

Arab Human Development Report

Research Paper Series

Energy and Arab Economic Development

**Bassam Fattouh
& Laura El-Katiri**



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* Director of the Oil & Middle East Programme
Oxford Institute for Energy Studies
57 Woodstock Road, Oxford OX2 6FA, United Kingdom
Tel: +44 (0)1865 311377 – Fax: +44 (0)1865 310527
Email: bassam.fattouh@oxfordenergy.org

** Research Fellow at the Oil and the Middle East Programme
Oxford Institute for Energy Studies
Tel: +44(0)1865 889134 – Fax: +44 (0)1865 310527
Email: laura.elkatiri@oxfordenergy.org

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Abstract

Like no other region, energy resources have shaped the Arab world and its modern-day development trajectory. Endowed with some of the world's most important oil and natural gas reserves, countries in the Arab world have over the past four decades produced and exported more oil than those of any other region, and hold reserves sufficient to supply world energy markets for more than another hundred years at current rates of production. Its energy wealth has benefited the Arab world, despite significant differences across the region alongside differing national resources, and their management across governments. Significant challenges also derive from the Arab energy-led development model, particularly patterns of domestic energy consumption, rising demand for energy across the region, and rising domestic investment needs. This paper attempts to provide a very brief overview of the role energy has played in driving economic development in the Arab world, its effects on development choices, and the challenges faced by the resultant development model. It does so by looking at four different aspects of energy-led development: 1) the effect of energy on regional Arab economic growth; 2) the inter-linkages between energy and Arab economic structures; 3) the implications of energy for intra-regional integration; and 4) evolving challenges from this development model.

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1. Introduction

Energy resources can be a critical contributor to economic growth and prosperity. Where they are plentiful, they can be both blessing and curse; blessing as an important source of national income, to be invested into other productive sectors or saved; and curse as a debilitating factor for growth in economic productivity and income levels, as observed in various empirical studies.¹ Like no other region, the Arab world and its modern-day development trajectory have been shaped by its energy resources. Endowed with some of the world's most important oil and natural gas reserves, Arab countries have over the past four decades produced and exported more oil than any other region, and hold energy reserves sufficient to supply world energy markets for more than another hundred years at current rates of production.²

Its energy wealth has without doubt benefited the Arab world, despite significant differences across the region alongside differing national resources, and governments' effectiveness in the management of the resource. For many large and medium Arab oil and gas producers, hydrocarbon export revenues have been a principal source of government revenue fuelling, in many cases, systematic state investment back into the economy, and, in the case of many of the Gulf States, some of the world's most generous modern welfare states. Energy has made some parts of the region rich, the GCC states being amongst the world's wealthiest nations on a per capita basis today.

However, many of the benefits of the region's oil and gas wealth remain unequally distributed across the Arab world. The Arab region's smaller or non-hydrocarbon producers benefit from the oil and gas wealth primarily indirectly, via intra-regional trade and investment flows, intra-Arab aid, and the long-term flow of labour remittances by the Arab expatriate workforce in neighbouring Arab oil producers. The region's energy reserves in this context were unable to fundamentally revise the Arab world's missing intra-regional economic integration.

The Arab world's wealth in oil and natural gas resources has also shaped the way the region uses energy, both in domestic consumption, and as a principal input factor to intermediate industries. The perceived abundance of energy resources and their seemingly low cost to the economy have spurred energy intensity and consumption rates in the Arab world, rendering parts of that region amongst the highest consumers of energy in the world, in per capita terms. With regional energy demand nearly doubling every decade, one of the key future challenges facing the Arab world's

¹ We look below in more detail at this literature.

² The Arab countries studied in this paper as comprising the Arab world are: Algeria, Bahrain, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Syria, Tunisia, the United Arab Emirates, and Yemen.

development model will undoubtedly be the management of its own patterns of energy consumption, including the areas of domestic energy pricing and improving efficiency. The long-standing question of economic diversification, and the reliance on the energy-intensive diversification strategies of the Arab energy producers, is likely to become even more pressing in the coming years.

The story of energy in the Arab world is also one of a shifting focus on different energy resources. For a long time, oil has taken the place of the Arab world's most important source of income, through exports and through its use in domestic industries. Discovered first on the Arabian Peninsula and later in North Africa during the 1930s, oil and the wealth it brought with it has helped cement many of the Arab Gulf's states, and has created the basis for many oil producers' modern-day prosperity.³ The nationalizations of most Arab oil industries during the 1970s marked an important crossing point for the role of the region's hydrocarbon industry in its economic development. Since the 1970s, the region has also witnessed a rapid expansion in the role of natural gas as a secondary source of income through direct natural gas exports, and as a valuable domestic source of energy.⁴ The rapid growth in regional demand for energy has since turned natural gas into a commodity in short supply in some Arab economies – a paradox amplified by the region's lack of internal energy trade integration and looming investment challenges, which have also begun to impact the more traditional oil sector.

Many of the economic linkages between the Arab world's energy sectors and the region's economies remain surprisingly misunderstood to this day – a gap which this paper tries to fill. Unable to provide a detailed account, which would fill a book volume or two, we concentrate on some of the major themes that we consider defining for the region. In particular, we examine those growth-enhancing linkages that have made oil and natural gas important contributors to regional economic development, and discuss some of the challenges of the Arab world's energy-led development model.

Section 2 begins with some basic facts about oil and natural gas in the Arab world, its main reserves, and production and consumption trends. Section 3 engages with a long-standing discussion surrounding the effect of energy resources on the Arab world's economic growth trajectory, finding mixed messages. Section 4 more closely examines the linkages between energy and the structure of Arab economies. Section 5 explores the implications of energy on the region's internal integration, including the aspects of trade, labour, and capital migration. In Section 6, we consider some of the main challenges the Arab world's energy-based development model faces: investment in the energy sector, economic diversification in the main producers, questions of a sustainable use of energy resources within the region, and finally, reform of domestic pricing frameworks in a policy shift towards greater regional efficiency in the use of its non-renewable resources.

³ For a thorough discussion, see Moneef, M. (2006) *The Contribution of the Oil Sector to Arab Economic Development*. OFID Pamphlet Series, 34. Vienna: September 2006. Available online at <http://www.ofid.org/LinkClick.aspx?fileticket=oFqdaYAZVNM%3D&tabid=109&mid=539>

⁴ With a lesser opportunity cost than oil and oil products, natural gas has gradually become a preferred fuel for industrial activities such as petrochemicals manufacturing and power generation, replacing more valuable oil, which is thus freed for export.

2. Some Basic Facts about Oil and Gas in the Arab World

The essential role played by oil and natural gas in the Arab world's socio-economic development clearly stems from the region's unique endowment with energy resources, and its role of forty years as the world's single most important supplier of energy. In this section, we provide an overview of the region's main reserves and its production and consumption patterns, as well as the role oil and natural gas have come to play in Arab energy-producing countries.

2.1. Reserves and Production

Oil has been the Arab world's most important energy resource; Arab countries hold more proved reserves than any other region, with some 713.6 billion barrels, more than 43 per cent of the world's total proven reserves (see Figure 1 and Table 1).⁵ With an average output of some 26.3 million barrels per day in 2011, the Arab world produces nearly a third of world oil supply, making the region also the world's single most important supplier of crude oil.

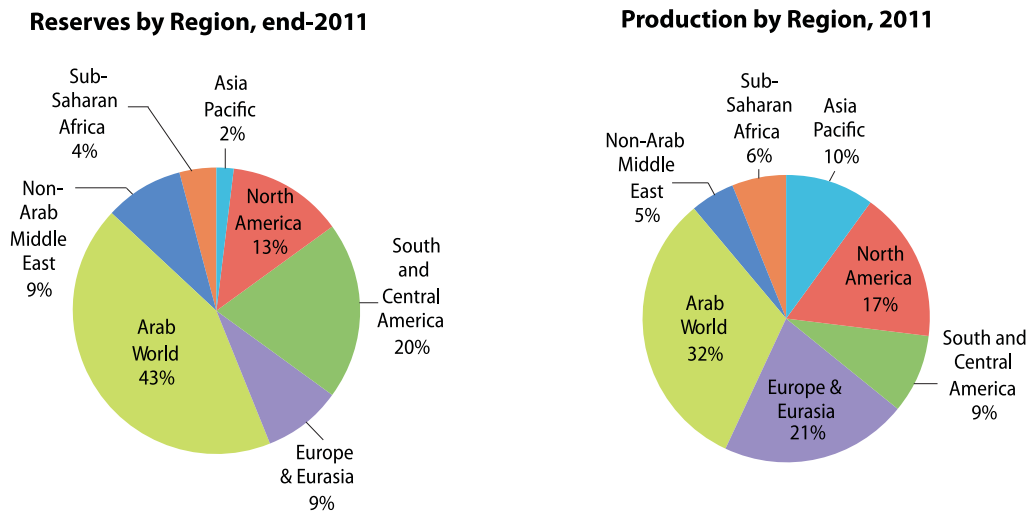
The key role the region plays in international oil markets extends beyond its wealth in reserves and in its annual output volume. Unlike many other oil producers in the world, Arab producers export the bulk of their oil production, and thus the region has a dominant position in international trade of crude oil (compare the export-consumption ratios in Table 2). In 2011, the region's exports constituted around 40 per cent of the world's crude oil exports. Furthermore, spare capacity is concentrated in the three Gulf Cooperation Council (GCC) member states⁶ Saudi Arabia, Kuwait, and the UAE, with Saudi Arabia holding the bulk of the world's available spare capacity. This has allowed Saudi Arabia to act as a swing producer, filling the gap at times of oil supply disruptions. Finally, the GCC reserves are among the cheapest in the world to find, develop, and produce (with the exception of those in Oman). The IEA estimates total production costs in Saudi Arabia, Kuwait, and the UAE to vary between \$3 and \$5 per barrel of oil produced.⁷

⁵ Collective data sets by BP and the EIA typically quantify regional energy reserves and production under the separate aggregates of 'Middle East' and 'Africa'. In this report, we have adapted these aggregates to reflect the Arab world as the collective reserves and production of our list of countries listed in fn 1.

⁶ The GCC members comprise Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE).

⁷ IEA (2005).

