabi and Qatar

Despite the strong, even evident explanatory power of economic wealth and domestic energy insecurity in driving alternative energy, environmental sustainability and climate change-related responses, these become problematic when the cases of Kuwait (wealthy, with almost no active responses) and Qatar (gas-rich, with still some level of responses) are considered. Additional factors must therefore be examined, as this study has done.

Abu Dhabi's domestic level responses

Abu Dhabi's status as a member and leader of the seven-emirate confederation of the United Arab Emirates makes it a peculiar case study: despite its high level of independence in many areas, in almost all policymaking there are still multiple inter-emirate linkages, dependencies, interest conflicts and other contending aspects that mostly complicate the process, starting from access to and aggregation of information, through consultation and coordination, to implementation and enforcement of decisions. In addition to the size disparities between Abu Dhabi and Dubai, on the one hand, and Sharjah and the smaller emirates, on the other, Abu Dhabi's heavy concentration of oil and natural gas reserves (94% and 93%) and wealth sets it apart from the other emirates. Abu Dhabi's oil and sovereign wealth-based affluence allows it to plan big, take its time, and even make some mistakes along the way, unlike, for example Dubai, where the foundation of the rentier system is much more volatile, as shown by the economic crisis that started in 2008. In the mid-2000s, led by the dynamic crown prince Sheikh Mohammed, Abu Dhabi embarked on an ambitious economic diversification endeavour, spearheaded by development vehicle Mubadala, with the aim of creating a number of new high-value economic sectors, including cultural tourism, high tech heavy industries and alternative energies.

Towards the late 2000s, the UAE's economy and population were booming as a result of high oil prices. Abu Dhabi realised it was facing a looming gas shortage, while the poorer

emirates, which it was supporting through both budgetary and energy allocations, found themselves amidst an energy crisis. Domestic sour gas reserves had not been developed in time and the high opportunity cost of using oil domestically made it an extremely unattractive option. Simultaneously, Abu Dhabi was securing increasing financial resources which would enable it to diversify its energy mix: between 2006 and 2008 the strategy became defined with the launching of two massive initiatives. These consisted of nuclear energy (in the medium term) and some renewable energy capacity and the aim to master alternative energy technologies (in the longer term). Unlike in Bahrain and Oman, where fossil fuel-derived wealth was more limited, all Abu Dhabi needed for deploying its ambitious alternative energy strategies was political will and technology transfers, implying in the case of nuclear technology the political support of key global suppliers, most importantly the United States, and in the case of other alternative energy technologies either massive investments in companies abroad or devising a strategy to attract foreign direct investment into Abu Dhabi.

First born from this context was Masdar, established in 2006. Its remit and budget quickly grew as the positive international attention increased its importance in the eyes of Sheikh Mohammed. The company's stated aim was no less than to transform the emirate into an energy technology exporter. In 2008, Abu Dhabi's government pledged it would support the company with US$15bn.

Masdar also took up a broader task, partly motivated by prestige and fame, partly driven by genuine 'pioneerism', which was to show the world through its 50,000-inhabitant eco utopia city project and domestic solar energy projects that environmental sustainability would be possible in one of the world's least sustainable places. Despite a spectacular start, the economic crisis of 2008 revealed a number of problems. Among Masdar's biggest early mistakes were arguably: the haste at which it publicised extremely ambitious targets, locked its technology choices, and rushed into implementation without proper feasibility studies; lack of strategic clarity on whether Masdar was a commercial project or a transformational vehicle of the government, as this has an impact on key priorities; and most importantly, forgetting the two other pillars of sustainable development, namely social and economic sustainability. All these problems also reflected Abu Dhabi's broader sustainability challenges, namely expectations of quick profits and boom-inspired excesses in real estate investments, typical for a rentier state, and the blurred lines between public and private interests, typical for the monarchical regimes of the Gulf. Masdar, nevertheless,

as of 2010, stood as the single most ambitious and successful cluster of alternative energy and technology investments and deployment in the Arab Middle East.

One of the most important 'spillover effects' of the late 2000s' convergence of domestic energy security issues, high oil prices, the establishment of Masdar Initiative, its early successes and the positive international response, and the relative strength of the local environmental authority (the EAD), was the rise of environmental sustainability in an unprecedentedly comprehensive manner on the emirate's strategic planning agenda.

The most important factor in bringing forth these responses, however, was the patronage of crown prince Sheikh Mohammed. Another key factor in Abu Dhabi's invention of itself as the regional 'green energy leader' was the elite's neotraditional environmental legitimacy mechanism, labelled as 'the legacy of Sheikh Zayed', which was reinvented in Masdar's alternative energy rhetoric. Notably, there also existed a tangible consequence of this legacy, namely the EAD (formerly ERWDA, established by Zayed), which is undoubtedly the strongest environmental institution in the GCC. Owing largely to the agency, with the backing of Sheikh Mohammed, Abu Dhabi's environmental sustainability problems and the potential negative impacts of climate change began receiving due attention. Moreover, the sensitivity of both Abu Dhabi's and Dubai's leaderships to external criticism regarding the UAE's environmental performance and carbon dioxide emissions was something that distinguished the two from the other small Gulf monarchies, apart from acting as an important catalyst to action.

The 'greening' of Abu Dhabi by its elite (and particularly Sheikh Mohammed) was hence a two-dimensional legitimacy quest, an attempt to please both external and domestic audiences. Towards Arab and Western audiences Masdar was a prestige tool, aimed at attracting envy and admiration of the modernity and progressiveness of the government—small state branding per se. The Masdar brand cleverly reinvented Abu Dhabi as *the* environmentally sustainable oil producer and, although influenced by external image considerations, this greening was not a direct result of Western pressure.

Legitimacy-seeking vis-à-vis domestic audiences was pre-emptive rather than reflective of values prevalent in the Emirati society, which was mainly disinterested and uninformed about the consequences of the UAE's high natural resources consumption rates and environmental deterioration. Through top-down awareness raising and other soft measures

that would not rock the rentier bargain and repel expatriates, the green forces of Abu Dhabi sought to address the soaring resource consumption. Simultaneously, the leadership was able to portray itself as a visionary leader to the fast-transforming and young Emirati society where calls for attention to climate change and other environmental issues were bound to appear, sooner rather than later.

A parallel development, initially not perceived in the same context as renewables and climate change mitigation, was Abu Dhabi's nuclear energy programme. Although handled by an Abu Dhabi government-owned company, similarly to Masdar, the strategic and security dimensions of nuclear technology placed the issue at a different level of priority. Set up with the assistance of the emirate's key external security allies, the United States and France, starting from 2007, Abu Dhabi's government became involved at the highest level, including Emir Sheikh Khalifa and also foreign minister Sheikh Abdullah. Despite a similar time frame to that of Masdar City, the nuclear energy programme's implementation did not reflect the international cycles of oil or real estate prices, indicating nuclear energy's primary status in the government's energy security strategy—and role of Masdar as a technology transfer vehicle.

As for why the nuclear energy programme was envisaged and implemented in Abu Dhabi and not in another Gulf monarchy, the answer lies in the emirate's increasing subregional political weight, financial resources, natural gas shortages, a 'conducive' domestic political environment (authoritarianism combined with restricted freedom of speech), the ambition of its young leaders Sheikh Mohammed and Abdullah, and perhaps most importantly the paradigm-breaking 'nuclear model' co-invented by Abu Dhabi and the United States.

Qatar's domestic level responses

A unitary political system, with a small, 1.7-million population and high concentration of power among few individuals, the dynamics and structures of Qatar's energy and environment-related decision-making are easier to grasp. Owing to its geopolitical vulnerability and ownership of the world's third largest natural gas reserves (14%), Qatar's foreign policy has since the mid-1990s been characterised by engagement and balancing with all main regional actors. LNG joint ventures and long-term export agreements with a number of foreign partners, and the hosting of the region's largest US air force base, however, are the backbone of Qatar's external security strategy. As in Abu Dhabi, Qatar's economic strategy consists of fossil fuel rent-based growth and diversification into

industrial sectors of comparative advantage, as well as a number of non-oil sectors. Carefully hand-picked, reflecting Qatar's small size, these include: real estate, air transport, conference and sports tourism, education, and technology development in the areas of energy, the environment, health and computing.

Qatar has been extremely successful in replacing rent from its depleting oil reserves, estimated to last for four to five decades, with natural gas revenues, becoming in 2006 the world's largest LNG exporter. By diversifying its gas exports on a geographical scale, through different types of exports, and along the value chain, Qatar built itself a robust strategy for securing a stable flow of continued external rent for the coming decades.

While natural gas for Qatar was both a catalyst for economic growth and development, it slowed down important investments and developments in the areas of domestic energy policy and environmental sustainability. In the case of the former, the government, following a subregional trend, began tentatively exploring nuclear and solar energy as early as 2007-2008. By 2010, however, there were no concrete plans on large-scale implementation. Amidst the accelerating construction boom, sustainable building was emerging as a bottom-up trend in the construction industry (whereas in Abu Dhabi it emerged top-down). Government-led attempts to design and implement plans specifically aimed at cutting natural resource consumption and emissions were still at very early stages.

The 2000s' massive development and real estate projects, fomented by and fomenting the economic growth, created a vicious cycle of unexpectedly fast population growth and, consequently, domestic natural resource consumption. This prompted a strategic re-evaluation of Qatar's development priorities and its pace, culminating in 2008 in the Qatar National Vision 2030, which placed emphasis on the three pillars of sustainable development, in addition to the formerly established goal of creating a knowledge economy, particularly visible in initiatives under Sheikha Mozah's patronage.

Due to its natural gas abundance and early start in developing its (easily exploitable) gas fields, Qatar was in the late 2000s in a very different situation to any other small Gulf monarchy in terms of domestic energy security. Despite signs of an eventual impact on Qatar's export capacity from growing industrial and residential energy demand, the government was still able afford to postpone addressing the inefficiencies of the domestic demand side.

Significantly contributing to the lack of measures to increase environmental sustainability and curb greenhouse gas emissions was the lack of a top-level elite patron for the issue. Evidence from Qatar's education sector demonstrates the large quantities of financial and human resources and political attention a small, but wealthy authoritarian state can draw together for a strategic goal, if this is perceived to be in the personal interests of a leading figure. Qatar's five most influential elite members, however, were occupied by their respective areas of authority and patronage. While sustainable development constituted the new umbrella for strategic thinking among the Qatari elite, the economic pillar was still leading the way, with social and environmental sustainability slowly advancing, but not in pace. Two elite members whose respective areas were tangential with alternative energies and technologies were energy minister al-Attiyah and Emir Hamad's wife Sheikha Mozah. Qatar also lacked a strong institutional leader in this area. The new local environmental institutions (first SCENR, then the Ministry of Environment), despite having increasingly significant staff numbers, were not bestowed with strong leaders. They therefore lacked capacity and clout to devise and implement society-wide environmental policies and deal with contemporary climate change-related questions. As a consequence, Qatar had a 'second sphere' of environmental strategy and policy-making, consisting of the GSDP and the Ministry of Energy/Qatar Petroleum, and even 'private' developers.

Arguably, energy minister al-Attiyah's personal scepticism towards the viability of renewable energies and the urgency of fighting climate change (most likely attributable to his belonging to an older generation of leaders), and his enormously heavy fossil fuel energy ministerial portfolio meant that alternative energies or mitigation policies did not figure in the priorities of Qatar's energy sector. Although focusing on a wider range of fields, from a narrower perspective, the mandate of the Qatar Science and Technology Park inaugurated in 2009, under Sheikha Mozah's support, was similar to that of Masdar: economic diversification, job creation, and building Qatar's 'post-carbon economy'. Since energy policy was tightly in minister al-Attiyah's court, and education and research in Sheikha Mozah's, all activities under the Qatar Foundation were bound to be scientifically oriented and primarily linked to knowledge-society building. Renewable energy as a theme was taken forward also by crown prince Tamim bin Hamad, under whom the Qatar National Food Security Programme, established in 2009, began exploring the impossible-sounding equation of enhancing arid Qatar's food security through solar desalination. Nevertheless, if a 'green patron' of Qatar in the late 2000s were to be named, it would be Sheikha Mozah.

A shared feature of Masdar and the QSTP was their dependence on direct elite patronage. In Abu Dhabi, this support was initially only linked to crown prince Sheikh Mohammed, but later became embedded in a number of the emirate's strategic objectives, international promises and domestic imperatives, enjoying increasingly broader elite support. In Qatar, in turn, the fate of the Qatar Foundation and the QSTP hang from a much thinner thread.

It is important to distinguish between Abu Dhabi's green energy leadership pursuit and the piecemeal approach of Qatar, consisting of a combination of minister al-Attiyah 'selling' natural gas to external audiences as a clean energy and Sheikha Mozah leading the gradual consolidation of a domestic hub of energy and environmental technology know-how and development that would establish a regional leadership position in a few select areas. Both were early responses to the transforming global energy agenda, but each was produced in a completely different domestic context, consisting of diverging energy security situations, differences in elite size, internal dynamics, historic personalities and present diversification priorities, and also distinct institutional settings, including differences in the strength of environmental institutions and (changes in) the locus of power in climate change-related decision-making. The main drivers and motives for change/continuity and divergence in Abu Dhabi's and Qatar's domestic-level responses to the climate change issue are presented in summary in table 7.1.

Table 7.1. Determinants of Abu Dhabi's and Qatar's domestic responses to climate change.

Abu Dhabi/the UAE: why change?	Qatar: why less change?
• Shortage of available natural gas for domestic use	• Abundance of natural gas for domestic use
• Concern over the future demand for oil	• Abundance of natural gas for export (presently and long-term)
• Sheikh Mohammed's economic diversification vision	• Areas of diversification few (due to smaller size) and locked
• Masdar (and Estidama)	• Lack of vision on alternatives or environment (National Vision vague)
• GCC first-comer's advantage (other initiatives in Masdar's economic niche seen as copycats)	• Need to find a different approach to alternative energy and tech (second-comer's burden) that also fits with existing priorities
• Strong political backing of Masdar and the nuclear energy programme	• Top elite members largely disinterested in green legitimacy
• Sheikh Zayed's legacy, including environmental legitimacy resources and a strong local environmental agency, local environmentalists	• Absence of a green patriarchal figure, weak local environmental institutions, few environmentalists
• Sensitivity over external image, especially vis-à-vis the West	• Insensitivity over external image, linked to external balancing
• Pre-emption: being a step ahead of nationals in environmental sustainability (linked to domestic energy security)	

7.3 The external-level responses of Abu Dhabi/the UAE and Qatar

Since the early years of the UNFCCC, the small Gulf monarchies were most visible in their support of efforts to protect the role of oil in the international energy economy. Their positions were strongly influenced by the policies and coordination of their main negotiating reference groups, the GCC, OPEC and others. Moreover, Saudi Arabia's lead and influence over the five countries' positions was uncontested. Since climate change mitigation was a low-key issue in domestic politics, the (de facto) lead in coordination of national positions in the GCC OPEC states was taken by energy ministries and national oil companies who perceived a clear motive to participate in the negotiations, while non-OPEC Bahrain and Oman remained passive in formulating individual positions. In addition

to shared interests arising from geographic proximity, structural similarities, and the participation of institutions with generally aligned interests, the 'human factor'—in the form of personalities and personal relationships—also reinforced uniformity within the group.

In the UNFCCC context, the GCC appeared externally unified, but was in reality rife with unvoiced disagreements and imbalances in interest representation, which were kept under the surface by the strength of the Saudi team's strategy and the absence of strongly perceived domestic interests that would clash with the Saudi/OPEC line. The material benefits, including technology transfer and financial returns through the Clean Development Mechanism, potentially available through active participation, and the immaterial benefits, such as a better negotiating reputation, achievable through more constructive participation, were not enough to persuade the small GCC states to take an independent course.

Throughout the 1990s and 2000s, the UAE's and Qatar's positions closely resembled each other and those of Saudi Arabia, the OPEC and the G77+China group and consisted of avoiding new international commitments, seeking recognition and support for the vulnerability of oil revenue-dependent states, and technology transfer (carbon capture and storage particularly).

As Masdar's plans advanced, their domestic implementation was highly dependent on international credibility (particularly in the case of Masdar City, which initially had a heavy real estate element). An important positive recognition was Abu Dhabi's victory in its campaign, led by foreign minister Sheikh Abdullah, to host the IRENA headquarters. With both Masdar and IRENA on its soil, siding with a group famous for its problematic negotiating tactics and even sheer obstructionism in the UNFCCC became an impending image issue, quickly picked up by the minister. The UAE's association with the Copenhagen Accord, the establishment of the Directorate of Energy and Climate Change and its swift engagement in the negotiations, and Sheikh Abdullah's participation in the Cancún climate conference, were all rapid and momentous changes for a country that had until early 2010 slumbered in OPEC's shade.