FIGURE 1: WORLD OIL RESERVES AND PRODUCTION BY REGION AT END-2011



Source: Authors' calculations based on BP (2012)

TABLE 1: PROVED OIL AND GAS RESERVES IN THE ARAB ECONOMIES AT END-20

	Oil			Natural Gas		
	Proved reserves (bbl)	Share of world reserves	R/P ratio	Proved reserves (Tcm)	Share of world reserves	R/P ratio
The GCC States	495.0	29.9%	69.5	42.4	20.3%	121.0
Bahrain	0.1	< 0.05%	7.0	0.3	0.2%	26.8
Kuwait	101.5	6.1%	97.0	1.8	0.9%	> 100
Oman	5.5	0.3%	16.9	0.9	0.5%	35.8
Qatar	24.7	1.5%	39.3	25.0	12.0%	> 100
Saudi Arabia	265.4	16.1%	65.2	8.2	3.9%	82.1
UAE	97.8	5.9%	80.7	6.1	2.9%	> 100
Other Major Oil Producers	202.4	12.2%	110.5	9.6	4.6%	114.2
Algeria	12.2	0.7%	19.3	4.5	2.2%	57.7
Iraq	143.1	8.7%	> 100	3.6	1.7%	> 100
Libya	47.1	2.9%	> 100	1.5	0.7%	> 100
Other Oil Producers	16.2	1.0%	26.8	12.6	1.4%	159.8
Egypt	4.3	0.3%	16.0	2.2	1.1%	35.7
Sudan and S. Sudan	6.7	0.4%	40.5	0.1	< 0.05%	-
Syria	2.5	0.2%	20.6	0.3	0.1%	34.3
Yemen	2.7	0.2%	32.0	0.5	0.2%	50.7
Total Arab World	713.6	43.2%	74.4	55.0	26.3%	107.2
Total World	1,652.6	100%	54.2	208.4	100%	63.6

Source: BP (2012); EIA (2012).

Within the Arab world, the six GCC member states along with Algeria, Iraq, and Libya account for nearly 98 per cent of the Arab world's total oil reserves, and 95 per cent of its total production (see Table 2). Saudi Arabia alone holds more than 265 billion barrels of proved oil reserves, 16 per cent of global total reserves. Four of the world's ten largest producers of oil are Arab oil producers, including Saudi Arabia, the UAE, Kuwait and Iraq.⁸ Together with Algeria, Libya, and Qatar, these producers form seven of the twelve member states of the Organization of Petroleum Exporting Countries (OPEC), of which several Arab states were also founding members.

TABLE 2: OIL AND GAS PRODUCTION BY ARAB ECONOMIES, 2011

	Oil Production (^{000 b/d)}	Share in World Production	Ratio Exports: Consumption (2)	Gas Production (Bcma)	Share in World Production	Ratio Exports: Consumption (3)
GCC States	19,505.1	23.3%	5.8	350.3	10.7%	-
Bahrain	47.4	0.1%	5.0	13.0	0.4%	-
Kuwait	2,681.9	3.2%	7.7	13.0	0.4%	-
Oman	888.9	1.1%	6.7	26.5	0.8%	0.7
Qatar	1,637.5	2.0%	6.0	146.8	4.5%	4.4
Saudi Arabia	11,153.0	13.3%	3.8	99.2	3.0%	-
UAE	3,096.3	3.7%	5.3	51.7	1.6%	0.3
Other Major Oil Producers	5,020.2	6.0%	4.2	83.9	2.6%	-
Algeria	1,884.1	2.3%	4.2	78.0	2.4%	1.9
Iraq	2,634.6	3.2%	3.0	1.9	0.1%	-
Libya	501.5	0.6%	5.5	4.1	0.1%	1.4
Other Oil Producers	1,737.1	2.1%	1.1	79.0	2.4%	-
Egypt	706.1	0.8%	0.3	61.3	1.9%	0.3
Mauretania	7.7	0.0%	0.4	0.0	0.0%	-
Morocco	3.9	0.0%	0.1	< 0.5 *	0.0%	-
Sudan and S. Sudan	455.0	0.5%	4.1	0.0	0.0%	-
Syria	330.8	0.4%	0.6	8.3	0.3%	-
Tunisia (1)	70.1	0.1%	0.9	2.0	0.0%	-
Yemen	163.4	0.2%	1.4	9.4	0.3%	7.2
Total Arab World	26,262.5	31.4%	3.3	513.2	15.7%	-
Total World	83,575.7	100.0%	n/a	3,276.2	100.0%	-

Notes:

(1) Production number for 2010;

(2) Ratio for 2008;

(3) Ratio for 2010

Source: Oil: EIA (2012); Gas: BP (2012); EIA; Ratios calculated by authors based on EIA, BP and Cedigaz.

⁸ Production for 2011, BP (2012).

Albeit not as significant as its oil resources, the Arab world also holds considerable reserves of natural gas; some 55 trillion cubic metres (Tcm) at the end of 2011, more than a quarter of the world's total proven gas reserves (see Table 1). Possible further, unconventional resources, which may include both natural gas and oil, remain largely untapped at present.⁹ Many of the region's energy resources are expected to last well into the next century at current production rates, including those in the area of natural gas, which renders the Arab world in principle a likely key energy production centre for many more decades to come (compare with R/P ratios in Table 1).

Despite these significant gas reserves in place, current Arab gas production remains comparably benign at 513 billion cubic metres per annum (Bcma) in 2011, merely about a sixth of world production, and considerably below what might be expected as the region's output potential. Only a few Arab gas producers currently export natural gas: Algeria, Libya, and Qatar are long-term gas exporters; Oman and Yemen have significantly smaller exports.¹⁰ Qatar overtook Algeria at the end of the 2000s as the region's largest producer and exporter of natural gas. In 2011, it supplied some 147 Bcm, nearly double Algeria's supply. With the partial exception of Qatar and Yemen, the bulk of Arab gas production is consumed domestically, where gas increasingly replaces oil in a number of industrial functions, including power generation, and serves as an important fuel for re-injection as part of Enhanced Oil Recovery (EOR) processes (compare the export–consumption ratios of Qatar and Yemen with the very low export–consumption ratios of other gas exporting countries in Table 2). The rapid growth in domestic demand for natural gas throughout the region is also likely to compromise export additions in the future, particularly in the long-term exporters Algeria, Egypt, and Oman.¹¹ Natural gas has hence proven to be a markedly more regional energy resource in the Arab world than oil, which has limited the geostrategic significance of Arab gas compared with Arab oil.

More than is the case for oil, the Arab world's natural gas reserves are highly concentrated. Qatar alone holds more than 25 Tcm, nearly half of total Arab reserves, and produces from the world's largest gas field, the North Field, which it shares with neighbouring Iran. Qatar's natural gas reserves are the currently third largest in the world, after Russia and Iran, and since the late 2000s the microstate has also been the world's largest producer and exporter of liquefied natural gas (LNG). Significantly smaller gas deposits are found in Saudi Arabia (8.2 Tcm), the UAE (6.1 Tcm), and Algeria (4.5 Tcm). Combined, the GCC states hold more than three quarters of the Arab world's total reserves, and supply two thirds of total Arab production.

With parts of the region remaining underexplored for natural gas, the next decade may yet see the addition of some significant additional Arab gas reserves; Iraq's current natural gas reserve estimates are thought by many observers to be significantly underestimated owing to decades

⁹ At the time of writing, only Saudi Arabia and Oman have been exploring and discussing the option of unconventional resource development, primarily in natural gas although unconventional oil reserves are also believed to be possible in both countries.

¹⁰ Oman itself imports small amounts of natural gas from its indirect neighbour Qatar via the UAE. The country occasionally runs out of sufficient own-gas supplies during the summer but is tied to long-term export contracts for the gas it produces.

¹¹ Darbouche (2011); Darbouche and Mabro (2011); Ledesma (2011).

of under-exploration, a revision of which may yet increase the region's total share in natural gas reserves in the coming years;¹² and Saudi Arabia is thought to hold considerably more natural gas reserves than currently estimated, particularly in unconventional form. The plans of Syria and Lebanon to further explore their offshore territories have yet to determine the potential for natural gas resources in the Levant; the region has attracted attention since the most recent discoveries of commercial quantities of natural gas in the east Mediterranean offshore in Israel and Cyprus.¹³

2.2. The Share of Oil and Gas in the Regional Economy

Sixteen of the twenty-two Arab League members are producers of oil,¹⁴ which explains the large role oil plays throughout the entire region. The share of oil and natural gas revenues in most Arab producers' export earnings is high; it ranges from 33 per cent in the relatively diversified economy of the UAE (with a much higher individual share for the main producing emirate Abu Dhabi) to 88 per cent in highly export-oriented economies such as Saudi Arabia and Qatar, and more than 97 per cent in Algeria and Iraq. The hydrocarbon sector's contribution to government revenues is in most cases even higher: around 66 per cent in Algeria, 62 per cent in Yemen, and between 80–90 per cent in most of the Gulf States and Libya (see Table 3). Many major Arab energy producers' government budgets hence depend critically on their oil and gas revenues.

TABLE 3: THE OIL AND GAS SECTOR'S CONTRIBUTION TO GDP (NOMINAL) AND GOVERNMENT REVENUES IN THE ARAB ECONOMIES, 2010

	GDP (\$ million)	Oil and Gas Sector (\$ million)	Share of Oil & Gas Sector	Share of individual GDP in Total Arab GDP	Share of Oil and Gas Revenues in total Government Revenues
The GCC States	1,084,391	479,547	44.2%	53.5%	80.7%
Bahrain	22,945	5,591	24.4%	1.1%	81.8%
Kuwait	124,244	64,009	51.5%	6.1%	93.8%
Oman	63,199	30,118	47.7%	3.1%	81.7%
Qatar	128,593	71,642	55.7%	6.3%	60.8%
Saudi Arabia	447,762	214,145	47.8%	22.1%	90.4%
UAE	297,648	94,042	31.6%	14.7%	75.9%
Other Major Oil Producers	357,247	172,237	48.2%	17.6%	84.3%
Algeria	161,947	56,185	34.7%	8.0%	66.3%
Iraq	121,335	62,643	51.6%	6.0%	96.1%
Libya	73,965	53,409	72.2%	3.6%	90.6%

¹² Iraq's current proved reserves stand at a modest 3.6 Tcm. Some observers believe this number could triple within the next decade. For instance, see Yacoub and Routledge (2011).

¹³ See Darbouche, El-Katiri, and Fattouh. (2012 forthcoming).

¹⁴ The Arab League comprises Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauretania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, the United Arab Emirates, and Yemen.

	GDP (\$ million)	Oil and Gas Sector (\$ million)	Share of Oil & Gas Sector	Share of individual GDP in Total Arab GDP	Share of Oil and Gas Revenues in total Government Revenues
Other Oil Producers	379,108	57,638	15.2%	18.7%	32.7%
Egypt	218,393	29,999	13.7%	10.8%	9.5%
Sudan and S. Sudan	72,519	6,822	9.4%	3.6%	51.5%
Syria	58,898	15,288	26.0%	2.9%	8.0%
Yemen	29,298	5,529	18.9%	1.4%	61.8%
Other Countries	205,989	9,386	4.6%	10.2%	2.1%
Djibouti	1,109	0	0.0%	0.1%	n/a
Jordan	26,463	877	3.3%	1.3%	n/a
Lebanon	39,221	0	0.0%	1.9%	n/a
Mauritania	3,629	1,166	32.1%	0.2%	n/a
Morocco	91,314	3,534	3.9%	4.5%	n/a
Tunisia	44,253	3,809	8.6%	2.2%	2.1%
Total Arab World	2,026,735	718,808	35.5%	100.0%	70.6%

Source: Arab Monetary Fund

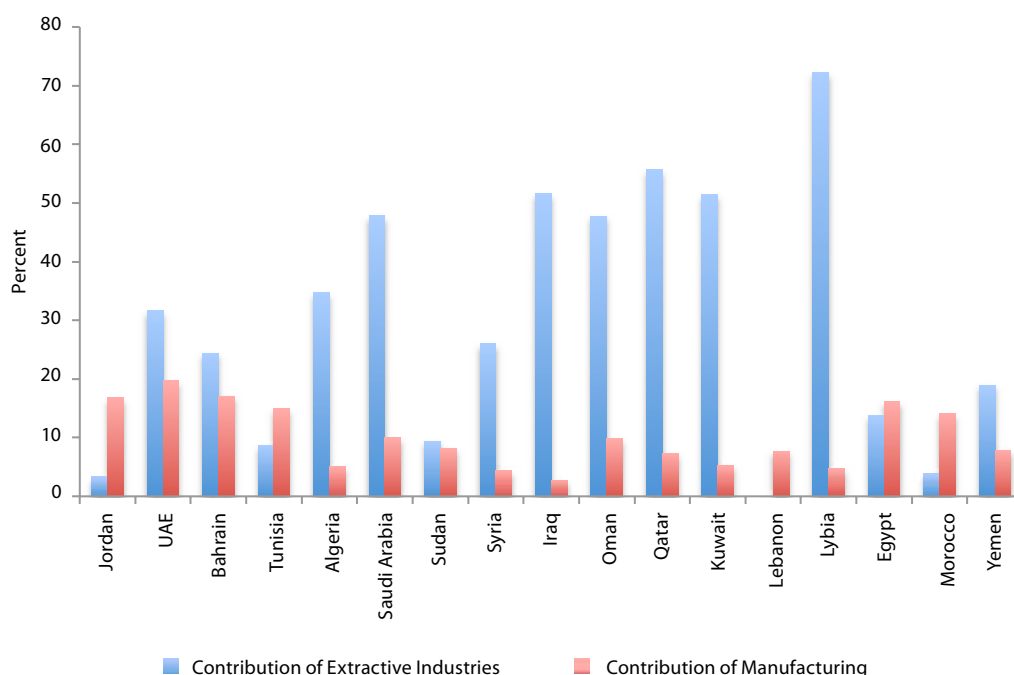
The critical contribution of hydrocarbons to the region's export and government earnings also helps explain the long-standing dominance of the oil and gas industry in the majority of these economies. By 2010, the average share of the oil and gas sector in Arab economies' combined GDP was 35.5 per cent, an exceptionally high share, typically exceeding the contribution of any other economic sector. Individual producers see a much larger share of hydrocarbons in their economy: Libya, Iraq, Kuwait, Saudi Arabia, and Oman generate one half or more of their gross economic output through their energy sectors, excluding in most cases the contribution of downstream activities which are accounted for separately.¹⁵ With four economies – Saudi Arabia, Egypt, Algeria, and Libya – accounting for nearly 60 per cent of the Arab world's total economic output, the share of oil and gas in the region's wider economic activity appears absolutely pivotal.

The value added by the manufacturing sector to GDP remains relatively low in most Arab economies and is outweighed by the extractive industries' value added. This is the case even in small oil and gas producers such as Yemen and Syria. For instance, in Syria, the contribution of manufacturing to GDP is six times less than the contribution of extractive industries, despite comparably smaller reserves and production than in some of the region's main producers. In some of the GCC exporters, the contribution of extractive industries is more than ten times the contribution

¹⁵ Many economies list refinery production in their gross economic product breakdown not under 'extractive industries' (the typical proxy for the oil and gas industries in these countries) but under 'manufacturing'. Not all countries clearly indicate this in their data, which makes it at times impossible to distinguish between countries that account for refinery products in the former or the latter category. The actual share of the oil and gas sector and its products in GDP in most of these economies should hence be expected to be significantly higher in practice.

of manufacturing. Only in six Arab economies does the contribution of manufacturing to GDP reaches 10 per cent or more (see Figure 2 below). In cases such as Bahrain, this figure includes the contribution of the crude oil-dependent refining sector and the country's energy-intensive aluminium production – an indirect contribution of oil and gas to manufacturing output.

FIGURE 2: THE CONTRIBUTION OF MANUFACTURING AND EXTRACTIVE INDUSTRIES TO GDP IN 2010



Source: Arab Monetary Fund

2.3. Consumption

For most of the past four decades, the Arab world has primarily been seen as an energy producing and exporting region. However, the region's fast economic growth, coupled to rapidly rising populations and living standards, has gradually turned the region into an evolving consumer market for energy as well. Table 4 shows average annual growth in total primary energy demand in the Arab world. Total Arab primary energy consumption rose fourfold between 1980 and 2009, at a rate of 4.5 per cent annually, the world's second fastest regional demand growth over the past thirty years after Asia, and in most cases far outpacing population (see Table 4) and GDP growth (compare with Figure 3). The GCC economies' energy demand rates since 1980 have risen particularly quickly: more than 6 per cent annually, which made the sub-region's energy consumption over this period grow more than five-fold. Over the past ten years, the Middle East and North Africa region has come to be considered the world's second most important growth market for energy after Asia, by international energy outlooks such as the IEA and others.¹⁶

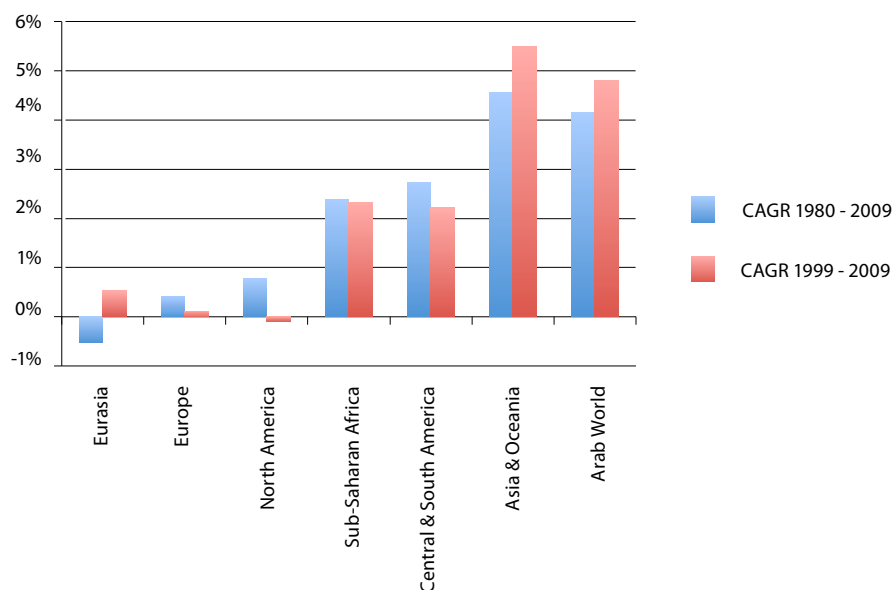
¹⁶ See, for instance, IEA (2011); EIA (2012); BP (2012).

TABLE 4: PRIMARY ENERGY CONSUMPTION IN THE ARAB ECONOMIES (MTOE), 1980–2009

	1980	1990	2000	2009	Compound Annual Growth Rate (CAGR) 1980–2009	Population Growth, CAGR 1980 – 2009
The GCC States	11.8	24.2	37.4	61.1	6.2%	3.7%
Bahrain	3.4	6.4	9.1	13.9	4.9%	4.1%
Kuwait	12.0	11.2	22.7	31.1	3.3%	2.9%
Oman	1.6	4.6	8.5	18.8	8.8%	3.5%
Qatar	5.4	8.6	16.1	25.6	5.5%	3.6%
Saudi Arabia	41.6	83.7	121.3	195.9	5.5%	1.4%
UAE	6.7	30.7	46.7	81.5	9.0%	6.9%
Other Major Oil Producers	14.4	22.0	24.6	33.6	2.9%	2.5%
Iraq	13.1	22.9	27.1	35.3	3.5%	2.0%
Algeria	20.0	30.4	31.0	46.0	2.9%	2.9%
Libya	9.9	12.8	15.7	19.5	2.4%	2.5%
Other Oil Producers	7.1	13.9	19.3	30.2	4.8%	3.1%
Egypt	17.7	35.9	50.1	84.7	5.6%	3.3%
Sudan and S. Sudan	1.3	1.6	2.6	5.6	5.2%	2.6%
Syria	6.9	14.1	19.6	21.5	4.0%	3.0%
Yemen	2.4	4.0	4.8	8.8	4.6%	3.6%
Other Countries	2.4	3.2	5.3	6.2	3.3%	3.2%
Djibouti	0.6	0.6	0.6	0.6	0.5%	3.7%
Jordan	1.9	3.6	5.6	8.0	5.0%	2.2%
Lebanon	2.6	1.8	5.9	4.6	2.0%	6.7%
Mauritania	0.2	0.3	1.2	1.1	5.5%	2.8%
Morocco	5.7	7.7	11.2	15.2	3.5%	1.7%
Tunisia	3.2	5.0	7.5	7.7	3.1%	2.3%
Total Arab World	8.2	15.1	21.4	32.9	4.5%	3.2%
World	6,631.1	8,104.9	9,355.6	11,391.3	1.8%	1.4%

Source: Authors' calculations based on EIA, BP, World Bank

FIGURE 3: PRIMARY ENERGY CONSUMPTION GROWTH BY REGION SINCE 1980



Source: Authors' calculations based on EIA

Aggregate Arab energy consumption in 2009 reached 10.5 million barrels of oil equivalent per day (boe/d), roughly the equivalent of Saudi Arabia's production. Saudi Arabia, the region's largest consumer of energy, consumed about a third of the region's total energy (including a quarter of its own oil production) or 2.4 million b/d in 2009.¹⁷ More than 98 per cent of Arab energy supplies consist of oil and natural gas, with a marginal share of alternative energies.¹⁸ Aggregate Arab oil consumption amounted to 6.98 million b/d in 2010, about 8 per cent of world demand for oil, but with the world's fastest regional average annual growth rate of 3.9 per cent over the past decade. Regional natural gas consumption in 2010 reached 315 Bcma, about a tenth of world demand with an average annual growth of 5.7 per cent, equal to the world's second largest regional demand growth after Asia-Pacific (see Table 5).