Qatar in turn, had in the early 2000s chosen to regard itself as a positive contributor to international climate change mitigation merely due to its natural gas exports, as shown by a

number of statements. A more active participant than the UAE, with clearly defined positions on a number of issues, Qatar's policy remained impressively static throughout the 1990s and 2000s indicating that, despite the establishment of a Ministry of Environment, external climate policy continued to be determined by the Ministry of Energy, led by minister al-Attiyah.

As demonstrated by this study, despite the striking structural similarities, Abu Dhabi's and Qatar's responses to the new energy paradigm and the climate change issue were driven by different factors on both domestic and external levels. The main determinants of the external level are illustrated in figures 7.1 and 7.2.

Figure 7.1. Determinants of Abu Dhabi's/the UAE's external climate policy in the late 2000s.

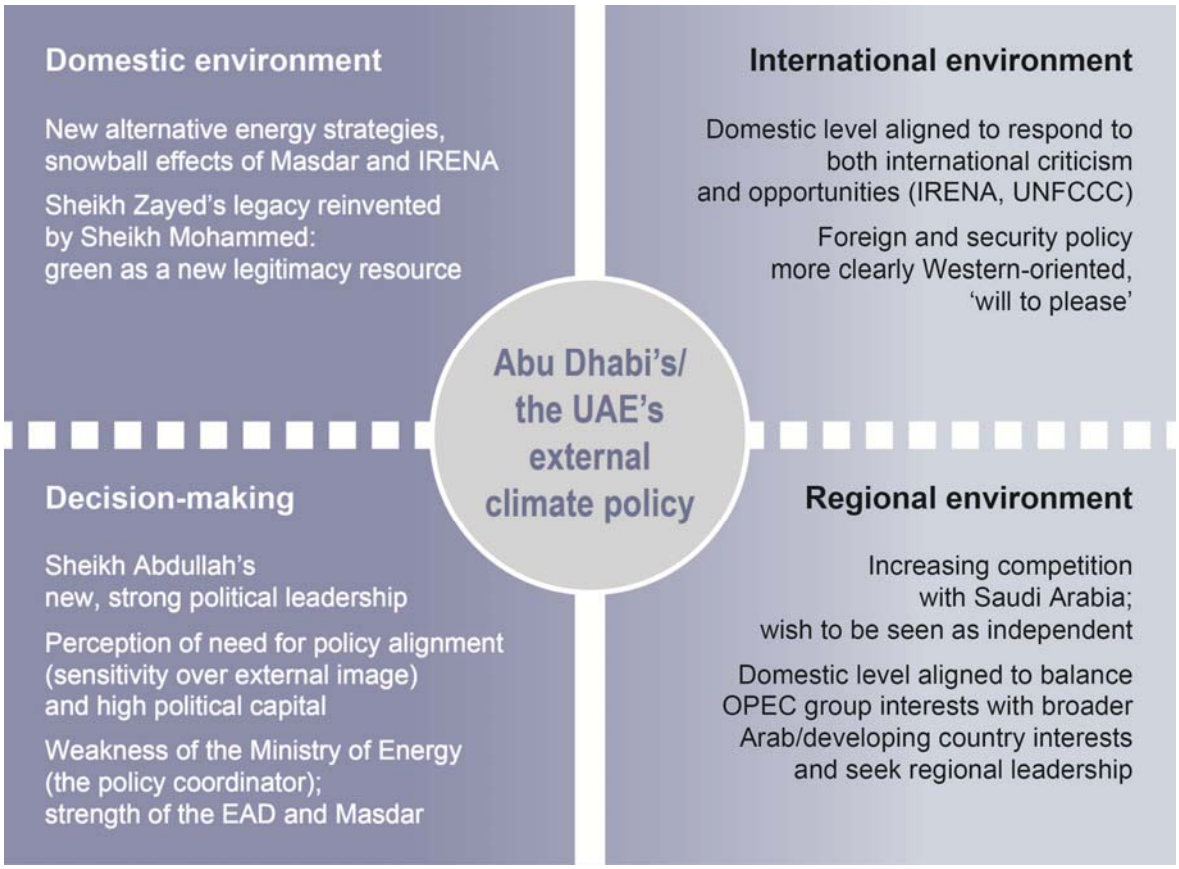
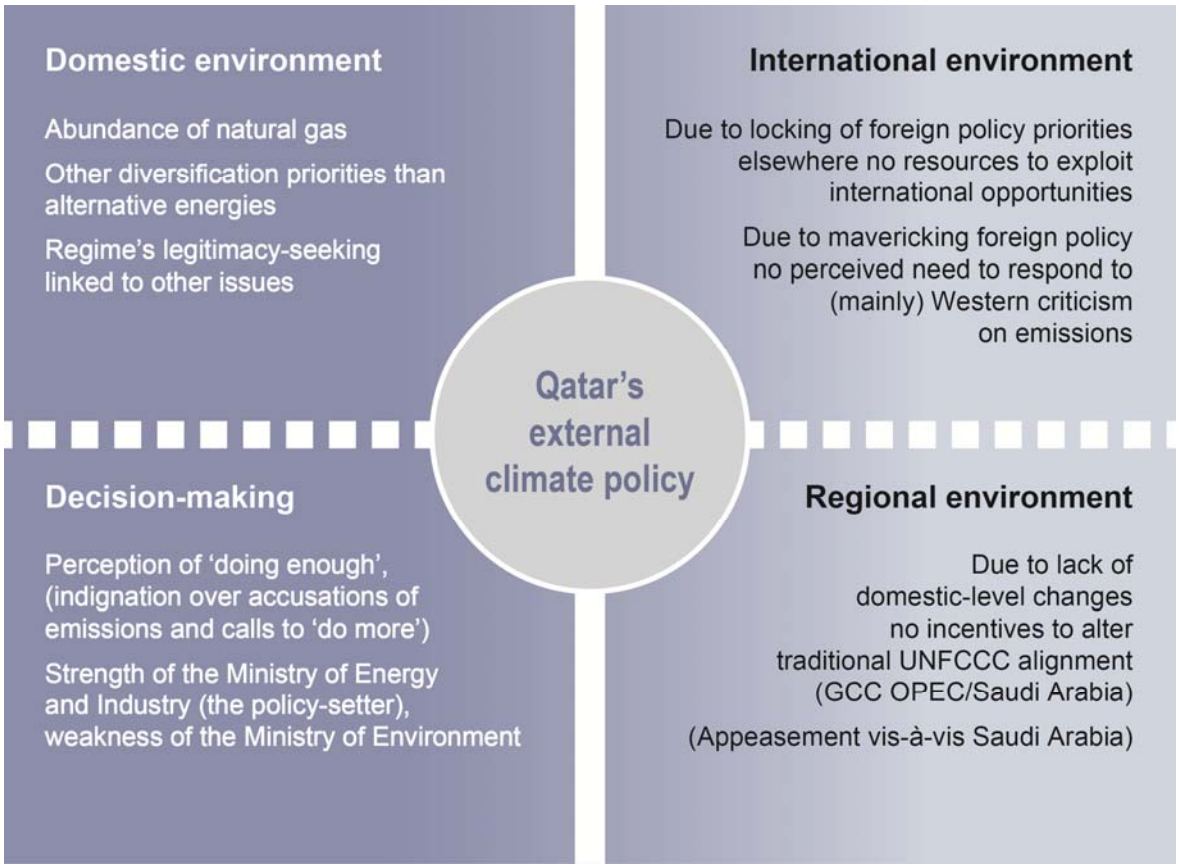


Figure 7.2. Determinants of Qatar's external climate policy in the late 2000s.



In summary, the external-level climate policies of Abu Dhabi and Qatar were produced in the juncture of external pressures and incentives and key decision-makers' perceptions of the above, embedded as they were in a complex domestic institutional setting and seeking to preserve their power and legitimacy through a number of strategies.

At this level of analysis the most important theory-related outcome of the two case studies was the strong influence on foreign policy-level positions of the domestic environment, most importantly the interests and perceptions of the decision-making elite, and the power relationships and dynamics of the decision-making system. However, there are two related points to be made.

Firstly, as long as the climate change issue remained a domestically marginal one, the existing alliances and pressures of the regional environment (relating to relations with Saudi Arabia) were the main determinant of small Gulf states' external climate policies. Even when domestic changes in the form of proactive responses to climate change and environmental sustainability began appearing, these only influenced external level

alignments when links to international level pressures became strong enough to demand for an adjustment (as was the case in Abu Dhabi).

Secondly, notwithstanding whether the state had adopted an engaging or a defensive posture in the negotiations, the benefits and advantages gained previously (i.e. the developing country status and the lack of emission reduction commitments) were still defended; decision-makers in Abu Dhabi and Qatar maintained that domestic-level actions were strictly voluntary and separate from the countries' obligations in the international climate regime.

As for the generalisability of the results to other small Gulf monarchies, regarding their late 2000s' domestic responses to climate change, the primary determinant in most cases was the state of the rentier state. Despite the large inflows of external rent of the 2000s, the simultaneous growth (demographic and economic) and gradual depletion of domestic fossil fuel resources overstretched the ruling bargain in Bahrain and Oman, which were already moving towards post-rentier states. As a result, the governments could not afford large investments in expensive and potentially risky long-term diversification ventures. Nor was there much international attention on these two states' greenhouse gas emissions or other environmental unsustainabilities. Sharjah and the tiny northern emirates of the UAE were in a similar situation, although many of them never had fossil fuel resources to begin with. Although Dubai, a rather diversified rentier state, demonstrated interest in cutting its natural resource usage around 2007-2008, through energy efficient building, the drastic weakening of its external rent flows since late 2008 tied the decision-makers' (or maker's) hands. As a consequence of the crisis in Dubai, economic sustainability remained the central focus of the government. In Kuwait, the strong rentier state was not being eroded but the political system, although the most democratised of the monarchies, was in a quasi-permanent state of tension and crisis. This meant that new alternative energy projects, like a nuclear energy programme, never moved forward from the level of rhetoric. In addition, a feature setting Abu Dhabi apart from the others was the was the existence of an environmentalist father figure, which not only provided the emirate's ruling elite with neotraditional legitimacy resources but also a strong environmental institutional base.

Finally, in relation to external level responses, it was clear that without tangible changes in domestic priorities, the other small Gulf states did not have incentives to seek a more

(pro)active role at the regional or international levels, towards climate change mitigation and adaptation either, remaining in the shadow of if their traditional reference group.[1]

If the allocative rentier monarchies of the Gulf, as we now know them, are maintained, it is unlikely that they will be able to evolve into significantly greener societies. Although the deterministic logic of the rentier structures might ultimately render fundamental transformation impossible, this study has, however, demonstrated that agency can indeed win a battle. In a longer perspective the question is whether or not regime self-conservation is possible without addressing the increasingly pressing structural environmental and natural resource-related unsustainabilities discussed in this study. Of course other factors might interfere sooner, and probably will.

[1] Abdullah al-Attiyah was replaced as energy minister in January 2011 by (younger) Mohammed Saleh al-Sada. The ramifications of this for domestic energy policy were unknown at the time of writing.

Bibliography

Books, periodical articles and other publications

Aarts, Paul, *The Arab Oil Weapon: A One-Shot Edition*, Emirates Occasional Paper No. 34 (Abu Dhabi: Emirates Center for Strategic Studies and Research, 1999).

Aarts, Paul, and Janssen, Dennis, "Shades of Opinion: The Oil Exporting Countries and International Climate Politics", *The Review of International Affairs*, 3 (2003), pp. 332-351.

ADNOC, *Health, Safety & Environment Report 2009* (Abu Dhabi: Supreme Petroleum Council, 2008).

Ahmed, Azhari, and Al Maslamani, M., "Anticipated Economic Costs and Benefits of Ratification of the Kyoto Protocol by the State of Qatar", *Climate Policy*, 4 (2004), pp. 75-80.

Al Awad, Mouawiya, and Chartouni, Carole, *Explaining the Decline in Fertility among Citizens of the G.C.C. Countries: the Case of the U.A.E.* Only available online. [http://www12.georgetown.edu/students/caa26/Carole_Chartouni_Paper3.pdf] Accessed on 8 December 2010.

Aliboni, Roberto, *Europe's Role in the Gulf: A Transatlantic Perspective.* Gulf Paper (Dubai: Gulf Research Center, 2006).

Al-Iriani, Mahmoud A., "Climate-Related Electricity Demand-Side Management in Oil-Exporting Countries—The Case of the United Arab Emirates", *Energy Policy* 33 (2004), pp. 2350-2360.

Al Mohannadi, Hassan, Hunt, Chris, and Wood, Adrian, "Residential Water Demand in Qatar, An Assessment", *Ambio*, 32 (2003), pp. 326-355.

Al Mulla, Ali Hamed, *Chapter 4: Climate Change and Human Development in Qatar: Issues, Challenges and Opportunities.* Unpublished, drafted for Qatar's Second Human Development Report (2009).

Al-Sayegh, Fatima, "The UAE and Oman: Opportunities and Challenges in the Twenty-First Century", *Middle East Policy*, 9 (2002), pp. 124-137.

Al Shamsi, Fatima, "Industrial Strategies and Change in the UAE during the 1980s" in Abbas Abdelkarim (ed.), *Change and Development in the Gulf* (Houndmill and London: MacMillan, 1999).

Anderson, Lisa, "Dynasts and Nationalists: Why Monarchies Survive" in Joseph Kostiner (ed.), *Middle East Monarchies: The Challenge of Modernity* (Boulder and London, Lynne Rienner, 2000), pp. 53-69.

Aspinall, Simon, "Environmental Development and Protection in the UAE" in I. Al Abed and P. Hellyer (eds.), *United Arab Emirates: A New* Perspective (London: Trident Press, 2001).

Aune, F. R., Kverndokk, S., Lindholt, L., and Rosendahl, K. E., "Profitability of fossil-fuel production under different instruments in international climate policies", *Climate Policy*, 7 (2007), pp. 60-72.

Ayoob, Mohammed, "Unraveling the Concept: 'National Security' in the Third World" in Baghat Korany, Paul Noble and Rex Brynen (eds.), *The Many Faces of National Security in the Arab World* (Basingstoke and London: Macmillan, 1993), pp. 31-55.

Baabood, Abdullah, "Dynamics and Determinants of the GCC States' Foreign Policy, with Special Reference to the EU" in Gerd Nonneman (ed.), Analyzing Middle East Foreign Policies and the Relationship with Europe (Oxon and New York: Taylor and Francis, 2005), pp. 145-173.

Bahry, Louay , "Elections in Qatar: A Window of Democracy Opens in the Gulf", *Middle East Policy*, 6 (1999), pp. 118-127.

Barnett, Jon, "The Worst of Friends: OPEC and G77 in the Climate Regime", *Global Environmental Politics,* 8 (2008), pp. 1-8.
Barnett, Jon, and Dessai, Suraje, "Articles 4.8 and 4.9 of the UNFCCC: Adverse Effects and the Impacts of Response Measures", *Climate Policy*, 2 (2002), pp. 231-239.
Barnett, Jon, Dessai, Suraje, and Webber, Michael, "Will OPEC Lose from the Kyoto Protocol?", *Energy Policy*, 32 (2004), pp. 2077-2088.
Bielecki, Janusz, "Energy Security: Is the Wolf at the Door?", *The Quarterly Review of Economics and Finance*, 42 (2002), pp. 235-250.
Beblawi, Hazem, "The Rentier State in the Arab World" in Hazem Beblawi and Giacomo Luciani (eds.), *The Rentier State* (New York: Croom Helm, 1987), pp. 49-62.
Beblawi, Hazem, and Luciani, Giacomo, "Introduction" in Hazem Beblawi and Giacomo Luciani (eds.), *The Rentier State* (New York: Croom Helm, 1987), pp. 1-21.
Blanchard, Christopher M., and Kerr, Paul K., *The United Arab Emirates Nuclear Program and Proposed U.S. Nuclear Cooperation*, Congressional Research Service (Washington D.C., 17 July 2009).
Booz & Company, *Gas Shortage in the GCC: How to Bridge the Gap*, Perspective (Booz & Co., 2010).
Braun, Joachim von, and Meinzen-Dick, Ruth, *'Land grabbing' by Foreign Investors in Developing Countries: Risks and Opportunities.* IFPRI Policy Brief 13 (International Food Policy Research Institute: 2009).
Brown, Gavin (ed.), *OPEC and the World Energy Market: A Comprehensive Reference Guide*. 2nd edition (Essex: Longman, 1991).
Brown, Oli, and Crawford, Alec, *Rising Temperatures, Rising Tensions: Climate Change and the Risk of Violent Conflict in the Middle East* (Winnipeg: International Institute for Sustainable Development, 2009).
Brynen, Rex, Korany, Baghat, and Noble, Paul, "Introduction: Theoretical Perspectives on Arab Liberalization and Democratization" in Rex Brynen, Baghat Korany and Paul Noble (eds.), *Political Liberalization & Democratization in the Arab World: Theoretical Perspectives* (London: Lynne Rienner, 1995), pp. 3-28.
Buhaug, Halvard, Gleditsch, Nils-Petter, and Theisen, Ole Magnus, *Implications of Climate Change for Armed Conflict. Social Dimensions of Climate Change* (Washington D.C.: World Bank, 2008).
Butt, Gerald, "Oil and Gas in the UAE" in Ibrahim Al Abed and Peter Hellyer (eds.), *United Arab Emirates: A New Perspective* (London: Trident Press, 2001).
Calabrese, John, "China and the Persian Gulf: Energy and Security", *Middle East Journal*, 52 (1998), pp. 351-366.
Campbell, Kurt. M., Gulledge, Jay, McNeill, J.R., Podesta, John, Ogden, Peter, Fuerth, Leon, Woolsey, R. James, Lennon, Alexander T.J., Smith, Julianne, Weitz, Richard, and Mix, Derek, *The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change* (Washington D.C.: Center for Strategic and International Studies and Center for a New American Century, 2007).
Chaaban, Farid B., "Air Quality" in Mostafa K. Tolba and Najib W. Saab (eds.), *Arab Environment: Future Challenges.* Report of the Arab Forum for Environment and Development (Beirut: AFED, 2008).
Chalcraft, John, *Monarchy, Migration and Hegemony in the Arabian Peninsula.* Research Paper No. 12. (London: Kuwait Programme on Development, Governance and Globalisation in the Gulf States, London School of Economics and Political Science, 2010).
Chatham House, *OPEC and Climate Change: Challenges and Opportunities*, Chatham House Briefing Paper (London: Chatham House, 2005).
CNA, *National Security and the Threat of Climate Change* (Alexandria, VA: The CNA Corporation, 2007).