¹⁷ By 2011, Saudi Arabia's oil consumption had risen to 2.86 million b/d, including a summer peak representing a substantially higher consumption rate between the months of April to November. The Kingdom's total primary consumption by the end of 2011 was suggested by Saudi Aramco's CEO Khaled Al-Falih as lying 'in the range of 4 million boe/d, give or take a couple hundred thousand.' *Platts*, 12 April 2012, 'Saudi Arabia: Burning fuel in an overheating market', *Platts*, 12 April 2012; BP (2012).

¹⁸ Oil covers 52.9 % of the Arab world's energy needs, and natural gas 45.4 %. Numbers for 2010. AMF (2011, 81, 89).

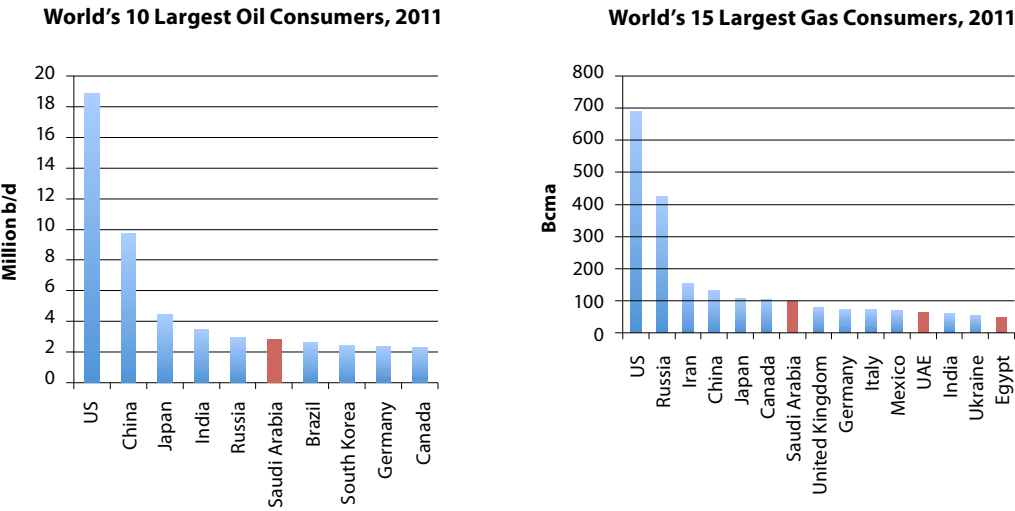
TABLE 5: OIL AND GAS CONSUMPTION IN THE ARAB WORLD 2000–2010

	Crude Oil and Petroleum Products ('000 b/d)		CAGR	Natural Gas (Bcm)		CAGR
	2000	2010	2000–2010	2000	2010	2000 – 2010
The GCC States	2,256	3,855	5.0%	111.48	214.5	6.1%
Bahrain	23	47	6.6%	8.5	12.3	3.4%
Kuwait	264	354	2.7%	6.9	14.5	7.0%
Oman	53	106	6.6%	5.68	17.5	10.8%
Qatar	48	152	11.0%	9.16	21.8	8.2%
Saudi Arabia	1,537	2,650	5.1%	49.81	87.7	5.3%
UAE	330	546	4.7%	31.43	60.8	6.2%
Other Major Oil Producers	879	1,295	3.6%	29.81	37.2	2.0%
Iraq	462	694	3.8%	2.9	1.3	-7.0%
Algeria	206	312	3.8%	21.83	28.8	2.6%
Libya	210	289	2.9%	5.08	7.1	3.0%
Other Oil Producers	948	1,321	3.1%	26.7	56.6	7.1%
Egypt	553	798	3.4%	21	46.2	7.4%
Sudan and S. Sudan	43	98	7.8%	n/a	n/a	n/a
Syria	256	268	0.4%	5.7	9.6	4.9%
Yemen	97	157	4.5%	n/a	0.8	n/a
Other Countries	485	503	0.3%	3.67	6.7	5.7%
Djibouti	11	12	0.6%	n/a		n/a
Jordan	101	98	-0.3%	0.29	2.7	22.7%
Lebanon	106	80	-2.5%	n/a	0.2	n/a
Mauritania	24	20	-1.4%	n/a	n/a	n/a
Morocco	158	209	2.5%	0.05	0.6	24.8%
Tunisia	85	84	-0.1%	3.33	3.3	-0.1%
Total Arab World	4,567	6,975	3.9%	171.66	315.0	5.7%
World	76,597	87,439	1.2%	2442.22	3,215.9	2.5%

Source: EIA (oil); Cedigaz (natural gas); authors' own calculations

Fast growth in domestic demand for oil and natural gas has already turned several individual Arab economies into major consumers of their own production; Saudi Arabia is the world's sixth largest consumer of oil, and the seventh largest consumer of natural gas. The UAE and Egypt are currently the world's twelfth and fifteenth largest consumers of natural gas, the UAE surpassing India with a population more than a hundred times the size of its own (see Figure 4).

FIGURE 4: ARAB OIL AND GAS CONSUMPTION IN PERSPECTIVE



Source: BP

3. Energy, Linkages, and Economic Growth

The Arab world's wealth in oil and natural gas has undoubtedly made the region a key supplier of world energy resources, but has it helped Arab economies to prosper? The question of whether natural resources accelerate development has been the subject of a large and controversial body of literature. In this section, we try to answer the question based on empirical data gleaned from the Arab world, moving beyond the ground covered by some of the established literature. In particular, we suggest that a measure purely of GDP growth per capita does not provide a complete picture of the impact of the Arab world's energy resources on its economic development.

Energy reserves, like other natural resources, are in principal a key contributor to economies' prospects for growth; economic theory sees them as an important source of income for developing countries, whose export revenues can have a positive impact on the savings and investment levels of their economies, and hence boost growth and development via numerous other economic sectors.¹⁹ The idea goes further: natural resources such as oil and natural gas should help developing economies to use natural resource revenues in the service of the wider economy's 'take-off' into self-sustained long-term growth.²⁰

Empirical studies, however, draw a different picture. Amongst the most cited works in the field is a study by Sachs and Warner, which compared economic growth in developing economies with income from natural resource exports over a twenty-year period over the 1970s and 1980s.²¹ Their results indicate a significant negative relationship between natural resource wealth and economic growth. While the original Sachs and Warner's methodology study has since been subject to criticism,²² various follow-up studies reconfirm a significant negative link between natural resources and per capita income growth,²³ as well as between natural resource wealth and a range of other socio-economic development indicators.²⁴

¹⁹ We revisit this critical theorem by Hirschman in much greater detail below in Section 3.

²⁰ We borrow this famous expression from Rustow (1956).

²¹ Sachs and Warner (1995; 1999). The authors specifically used per capita income rates as a measure of sustainable individual income growth as opposed to gross economic growth rates (which show little about individual income standards). Individual countries' regression results are shown in Sachs and Warner (1999, 829). The data can also be redrawn using a simple regression analysis based on the same data available from World Bank (2012). The methodology used by Sachs and Warner has been the subject of considerable criticism amongst development economists.

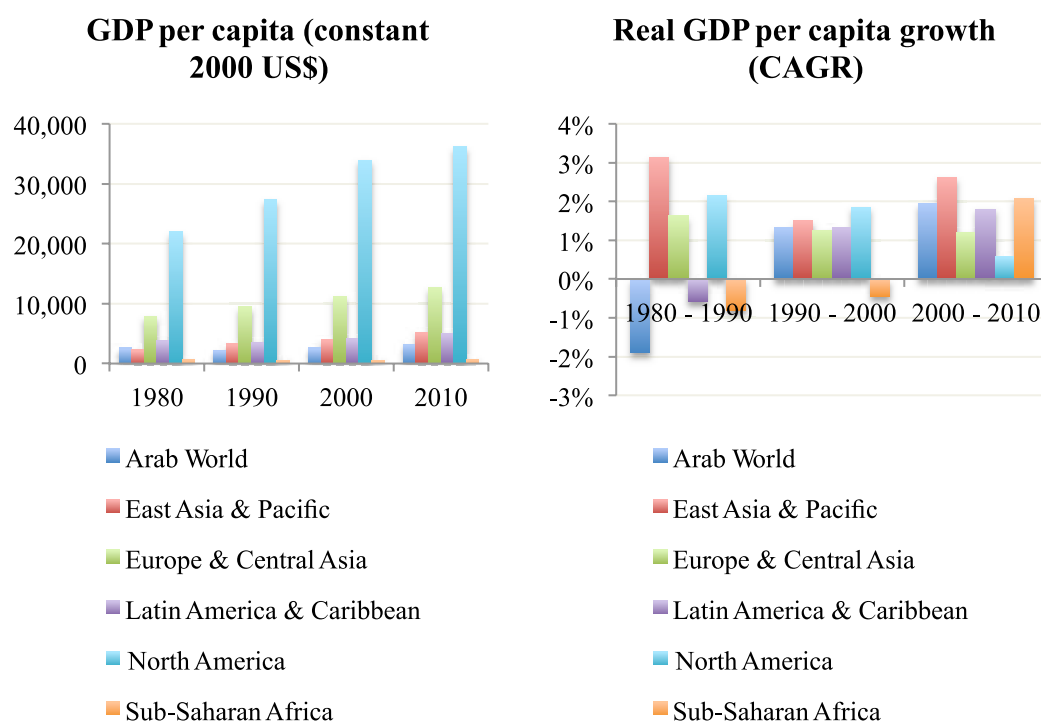
²² A small selection of this literature includes Davis, (1995); Stijns, (2005); and Brunnschweiler and Bulte, (2008).