Coates Ulrichsen, Kristian, "Internal and External Security in the Arab Gulf States", *Middle East Policy*, 16 (2009), pp. 39-58.
Cordesman, Anthony, H., "The One True U.S. Strategic Interest in the Middle East: Energy", *Middle East Policy*, 8 (2001), pp. 117-127.
———, *Energy Developments in the Middle East* (Westport: Praeger, 2004).
———, *Iran, Oil and the Strait of Hormuz* (Washington D.C.: Center for Strategic and International Studies, 2007).
Cruz, R.V., Harasawa, H., Lal, M. & Wu, S., "Chapter 10: Asia" in M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson (eds.), *Climate Change 2007: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge: Cambridge University Press, 2007), pp. 469-506.
Crystal, Jill, *Oil and Politics in the Gulf: Rulers and Merchants in Kuwait and Qatar* (Cambridge: Cambridge University Press, 1995).
Dargin, Justin, "Qatar's Natural Gas: The Foreign-Policy Driver", *Middle East Policy*, 3 (2007), pp. 138-142.
———, *The Dolphin Project: The Development of a Gulf Gas Initiative*, NG 22 (Oxford: Oxford Institute for Energy Studies, 2008).
Dasgupta, Susmita, Laplante, Benoit, Meisner, Craig, Wheeler, David, and Jianping, Yan, *The Impact of Sea Level Rise on Developing Countries: A Comparative Analysis.* World Bank Policy Research Working Paper 4136 (Washington D.C.: World Bank, 2007)
David, Steven R, "Explaining Third World Alignment", *World Politics* 43 (1991), pp. 233-256.
Davidson, Christopher M., *The United Arab Emirates: A Study in Survival* (Boulder and London: Lynne Rienner, 2005).
———, "After Shaikh Zayed: The Politics of Succession in Abu Dhabi and the UAE", *Middle East Policy* 13 (2006), pp. 42-59.
———, "The Emirates of Abu Dhabi and Dubai: Contrasting Roles in the International System", *Asian Affairs* 38 (2007), pp. 33-48.
———, *Dubai: The Vulnerability of Success* (London: Hurst, 2008).
———, *Abu Dhabi: Oil and Beyond* (London: Hurst, 2009).
———, "Abu Dhabi's New Economy: Oil, Investment and Domestic Development", *Middle East Policy*, 16 (2009), pp. 59-79.
Dawoud, Mohammed A., *Water Scarcity in GCC Countries: Challenges and Opportunities*, Research Paper (Dubai: Gulf Research Center, 2007).
Dawoud, M.A., Allam, A.R., El Shewey, M. A., and Soliman, S. M. , "Using Renewable Energy Sources for Water Production in Arid Regions: GCC Countries Case Study" in A. M. O. Mohamed (ed.), *Arid Land Hydrogeology: In Search of a Solution to a Threatened Resource*, Vol. IV, DARE Series (London, Taylor & Francis, 2006), pp. 117-129.
Deffeyes, Kenneth, S. *Beyond Oil: The View from Hubbert's Peak* (New York: Hill and Want, 2006).
Depledge, Joanna, "Striving for No: Saudi Arabia in the Climate Change Regime", *Global Environmental Politics*, 8 (2008), pp. 9-35.
Dessai, Suraje, *An Analysis of the Role of OPEC as a G77 Member at the UNFCCC*, Report for WWF (2004).
Division for Sustainable Development, *CSD-14/15 Thematic Profiles: Atmosphere* (UN, 2007).
Division for Sustainable Development, *CSD-14/15 Thematic Profiles: Industry* (UN, 2007)
Dogan, Mattei, and Pelassy, Dominique, *How to Compare Nations: Strategies in Comparative Politics* (Chatham: Chatham House Publishers, 1984).

Doukas, Haris, Palitzianas, Konstantinos D., Kagiannias, Argyris G., and Psarras, John, "Renewable Energy Sources and Rationale Use of Energy Development in the Countries of GCC: Myth or Reality?", *Renewable Energy* 31 (2006), pp. 755-770.
Economist Intelligence Unit (EIU), *Bahrain: Country Profile 2008* (London: EIU, 2008).
———, *Bahrain: Country Report, July 2008* (London: EIU, 2008)
———, *Kuwait: Country Profile 2008* (London: EIU, 2008).
———, *United Arab Emirates: Country Profile 2008* (London: EIU, 2008).
———, *Oman: Country Profile 2008* (London: EIU, 2008).
———, *Bahrain: Country Profile 2009* (London: EIU, 2009).
———, *Qatar: Country Profile 2009* (London: EIU, 2009).
———, *United Arab Emirates: Country Report, April 2009* (London: EIU, 2009).
———, *United Arab Emirates: Country Report, June 2009* (London: EIU, 2009).
———, *Qatar*: *Country Report, November 2009* (London: EIU, 2009).
———, "Qatar: Energy Report", *EIU Industry Briefing* (1 December 2009).
———, *Qatar: Country Report, January 2010* (London: EIU, 2010).
———, *Qatar: Country Report, February 2010* (London: EIU, 2010).
———, *Qatar: Country Report, December 2010* (London: EIU, 2010).
———, *The GCC in 2020: Resources for the Future* (London, EIU, 2010).
Ecoventures, *The State of Environmental Initiatives Among UAE Companies* (Dubai: 2009).
Ehteshami, Anoushiravan, and Wright, Steven, "Political Change in the Arab Oil Monarchies: From Liberalisation to Enfranchisement", *International Affairs* 83 (2007), pp. 913-932.
Elman, Colin, "Realism" in Martin Griffiths (ed.), *International Relations Theory for the Twenty-First Century: An Introduction* (New York: Routledge), p. 12-20.
Environment Agency – Abu Dhabi (EAD), *Policies and Regulations of Abu Dhabi Emirate, United Arab Emirates* (Abu Dhabi: EAD 2008).
———, *Climate Change: Executive Summary* (Abu Dhabi: EAD, 2009).
———, *Climate Change: Impacts, Vulnerability & Adaptation* (Abu Dhabi: EAD, 2009).
———, *Annual Report 2009-2010* (Abu Dhabi: EAD, 2010).
EWS/WWF, *Dar al Khair*, 24 (2010).
EWS/WWF, Ministry of Environment and Water of the UAE, Environment Agency – Abu Dhabi, and Global Footprint Network, *UAE Ecological Footprint Initiative* (2010).
Falkner, Robert, "The New Geopolitics of Climate Change after Copenhagen", *Industry Vision* (World Economic Forum, January 2010).
Fattouh, Bassam, *The Drivers of Oil Prices: The Usefulness and Limitations of Non-Structural Model, the Demand-Supply Framework and Informal Approaches*, WPM 32 (Oxford: Oxford Institute for Energy Studies, 2007).
Friedman, Thomas L., "The First Law of Petropolitics", *Foreign Policy*, May/June (2006), pp. 28-36.
Gause, F. Gregory, *Oil Monarchies: Domestic Security Challenges in the Arab Gulf* (New York: Council on Foreign Relations Press, 1994).
———, "The Persistence of Monarchy in the Arabian Peninsula: A Comparative Analysis" in Joseph Kostiner (ed.), *Middle East Monarchies: The Challenge of Modernity* (Boulder and London, Lynne Rienner, 2000), pp. 167-186.
General Secretariat for Development Planning, *Advancing Sustainable Development: Qatar National Vision 2030. Qatar's Second Human Development Report* (Doha: GSDP, 2009).
Ghanem, Shokri, Lounnas, Rezki, and Brennand, Garry, "The Impact of Emissions Trading on OPEC", *OPEC Review*, 23 (1999), pp. 79-112.
Ghoneim, Eman, "A Remote Sensing Study of Some Impacts of Global Warming on the Arab Region" in Mostafa K.Tolba and Najib W. Saab (eds.), *Climate Change:*

Impact of Climate Change on Arab Countries. (Beirut: Arab Forum for Environment and Development, 2009).
Giddens, Anthony, *The Politics of Climate Change* (Cambridge: Polity Press, 2009).
Gleditsch, Nils Petter, "Environmental Change, Security and Conflict" in Chester Crocker, Fen Osler Hampson and Pamela Aall (eds.), *Leashing the Dogs of War: Conflict Management in a Divided World* (Washington D.C.: US Institute of Peace Press, 2007).
Government of Qatar Planning Council, *Turning Qatar into a Competitive Knowledge-Based Economy: Knowledge Economy Assessment of Qatar* (World Bank, 2007).
Gulf Research Center, *Green Gulf Report* (Dubai: GRC, 2006).
———, *Gulf Yearbook 2006-2007* (Dubai: Gulf Research Center 2007).
Harry, Wes, "Employment Creation and Localisation: The Crucial Human Resource Issues for the GCC", *International Journal of Human Resource Management*, 18 (2007), pp. 132-146.
Heard-Bey, Frauke, "The United Arab Emirates: Statehood and nation-building in a traditional society", *Middle East Journal*, 59 (2005), pp. 357-375.
Herb, Michael, *All in the Family: Absolutism, Revolution, and Democracy in the Middle Eastern Monarchies* (Albany: State University of New York, 1999).
Hertog, Steffen "Shaping the Saudi State: Human Agency's Shifting Role in Rentier-State Formation", *International Journal of Middle Eastern Studies*, 30 (2007), pp. 539-563.
———, *Princes, Brokers, and Bureaucrats: Oil and the State in Saudi Arabia* (New York: Cornell University Press, 2010).
Hertog, Steffen, and Luciani, Giacomo, *Energy and Sustainability Policies in the GCC*, Working Paper No. 6 (London: Kuwait Programme on Development, Governance and Globalisation in the Gulf States, London School of Economics and Political Science, 2009).
Hinnebusch, Raymond, *The International Politics of the Middle East* (Manchester and New York: Manchester University Press, 2003).
———, "Introduction: An Analytical Framework" in Raymond Hinnebusch and Anoushiravan Ehteshami, *The Foreign Policies of Middle East States* (Boulder and London: Lynne Rienner, 2002), pp. 1-27.
Hinnebusch, Raymond, and Ehteshami, Anoushiravan, "Conclusion: Patterns of Policy" in Raymond Hinnebusch and Anoushiravan Ehteshami, *The Foreign Policies of Middle East States* (Boulder and London: Lynne Rienner, 2002), pp. 335-350.
——— (eds.), *The Foreign Policies of Middle East States* (Boulder and London: Lynne Rienner, 2002).
Hudson, Michael C., *Arab Politics: The Search for Legitimacy* (New Haven and London: Yale University Press, 1977).
Human Rights Watch, *World Report 2010* (New York: Human Rights Watch, 2010).
Hvidt, Martin, *The Dubai Model: An Outline of Key Components of the Development Process in Dubai*, Working Paper No. 12 (Center for Contemporary Middle East Studies, University of Southern Denmark, 2007).
IISS, *Nuclear Programmes in the Middle East: In the Shadow of Iran*, IISS Strategic Dossier (Hastings: International Institute for Strategic Studies, 2008).
IndyACT, Arab position matrix, 8 October 2009. Unpublished.
International Crisis Group, *Bahrain's Sectarian Challenge*. Middle East Report No. 40, (6 May 2005).
International Energy Agency (IEA), *World Energy Outlook 2005: Middle East and North Africa Insights* (Paris: OECD/IEA, 2005).
———, *Betwixt Petro-Dollars and Subsidies: Surging Energy Consumption in the Middle East and North Africa States*, IEA Information Paper (Paris: OECD/IEA, 2008).
———, *World Energy Outlook 2008* (Paris: OECD/IEA, 2008).

———, *Oil Information 2010* (Paris: OECD/IEA, 2010).
———, *World Energy Outlook 2010 Fact Sheets*, [http://www.worldenergyoutlook.org/docs/weo2010/factsheets.pdf]. Accessed on 15 December 2010.
IPCC, *Climate Change 2007: Synthesis Report. Summary for Policymakers* (Valencia: Intergovernmental Panel on Climate Change, November 2007).
———, "Summary for Policymakers" in M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson (eds.), *Climate Change 2007: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge: Cambridge University Press, 2007) pp. 7-22.
Jeridi Bachellerie, Imen, "Renewable Energy Transition in the GCC: Finding the Right Paradigms", *GRC Analysis* (Dubai: Gulf Research Center, 2010).
Kadhim, Abbas, "The Future of Nuclear Weapons in the Middle East", *Nonproliferation Review* 13 (2006), pp. 581-589.
Kamrava, Mehran, "Royal Factionalism and Political Liberalization in Qatar", *The Middle East Journal*, 63 (2009), pp. 401-420.
Kapiszewski, Andrzej, *Arab versus Asian Migrant Workers in the GCC Countries*, UN/POP/EGM/2006/02. Paper presented in the United Nations Expert Group Meeting on International Migration and Development in the Arab Region of the UN Population Division (22 May 2006).
Karl, Terry Lynn, "The Perils of the Petro-State: Reflections on the Paradox of Plenty", *Journal of International Affairs* 53 (1999), pp. 31-48.
Kassler, Peter, and Paterson, Matthew, *Energy Exporters and Climate Change* (London: Royal Institute of International Affairs, 1997).
Katz, Mark. N., "Russia and Qatar", *Middle East Review of International Affairs*, 11 (2007), pp. 1-6.
Katzenstein, Peter, "International Relations and Domestic Structures: Foreign Economic Policies of Advanced Industrial States", *International Organization* 30 (1976), pp. 1-45.
Kazim, Ayoub M., "Assessments of Primary Energy Consumption and its Environmental Consequences in the United Arab Emirates", *Renewable and Sustainable Energy Reviews*, 11 (2007), pp. 426-446.
Kéchichian, Joseph A., *Power and Succession in Arab Monarchies: A Reference Guide* (London: Lynne Rienner, 2008).
Kingdom of Bahrain, *Bahrain's Initial National Communication to the UNFCCC. Volume I: Main Summary Report* (Manama: General Commission for the Protection of Marine Resources, Environment & Wildlife, 2005).
Korany, Baghat, Brynen Rex, and Noble, Paul, "The Analysis of National Security in the Arab Context: Restating the State of the Art" in Baghat Korany, Paul Noble and Rex Brynen (eds.), *The Many Faces of National Security in the Arab World* (Basingstoke and London: Macmillan,1993), pp. 1-23.
Launay Frederic, *Environmental Situational Assessment for the GCC Countries*, GRC Research Paper (Dubai: Gulf Research Center, 2006).
Lewis, Joanna, and Diringer, Elliot, *Policy-Based Commitments in a Post-2012 Climate Framework* (Arlington: Pew Center on Global Climate Change, 2007).
Losman, Donald L., "The Rentier State and National Oil Companies: An Economic and Political Perspective", *The Middle East Journal* 64 (2010), pp. 427-445.
Luciani, Giacomo, "Allocation vs. Production States: A Theoretical Framework" in Hazem Beblawi and Giacomo Luciani (eds.), *The Rentier State* (New York: Croom Helm, 1987), pp. 63-82.
———, "Economic Foundations of Democracy and Authoritarianism: The Arab World in Comparative Perspective", *Arab Studies Quarterly*, 10 (1988), pp. 457-475.
———, "The Gulf Countries and Nuclear Energy", *Gulf Monitor*, 1 (2007).

Luomi, Mari, "Abu Dhabi's Alternative-Energy Initiatives: Seizing Climate-Change Opportunities", *Middle East Policy*, 16 (2009), pp. 102-117.

———, *Bargaining in the Saudi Bazaar: Common Ground for a Post-2012 Climate Agreement?* FIIA Briefing Paper No. 48 (Helsinki: Finnish Institute of International Affairs, 2009).

———, *Ilmasto- vai öljypolitiikkaa? Lähi-idän arabimaiden ilmastopolitiikan selitysten jäljillä*, Working Paper No. 62, (Helsinki: Finnish Institute of International Affairs, 2009).

———, *Oil or Climate Politics? Avoiding a Destabilising Resource Split in the Arab Middle East*, Briefing Paper No. 58 (Helsinki: Finnish Institute of International Affairs, 2010).

Mahdavy, Hussein, "Patterns and Problems of Economic Development in Rentier States: the Case of Iran" in M. A. Cook (ed.), *Studies in the Economic History of the Middle East. From the Rise of Islam to the Present Day* (Oxford: Oxford University Press, 1970), pp. 428-467.

Marcel, Valérie, *Oil Titans: National Oil Companies in the Middle East* (Baltimore: Brookings, 2006).

Met Office, *Climate Change and the Middle East* (Met Office, 2009).

Ministry of Economy of the UAE and UNDP, *Millennium Development Goals. United Arab Emirates.* Second Report (2007),

Ministry of Energy of the UAE, *The United Arab Emirates: Initial National Communication to the UNFCCC* (Abu Dhabi: 2006).

———, *The United Arab Emirates: Second National Communications to the Conference of the Parties of United Nations Framework Convention on Climate Change* (2010).

Mitchell, John V., and Stevens, Paul, *Ending Dependence: Hard Choices for Oil-Exporting States* (London: Chatham House, 2008).

Müller, Benito, *Framing Future Commitments: A Pilot Study on the Evolution of the UNFCCC Greenhouse Gas Mitigation Regime,* EV 32 (Oxford: Oxford Institute for Energy Studies, 2003).

Nader, Sam, "Paths to a Low-Carbon Economy – the Masdar Example", *Energy Procedia*, 1 (2009), pp. 3951-3958.

Nakhleh, Emile A., "The Creation of Qatar' by Rosemarie Said Zahlan", Review, *International Journal of Middle East Studies,* 16 (1984), pp. 295-296.

National Media Council, *UAE Yearbook 2009* (Abu Dhabi, 2009).

———, *UAE Yearbook 2010* (Abu Dhabi, 2010).

Nimah, Musa N., "Water Resources" in Mostafa K.Tolba and Najib W. Saab (eds.): *Arab Environment: Future Challenges.* Report of the Arab Forum for Environment and Development (Beirut: AFED, 2008).

Noble, Paul, Brynen Rex, and Korany, Baghat, "Conclusion: The Changing Regional Security Environment" in Baghat Korany, Paul Noble and Rex Brynen (eds.), *The Many Faces of National Security in the Arab World* (Basingstoke and London: Macmillan,1993), pp. 275-302.

Nonneman, Gerd, "Analyzing the Foreign Policies of the Middle East and North Africa: A Conceptual Framework" in Gerd Nonneman (ed.), *Analyzing Middle East Foreign Policies and the Relationship with Europe* (Oxon and New York: Routledge, 2005), pp. 6-18.

———, *Political Reform in the Gulf Monarchies: From Liberalisation to Democratisation? A Comparative Perspective*. Working Paper. (Durham: University of Durham, Centre for Middle Eastern and Islamic Studies, 2006),

O'Brien, James, Keivani, Ramin, and Glasson, John, "Towards a New Paradigm in Environmental Policy Development in High-Income Developing Countries: The Case of Abu Dhabi, United Arab Emirates", *Progress in Planning,* 68 (2007), pp. 201-256.

OPEC, *World Oil Outlook 2008* (Vienna: OPEC Secretariat, 2008).
———, *World Oil Outlook 2010* (Vienna: OPEC Secretariat, 2010).
Ouis, Pernilla, "Greening in the Emirates: The Modern Construction of Nature in the United Arab Emirates", *Cultural Geographies*, 9 (2009), pp. 334-347.
Oxford Business Group, *The Report: Dubai 2007* (OBG, 2007).
———, *The Report: Qatar 2010* (London: OBG 2010).
Partrick, Neil, *Nationalism in the Gulf States*, Research Paper No. 5 (London: Kuwait Programme on Development, Governance and Globalisation in the Gulf States, London School of Economics and Political Science, 2009).
Paterson, Matthew, *Global Warming and Global Politics* (London: Routledge, 1996).
Persson, Tobias A., Azar C., Johansson, D., and Lindgren, K., "Major Oil Exporters May Profit Rather than Lose in a Carbon-Constrained World", *Energy Policy*, 32 (2007), pp. 6346-6353.
Peterson, J.E., "Qatar and the World: Branding for a Micro-State", *Middle East Journal*, 60 (2006), pp. 732-748.
Planning Council of Qatar, *Human Development Report: The State of Qatar 2006* (Doha: The Planning Council/UNDP, 2006).
Pollack, Kenneth M., "Securing the Gulf", *Foreign Affairs* 82 (2003), pp. 2-16.
Presidency of Meteorology and Environment of Saudi Arabia, *First National Communication: Kingdom of Saudi Arabia* (PME, 2005).
Qatar Foundation Research Division, *Annual Report 2008/9* (Doha: Qatar Foundation, 2010).
Qatar Science and Technology Park, "New phase in Qatar's R&D program", Press release (22 February 2009).
Rabi, Uzi, "Qatar's Relations with Israel: Challenging Arab and Gulf Norms", *Middle East Journal*, 63 (2009), pp. 443-459.
Raouf, Mohamed A., *Economic Instruments as an Environmental Policy Tool: The Case of the GCC Countries* (Dubai: The Gulf Research Center 2007).
———, *Climate Change Threats, Opportunities, and the GCC Countries*, Policy Brief No. 12 (Washington D.C.: Middle East Institute, 2008).
———, *Water Issues in the Gulf: Time for Action*, Policy Brief No. 22 (Washington D.C.: The Middle East Institute, 2009).
Regulation and Supervision Bureau, *Electricity Tariffs for Large Users in the Emirate of Abu Dhabi*, Information Tariffs (November 2009).
Reich, Bernard (ed.), *Political Leaders of the Contemporary Middle East and North Africa: A Bibliographical Dictionary*. Connecticut: Greenwood Press, 1990).
Reiche, Danyel, "Energy Politics of Gulf Cooperation Council (GCC) Countries—Possibilities and Limitations of Ecological Modernization in Rentier States", *Energy Policy*, 38 (2010), pp. 2395-2403.
Rezai, Hamid, Wilson, Simon, Claereboudt, Michel, and Riegl, Bernard, "Coral Reef Status in the ROPME Sea Area: Arabian/Persian Gulf, Gulf of Oman and Arabian Sea" in Wilkinson, Clive (ed.), *Status of Coral Reefs of the World: 2004*. Volume 1 (Australian Institute of Marine Sciences, 2004), pp. 155-170.
Richer, Renee, *Conservation in Qatar: Impacts of Increasing Industrialization*, CIRS Occasional Paper (Doha: Center for International and Regional Studies, Georgetown University School of Foreign Service in Qatar, 2008).
Rose, Gideon, "Neoclassical Realism and Theories of Foreign Policy", *World Politics*, 51 (1998), pp. 144-172.
Ross, Michael L., "Does Oil Hinder Democracy", *World Politics* 53 (2001), pp. 325-361.
Schweller, Randall L., *Unanswered Threats: Political Constraints on the Balance of Power* (Princeton, NJ: Princeton University Press, 2006).

Setser, Brad, and Ziemba, Rachel, *GCC Sovereign Funds: Reversal of Fortune*. CFR Working Paper (Council on Foreign Relations, Center for Geoeconomic Studies, January 2009.

Sharabi, Hisham, *Neopatriarchy: A Theory of Distorted Change in Arab Society* (New York: Oxford University Press, 1988).

Shearman, David, and Smith, Joseph Wayne, *The Climate Change and the Failure of Democracy* (London: Praeger, 2007).

Stern, Nicholas, *The Stern Review: The Economics of Climate Change* (Cambridge: Cambridge University Press, 2007).

Taelman, Elisa, "Saadiyat Island Tourist Development Project: Dredging in an Ecologically Sensitive Area", *Terra et Aqua*, issue 116 (2009), pp. 3-11.

Teslik, Lee Hudson, *China-Gulf Economic Relations.* Backgrounder (Council on Foreign Relations, 4 June 2008).

Tolba, Mostafa K., and Saab, Najib W. (eds.), *Arab Environment Future Challenges.* Report of the Arab Forum for Environmental Development (Beirut: AFED, 2008).

Tuchman Mathews, Jessica, "Redefining Security", *Foreign Affairs* 68 (1989), pp. 162-177.

UK Trade & Investment, *Power & Water: Dubai and the Northern Emirates, United Arab Emirates (UAE)*, Sector Report (June 2009).

UNDP, *Human Development Report 2007/2008. Fighting Climate Change: Human Solidarity in a Divided World* (New York: United Nations Development Programme, 2007).

———, *Human Development Report 2009. Overcoming Barriers: Human Mobility and Development* (New York: United Nations Development Programme, 2009).

———, *Human Development Report 2010: The Real Wealth of Nations* (New York: United Nations Development Programme, 2010).

UNEP, *Overview of Land-Based Sources and Activities Affecting the Marine Environment in the ROPME Sea Area*, UNEP Regional Seas Reports and Studies No. 168 (United Nations Environment Programme, 1999).

United Nations, *Johannesburg Summit 2002. Qatar Country Profile* (UN, 2002).

———, *The United Nations Regional Commissions and the Climate Change Challenges* (New York: UN, 2009).

U.S. Energy Information Administration (US EIA), *Oman: Country Analysis Brief* (US EIA, April 2007).

———, *Bahrain: Country Analysis Brief* (US EIA, March 2008).

———, *United Arab Emirates: Country Analysis Brief* (US EIA, November 2009).

———, *Qatar: Country Analysis Brief* (US EIA: December 2009).

———, *Qatar: Country Analysis Brief* (US EIA: January 2011).

———, *Saudi Arabia: Country Analysis Brief* (US EIA: January 2011).

Vormedal, Irja, "The Influence of Business and Industry NGOs in Negotiation of the Kyoto Mechanisms: the case of Carbon Capture and Storage in the CDM", *Global Environmental Politics*, 8 (2008), pp. 36-65.

Wilén, Juha, *Arabiemiraatit: Abu Dhabin rakentaminen*, Toimialakatsaus (Finpro, 2007).

Woertz, Eckart, "Food Inflation in the GCC Countries", *Gulf Monitor*, 2 (2008).

———, "The Gulf Food Import Dependence and Trade Restrictions of Agro Exporters in 2008" in S. Evenett (ed.), *Will Stabilisation Limit Protectionism? The 4th GTA Report* (London: Centre for Economic Policy Research, 2010), pp. 43-56.

World Bank, *A Water Sector Assessment Report on the Countries of the Cooperation Council of the Arab States of the Gulf*, Report No. 32539-MNA (Water, Environment, Social and Rural Development Department, MENA Region, 2005).

———, *State and Trends of the Carbon Market 2010*, (Washington D.C.: Carbon Finance at the World Bank, 2010).

World Wildlife Fund for Nature, *No Energy Security without Climate Security* (Gland: WWF, July 2006).
Wright, Steven, *Generational Change and Elite-Driven Reforms in the Kingdom of Bahrain.* Durham Middle East Papers. Sir William Luce Publication Series, No. 7.
WWF, *Living Planet Report 2010* (Gland: WWF, 2010).
Yaffe, Michael, "The Gulf and a New Middle East Security System", *Middle East Policy* 11 (2004), pp. 118-130.

Media, journal and magazine articles and press releases (chronological order)

2000-2006

APS Diplomat Operations in Oil Diplomacy, "QATAR – Profile – Abdullah bin Hamad Al Attiya", (30 October 2000).
Imperial College, "Imperial College appoints pro rector for public and corporate affairs", Press release (18 September 2001).
Virginia Commonwealth University, "Virginia Commonwealth University in Qatar to graduate first class", Press release (25 June 2002).
QSTP, "ExxonMobil announces new LNG research facility in Qatar", Press release (31 May 2004).
Al Jandaly, Bassma, "Palm development caused fish deaths, say officials", *Gulf News* (30 October 2005).
Gulf Times, "Qatar 'making progress' on Kyoto commitments" (2 June 2006).
AMEinfo, "Kyoto Protocol workshop inaugurated in Abu Dhabi" (4 September 2006).
MEED, "UAE Census: Population explosion" (8 September 2006).
Al Harthy, Nasser, "Qatar: Water management project launched", *The Peninsula* (23 November 2006).

2007

MEED, "Abu Dhabi: the mother of invention" (5 January 2007).
The Peninsula, "Meetings on climate change held" (18 January 2007).
APS Review Oil Market Trends, "Abu Dhabi – The Abu Dhabi Investment Authority" (22 January 2007).
al-Shobakky, Waleed, "Qatar's science revolution", *SciDevNet* (14 March 2007), [http://www.scidev.net/en/features/qatars-science-revolution.html].
QNA, "Emir appoints new PM", *Gulf Times* (4 April 2007).
International Herald Tribune, "Oman blames cyclone Gonu for US$1 billion in damage" (11 June 2007).
Reuters, "Gonu costs Oman $200 m in lost exports", *Arabian Business* (11 June 2007).
Mubadala, "Abu Dhabi to become a global leader in clean energy", Press release (2 July 2007).
WAM, "France to help UAE launch civilian nuclear programme", *Khaleej Times* (21 July 2007).
Landais, Emmanuelle, "Solar solutions for the UAE", *Gulf News* (1 October 2007).
AMEinfo, "HH Sheikh Mohammed issues directive to adopt 'Green Building' model in Dubai'" (25 October 2007).
Kumar, Himendra Mohan, "Phase one of Masdar City to be ready before 2010", *Gulf News* (28 October 2007).
QNA, "Climate change committee set up" *Gulf Times* (29 October 2007).
The Peninsula, "Qatar sets up centre for nuclear information" (4 November 2007).
MEED, "UAE country profile" (14 November 2007).

———, “Power grid drives regional co-operation” (16 November 2007).

2008

Worth, Robert F., “Al Jazeera no longer nips at Saudis”, *New York Times* (4 January 2008).
MEED, “Abu Dhabi to provide power to northern neighbours” (11 January 2008).
Stratfor, “France, UAE: A French presence in the Gulf” (15 January 2008a).
———, “UAE, France: Civilian nuclear deal expected” (15 January 2008b).
WAM, “UAE and France sign landmark nuclear cooperation agreement”, *Gulf News* (15 January 2008).
BP, “Masdar and hydrogen energy plan clean energy plant in Abu Dhabi”, Press Release (21 January 2008).
Environment Agency – Abu Dhabi, “Executive Committee of the CDM adopt procedures for submitting requests for CDM projects”, Press release (22 January 2008).
Masdar, “Abu Dhabi’s Masdar Initiative breaks ground on carbon-neutral city of the future”, Press release (9 February 2008).
Owen, Ed, “British firms face Dubai shut out over green codes”, *New Civil Engineer* (13 February 2008).
Nuclear Threat Initiative, “IAEA Nuclear Fuel Bank Reaches Funding Target”, *Global Security Newswire* (9 March 2008).
Absal, Rayeesa, “Data in report on footprint ‘was wrong’”, *Gulf News* (19 March 2008).
MEED, “Emirates raise tariffs in line with Dubai” (20 March 2008).
Perumal, Santosh V., “State budget sees all-time high revenue”, *Gulf Times* (1 April 2008).
QSTP, “Qatar Petroleum will open research centre at QSTP”, Press release (1 April 2008).
Reuters, “Attiyah blames biofuels for food shortage”, *Gulf Times* (21 April 2008).
Inskeep, Steve, and Palca, Joe, “UAE has mixed motivations for eco city”, *NPR*, Web article (5 May 2008).
Gulf Times, “Bird protection fund gets $1mn headstart” (14 May 2008).
WAM, “UAE, UK sign MoU on nuclear energy usages”, *Khaleej Times* (15 May 2008).
The National, “Institute plans to lead in alternative energy” (14 May 2008).
Todorova, Vesela, “Capital tackles climate change”, *The National* (17 May 2008).
Economist Intelligence Unit (EIU), “UAE economy: Nuclear intent”. *EIU ViewsWire* (28 May 2008).
Imperial College, “World-Class research collaboration in carbonate reservoirs and carbon storage”, Press release (9 June 2008).
The National, “Industrial zone to capture carbon dioxide” (11 June 2008).
George, Joseph, “Bids invited for N-power”, *Emirates Business 24/7* (23 June 2008).
Jing, Li , “CNOOC strikes Qatar LNG deal”, *China Daily* (25 June 2008).
Power, Helene, “Qatar: Small state with big fund buys British”, *The Telegraph* (28 June 2008).
Noueihed, Lin, “Abu Dhabi to develop farmland for food security”, *Reuters* (1 July 2008).
Chacko, K. T., “Emir enlarges government”, *Gulf Times* (2 July 2008).
Ashfaq, Ahmed, “Expats make up 99% of private sector staff in the UAE”, *Gulf News* (4 July 2008).
Fenton, Suzanne, “UAE looks abroad for food security”, *Gulf News* (9 July 2008).
Arnold, Wayne, “Wealth funds draw profits and attention”, *The National* (13 July 2008).
Gale, Ivan, “Etihad boosts emirate’s future with $43bn deal”, *The National* (14 July 2008).
Carlisle, Tamsin, “Ajman to build Gulf’s first coal plant”, *The National* (17 July 2008).
Fenton, Suzanne, “Malaysian firm to set up $2b power plant in Ajman”, *Gulf News* (18 July 2008).
Reuters, “UAE investment firm Mubadala, GE launch $8 bln JV” (22 July 2008).
———, “Qatar and Vietnam set up agriculture fund” (3 September 2008).
The Economist, “Family feeling behind the football” (25 September 2008).