²³ Atkinson and Hamilton (2003); Papyrakis and Gerlagh (2004); Gylfason and Zoega (2006); Bulte et al (2003).

²⁴ Davis (1995); Gallup and Sachs (1998); Stijns (2005); Brunnschweiler and Bulte (2008); Boyce and Emery (2011).

Taking per capita GDP growth as a basic indicator of economic growth and prosperity gains, a look at the Arab world's historical growth record presents a remarkably mixed picture. Compared with all other major world regions, the Arab world's real per capita GDP has been perhaps the most volatile, ranging from around the most negative to comparatively modest growth rates over the past thirty years (see Figure 5). Per capita GDP growth during the 1980s was particularly disappointing, with negative growth rates exceeding even those of sub-Saharan Africa. Since then, GDP growth has picked up but has consistently failed to catch up with other emerging markets, particularly with the far more resource-poor east Asia. Over the same period of time, average Arab GDP per capita has almost consistently been the lowest in the world, second only to sub-Saharan Africa (see Figure 5).

FIGURE 5: REAL GDP PER CAPITA GROWTH AND REAL GDP PER CAPITA BY REGION, 1980 – 2010



Source: World Bank

Other empirical studies confirm this outcome for the Middle East and North Africa (MENA) region, and conclude, moreover, that growth in the MENA region has been significantly lower than what would be expected on the basis of the long-term structural characteristics of the countries in the region.²⁵ Has the Arab world's energy wealth been more of a curse than a blessing?

A closer look at disaggregated regional data provides a more nuanced picture. Table 6 below shows average annual growth rates in real GDP per capita for selected Arab countries. At first

²⁵ For instance, see Bhattacharya and Wolde (2009).

glance, the data reflect the higher reserves–lower growth hypothesis. One of the most striking features are again some strongly negative growth rates for some of the GCC economies and Algeria during much of the 1970s and 1980s. Within this sub-group of countries, Saudi Arabia and Oman have done considerably better than the rest, with mostly positive, though low, per capita income growth rates over this period of time. Overall, the data suggest that non-oil producing Arab economies over the past thirty years have done significantly better, in terms of per capita income growth, than Arab oil producers, the GCC and Algeria having experienced the weakest growth.

Generally high levels of annual GDP growth volatility are observable in Table 6, with a typical standard deviation over the years 1980 to 2012 of 3 per cent or more – a higher degree of growth volatility than in most other parts of the world.²⁶ The data also show that these relatively high values differ only marginally between oil producers and non-oil producers, with the notable exceptions of some of the GCC states. The standard deviation of GDP growth in the latter, particularly Kuwait, Qatar and the UAE was a multiple higher than anywhere else both in the Arab world, and in global comparison, suggesting that these economies have had to endure recurring periods of very high versus very slow (or negative) growth with high fluctuations in oil revenues being the most likely explanatory value for the higher growth volatility.²⁷ Large intra-GCC variations in GDP growth volatility suggest that different countries facing similar revenue fluctuations have dealt differently with these fluctuations; hence Saudi Arabia, for instance, being a significantly larger economy, faced lesser fluctuations in overall economic growth; and smaller, more diversified, economies such as Bahrain suffered considerably less from volatile government revenues than, for instance Kuwait.²⁸

TABLE 6: REAL GDP PER CAPITA GROWTH (AVERAGE ANNUAL %) IN SELECTED ARAB ECONOMIES, 1970

	1970–1979	1980–1989	1990–1999	2000–2004	2005–2010	GDP per capita, PPP (constant 2005 international \$), 2010	GDP growth volatility (standard deviation), 1980–2012 (3)
The GCC States	1.6	–0.7	0.6	2.7	–1.2	37,369	7.7
Bahrain	n/a	–1.8	2.7	4.1	–4.4	21,345	2.9
Kuwait (1)	–3.9	–5.3	–2.0	3.7	0.1	45,623	16.3
Oman	2.1	4.7	1.7	2.8	6.0	24,559	4.8
Qatar	n/a	n/a	n/a	3.5	–0.9	69,798	10.0
Saudi Arabia	8.6	–5.7	0.8	0.2	0.4	20,534	4.7
UAE (2)	–0.4	4.7	0.0	1.7	–8.2	42,353	7.7

²⁶ A recent study by Makdisi, Fattah, and Limam (2007) reaches the same conclusion.

²⁷ Makdisi, Fattah and Limam (2007) find a negative impact of volatility (due to fluctuations in world oil prices, weather conditions, workers' remittances, capital flows) and external shocks on MENA's real GDP per capita growth. In contrast, measures of terms of trade were found to have no significant impact.

²⁸ For a detailed discussion of the effects of a higher level of economic diversification in oil exporting countries, see Section 5.2. below.

Other Oil Producers	5.0	2.2	2.6	3.4	3.2	4,240	3.8
Algeria	3.9	-0.3	-0.4	2.8	1.4	7,564	2.8
Egypt	6.2	5.9	4.3	3.7	5.9	5,544	2.1
Iraq (4)	n/a	n/a	n/a	5.0	0.6	3,195	4.2
Sudan and S. Sudan	1.2	0.5	1.8	3.3	4.5	2,023	4.8
Syria (5)	8.8	2.8	5.7	4.3	5.1	4,741	5.1
Yemen (6)	n/a	n/a	1.4	1.2	1.4	2,373	3.7
Other Countries	6.3	3.8	4.3	4.9	5.2	5,995	3.9
Jordan	n/a	4.0	4.9	5.6	6.6	5,249	4.9
Morocco	5.3	3.9	2.8	4.7	4.6	4,227	4.5
Tunisia	7.2	3.6	5.1	4.5	4.4	8,508	2.4

Notes:

(1) GDP growth numbers for 1995–9; (2) Numbers for 1976–9; (3) Numbers for 2012 IMF staff estimates; (4) S.d. number for 2006–12; (5) S.d. number for 1980–2010; (6) S.d. number for 1991–2012. Source: World Bank, IMF.

An important observation from the above data is that whilst oil exporters appear to experience on average lower growth than non-oil exporters, their per capita income *levels* tend to be considerably higher than those of the non-exporters. This income difference is particularly startling in the case of the GCC economies, whose average per capita GDP (PPP) is with \$37,369 more than six times as high as the average of \$5,995 for the region's non-oil exporters. In global comparison, Qatar, Kuwait, and the UAE have among the highest GDP per capita rates in the world. These large intra-Arab income level differences are also reflected in wider measures of these countries' levels of socio-economic development, for instance in the UNDP human development index, where the GCC states and Libya stand out in levels in human development, as measured by factors such as life expectancy and educational attainments (see Table 7). Individual country evidence from the GCC economies also suggests a relatively equal distribution of incomes within these economies, along Northern European lines.²⁹

This story is notably different for other parts of the region. A vast gap in income levels exists between the GCC economies and other Arab oil and gas exporters, such as Algeria, Egypt, and Syria. Even Libya, for which no consistent data are available, lags significantly behind the GCC economies. Iraq, Sudan, and Yemen have all done substantially worse economically than many of their energy-poorer Arab neighbours. Sudan and Yemen also fall under the UN classification of 'least developed countries', at first sight a paradox given these countries' significant energy wealth. Their high level of oil and gas resources appears to not have helped these countries achieve higher levels of growth and socio-economic development than their Arab neighbours – who lack these resources – in fact, quite the opposite.³⁰ In comparison with this group of countries, the non-oil economies fare, on average, better in terms of per capita income growth, absolute income levels, and a range of basic socio-economic indicators.

²⁹ El-Katiri, Fattouh and Segal (2011) for instance calculate a gini coefficient of 28 for Kuwait's population as a whole, and 21.8 for Kuwaiti nationals (i.e. excluding the foreign labour force).

³⁰ For a discussion of Yemen, see El-Katiri and Fattouh (2011).

TABLE 7: UNDP DEVELOPMENT INDEX (SELECTED INDICATORS) FOR THE ARAB WORLD, 2011

		Human Development Index (HDI)	Life expectancy at birth		Mean years of schooling		Expected years of schooling		Gross National Income (GNI) per capita	
HDI rank		Value	(years)		(years)		(years)		(Constant 2005 PPP\$)	
VERY HIGH HUMAN DEVELOPMENT										
30	UAE	0.846		76.5		9.3		13.3		59,993
37	Qatar	0.831		78.4		7.3		12.0		107,721
42	Bahrain	0.806		75.1		9.4		13.4		28,169
HIGH HUMAN DEVELOPMENT										
56	Saudi Arabia	0.770		73.9		7.8		13.7		23,274
63	Kuwait	0.760		74.6		6.1		12.3		47,926
64	Libya	0.760		74.8		7.3		16.6		12,637
71	Lebanon	0.739		72.6		7.9	c	13.8		13,076
89	Oman	0.705		73.0		5.5	c	11.8		22,841
94	Tunisia	0.698		74.5		6.5		14.5		7,281
MEDIUM HUMAN DEVELOPMENT										
95	Jordan	0.698		73.4		8.6		13.1		5,300
96	Algeria	0.698		73.1		7.0		13.6		7,658
113	Egypt	0.644		73.2		6.4		11.0		5,269
114	Occupied Palestinian Territory	0.641		72.8		8.0	c	12.7		2,656
119	Syria	0.632		75.9		5.7	f	11.3		4,243
130	Morocco	0.582		72.2		4.4		10.3		4,196
132	Iraq	0.573		69.0		5.6		9.8		3,177
LOW HUMAN DEVELOPMENT										
154	Yemen	0.462		65.5		2.5		8.6		2,213
165	Djibouti	0.430		57.9		3.8	g	5.1		2,335
169	Sudan*	0.408		61.5		3.1		4.4		1,894
Regional Index										
	Arab States	0.641		70.5		5.9		10.2		8,554
	East Asia and the Pacific	0.671		72.4		7.2		11.7		6,466
	Europe and Central Asia	0.751		71.3		9.7		13.4		12,004
	Latin America and the Caribbean	0.731		74.4		7.8		13.6		10,119
	South Asia	0.548		65.9		4.6		9.8		3,435
	sub-Saharan Africa	0.463		54.4		4.5		9.2		1,966
	World	0.682		69.8		7.4		11.3		10,082

Notes:

(*) Sudan is represented under the 2011 UNHD index as one country. ^a Data refer to 2011 or the most recent year available. ^b Based on OECD and others (2011) and UNDESA (2011) projected growth rates. ^c Based on UNESCO (2011) estimates of education attainment distribution. ^d Based on UNESCWA (2011) and UNDESA (2011) projected growth rates. ^e Based on unpublished estimates from World Bank. ^f Updated by HDRO based on UNESCO (2011) data. ^g Based on data from UNICEF (2000–2010).