QSTP, “TATA to develop green technologies at QSTP”, Press release (7 October 2008).
Foreman, Colin, “CH2M Hill to manage UAE nuclear power programme”, *MEED* (14 October 2008).
Kakande, Yasin, and Attwood, Karen, “Powerless, the north waits for dawn”, *The National* (15 October 2008).
Carlisle, Tamsin, “Masdar invests in UK’s biggest windfarm project”, *The National* (16 October 2008).
WAM, “UAE commitment to nuclear disarmament”, *Gulf News* (19 October 2008).
Kakande, Yasin, “Ajman Marina to built its own power plant”, *The National* (20 October 2008).
Landais, Emmanuelle, “Solar panel plant planned”, *Gulf News* (25 October 2008).
UAE Interact, “Abu Dhabi’s $3b Carbon Capture Project Set for 2013” (29 October 2008).
Carbon Trust, “£250m clean technology fund announced between the UK’s Carbon Trust and Qatar Investment Authority”, Press release (2 November 2008).
Carlisle, Tamsin, “Drive to find gas in Abu Dhabi accelerates” *The National* (4 November 2008).
England, Andrew, “Saudi Aramco reviews projects” *Financial Times* (4 November 2008).
Carlisle, Tamsin, “Gulf states throttle back on oil and step on gas”, *The National* (10 November 2008).
International Energy Agency, “New energy realities—WEO calls for global energy revolution despite economic crisis”, Press release (12 November 2008).
Stanton, Chris, “Cloudy skies for Masdar’s solar project”, *The National* (12 November 2008).
Reuters, “U.S. firm Mustang wins Abu Dhabi clean energy deal” (18 November 2008).
Hulbert, Matthew, and Akbar, Tariq, “Why a gas troika and cartel will prove to be hot air...”, Global Analysis, *Datamonitor* (19 November 2008).
Carlisle, Tamsin, “Oil’s plunge threatens Gulf balance sheet”, *The National* (22 November 2008).
Rice, Xan, “Qatar looks to grow food in Kenya”, *The Guardian* (2 December 2008).
The National, “Carbon plan could pay richly for Abu Dhabi” (10 December 2008).
Daragahi, Borzou, “U.S. and UAE forge nuclear cooperation deal”, *Los Angeles Times* (16 December 2008).
Qazi, Sarmad, “Drive on water conservation awareness soon”, *Gulf Times* (28 December 2008).

2009

Global Gas Flaring Reduction Partnership, *The News Flare*, No. 8 (2009).
MEED, “Sustainability without sacrifice in the Middle East”, Supplement (2009).
Reuters, “Qatar breaks off relations with Israel over Gaza operation”, *Haaretz* (16 January 2009).
WAM, “Nuclear policy ensures highest standards of safety”, *Gulf News* (16 January 2009).
Millington, Benjamin, “Bahrain’s turbines spin: consultant”, *Construction Week* (17 January 2009).
General Electric, “Masdar and GE announce world’s first ecomagination centre at Masdar City”, Press release (20 January 2009).
Drummond, James, and Wigglesworth, Robin, “Renewables race hots up”, *Financial Times* (21 January 2009).
Energiateollisuus, “Energiavuosi 2008 sähkö”, Press release (22 January 2009).
Young, Tom, “International Renewable Energy Agency launches today”, *BusinessGreen*, (26 January 2009).
The Peninsula, “Temperature in Qatar to rise by 30C [sic] in 40 years” (28 January 2009).

Pearce, Fred, “Greenwash: Gulf’s green claims awash in a desert of deception”, *Guardian* (29 January 2009).
WAM, “We are looking forward to defending the UAE petroleum, gas and oil industry exports: Hamili”, *UAE Interact* (3 February 2009).
GSDP (General Secretariat for Development Planning), “GSDP starts an intensive stakeholder engagement process”, Press release (5 February 2009).
Dahl, Fredrik, and Kalantari, Hashem, “Crescent disputes changed Iran gas deal terms”, *The National* (15 February 2009).
Chevron, “Chevron to Establish Sustainable Energy Efficiency Center in Qatar”, Press release (17 February 2009).
QSTP, “New phase in Qatar’s R&D program”, Press release (22 February 2009).
QNA, “Qatar, Iran sign pact to boost defence ties”, *Gulf Times* (25 February 2009).
Construction Week, “Qatar Green Building Council on the Way”, *Arabian Business* (28 February 2009).
Carlisle, Tamsin, “RAK to build coal fired power station”, *The National* (4 March 2009).
Qatar Today, “QSTP: Research Accelerator” (10 March 2009).
AMEinfo, “EAD’s Secretary General win GCC award” (18 March 2009).
Masdar PV, “Masdar breaks ground on photovoltaic factory in Germany”, Press release (18 March 2009).
GreenGulf, “QSTP and GreenGulf launch solar-energy trials”, Press release (18 March 2009).
The Peninsula, “Expert: Water consumption in Qatar very high”, *MENAFN* (19 March 2009).
WAM, “EAD warns against depletion of Abu Dhabi’s water resources within next 50 years”, *UAE Interact* (22 March 2009).
Rahman, Saifur, “Indonesian coal to power RAK projects”, *Gulf News* (23 March 2009).
Baxter, Kevin, “UAE President says $70 is a fair price for oil”, *ArabianOilandGas* (25 March 2009).
Kerr, Simeon, “Ras al-Khaimah mines a variety of seams”, *Financial Times* (25 March 2009).
Windfuhr, Volkhard, and Zand, Bernhard, “We are coming to invest”, *Spiegel International* (29 March 2009).
Solomon, Jay, and Coker, Margaret, “Oil-Rich Arab State Pushes Nuclear Bid with U.S. Help”, *Wall Street Journal* (2 April 2009).
Stewart, Jamie, “Qatar green building code to be enforced by law”, *Construction Week Online* (10 April 2009).
AlQassemi, Sultan, “Why Irena should find her home in Abu Dhabi”, *The National* (19 April 2009).
The National, “Minister urges action on climate change” (23 April 2009).
WAM, “UAE is determined to reduce carbon footprint: Hamli”, *UAE Interact* (23 April 2009)
WAM, “UAE calls for support to host IRENA headquarters”, *Gulf News* (1 May 2009).
Menon, Sunita, and Issa, Wafa, “Over 200 workers to be deported for violence”, *Gulf News* (3 May 2009).
Todorova, Vesela, “UAE ‘could help clinch climate deal’”, *The National* (4 May 2009).
The National, “UN hears pitch for green agency”, (6 May 2009).
Todorova, Vesela, “UAE criticised for wasting water”, *The National* (7 May 2009).
Emirates Business 24/7, “UAE population to grow 6% in 2009”, *UAE Interact* (19 May 2009).
The National, “Dubai power demand rises” (19 May 2009).
Billing, Soren, and Arnold, Tom, “GCC monetary union 'dead' after UAE pull out – analysts”, *Arabian Business* (20 May 2009).

Landles, Mark, “Despite torture video, U.S. and Emirates sign key pact”, *New York Times* (21 May 2009).
Wigglesworth, Robin, and England, Andrew, “UAE quits Gulf monetary union”, *Financial Times* (21 May 2009).
Baxter, Elsa, “Qatar starts project to rebuild heart of Doha”, *Construction Week Online* (25 May 2009).
The Middle East, “Nuclear energy gains ground in Arab states”, (June 2009), pp. 40-44.
Gulf News, “Masdar connects 10 MW plant to Abu Dhabi’s electricity grid” (1 June 2009).
Habboush, Mahmoud, “Italy to ratify UAE treaty by end of year”, *The National* (2 June 2009).
AMEinfo, “Hassad Qatar announces new projects and company achievements” (3 June 2009).
MEED, “Qatar implementing national vision” (5 June 2009).
Wadhams, Nick, “Kenyan activists fight land deal with Qatar”, *The National* (5 June 2009).
IISS, “Balancing Act,” *IISS in the Press*, from *The Gulf* (8 June 2009).
Roberts, Martin, “Masdar eyes $10 bln green investment by ‘15”, *Arabian Business* (9 June 2009).
The National, “UN’s environment chief positive about Abu Dhabi bid for Irena HQ” (10 June 2009).
Gulf News, “US$40b desalination projects planned to boost production” (15 June 2009).
Stratfor, “South Korea, UAE: Pact on peaceful nuclear energy signed” (16 June 2009).
QSTP, “QSTP-based Barwa and Qatari Diar Research Institute aims to develop new knowledge in urban construction”, Press release (17 June 2009).
WAM, “UAE becomes the first country to ratify IRENA statute” (18 June 2009).
Gulf News, “UAE seeks UN member support for its Irena bid” (19 June 2009).
Reinl, James, “UAE energy expert to advise UN chief”, *The National* (19 June 2009).
Underwood, Mitya, and Gornall, Jonathan, “UAE birth rate falls by nearly 50%”, *The National* (21 June 2009a).
Todorova, Vesela, “Water-saving devices to be installed”, *The National* (21 June 2009b).
Reinl, James, “Abu Dhabi can ‘bring Irena to life’”, *The National* (21 June 2009c).
Baxter, Elsa, “Masdar to help Bahrain to cut its carbon footprint”, *Arabian Business* (22 June 2009).
Stanton, Chris, “Solving the mystery of where water goes”, *The National* (22 June 2009).
Abdul Kader, Binsal, “Australia and Finland to vote for UAE’s IRENA bid”, *Gulf News* (24 June 2009).
Al Lawati, Abbas, “Irena delegations working overtime”, *Gulf News* (28 June 2009).
Constantine, Zoi, “Australia to double force in UAE base”, *The National* (28 June 2009).
Al Lawati, Abbas, Landais, Emmanuelle, and Absal, Rayeesa, “UAE's Irena win will 'inspire region' to reduce reliance on fossil fuels”, *Gulf News* (29 June 2009).
Carlisle, Tamsin, “Saudi hires generators to beat power shortage”, The National (29 June 2009).
Stanton, Chris and, Habboush, Mahmoud, “UAE wins support from US on IRENA”, *The National* (29 June 2009).
———, “UAE to house IRENA headquarters”, *The National* (30 June 2009a).
Todorova, Vesela, “UAE victory hailed as big step forward”, *The National* (30 June 2009b).
O’Sullivan, Edmund, “Environmental issues move up the Gulf’s agenda”, *MEED* (1 July 2009).
Stanton, Chris, “Irena to seize climate initiative”, *The National* (1 July 2009).
Japan External Trade Organization, “Japan-UAE trade for the year 2008”, Press release (2 July 2009).

MacDonald, Fiona, “Kuwait is not happy with Qatar’s LNG Supply Terms”, *Bloomberg* (3 July 2009).
Landais, Emmanuelle, “UAE to ban plastic bags from 2012”, *Gulf News* (4 July 2009).
QGBC (Qatar Green Building Council), “QGBC to develop a sustainable property industry for Qatar”, Press release (6 July 2009).
Maree, Karin, “Firms bid for nuclear plant deal in Emirates”, *MEED* (7 July 2009).
Al Jaber, Sultan, “How we won IRENA, and why it’s only a beginning”, *The National* (8 July 2009).
Associated Press, “US, UAE nuclear deal would end if terms violated” (8 July 2009).
The Peninsula, “Qatar has no power to sell Kuwait: Paper”, (8 July 2009).
MEED, “Abu Dhabi considers oil-fired plants” (10 July 2009).
The National, “Striking a balance between price rises and subsidies” (10 July 2009a).
Stanton, Chris, “Abu Dhabi to boost alternative energy”, *The National* (10 July 2009b).
Todorova, Vesela, “Irena’s new boss sets out her agenda”, *The National* (10 July 2009c).
Bardsley, Daniel, “University funding for all Emirati students”, *The National* (13 July 2009).
Stanton, Chris, “Nuclear power comes closer as Emirates accept key protocols”, *The National* (2 August 2009).
Bakr, Amena, “Interview – Qatar’s Hassad Food eyes firms instead of farmland”, *Reuters* (11 August 2009).
Kardas, Saban, “Turkey inches towards Qatar LNG deal”, *Asia Times* (20 August 2009).
The Peninsula, “Qatar buys 6.78 pc in Volkswagen” (29 August 2009).
Bakr, Amena, “Interview – Saudi in talks to lease Pakistan farmland – official”, *Reuters* (1 September 2009).
James, Bonnie, “‘Trailblazing’ green convention centre”, *Gulf Times* (9 September 2009).
MEED, “Qatar: Dominating world gas markets”, (11-17 September 2009).
The Peninsula, “Qatar seeks fairer carbon measurement” (11 September 2009).
Bains, Elizabeth, “Qatar Foundation: Building world-class facilities”, *MEED* (18 September 2009).
Reuters, “Qatar Investment Authority says bourse buys strategic” (21 September 2009).
The National, “Environment agency abrogated” (1 October 2009).
Malas, Nour, “U.A.E. passes nuclear-energy law”, *The Wall Street Journal* (4 October 2009).
Rasheed, Abdullah, “Expat numbers rise rapidly as UAE population touches 6m”, *Gulf News* (6 October 2009a).
———, “1.9 m increase in population since last official census”, *Gulf News* (6 October 2009b).
Mouawad, Jad, and Revkin, Andrew C., “Saudi seeks payments for any drop in oil revenues”, *New York Times* (13 October 2009).
Graham, Rachel, and Carr, Mathew, “IEA questions OPEC’s need for climate compensation (update 1)”, *Bloomberg* (14 October 2009).
Gulf Times, “Chevron names key man for QSTP project” (15 October 2009).
The Peninsula, “Existing airport to become Free Trade Zone after new one opens” (26 October 2009).
Qatargas, “CEO Interview”, *The Pioneer*, No. 128 (November-December 2009).
Reuters, “Qatar Holding to open office in China – paper” (2 November 2009).
WAM, “Sheikh Khalifa re-elected president of the UAE”, *UAE Interact* (4 November 2009).
Sambidge, Andy, “Qatar spends $1.9bn as 2009 power demand rises”, *Arabian Business* (5 November 2009).
Hetzner, Christiaan, and Irish, John, “UPDATE 4 – Qatar tops up war chest by selling VW pref shares”, *Reuters* (10 November 2009).
The Peninsula, “Qatar initiates plans for better food security” (17 November 2009).

BQDRI, “Qatar Sustainable Assessment System (QSAS) Wins International Award of Excellency for Outstanding Contribution to Sustainable Development from the IREF Summit in London”, Press release (18 November 2009).
Gulf Times, “Barwa, Diar adopt Qatari green building norms” (18 November 2009).
Kerr, Simeon, “Propelled to the top of the rich list”, *Financial Times* (19 November 2009).
Al Jazeera English (website), “Qatar signs up Germans for metro” (22 November 2009).
Khan, Ghazanfar Ali, “GCC power grid launched”, *Arab News* (15 December 2009).
QNA, “Hassad Food launches livestock project in Australia” (22 December 2009).
Emirates Nuclear Energy Corporation, “Selection of Prime Contractor”, Press Release (27 December 2009).
England, Andrew, Hollinger, Peggy, and Jung-a, Son, “S Koreans win $2bn UAE nuclear power contract”, *Financial Times* (27 December 2009).
Reuters, “Timeline – UAE nuclear development” (27 December 2009).
The National, “After oil, now welcome to the nuclear family” (28 December 2009a).
Bardsley, Daniel, “Masdar to work on technology with Koreans”, *The National* (28 December 2009b).

2010

Qatar Foundation, “Here comes the sun”, *The Foundation*, Issue 16 (2010).
———, “Qatar Foundation and KAUST to Cooperate”, *Qatar Researcher*, Issue 2 (2010).
RasGas, “Qatar at the Crossroads”, *RasGas Magazine*, Issue 29 (2010).
Stanton, Chris, “Masdar drops 2016 date for completing clean city”, *The National* (4 January 2010).
Habboush, Mahmoud, “Two-year timetable prepared to control power shortages in Northern Emirates”, *The National* (6 January 2010).
Saudi Gazette, “Qatar eyes $1 billion solar power project” (7 January 2010).
QNA, “Deputy PM chairs Cabinet meeting”, *Gulf Times* (7 January 2010).
Maree, Karin, “Sogreah wins Qatar solar power consultancy deal”, *MEED* (8-14 January 2010).
Reuters, “Qatar economy grew 11 percent in 2009” (10 January 2010).
Environment Agency – Abu Dhabi, “Permanent committee set up on water and agriculture resources”, Press release (13 January 2010).
Al Bawaba, “Qatar’s Emir renames ‘Heart of Doha’ project as ‘Musheireb’” (14 January 2010).
Qatar Tribune, “Qatar plans solar power-run plant”, (17 January 2010).
Carlisle, Tamsin, and Stanton, Chris, “Turkey touts proposed gas pipeline from Qatar”, *The National* (18 January 2010).
Carlisle, Tamsin, “Carbon capture plan will boost oilfield output”, *The National* (19 January 2010a).
Stanton, Chris, “Gulf leaders defend virtues of fossil fuels”, *The National* (19 January 2010b).
Masdar, “Masdar signs agreement on developing emission reductions”, Press release (20 January 2010).
MEED, “Megaprojects push Qatar's population up” (5-11 February 2010).
———, “Qatar explores alternatives to gas”, (8 February 2010).
Sambidge, Andy, “Qatar's $2.6bn Energy City set to complete in 2012”, *Arabian Business* (11 February 2010).
Reuters, “Egypt to build wind farm with Abu Dhabi’s Masdar” (17 February 2010).
The Peninsula, “Qatar-National Water Control Centre inaugurated”, *MENAFN* (23 February 2010).
John, Pratap, “Qatar, US sign deal for energy research”, *Gulf Times* (26 February 2010).
Qazi, Sarmad, “US energy dept, QSTP sign MOU”, *Gulf Times* (26 February 2010).

Attwood, Ed, “Top Masdar execs quit as bosses order ‘rethink’ on project”, *Arabian Business* (28 February 2010).
Carlisle, Tamsin, “Ferrostaal, eSolar to build solar projects in UAE, South Africa, Spain”, *The Grid/The National* (18 February 2010).
WAM, “UAE government establishes International Advisory Board to support UAE Peaceful Nuclear Energy Program”, *UAE Interact* (23 February 2010).
Ligaya, Armina, “Plans for strategic food bank advance”, *The National*, (1 March 2010a).
Stanton, Chris, “Qatar to build silicon plant”, *The National* (1 March 2010b).
Maree, Karin, “Doha rethinks water services”, *MEED* (5-11 March. 2010).
Australian Financial Review, “Qatar agribusiness buys first Australian holding” (8 March 2010).
Malas, Nour, “Capital ideas”, *Wall Street Journal* (15 March 2010).
BQDRI, “Qatar General Electricity & Water Corporation and BARWA & Qatari Diar Research Institute signed an MOU on the provision of sustainability development”, Press release (16 March 2010).
Rohan, Brian, “Qatar energy minister says crude price is fair at $70-$80 a barrel”, *Reuters* (20 March 2010).
Qatar Foundation, “Green projects to educate the leaders of tomorrow”, *Qatar Foundation Telegraph* (25 March 2010).
———, “QF goes green with eco scheme”, *Qatar Foundation Telegraph* (25 March 2010).
The Peninsula, “Qatar not to curb gas output: Minister” (27 March 2010).
Lidstone, Digby, “GCC Power: harnessing the elements”, *MEED* (28 March 2010a).
MEED, “GCC power market report 2010: keeping pace with demand” (28 March 2010b).
———, “Doha considers power exports” (28 March 2010c).
Stanton, Chris, “Delays to major projects give Abu Dhabi Water and Electricity Authority breathing space”, *The National* (30 March 2010).
Gulf States Newsletter, “Saudi-UAE naval clash over Dolphin pipeline points to brittle GCC relations” (9 April 2010).
QSTP, “ExxonMobil Research Qatar announces funding to top 218 million QR at QSTP”, Press release (11 April 2010).
AMEinfo, “Qatalum aluminium smelter opens facility in Mesaieed Industrial City” (12 April 2010).
Yahoo News Maktoob, “Emirati population squeezed on expat influx” (13 April 2010).
Lepeska, David, “For Qatar a green future is not just hot air”, *The National* (15 April 2010).
Emirates Nuclear Energy Corporation, “Emirates Nuclear Energy Corporation files license applications and environmental assessment for UAE civil nuclear power program”, Press release (22 April 2010).
Reuters, “Update 1 – Kuwait resumes seasonal LNG imports, official says” (22 April 2010).
GreenGulf, “Qatar’s schools to go green”, Press release (24 April 2010).
QSTP, “Chevron and GreenGulf sign agreement to study solar energy in Qatar”, Press Release (25 April 2010).
James, Bonnie, “Solar test site work set to begin in June”, *Gulf Times*, (26 April 2010).
England, Andrew, “Conoco pulls out of Abu Dhabi project”, *Financial Times* (28 April 2010).
The Peninsula, “Qatar Minister: Reducing water cost big challenge”, *MENAFN* (28 April 2010).
Megson, Euan, “Qatar set for bid to host World Cup 2022”, *The National* (29 April 2010).
Kanellos, Michael, “More applied turmoil: Masdar PV abruptly changes management”, *Greentech Solar* (7 May 2010).
Reuters, “Qatar investor buys UK department store Harrods” (8 May 2010).
Kakande, Yasin, “Power outages ripple through Sharjah”, *The National* (9 May 2010).

Reuters, “Customs union still faces snags” *Kuwait Times* (9 May 2010).
Todorova, Vesela, “Abu Dhabi ‘could triple land under cultivation’”, *The National* (18 May 2010).
BQDRI, “More than 128 buildings in Qatar are under QSAS certification process”, Press release (27 May 2010).
Freebairn, William , “ENEC gets environmental permit, signs subcontracts for UAE project” *Wall Street Journal* (27 May 2010).
BQDRI, “Ashghal adopts QSAS building practices”, Press release (30 May 2010).
The National, “Population leaps to 8.19 million” (30 May 2010).
Bakr, Amena, “Qatar plans to secure food supplies domestically”, *Arabian Business* (2 June 2010).
The Peninsula, “Kahramaa drive to save energy” (7 June 2010).
Spencer, Richard, “Abu Dhabi plans largest solar power plant”, *The Telegraph* (10 June 2010).
MEED, “Qatar-Bahrain Causeway on hold” (11-17 June 2010).
Kollewe, Julia, “Qataris enjoy rich pickings in London property”, *The Guardian* (14 June 2010).
Bakr, Amena, “Saudi may enrich uranium for nuclear power plants”, *Arabian Business* (from Reuters, 16 June 2010).
Shaheen, Kareem, and Hassan, Hassan, “FNC calls for fairer federal finances”, *The National* (16 June 2010).
Gale, Ivan, and Stanton, Chris, “Masdar launches clean energy fund with Deutsche bank”, *The National* (19 June 2010).
Daya, Ayesha, “U.A.E. Masdar said to lose research chief in year one (Update1)”, *Bloomberg* (21 June 2010).
Arnold, Tom, “Capital leads way on clean energy”, *The National* (26 June 2010).
Qatar Tribune, “Water consumption rose 7% in summer of 2009” (29 June 2010).
WAM, “UAE committed to clean energy efforts; No scaling back of Masdar plans: Al-Jaber”, *UAE Interact* (30 June 2010).
Reuters, “Foreign firms eye $2bn Oman coal power plant deal” (2 July 2010).
Toumi, Habib, “Qatar to increase water reserve”, *Gulf News* (12 July 2010).
QNA, “Qatar, China discuss military cooperation” (14 July 2010).
Sambidge, Andy, “UAE on course for 7% renewables by 2020 - Masdar CEO”, *Arabian Business* (26 July 2010).
Gulf Times, “Qatar budgets QR112bn for energy, QNB says” (27 July 2010).
Petroleum Economist, “Middle East gas shortages grow” (29 July 2010).
Stanton, Chris, “Improved Gulf power grid reduces blackouts”, *The National* (29 July 2010).
Japan External Trade Organization, “JETRO press release on Japan-GCC trade during the year 2009” (2 August 2010).
Mills, Andrew, “Masdar Institute: a mission to be part of the energy solution”, *The Chronicle of Higher Education* (2 August 2010).
United Nations, “Secretary-general launches high-level panel on global sustainability to create new blueprint for achieving low-carbon prosperity in twenty-first century”, Press release ENV/DEV/1149 (9 August 2010).
The National, “Timeline: The UAE’s nuclear programme” (10 August 2010).
Janahi, Sara, “Rise in number of spinsters as Emiratis marry foreigners”, *Gulf News* (24 August 2010).
The Peninsula, “Qatar to supply 150 megawatts of electricity to Bahrain” (6 September 2010).
Zacharias, Anna, “RAK solar islands could power emirate”, *The National* (13 September 2010).

Bloomberg, “Lusail to complete Qatari city in 10 years”, *Arabian Business* (15 September 2010).
John, Pratap, “$1bn Qatar ‘boil-off’ gas project to cut emissions”, *Gulf Times* (19 September 2010).
Reuters, “Factbox: UAE oil and gas concessions” (22 September 2010).
UPI, “Russia expands its nuclear energy presence in the Middle East” (22 September 2010).
Ouroussoff, Nicolai, “In Arabian desert, a sustainable city rises”, *New York Times* (25 September 2010).
Al Harthy, Nasser, “N-power feasibility report by year-end”, *The Peninsula* (5 October 2010).
Stanton, Chris, “Cheapest electricity since 1998 set for Abu Dhabi”, *The National* (19 October 2010).
———, “IRENA head quits”, *The National* (20 October 2010).
Alderman, Liz, “Dubai faces environmental problems after growth”, *New York Times* (27 October 2010).
Singh, Mandeep, “Gazprom set to enter Bahrain oil-gas sector”, *Gulf Daily News* (28 October 2010).
WFES (World Future Energy Summit), “Abu Dhabi selected as host of next International Renewable Energy Conference”, Press release (30 October 2010).
WAM, “Sultan bin Zayed pays tribute to the UAE founder Sheikh Zayed bin Sultan Al Nahyan”, *UAE Interact* (2 November 2010).
Emirates Business 24/7, “UAE says $70 oil price is good” (3 November 2010).
Saseendran, Sajila, “Dubai govt approves green building code”, *Khaleej Times* (3 November 2010).
Petroleum Economist, “CCS plants could ease UAE gas deficit” (4 November 2010).
Doha Carbon and Energy Forum, “Doha Carbon & Energy Forum to be Inaugurated by Deputy Premier Al Attiyah”, Press release (8 November 2010).
Neuhof, Florian, “Masdar City: Testing Times,” *Utilities-ME* (8 November 2010).
Bitar, Zaher, “Dubai plans peaceful nuclear power”, *Gulf News* (10 November 2010).
Doha Carbon and Energy Forum, “Doha Carbon & Energy Forum Declared a Success”, Press release (10 November 2010).
Shaheen, Kareem, “FNC raises the alarm on water supplies”, *The National* (10 November 2010).
Khaleej Times, “Timeline: UAE nuclear development” (11 November 2010).
Olayiwola, Noimot, “Jan start for energy institute”, *Gulf Times* (11 November 2010).
Gulf News, “Tender for Dubai coal study gets strong interest” (14 November 2010).
The Peninsula, “Qatargas delivers 100th LNG cargo to Britain” (15 November 2010).
Blas, Javier, Farchy, Javier, England, Andrew, and Khalaf, Roula, “Abu Dhabi moves to secure food supply”, *Financial Times*, 16 November 2010.
Daya, Ayesha, “Dubai received first liquefied natural gas cargo from Qatar, Shell says”, *Bloomberg* (30 November 2010).
Carlisle, Tamsin, “Masdar City clips another $2.5bn from price tag”, *The National* (1 December 2010).
The Guardian, “US embassy cables: UAE presses to host renewable energy headquarters” (3 December 2010).
Construction Week Online, “Qatar wins 2022 FIFA World Cup bid” (4 December 2010).
Gulf Times, “Qatargas opens new LNG market with Dubai cargo” (7 December 2010).
Todorova, Vesela, “UAE beefs up team for climate talks” *The National* (7 December 2010).
Kapur, Vicky, “Petrol could cost Dh1 more per litre”, *Emirates Business 24/7* (9 December 2010).

Bakr, Amena, and Bronstein, Hugh, “Saudi still favors $70-$80 oil, OPEC holds supply”, *Reuters* (11 December 2010).
WAM, “UAE has steadily increased its engagement in the international climate talks: Abdullah”, *UAE Interact* (12 December 2010).
Henni, Abdelghani, “Fuel for thought”, *Arabian Business* (14 December 2010).
Solomon, Erika, “Feature – Abu Dhabi sees regional threats to water supply”, *Reuters* (20 December 2010).
The National, “UAE tops region with arms deals worth $67bn” (26 December 2010).
Todorova, Vesela, and Ghazal, Rym, “Dh1m donation “for our precious desert”’, *The National* (28 December 2010).
WAM, “Emirates Nuclear Energy Corporation Submits Construction License Application for Braka Units 1 and 2”, *UAE Interact* (28 December 2010).
Kuwait News Agency, “GCC, Iran entitled to acquire nuclear power for peace” (31 December 2010).

2011

Alafrangi, Manal, “Online petition calls for universal suffrage in UAE”, *Gulf News* (9 March 2011).

Official documents

Abu Dhabi Executive Affairs Authority, “Economic and Energy Affairs”, [http://eaa.abudhabi.ae/Sites/EAA/Navigation/EN/AdvisoryUnits/economic-affairs.html]. Accessed on 21 December 2009.
Abu Dhabi Executive Council, *Policy Agenda 2007-2008: The Emirate of Abu Dhabi* (2007).
Abu Dhabi Urban Planning Council, *Plan Abu Dhabi 2030: Urban Structure Framework Plan* (2007).
Bahrain Economic Development Board, *From Regional Pioneer to Global Contender: The Economic Vision for 2030* (2008).
Environment Agency – Abu Dhabi (EAD), *Abu Dhabi Water Resources Master Plan* (Abu Dhabi: EAD, 2009).
———, *Entity Strategic Plan 2009-2013* (Abu Dhabi: EAD, 2009).
European Commission, *Green Paper: A European Strategy for Sustainable, Competitive and Secure Energy*, COM(2006) 105 final (Brussels: 8 March 2006).
———, *Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions: Limiting Global Climate Change to 2 degrees Celsius. The Way Ahead for 2020 and Beyond.* COM(2007) 2 final (Brussels: 10 January 2007).
———, *Climate Change and International Security.* Paper from the High Representative and the European Commission to the European Council, S113/08 (14 March 2008).
Finnish Ministry of Foreign Affairs, internal memo, 4 February 2010. Not published.
General Secretariat for Development Planning, *Qatar National vision 2030* (July 2008).
Government of Abu Dhabi, *The Abu Dhabi Economic Vision 2030,* Context and Executive Summary (2008).
Government of Dubai, *Dubai Strategic Plan 2015: Highlights* (2007).
Government of the UAE, *Policy of the United Arab Emirates on the Evaluation and Potential Development of Peaceful Nuclear Energy* (20 April 2008).
Joint statement from the foreign ministers of the UAE, Cape Verde, Costa Rica, Iceland, Singapore and Slovenia, 9 December 2009.

Minister of State for Foreign Affairs of the UAE, Letter to Yvo de Boer, Ref. 3784 (14 February 2010).
Ministry of National Economy of Oman, *Second Long Term Development Strategy 1006-2020)* (2008).
Preparatory Commission for IRENA, *Report of the First Session of the Preparatory Commission*, IRENA/PC.1/SR (27 January 2009).
United Nations, "Johannesburg Declaration on Sustainable Development", World Summit on Sustainable Development, A/CONF.199/20 (4 September 2002).
UN General Assembly, *Declaration on the Right to Development*, A/RES/41/128 (4 December 1986).
———, "Report of the World Commission on Environment and Development", A/RES/42/187 (11 December 1987).
———, *Climate Change and Its Possible Security Implications*, A/63/L.8/Rev.1 (18 May 2009).
UN Security Council, "Security Council holds first-ever debate on impact of climate change on peace, security, hearing over 50 speakers", SC/9000 (17 April 2007).
UNFCCC, *FCCC/AGBM/1997/Misc.1/Add.1*.
———, *FCCC/CP/2001/MISC.1*.
———, *FCCC/CP/2001/MISC.1/Add.1*.
———, *FCCC/SBSTA/2002/MISC.3*.
———, *FCCC/KP/CMP/2006/MISC.2*.
———, *FCCC/AWGLCA/2008/Misc.5/Add.2 (Part I).*
———, *FCCC/AWGLCA/2009/MISC.1/ Add.1*
———, *FCCC/AWGLCA/2009/MISC.4 (Part II).*
———, *FCCC/KP/AWG/2009/MISC.4*.