Source: UNDP (2011) Human Development Report 2011

These results suggest three main messages: first, resource rich economies in the region have experienced relatively low per capita GDP growth and high levels of growth volatility.³¹ Second, in the case of the GCC economies and to a lesser extent Libya, per capita growth rates alone do not provide an adequate picture of their achieved levels of overall economic development and social welfare, as these countries have maintained a high level of income per capita.³² Third, some Arab oil and gas producers seem to have used their hydrocarbon revenues in more effective ways to spur economic growth and development than others.³³ In the following section, we explore some of the reasons of why this might be.

If the Arab world on the whole performs less well on basic indicators such as per capita GDP growth as well as – in some cases – on socio-economic development indicators than many other emerging regions, then how have its energy resources affected its growth patterns? We use the framework proposed by Hirschman to analyse some of the linkages between the energy sector and the wider economy for Arab oil and gas producers.³⁴ Hirschman's theory follows the idea that one industry might facilitate the development of another by easing conditions in the latter industry.³⁵ This framework of identifying linkages between the commodities sector and the rest of the economy also moves beyond the simplistic characterization of the oil and gas sector as an 'enclave' industry.³⁶

Hirschman specifically identifies three types of linkages: fiscal linkages, production linkages and consumption linkages. Production linkages can be further split into backward and forward linkages. Consumption linkages are the most difficult to observe in the Arab world; they refer to the demand for other sectors' output and services arising from incomes earned in the commodities sector. Data on consumption linkages in the Arab world do not exist, but we suspect that their contribution is very limited for two main reasons. First, the energy sector's contribution to overall employment remains marginal, hence limiting the direct impact of energy sector salaries on gross economic consumption. Second, many Arab oil producers' high reliance on imports implies that many of the consumption linkages are primarily leaked abroad. In our discussion below we therefore only deal with fiscal, forward, and backward linkages.

³¹ See also Arezki and Nabli (2012).

³² This observation, which applies also to other large natural resource exporters outside the Arab world, has also been highlighted in studies such as that by Boyce and Emery (2011) who discuss the problematique of choosing per capita income growth rates over income levels as the main criterion of levels of economic welfare, or as a measure of wider economic development.

³³ For a case study of Kuwait, see El-Katiri, Fattouh and Segal (2011). Fattouh and El-Katiri (2012) discuss differences in energy subsidy policies as one way of resource rent distribution between different Arab countries.

³⁴ Hirschman (1958); Hirschman (1977).

³⁵ Ray (1998, 138). See also Hirschman (1958, 1977).

³⁶ See, for instance, Singer's seminal contribution (Singer, 1950). A large number of studies have recently applied this framework to a large number of extractive industries and show that the oil and gas sector can be strongly linked to other sectors, though the depth and extent of these linkages depend on a large array of factors including the institutional development of the country, government policy, and time. For instance, see Mbayi (2011); Mjimba (2011); A specific body of literature examines the oil sector in Nigeria e.g. Oyejide and Adewuyi (2011), and Angola (Teka (2011). Al-Moneef (2006: 17-21) specifically applies these linkages to the Arab world.

3.1. Fiscal Linkages

Fiscal linkages refer to the rents that the government extracts from the energy sector through a combination of taxes, royalties, and dividends. For many Arab producers, the cost of developing oil reserves is low and hence the size of the rent is quite massive and constitutes a big fraction of the country's GDP.³⁷ In the case of gas, rents to be collected are smaller as the cost of transporting gas to international markets is higher. Furthermore, in countries such as Qatar, Egypt, and Yemen, where gas reserves are developed jointly with foreign oil companies, part of the rent is leaked to foreign investors. Still, their contribution to overall economic activity can be large, especially where the size of the overall economy is small and where few other productive, export-oriented economic sectors exist.³⁸

Some of the early debates by economists centred round the classical dilemma of primary product export-led growth, and of developing countries' limited trade integration outside their primary product export area.³⁹ Many of these economists argued even then that primary product exports did nothing to help developing countries retrieve the pecuniary value of many of the industrialized world's increasingly sophisticated tertiary products. This view has proven difficult to apply to the oil and gas sector and to the Arab world. Most Arab countries have been effective in maximizing fiscal linkages through a variety of means, including direct ownership of oil assets and/or designing and implementing fiscal regimes that maximize the government's take from the oil revenue stream.

Fiscal linkages play an important role in shaping the structure and the growth patterns of Arab economies. Through fiscal linkages, the government obtains the revenues that can be invested to promote other sectors in the economy, including the non-oil private sector, and in infrastructure, social programmes, and building human capital. The effectiveness with which governments distribute revenues is a different matter. Experience in the Arab world is quite varied in this respect, with some Arab states being more successful in channelling rents to the wider population and using these rents to foster industrialization and promote other sectors in the economy than others.

However, there is a general trend in the literature suggesting that oil revenues are usually not invested productively, and thus the impact of oil wealth on growth has been limited or even negative. For instance, some studies argue that, faced with high oil revenues, governments find it difficult to invest productively, as the investment capacity can't keep pace with the capacity to manage investments. Others have suggested that governments in resource-rich economies do not spend their revenues efficiently because governments are either unable or unwilling to make the necessary, but possibly unpopular, allocation decisions. Such decisions include whether to

³⁷ See for instance, El-Badawi and Soto (2011). Some argue that the scale of oil revenues differentiates them from other kinds of revenues and this feature has a direct bearing on growth.

³⁸ Qatar, for instance, the Arab world's largest natural gas producer, has a population of less than 2 million, and a total GDP of US\$129 billion. The oil and gas sector contributes more than half of GDP, and natural gas rents provide slightly more than half of Qatar's overall hydrocarbon export revenues. See Table 3 above; Data from World Bank (2012).

³⁹ Hirschman (1958), Seers (1964), and Baldwin (1966).

maintain a particular level of savings or to invest, and striking the right balance between capital and (often very wasteful) current spending.⁴⁰ In particular, popular but often economically inefficient policies in many oil-rich economies include the employment of large parts of the population in bloated public sectors; the award of generous social benefits that discourage jobseekers' pursuit of paid work in the private sector; and the widespread use of subsidies and price controls which lower living costs but distort market signal and incentivize waste.⁴¹

Particularly popular in much of the 1980s and 1990s literature surrounding the problem of resource-led growth in developing economies, including the Arab world, was the infamous 'Dutch disease' effect, observed where the sudden, high-rate inflow of natural resource revenues leads to ultimately growth-declining economic features such as the long-term appreciation of the exporter's currency, and the gradual decline in other, productive manufacturing industries.⁴² While the argument has seemingly fitted well economic problems found in Sub-Saharan Africa following mineral-export booms there, the effect has been much more difficult to observe in the Arab world, particularly in the Gulf oil and gas exporters whose currencies have been for many decades pegged to the dollar or a basket-value, and whose manufacturing sectors were non-existent or underdeveloped and only received systematic state attention following the region's oil export boom during the 1970s.

Related studies argue that resource-rich economies without sensible distributive strategies struggle with the implementation of policies, owing to pervasive levels of corruption concerning all levels of the economy and institutional framework of the countries.⁴³ Natural resource wealth, such as in oil in this context, created embedded chains of interest and offers decision-makers the option to use resource revenues in their own interest first. The varied experience in the Arab world and the rapid improvement in the standards of living over the past three decades trigger a call for caution on making general conclusions and applying the above frameworks liberally in the context of the Arab world.⁴⁴

One feature is often emphasized as a drag on growth, and is common to all Arab oil producers: the instability or volatility of export revenues. The literature of the 1970s and 1980s discussed that during these decades observed volatility of energy export revenues – particularly for oil exporters – was a cause of slow or deferred growth.⁴⁵ Oil price declines during the later 1970s and the 1980s were widely held responsible for subsequent years of negative growth in some oil exporters, particularly those whose government budgets were highly dependent on oil export revenues. With losses in revenue, government consumption and investment levels declined, reducing growth in economies that are, even now, highly dependent on government spending, including in

⁴⁰ Tornell and Lane (1998); Sala-i-Martin and Subramanian (2003).

⁴¹ For instance, El-Katiri, Fattouh and Segal (2011).

⁴² Gelb (1986); Benjamin, Devarajan and Weiner, (1989); Auty, (1994).

⁴³ Kutun, Douglas, and Judge (2009).

⁴⁴ For a more general critique of the concept and its at time sweeping application to development countries, see Davis (1995).

⁴⁵ E.g. Meadows et al. (1972); Mabro and Munroe (1974); Lewis (1955); Mabro (1980); Neary & Van Wijnbergen (1986).

non-oil economic activities. Volatility of energy export revenues also generates macroeconomic uncertainty and shortens planning horizons, lowering the incentive for capital accumulation and undermining economic growth.⁴⁶

Recent evidence also suggests that in countries where the oil sector is large relative to the economy, oil price movements in international markets affect the economic cycle only through government expenditure.⁴⁷ Without an increase in government expenditure, oil price shocks do not have an independent effect on the economic cycle. This is true also for the non-oil sector, which still relies heavily on government spending for its growth. For instance, using impulse response analysis, Husain et al found that in the context of the GCC, oil prices significantly affect public spending, which in turn impact the output cycle.⁴⁸

Furthermore, rather than dampening the cycle, fiscal policy could exacerbate the business cycle both in the upward and the downward phases.⁴⁹ Some studies have found that in contrast to industrial economies, fiscal policy in developing countries is pro-cyclical. During the downturn of the cycle, declining revenues and limited access to capital market undermine the ability of government to pursue expansionary policies and to maintain existing levels of government spending. During the upturn of the cycle, increasing political pressure on government to distribute oil rents could result in increased government spending, reinforcing the upward phase of the cycle.⁵⁰ Furthermore, many oil exporters usually don't have the automatic stabilizers, such as a progressive tax system or a transfer programme, that are sensitive to the price cycle.

The failure to moderate the impact of revenue instability on growth, and the failure to pursue a more counter-cyclical policy in Arab producers, are often attributed to a weak institutional environment, weak governance structures, and lack of transparency and accountability in resource-rich economies.⁵¹ Many studies have emphasized the impact of natural resource wealth on political structures and institutions – such as the type, quality, and characteristics of governments and their spending processes.⁵² In this respect, some studies argue that oil wealth can act as a barrier to democratic transitions⁵³ as it reduce governments' need to rely on taxation, which in turn reduces the people's incentive to demand higher degrees of government accountability and a popular say in governmental decision-making. Some studies have found a strong correlation between the adoption of fiscal rules, and strong political systems with strong checks and balances.⁵⁴ While some countries have established fiscal institutions such as fiscal rules and stabilization

⁴⁶ See for instance Lane (2003). Various empirical studies have found an inverse relationship between volatility and growth – Ramey and Ramey (1995); Aizemann and Pinto (2005); Goyal and Sahay (2006), Aghion and Banerjee (2005).

⁴⁷ Husain et al (2008).

⁴⁸ Husain et al. (2008).

⁴⁹ See for instance El-Badawi and Soto (2011).

⁵⁰ See for instance Alesina and Tabellini (2005); Arezki et al (2011).

⁵¹ Arezki and Gylfason (2011); Persson (2002).

⁵² E.g. Makdisi, Fattah and Limam (2007); Chaudhry (1994); Moore (2004); Collier and Hoeffler (2005); Mehlum, Moene and Torvik, 2006a; Mehlum, Moene and Torvik, 2006b, Humphreys et al., (2007); Bornhorst et al. (2008); Moore (2007); Rajkumar and Swaroop (2008); McGuirk (2010).

⁵³ Ross (2001).

⁵⁴ Arezki et al (2011).

funds (for instance, many Arab producers nowadays use very conservative price assumptions and have established stabilization and saving funds) to deal with the issue of macroeconomic stability, some studies find that these fiscal institutions have been ineffective so far.⁵⁵ However, such a conclusion cannot be generalized and needs to be assessed in light of some recent evidence which provides a more complex picture. In the MENA context, some studies have suggested that fiscal policy has been predominately pro-cyclical, but with some important asymmetries and differences across countries and over time.⁵⁶ First, they find that procyclicality has been more pronounced during good times. Second, procyclicality is pronounced in oil exporters but not in oil importers, where the authors find no significant link between the cyclical component of output and government spending. Finally, in the latest downturn following the financial crisis in 2008, fiscal policy has been modestly countercyclical, with half of the countries in their sample increasing government expenditure during the downturn. Countries facing fewer financing constraints and more ‘fiscal space’ were able to pursue very ambitious expansionary programmes in the face of the downturn. One should, however, also note that fiscal institutions have been put in place only recently, and it is simply too early to tell whether they have been effective or not.⁵⁷ So in short, the jury is still out on the effectiveness of the new fiscal rules.

3.2. Forward Linkages

Some studies, primarily those with a focus on sub-Saharan Africa and its growth experience since the 1980s, have linked natural resources to the development of ‘insular industries’ around the extractive sector, with a congruent neglect of the growth of an essential manufacturing sector.⁵⁸ Recent studies however have suggested that the extraction sector can be strongly linked to other sectors in the economy.⁵⁹ The output of the energy sector, rather than all exported, can be used as inputs in local industries. As a factor input for a further value-chain, natural resources can ease the supply of other products and hence help ‘push’ new industries, and generate areas of national economic advantage. These ‘push effects’ are often referred to as *forward linkages*. In the oil sector, crude oil can be used as an intermediate input in the refining sector to produce refined products for domestic consumption, for export purposes, or for the petrochemical sector. In the gas sector, natural gas can be used as a feedstock in power generation and in the petrochemical industry.

In the oil and gas resource-rich economies of the region, forward linkages are considered of great importance, as they are expected to promote industrialization and diversification. Diversification is considered as central for achieving the goals of shifting to a new development path away from non-renewable resources, generating sustainable and stable growth, and enhancing the role of the private sector in the economy. Diversification is also perceived as essential to enhance the

⁵⁵ Arezki and Nabli (2012).

⁵⁶ See for instance Abdih et al (2010). The study also includes countries outside our definition of the Arab world.

⁵⁷ See Ossowski et al. (2008) and Nabli and Arezki (2012).

⁵⁸ Gelb, A. and associates (1988); Benjamin, Devarajan, and Weiner (1989); Auty (1994).

⁵⁹ For instance, see Mbayi (2011); Mjimba (2011); Oyejide and Adewuyi (2011), and Teka (2011). Al-Moneef (2006: 17-21) specifically applies these linkages to the Arab world.

economies' integration into the global economy via channels other than the export of crude oil and petroleum products.

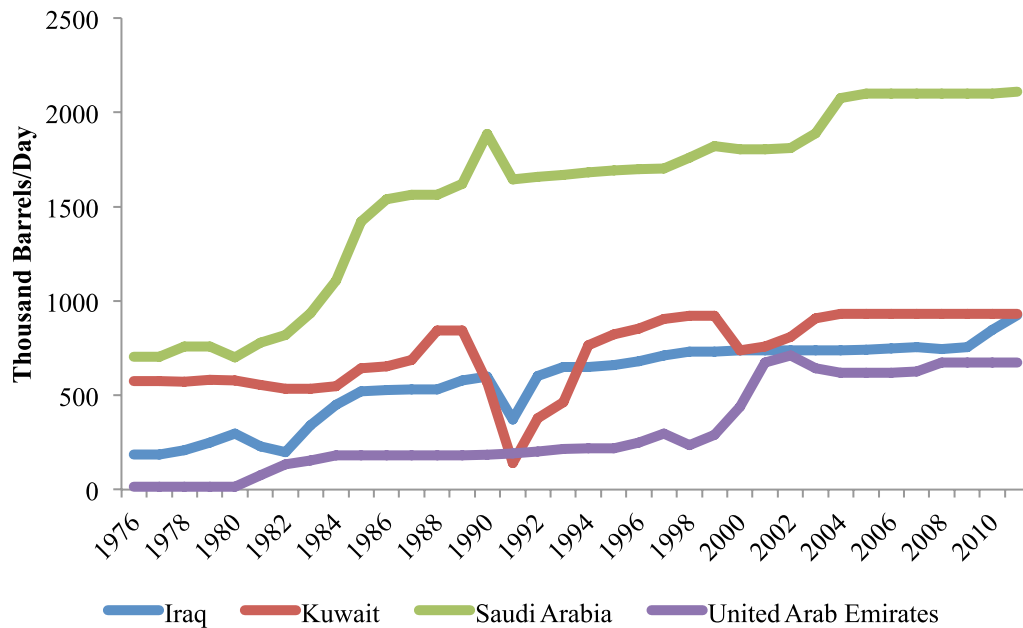
For most of the region's oil and gas exporters, diversification strategy is based on two main pillars. First, the establishment of export-oriented industries that capture the value added through extending the energy chain into downstream activities; this strategy is very capital- and energy-intensive. It involves heavy public and private investment in industries such as refineries, petrochemicals, and other sectors such as aluminium, fertilizers, and steel. The second pillar is to maintain oil and gas prices to the domestic market at very low levels. This is essential to promote industry's competitiveness and to attract foreign direct investment, but as discussed below, this policy has created some distortions and broader economic and developmental challenges. We look below at two foremost examples, the refining sector and the petrochemicals sector.

3.2.1. Example 1: The Refining Sector

The first contribution of the oil sector comes through developing the local refining industry. Figure 6 shows the evolution of refining capacity in selected Arab countries. After rapid increase in refining capacity in the aftermath of the nationalization wave in the mid-1970s, which extended well into the 1980s, growth in refining capacity stagnated for most of the 1990s (the Iraq invasion of Kuwait in 1990 resulted in a drop of refining capacity in both these countries). The decline in oil production, the fall in government revenues, and the relative profitability of upstream compared to downstream all contributed to stagnation in the 1990s.

However, the rapid growth in oil demand and the improvement in refining margins since the early 2000s shifted governments' attention back to refining, and consequently investment in refining capacity in the region started to pick up, especially in the GCC. Many factors can account for this new drive towards expansion in refining capacity. Some of these factors are purely technical and relate to factors such as maximizing high-value products, producing clean fuels, meeting environmental regulation, and the changing mix in petroleum product demand. One important driver has been to meet the rapid increase in domestic demand for petroleum products. Another is the shift in investment strategy towards integrating refineries with petrochemical plants, to diversify the feedstock going into petrochemical plants.

FIGURE 6: EVOLUTION OF REFINING CAPACITY IN SELECTED ARAB COUNTRIES (1976 – 2011)

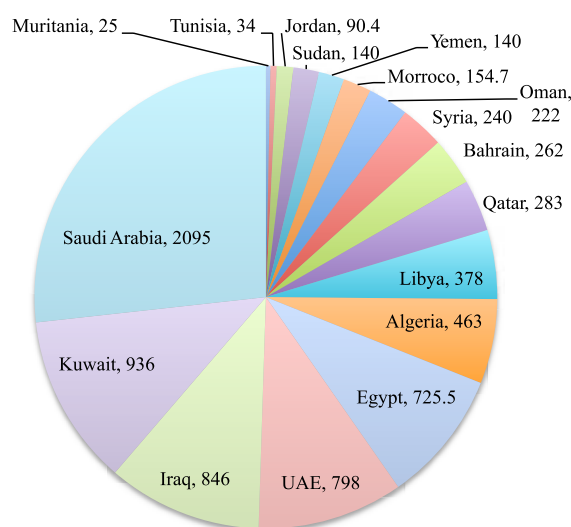


Source: BP Statistical Review of World Energy 2012

In 2010, refining capacity in the Arab world stood at 7.83 million b/d, in other words around 8.5 per cent of the global refining capacity in that year. As shown in Figure 7, this refining capacity is unevenly distributed with Saudi Arabia, Kuwait, UAE, Iraq, and Egypt accounting for around 70 per cent of the refining capacity in the Arab world. In the last few years, many Arab countries have announced projects for new refineries. If these projects are implemented, the Arab world could increase its capacity by 5 million b/d by 2015. However, many of these projects have been shelved or postponed and thus the increase in refining capacity by 2015 is likely to be more modest, with most of the new refining capacity expected to come from Saudi Arabia, UAE, and Qatar.⁶⁰

⁶⁰ MEES, Vol.55, Issue 18.