Personal interviews and communications (chronological order)

2008

High-level US diplomat, Helsinki, September 2008. Conversation.
Abu Dhabi-based journalist, Abu Dhabi, October 2008. Interview.
Abu Dhabi-based investor, Abu Dhabi, October 2008. Interview.
Masdar Institute faculty member, Masdar City, Abu Dhabi October 2008. Interview.
Dr Tarik Yousef, Dean of Dubai School of Government, Dubai, October 2008. Interview.
UAE-based climate policy expert, Dubai, October 2008. Interview.
Dubai-based journalist, November 2008. Phone interview.
Qatar-based academic, November 2008. Phone interview.
Rola Nasreddine, Environmental Specialist, OAPEC Secretariat, Poznan, December 2008. Conversation.
Kati Kulovesi, Editor, Earth Negotiations Bulletin (IISD), Poznan, December 2008. Interview.
Wael Hmaidan, Executive Director, IndyAct, Poznan, December 2008. Interview.
Ibrahim Ahmed Al Ajmi, Director-General of Climate Affairs, Ministry of Environment and Climate Affairs of Oman, Poznan, December 2008. Interview.
Dr Rashid Ahmed bin Fahad, Minister of the Environment and Water of the UAE, Poznan, December 2008. Interview.

2009

Dubai-based journalist, March 2009. Phone interview.
Dubai-based environmental expert, March 2009. Phone interview.

UAE-based climate policy expert, June 2009. Phone interview.
Dr Christopher Davidson, Lecturer, University of Durham, June 2009. Interview.
Bahraini delegate, 'Bonn 2' UNFCCC climate conference, Bonn, June 2009. Interview.
Omani negotiator, 'Bonn 2' UNFCCC climate conference, Bonn, June 2009. Interview.
HH Sheikh Abdul Aziz bin Ali Al Nuaimi, Helsinki, August 2009. Interview.
Dr Waleed Al Malik, Legal Advisor, EAD (Environment Agency – Abu Dhabi), Abu Dhabi, October 2009. Personal views. Interview.
Dr Saad Al Numairy, Environmental Advisor, Ministry of Environment and Water, Dubai, October 2009. Interview.
Masdar City site employee, Masdar City, Abu Dhabi, October 2009. Conversation.
UAE-based journalist, Abu Dhabi, October 2009. Interview.
Lubna Al Ameri, Environment Advisor, Health and Safety Division, Supreme Petroleum Council, Abu Dhabi, October 2009. Interview.
Ahmad Majed Al Naqbi, Director of Petroleum Department, Ministry of Energy, Abu Dhabi, October 2009. Interview.
Climate change policy expert at the EAD (Environment Agency – Abu Dhabi), Abu Dhabi, October 2009. Interview.
Dr Ali Hamed Al-Mulla, Manager, Corporate Environment and Sustainable Development, Qatar Petroleum, Doha, October 2009. Interview.
Qatari negotiator, Doha, October 2009. Interview.
Aysha Abu Shahab, Associate Planner, Abu Dhabi Urban Planning Council, November 2009. Phone interview.
Qatar-based Asian diplomat, Doha, November 2009. Interview.

2010

Arab climate change policy expert, April 2010. Correspondence.
Christer Viktorsson, Deputy Director General for Operations, the Federal Authority for Nuclear Regulation of the UAE, Abu Dhabi, May 2010. Interview.
Long-term climate negotiator of a small Gulf state, May 2010. Interview.
Elina Lehtinen, Communications Manager, Crisis Management Initiative, formerly based in Qatar, Helsinki, June 2010. Interview.
Dennis Kumetat, LSE (London School of Economics and Political Science), August 2010. Correspondence.
Dr Christopher Davidson, Reader in Middle East Politics, University of Durham, August 2010. Correspondence.
Dr Iain MacDonald, programme manager, Qatar Carbonates and Carbon Storage Research Centre, August 2010 and January 2011. Correspondence.
Habiba Al Marashi, Chairperson, Emirates Environment Group, October 2010. E-mail interview.
Dr Nawal Al Hosany, Associate Director of Sustainability, Masdar, Masdar City, Abu Dhabi, October 2010. Interview.
Manager at Masdar, Masdar City, Abu Dhabi, October 2010. Interview.
Carbon expert at Masdar, Masdar City, Abu Dhabi, October 2010. Interview.
Rob Bradley, Senior Climate Policy Advisor, Directorate on Energy and Climate Change, Ministry of Foreign Affairs of the UAE, Abu Dhabi, October 2010. Interview.
UAE-based climate expert, Abu Dhabi, October 2010. Interview.
Climate change policy expert at the EAD (Environment Agency – Abu Dhabi), Abu Dhabi, October 2010. Interview.
Mohamed Dawoud, Manager, Water Resources Department, EAD (Environment Agency – Abu Dhabi), Abu Dhabi, October 2010. Interview.
Tanzeed Alam, Climate Change and Sustainability Manager, EWS-WWF (Emirates Wildlife Society – WWF), Abu Dhabi, October 2010. Interview.

UAE-based climate change expert, Abu Dhabi, October 2010. Interview.
Aziza Al Khalaqi, Social Researcher, Department of Social Development, GSDP, Doha, November 2010. Interview.
Dr Benno Boer, Programme Specialist, Sustainable development, UNESCO, Doha, November 2010. Two interviews.
Dr Eulian Roberts, CEO, Qatar Science and Technology Park, Doha, November 2010. Interview.
Qatar-based technology expert, Doha, November 2010. Interview.
Craig Field, Corporate Communications Specialist and Narasimha Raghavan, Director of Business Development, Qatar Solar Technologies, Doha, November 2010. Interview.
Qatar-based renewable energy experts, Doha, November 2010. Interview.
Dr Yousef al-Horr, President, BQDRI, Doha, November 2010. Interview.
Qatar-based renewable energy expert, Doha, November 2010. Interview.
Katrin Scholz-Barth, CEO, Katrin Scholz-Barth Consulting, Doha, November 2010. Interview.
Sam Pickering, Managing Director, BluuGreen Qatar, Doha November 2010. Interview.
Richard Leete, Director, Department of Social Development, GSDP, Doha, November 2010. Interview.
Qatar-based PR specialist, Doha, 10 November 2010. Interview.
Hamad Ali Al Kaabi, Permanent Representative of the UAE to the IAEA. November 2010. Phone interview.

2011

Matti Lassila, Finnish Ambassador to Abu Dhabi, January 2011. Correspondence.
Craig Field, Corporate Communications Specialist, Qatar Solar Technologies, January 2011. Correspondence.
Aziza Al Khalaqi, Social Researcher, Department of Social Development, GSDP, January 2011. Correspondence.
Saif Al Naimi, Director, HSE Regulations and Enforcement, Qatar Petroleum, Doha, February 2011. Interview.
Tanzeed Alam, Climate Change and Sustainability Manager, EWS-WWF (Emirates Wildlife Society – WWF), Abu Dhabi, March 2011. Correspondence.
Omran Al Kuwari, CEO, GreenGulf, February 2011. Correspondence.
Atif al-Jumaili, Manager, International Relations, Kuwait Petroleum Corporation, March 2011. Correspondence.

Presentations in seminars and conferences, statements and seminar reports

Al Bowardi, Ahmed, Speech, 17 April 2008, [http://www.abudhabi.ae/egovPoolPortal_WAR/appmanager/ADeGP/Citizen?_nfpb=true&_pageLabel=P42001137912184442 60839&lang=en]. Accessed on 27 December 2010.
Al Kaabi, Hamad, *Challenges Faced by Developing Countries in Nuclear Power Deployment: UAE Approach.* Presentation in an IAEA meeting (27 October 2009).
Al Mansouri, Majid, "The Institutional Set Up: DNA; UAE", presentation at *The First International Conference on the Clean Development Mechanism*, Saudi Arabia. 19-21 September 2006.
Al Mulla, Ali Hamed, "Post 2012 Kyoto Protocol Climate Change Negotiations: Issues and Strategic Challenges to Qatar", paper presented at *the 7th Natural Gas Conference*, Doha, 10-12 March 2009.

Al Nahyan, Sheikh Abdullah bin Zayed, Minister of Foreign Affairs of the UAE, speech in the high-level event on Climate Change, 'The Future in Our Hands: Addressing the Leadership Challenge of Climate Change', New York, 24 September 2007.

———, statement in joint high-level segment of COP and CMP, 16th Conference of the Parties, UNFCCC, Cancún, 9 December 2010.

Al-Ramzani, Adnan Fahad, Manager, Clean Development Mechanism, HSE Regulation and Enforcement Directorate, Qatar Petroleum, presentation *Lessons Learned from Al-Shaheen (ALS) Oil Field, Gas Recovery and Utilization Project* in Environmental Challenges in Gas Processing, Doha, 5 November 2008.

Al Thani, Sheikh Hamad bin Jassim bin Jabor, speech in the seminar *Towards Qatar's National Strategy: Issues and Challenges*, 28 October 2008, Doha.

Al Thani, Sheikh Hamad bin Jabor bin Jassim, speech in the seminar *Towards Qatar's National Strategy: Issues and Challenges*, 28 October 2008, Doha.

Al Thani, Sheikh Hamad bin Khalifa, statement in the General Debate of the Sixty-Second Session of the United Nations General Assembly, New York, 25 September 2007.

———, statement in the General Debate of the Sixty-Fourth Session of the United Nations General Assembly, New York, 23 September 2009.

Al Zayoudi, Thani, "Key UAE Mitigation Initiatives", Mitigation side event, Bonn climate talks, 1 August 2010.

Beyond Copenhagen: Environmental Diplomacy at Crossroads. Executive Seminar of the Zayed Diplomatic Academy, Zayed University and the Ministry of Foreign Affairs of the UAE, Abu Dhabi, 4 May 2010. Chatham House rule applied.

Davidson, Christopher, "Political Reform and Civil Society in the Small Gulf Monarchies", The Politics of the Oil Monarchies lecture series. Durham, 1 February 2008.

Enhancing the EU-GCC relations within a New Climate Regime: Prospects and Opportunities for Cooperation. Seminar. Gulf Research Centre and Centre for European Policy Studies, Brussels, 26 February 2009.

Environment Agency—Abu Dhabi (EAD), "Water resources in Abu Dhabi emirate" (2009), [http://www.ead.ae/Tacsoft/FileManager/Misc/2-%20Water%20Resources%20in%20Abu%20Dhabi%20Emirate-EAD.pdf]. Accessed on 18 December 2010.

Fahad (bin), Rashid Ahmed, Minister of Environment and Water of the UAE, speech in joint high-level segment of COP and CMP, 15th Conference of the Parties, UNFCCC, Copenhagen, December 2010.

International Institute for Sustainable Development (IISD), *Earth Negotiations Bulletins*, 12 (1996-2010).

International Energy Agency (IEA), "Presentation to the Press", [http://www.iea.org/speech/2009/Tanaka/WEO2009_Press_Conference.pdf]. London, 10 November 2009.

———, "World Energy Outlook 2010: Presentation to the Press", [http://www.worldenergyoutlook.org/docs/weo2010/weo2010_london_nov9.pdf]. London, 9 November 2010.

Kumetat, Dennis, "Climate Change in the Persian Gulf—Regional Security, Sustainability Strategies and Research Needs", Conference on *Climate Change, Social Stress and Violent Conflict*, [http://personal.lse.ac.uk/kumetat/pdfs/Kumetat,_Climate_change_in_the_Persian_Gulf.pdf]. Hamburg, 19-20 November 2009.

Maini, Tidu, speech "Qatar's Investment in Research & Development for the Post-Carbon Era" in the *All Energy Conference*, Aberdeen, 20 May 2009.

Miller, Keith, Director of Planning & Studies Directorate, ADWEC, "ADWEC Winter 2009/2010 Demand Forecast", presentation at *MEED Arabian Power & Water Summit 2010*, Abu Dhabi, 30-31 March 2010.

OPEC, Statement to the United Nations Climate Change Conference (COP13), Bali, 14 December 2007.
Qatar Science and Technology Park, "Introduction to QSTP". Presentation received in pdf format from Dr Eulian Roberts, dated 17 June 2010.
Raouf, Mohamed, presentation in seminar on *Arab World Policy for post-2012 Negotiations*, IndyAct, Beirut, 15 October 2008.
Richer, Renee, "Sustainable Development in Qatar: Issues and Challenges". Presentation in the seminar *Towards Achieving the Environmental Outcomes of the QNV 2030*, GSDP, Doha (2 February 2009).
Tassabehji, Ziad, "Masdar – opportunity!". Presentation at Arabian Peninsula business event, Finpro, Helsinki, 29 April 2009.
T*he Nuclear Question in the Middle East: Regional Perspectives*. Working group. Georgetown University School of Foreign Service in Qatar, Doha, 7 November 2010.
Tompkins, Ryan, Presentation at Arabian Peninsula business event, Finpro, Helsinki, 29 April 2009.
Varjotie, Jari, Presentation at Arabian Peninsula business event, Finpro, Helsinki, 29 April 2009.
Watts, Katherine, Climate Policy Officer, Climate Action Network Europe, and Wael Hmaidan, IndyAct, presentations in a NGO side-event, UNFCCC COP-14, Poznan, 11 December 2008.

Statistical publications and databases

BP, *Statistical Review of World Energy*. June 2010 Edition.
Central Bank of Bahrain, *Statistical Bulletin*, September 2010 issue.
Central Bank of Kuwait, *CBK Quarterly Statistical Bulletin*, September 2010 issue.
Central Intelligence Agency, *The World Factbook. Oman 2010*, [https://www.cia.gov/library/publications/the-world-factbook/geos/mu.html]. Accessed on 8 December 2010.
———, *The World Factbook. Qatar*, [https://www.cia.gov/library/publications/the-world-factbook/geos/qa.html]. Accessed on 23 December 2010.
———, "Country comparison: GDP per capita (PPP)", [https://www.cia.gov/library/publications/the-world-factbook/rankorder/2004rank.html]. Accessed on 22 December 2010.
Dubai Statistics Center, "Population Clock", [http://www.dsc.gov.ae/en/pages/home.aspx]. Accessed on 8 December 2010.
Economist Intelligence Unit (EIU), "The Economist Intelligence Unit's Index of Democracy 2008", [http://graphics.eiu.com/PDF/Democracy%20Index%202008.pdf]. Accessed on 23 December 2010.
FAO, *Aquastat online database*, [http://www.fao.org/nr/water/aquastat/dbase/index.stm]. Accessed on 29 December 2010.
Fenhann, Joergen, "CDM pipeline", UNEP Risoe Centre. Excel chart, [http://cdmpipeline.org/]. Updated on 1 July 2009.
———, "CDM projects in the pipeline", UNEP Risoe Centre. Excel chart, [http://cdmpipeline.org/]. Updated on 1 December 2010.
———, "CDM pipeline", UNEP Risoe Centre. Excel chart, [http://cdmpipeline.org/]. Updated on 1 January 2011.
Freedom House, "Freedom in the World Comparative and Historical Data", [http://www.freedomhouse.org/template.cfm?page=439]. Accessed on 14 December 2010.
International Energy Agency, *Energy Balances of Non-OECD Countries*, 2010 Edition.
———, *Energy Balances of OECD Countries*, 2010 Edition.

International Monetary Fund (IMF), *United Arab Emirates: Statistical Appendix 2009.* IMF Country Report No. 09/120.

———, "World Economic Outlook Database", October 2009, [http://imf.org/external/pubs/ft/weo/2009/02/weodata/index.aspx].

———, *Qatar: Statistical Appendix 2010.* IMF Country Report No. 10/62.

———, *World Economic Outlook*, October 2010 edition.

MEED, "Solar power projects in the Middle East and North Africa" (Excel file, 28 March 2010), [http://www.meed.com/supplements/2010/gcc-power-market-report-2010/gcc-power-harnessing-the-elements/3005249.article].

Ministry of Economy of the UAE, "UAE in Numbers 2007", [http://www.economy.ae/Arabic/EconomicAndStatisticReports/StatisticReports/Documents/Statistic%20Reports/UAE%20in%20Numbers/UAE%20Figures2007.pdf]. Accessed on 22 December 2010.

Ministry of Energy of the UAE, *Statistical Report 2003-2007*, [http://www.moenr.gov.ae/assetsmanager/Documents/Statistical%20Report.pdf]. 2008. In Arabic.

OPEC, *Annual Statistical Bulletin 2008* (Vienna: OPEC, 2009).

———, *Annual Statistical Bulletin 2009*, [http://www.opec.org/library/Annual%20Statistical%20Bulletin/interactive/2009/FileZ/Main.htm]. Accessed on 15 December 2010.

Qatar Statistics Authority, "Population and Social Statistics. Labor Force Sample Survey", December 2008, [http://www.qsa.gov.qa/Eng/publication/other_publication.htm]. Accessed on 15 March 2010.

———, *Labor Force Sample Survey Results, 2008: Analytical Summary*, Population & Social Statistics Department (Doha: QSA, 2009 or 2010).

SEDAC, "The Environmental Performance Index", [http://sedac.ciesin.columbia.edu/es/epi/]. Accessed on 28 December 2010.

———, "The Environmental Sustainability Index", [http://sedac.ciesin.columbia.edu/es/esi/]. Accessed on 28 December 2010.

Statistics Center – Abu Dhabi, *Statistical Yearbook of Abu Dhabi 2010* (SCAD, 2010).

Stockholm International Peace Research Institute, *The SIPRI Military Expenditure Database*, [http://www.sipri.org/databases/milex]. Accessed on 2 January 2011.

UNCTAD, *World Investment Report 2010. Investing in a Low-Carbon Economy* (Geneva: United Nations, 2010).

United Nations, *United Nations Common Database*. Updated on 19 December 2007. Accessed through ESDS International, University of Manchester on 3 December 2008.

———, *World Population Prospects: The 2008 Revision* (New York: UN Department of Economic and Social Affairs, Population Division, 2009). Updated in 18 June 2009.

U.S. Energy Information Administration, "OPEC Oil Export Revenues", August 2010 [http://www.eia.doe.gov/cabs/OPEC_Revenues/Factsheet.html].

———, "International Energy Statistics", [http://tonto.eia.doe.gov/cfapps/ipdbproject/IEDIndex3.cfm]. Accessed on 16 December 2010.

———, "Natural Gas Weekly Update", 16 December 2010, [http://tonto.eia.doe.gov/oog/info/ngw/ngupdate.asp].

World Bank, "Gross domestic product 2009", [http://siteresources.worldbank.org/DATASTATISTICS/Resources/GDP.pdf]. Updated on July 2010.

World Bank, *World Development Indicators*, September 2010 edition.

World Bank Global Gas Flaring Reduction, "Estimated Flared Volumes from Satellite Data, 2005-2009", [http://go.worldbank.org/G2OAW2DKZ0]. Accessed on 15 January 2011.

World Resources Institute, *Climate Analysis Indicators Tool (CAIT)*, Version 8.0, (Washington D.C: WRI, 2010).

Yale University, “Country Scores”, 2010 Environmental Performance Index, [http://epi.yale.edu/Countries]. Accessed on 20 December 2010.

Websites and other Internet-based publications

Abu Dhabi Executive Council, “Abu Dhabi Government” and “Executive Council”, [http://gsec.abudhabi.ae/Sites/GSEC/Navigation/EN/root.html]. Accessed on 27 December 2010.

Abu Dhabi Global Environmental Data Initiative, [http://www.agedi.ae/]. Accessed on 3 August 2009.

Abu Dhabi Government, “Environment Agency – Abu Dhabi (EAD)”, [http://www.abudhabi.ae/egovPoolPortal_WAR/appmanager/ADeGP/Citizen?_nfpb=true&_pageLabel=p_citizen_departments&did=852&lang=en]. Accessed on 27 December 2010.

Abu Dhabi Tourism Authority, “Country Size”, [http://www.visitabudhabi.ae/en/uae.facts.and.figures/country.size.aspx]. Accessed on 29 December 2010.

———, “Geography”, [http://www.visitabudhabi.ae/en/about.abudhabi/geography.aspx]. Accessed on 21 December 2010.

Abu Dhabi Urban Planning Council, “About us”, [http://upc.gov.ae/]. Accessed on 28 December 2010.

ADNOC, “Energy to the Consumer”, [http://www.adnoc.ae/content.aspx?newid=47&mid=47]. Accessed on 30 December 2010.

ALDAR, “About Aldar”, [http://www.aldar.com/about_aldar.en]. Accessed on 28 December 2010.

Amiri Diwan, “H.E. the Heir Apparent”, [http://www.diwan.gov.qa/english/heir_apparent/default.htm]. Accessed on 6 January 2011.

BQDRI, *Lusail; QSAS Fact Sheet*, [http://www.bqdri.org/doc/QSAS%20Lusail%20fact%20sheet.pdf]. June 2010.

BQDRI, “Barwa & Qatar Diar Research Institute (BQDRI)” Press kit [http://www.bqdri.org/index.php?page=press-kit]. Accessed on 6 September 2010.

Carnegie Endowment, “Qatar”, Arab Political Systems, [http://www.carnegieendowment.org/publications/?fa=41362]. Accessed on 6 January 2011.

CDM-DNA UAE, “DNA UAE”, [http://www.cdm-uae.ae/portal/menu.authority.aspx]. Accessed on 28 December 2010.

Clean Energy Ministerial, [http://www.cleanenergyministerial.org/]. Accessed on 24 January 2011.

Dolphin Energy, “Core Customers and Volumes” [http://www.dolphinenergy.com/Public/marketing-distribution/marketing-natural-gas-customers-volumes.htm] Accessed on 23 December 2010.

ECSSR (Emirates Center for Strategic Studies and Research), “UAE Experience in Combating Desertification: Strategies and Policies” (2004), [http://www.ecssr.ac.ae/CDA/en/FeaturedTopics/DisplayTopic/0,1670,305-101-84,00.html]. Accessed on 16 July 2009.

———, “H.E. Ambassador Hamad Ali Al-Kaabi, Profile”, [http://www.ecssr.ac.ae/]. Accessed on 7 August 2009.

Embassy of the State of Qatar in Washington D.C., “Environment Affairs”, [http://www.qatarembassy.org/environment.asp]. Accessed on 11 April 2010.

———, “Law No. 30 of 2002”, [http://www.qatarembassy.net/law%20of%20environment%20protection.asp] Accessed on 23 April 2010.

Embassy of the UAE in Washington D.C., “Export Control and Combating Terror Financing”, [http://www.uae-embassy.org/business-trade/trade-export/export-control]. Accessed on 2 January 2011.
Environment Agency – Abu Dhabi (EAD), “Strategies”, “Regulations”, [http://www.soe.ae/Abu_Themespage.aspx?m=414]. Accessed on 2 August 2009.
———, “Governance”, [http://www.soe.ae/Abu_themespage.Aspx?m=259]. Accessed on 5 August 2009.
———, “Conferences & Exhibitions”, [http://www.ead.ae/en/portal/conferences.exihibitions.aspx]. Accessed on 27 December 2010.
Executive Affairs Authority, “About us”, [http://eaa.abudhabi.ae/Sites/EAA/Navigation/EN/about-us.html]. Accessed on 27 December 2010.
———, “Chairman of the Executive Affairs Authority”, [http://eaa.abudhabi.ae/Sites/EAA/Navigation/EN/chairman-executive-affairs-authority.html]. Accessed on 26 December 2010.
Federal Authority for Nuclear Regulation of the UAE, “Director General’s message”, [http://fanr.gov.ae/en/article/about-fanr/director-general-message.html]. Accessed on 2 January 2011.
Freedom House, *Freedom in the World, 2008 Edition. Country Report: Kuwait*. [http://www.freedomhouse.org/template.cfm?page=22&year=2008&country=7426]. Accessed on 15 December 2008.
GTZ, “Wind power project on Sir Bani Yas island”, [http://www.gtz.de/en/weltweit/maghreb-naher-osten/vereinigte-arabische-emirate/13565.htm]. Accessed on 17 December 2010.
Hassad Food, “Strategic focus”, [http://www.hassad.com/Aboutus/strategicfocus/tabid/67/Default.aspx]. Accessed on 14 August 2010.
HH Sheikha Moza Office, “Biography”, [http://www.mozabintnasser.qa/Her%20Highness/Biography/Pages/default.aspx]. Accessed on 6 January 2011.
Hukoomi, “Directory”, Qatar e-Government, [http://www.gov.qa/wps/portal/directory/directory/]. Accessed on 10 April 2010.
———, “Ministry of Environment”, Qatar Government Online, [http://www.gov.qa/]. Accessed on 11 April 2010.
IISD (International Institute for Sustainable Development), “Linkages”, [http://www.iisd.ca/ozone/mop20/]. Accessed on 6 October 2010.
IHS Global Insight, “Long-serving oil minister bows out after completing Qatar's LNG, oil expansion” (19 January 2011), [http://www.ihsglobalinsight.com/SDA/SDADetail19766.htm].
Imperial College, “Qatar Carbonates and Carbon Storage Research Centre”, [http://www3.imperial.ac.uk/qatarcarbonatesandcarbonstorage]. Accessed on 30 August 2010.
IRENA@UAE, “The Future is Here”, PowerPoint presentation, [http://www.irenauae.com/]. Accessed on 15 July 2009.
IRENA@UAE website, “Sustainability is a foundation of Abu Dhabi’s heritage”, [www.irenauae.com]. Accessed on 17 August 2009.
Johnson, Keith, “Gas pains: China, Qatar and the competition for natural gas”, *Environmental Capital blog*, Wall Street Journal (28 October 2009), [http://blogs.wsj.com/environmentalcapital/2009/10/28/gas-pains-china-qatar-and-the-competition-for-natural-gas/].
Masdar, “Activities”, [http://www.masdar.ae/]. Accessed on 29 July 2009.
———, “Introduction”, [http://www.masdar.ae/]. Accessed on 29 July 2009.
Masdar Institute of Science and Technology, [http://www.mist.ac.ae/]. Accessed on 28 July 2009.
McGray, Heather, “From Copenhagen to Cancun: Adaptation”, *World Resources Institute*, 13 May 2010, [http://www.wri.org/stories/2010/05/copenhagen-cancun-adaptation/].

Ministry of Foreign Affairs of Qatar, “Council of Ministers”, [http://english.mofa.gov.qa/details.cfm?id=44]. Accessed on 10 April 2010.
———, “His Excellency Abdullah Bin Hamad Al-Attiyah”, [http://english.mofa.gov.qa/get_gov_info.cfm?id=36] Accessed on 6 April 2010.
———, “The Constitution”, [http://english.mofa.gov.qa/details.cfm?id=80]. Accessed on 10 April 2010.
Mubadala, [http://www.mubadala.ae/]. Accessed on 28 July 2009.
Musheireb, “Her Highness message”, [http://musheireb.dohaland.com/]. Accessed on 6 September 2010.
Oxford Business Group, *The Report: Qatar 2009*, [http://www.oxfordbusinessgroup.com/product/report/report-qatar-2009]. Accessed on 15 May 2010.
Prime Minister of the UAE, “Prime minister’s first e-session with the public”, [http://www.uaepm.ae/en/media/e-sessions/Public-e-Session-en-010609.html]. Updated on 1 June 2009.
Qatar Cool, “Our customers”, [http://www.qatarcool.com/ourcustomers.php]. Accessed on 17 January 2011.
Qatar Electricity and Water Company, “About Qatar Electricity & Water Co.”, [http://www.qewc.com/Web.nsf/aboutqewc?OpenPage]. Accessed on 6 January 2011.
Qatar Foundation, [http://www.qf.org.qa/]. Accessed on 27 August 2010.
Qatar Green Center, [http://www.qgreen-clean.com/]. Accessed on 20 June 2010.
Qatar Investment Authority, “FAQs”, [http://www.qia.qa/QIA/faq.html]. Accessed on 6 April 2010.
Qatar National Food Security Programme, “Survey of arable land”, [http://www.qnfsp.gov.qa/programme/agriculture/geographic%20summary/survey-and-arable-land]. Accessed on 15 January 2011.
Qatar Natural History Group, [http://www.qnhg.org/]. Accessed on 20 June 2010.
Qatar Petroleum, “Health Safety & Environment”, [http://www.qp.com.qa/en/homepage/qpactivities/qpoperations/environmentandsociety/20-1719777058.aspx]. Accessed on 12 January 2011.
Qatar Science and Technology Park: “Bio: Dr. Tidu Maini”, [http://www.qstp.org.qa/files/pdf/Bio-TM-Mar08.pdf]. Accessed on 29 August 2010.
———, “Press pack”, (undated), [http://www.qstp.org.qa/files/pdf/QSTPPressPack.pdf] Accessed on 31 August 2010. Nb. Judging by the text, the document is from 2009.
———, “Current members”, [http://www.qstp.org.qa/output/page54.asp] Accessed on 2 September 2010.
Qatar Statistics Authority, “Qatar Census 2010”, [http://www.qsa.gov.qa/QatarCensus/Census_Results.aspx]. Accessed on 3 January 2011.
———, “Total Population, 30 Nov 2010”, [http://www.qsa.gov.qa/eng/index.htm]. Accessed on 8 December 2010.
QNFSP (Qatar National Food Security Programme), “About us”, [http://www.qnfsp.gov.qa/about-us/]. Accessed on 15 January 2011.
Simpfendorfer, Ben, “China’s historic return to the Gulf”, *The Middle East Channel blog*, Foreign Policy (2 April 2010), [http://mideast.foreignpolicy.com/posts/2010/04/02/china_s_historic_return_to_the_gulf].
Sovereign Wealth Fund Institute, “Qatar Investment Authority”, [http://www.swfinstitute.org/swfs/qatar-investment-authority/]. Accessed on 30 December 2010.
———, “Sovereign wealth fund rankings”, [http://www.swfinstitute.org/fund-rankings/], Updated in December 2010.
Squassoni, Sharon, and Hon Chung, Kee , “Nuclear Choices in the Middle East”, *Nuclear in Focus blog*, Center for Strategic and International Studies (14 October 2010). [http://csis.org/blog/nuclear-choices-middle-east].

Sustainable Qatar, [http://sustainableqatar.pbworks.com/]. Accessed on 20 June 2010.
Texas A&M Mechanical Engineering Research, “Research Laboratories”, [http://meen.qatar.tamu.edu/research/2233.aspx]. Accessed on 30 August 2010.
The Friends of the Environment Centre, [http://www.fec.org.qa/]. Accessed on 20 June 2010.
The Group of 77, “About the Group of 77”, [http://www.g77.org/doc/index.html]. Accessed on 9 February 2009.
UAE Interact, “Government – Political system”, [http://www.uaeinteract.com/government/political_system.asp]. Accessed on 26 December 2010.
———, “Government – President of the UAE”, [http://www.uaeinteract.com/government/zayed.asp]. Accessed on 26 December 2010.
UNCCD, “Action Programmes”, [http://www.unccd.int/actionprogrammes/asia/asia.php#national]. Updated on 1 April 2010.
UNFCCC, “Documents”, [http://unfccc.int/documentation/documents/items/3595.php]. Accessed on 17 October 2010.
———, “National focal points”, [http://maindb.unfccc.int/public/nfp.pl]. Accessed on 20 December 2010.
———, “Designated national authorities”, [http://cdm.unfccc.int/DNA/index.html]. Accessed on 22 January 2011.
———, “Webcasts and videos”, [http://unfccc.int/press/multimedia/webcasts/items/5857.php]. Accessed on 27 January 2011.
United Development Company, “The Pearl-Qatar”, [http://www.udcqatar.com/English/OurVentures/ThePearlQatar/Pages/default.aspx]. Accessed on 4 January 2011.
United Nations Environment Programme, “Champions of the Earth: 2005 Laureates”, [http://www.unep.org/champions/laureates/2005/Zayed.asp]. Accessed on 26 December 2010.
World Bank, “A Strategy to Address Climate Change in the MENA Region” (2 October 2008), [http://go.worldbank.org/OIZZFRJZZ0].
———, “Adaptation to climate change in the Middle East and North Africa region”, [http://go.worldbank.org/B0G53VPB00]. Accessed on 12 December 2010.
World Council for Renewable Energy, “The long road to IRENA – A Chronology”, [http://www.wcre.de/en/images/stories/pdf/irena_chronologie.pdf]. Accessed on 21 January 2011.
World Future Energy Summit, [http://www.worldfutureenergysummit.com/]. Accessed on 18 January 2011.
World Future Energy Summit, “2010 summit and exhibition”, [http://www.worldfutureenergysummit.com/en/about-wfes/2010-summit-and-exhibition.aspx]. Accessed on 24 January 2011.
World Nuclear Association, “Nuclear Power in the United Arab Emirates”, [http://www.world-nuclear.org/info/UAE_nuclear_power_inf123.html]. Updated in July 2009.
WREC (World Renewable Energy Congress), [http://www.wrenuk.co.uk/wrecxi.html]. Accessed on 24 January 2011.
Zayed Future Energy Prize, [http://www.zayedfutureenergyprize.com/]. Accessed on 28 December 2010.
———, ‘Sheikh Zayed’, [http://www.zayedfutureenergyprize.com/en/about-the-prize/background/the-vision/sheikh-zayed.html]. Accessed on 4 February 2011.
Zayed International Prize for the Environment, [http://www.zayedprize.org.ae/]. Accessed on 28 December 2010.