FIGURE 7: DISTRIBUTION OF REFINING CAPACITY IN THE ARAB WORLD IN 2010 (TOTAL = 7.83 MILLION B/D)

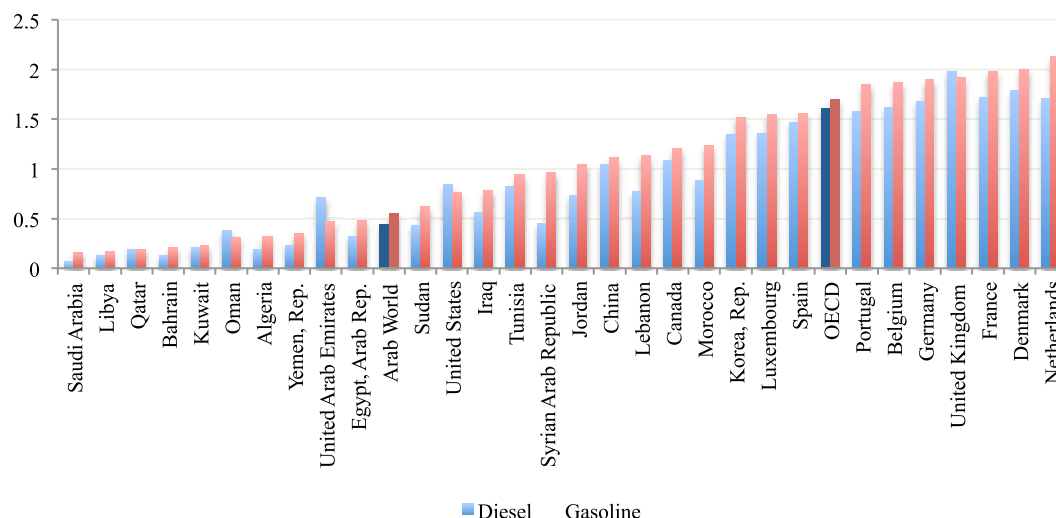


Source: OAPEEC

To strengthen forward linkages in the refining sector, some countries have opened the sector to foreign investors. For instance, in Saudi Arabia, there are three joint venture refineries with foreign oil companies, with total capacity of 1.1 million b/d. Two new refining projects with total capacity of 800,000 b/d, expected to come on stream in 2013 and 2014, are also being built in partnership with foreign companies. Some Gulf producers have also been expanding their downstream operations overseas by acquiring refining assets, mainly in Asia. For instance, Saudi Aramco has four international joint-venture refineries with total capacity of more than 2 million b/d, with more such projects in the pipeline. Recently KPC, the Kuwaiti national oil company, and Sinopec began the construction of an oil refinery and petrochemicals complex in southern China, which includes a 300,000 b/d capacity refinery and 1mn tons/year ethylene cracker. This trend of investing in upstream assets in Asia is likely to accelerate as the dynamics of global oil demand continue to shift from the West towards the East.

A key determinant of the depth of forward linkages is the rational pricing of refined products. Figure 8 shows that in most Arab countries, petroleum products are sold locally at very low prices, not even covering the increasing cost of refining. Low domestic prices do not provide the incentive for NOCs to supply petroleum products to the local market, or the incentive to invest in new refining capacity. But given the importance of petroleum products for the local economy, NOCs are often given the responsibility to meet local demand at prices set by the government. In integrated national oil companies, losses in the refining sector are cross-subsidized by profits in upstream activities. In countries with an independent refining sector, and where the upstream sector is small, the government has to make explicit transfers to compensate for the losses of refineries and distributors.

FIGURE 8: AVERAGE RETAIL PRICES FOR GASOLINE AND DIESEL IN SELECTED COUNTRIES (US\$/LITRE), 2010



Source: World Bank, World Development Indicators

3.2.2. Example 2: The Petrochemicals Sector

A second example of the contribution of the oil sector to a country's economy is the development of petrochemical industries. The output of the gas sector (ethane, propane, and butane) and the refining sector (naphtha) can be used as feedstock in petrochemical plants. In most oil exporting economies, the development of the petrochemical industry is a key element in their efforts to diversify their economies and generate employment opportunities for their local population.

The past three decades have witnessed rapid expansion of the petrochemical industry, transforming the region into a key player in the petrochemical industry. Most of the petrochemical capacity in the region is concentrated in the Gulf.⁶¹ From being a marginal player in the 1980s, the Gulf's petrochemical production has increased rapidly during the last three decades, from 4 mn tons/year in 1985 to over 100mn t/y in 2010.⁶² This rapid growth is expected to continue into the next decade, with the Gulf's share of the world's petrochemical production predicted to increase from its present level of 15 per cent to 20 per cent by 2015. The Gulf is expected to capture a considerable market share in basic petrochemicals (ethylene, propylene, and methanol) and their intermediaries (*polypropylene*) by 2015: between 2009 and 2015, the share of ethylene is expected to grow from 12.6 per cent to 20.5 per cent; polyethylene from 12.9 per cent to 18 per cent; propylene from 5.8 per cent to 9.6 per cent; and *polypropylene* from 10.8 per cent to 13 per cent. Within the Gulf, Saudi Arabia accounts for around 50 per cent of the region's total production, followed by Iran (27 per cent), Qatar (9 per cent), UAE, Kuwait, Oman, and Bahrain.

⁶¹ There is some petrochemical production outside the Gulf, particularly in Egypt, but the production is relatively small.

⁶² *MEES*, VOL. LIV, No 9, 28-Feb-2011

The forward linkages through the petrochemical industry have generated many spillovers. The region's position in a key international sector has been enhanced; national champions (such as SABIC in Saudi Arabia) have developed; the attraction of foreign direct investment has been encouraged; the role of the private sector has been promoted by opening the sector to private participation; in addition, the linkages have contributed to the development of financial markets through the listing of petrochemical companies on some of the region's stock exchanges; and the linkages have also helped diversify the economy and the export base, to some extent. The data for 2010 show that petrochemicals accounted for 6 per cent of the total exports of the Arab world and 11.5 per cent of intra-Arab exports.⁶³ This average, however, hides wide variation across countries. For instance, in Saudi Arabia, petrochemicals constituted more than 60 per cent of non-oil exports in 2010.

The extent and depth of these forward linkages can be seen in the context of Saudi Arabia. In 1970, only around 11 per cent of gas produced was used while the rest was flared or used for reinjection in oil fields.⁶⁴ In 1975, Saudi Aramco developed an integrated gas system that collects and processes associated gas in order to put an end to gas flaring and to capture this valuable energy source so it can be used as feedstock in the newly created petrochemical and chemical complex SABIC. The result was the establishment of the Master Gas System (MGS), which started operating in 1982. This represented a major turning point in the Kingdom's development and industrialization path. The MGS consists of a complex web of gas-oil separating plants, gas-processing plants, fractionation, and Natural Gas Liquids (NGL) recovery plants and pipelines. At the heart of this system are the gas-processing plants, where impurities are removed and the gas is prepared for domestic use. Since its establishment in the early 1980s, the gas-processing capacity has witnessed a rapid expansion reflecting the increasing importance of gas in the domestic energy mix. When the system first started operation in 1982, its processing capacity amounted to 99 million cubic metres per day. By 2009, the MGS had the capacity to process 312 million cubic metres per day of raw gas and to produce around 240 million cubic metres per day of sales gas.⁶⁵ Most of the gas produced from these plants is methane and ethane, which are mainly used as fuels for power generation, water desalination plants, petrochemicals, and other energy-intensive industries. The NGL recovery plants and fractionation plants are also integral parts of the MGS. NGLs are recovered and then piped into the fractionation units to produce ethane, propane, butane, and natural gasoline, which are used as feedstock for the petrochemical plants. NGLs are then fractionated further to produce LPG for domestic use and export markets. Saudi Arabia is currently the largest producer of LPG in the Middle East with estimated production of more than 19 million tonnes/year in 2009, accounting for about 42 per cent of the region's production.⁶⁶ Around 60 per cent of the Kingdom's total production finds its way to export markets, mainly to south-east Asia.⁶⁷

⁶³ AMF (2011, Figures 8.2 and 8.4).

⁶⁴ OAPEEC (2002).

⁶⁵ APRC (2009).

⁶⁶ Hart, Gist, and Otto (2010).

⁶⁷ APRC (2009).

The key to the success to these forward linkages and the expansion of the petrochemical industry has been the cost of feedstock, the main cost component of petrochemical products. GCC countries procure ethane at \$0.75 to \$1.5/MMBTU, which is well below prices in international markets. Low-cost ethane gives the Gulf petrochemical industry comparative advantage over its competitors, who rely on more expensive ethane (derived from natural gas) and on naphtha as a major feedstock.

The policy of providing low-priced ethane for the petrochemical industry, however, has created some challenges. Despite the sizeable gas reserves in the region, countries such as Saudi Arabia, Kuwait, and UAE face gas shortages as the gap between demand and supply continues to widen. The lower availability of ethane may slow down the recent growth in petrochemical expansion, as uncertainty about allocation reduces the incentive to invest. Furthermore, ethane does not yield higher value products down the chain. This is crucial for employment generation, as most of the job creation is down the chain (such as in derivatives and end products) and not in the basic chemicals. There has therefore been a shift, especially in Saudi Arabia, to non-ethane stock, mainly naphtha, for new projects. The price of naphtha is both much higher and more volatile, since it is priced on the basis of prices in international markets. Over time, this would probably reduce the comparative advantage of Gulf-based petrochemicals, but would allow them to produce new products and move down the petrochemical chain. This explains, in part, the recent shift to more integrated projects (refinery and petrochemicals) to take advantage of scale as well as to feed petrochemical plants with naphtha.

Others have noted that low-priced feedstock has encouraged rent seeking behaviour, reducing the incentive from innovation and discouraging entrepreneurs from investing down the petrochemical chain, hence raising the question as to whether the expansion of the petrochemical industry really counts as diversification.⁶⁸

Another challenge facing the petrochemical industry is the threat of protectionist tariffs in the form of anti-dumping measures, especially from countries such as China and India, which also aspire to expand their petrochemical production. From these countries' view, the provision of cheap feedstock to petrochemicals plants constitutes an unfair advantage. For instance, in June 2009, the Indian authorities issued an anti-dumping ruling against SABIC and another Saudi petrochemical company, Advanced Petrochemicals (APC), on their polypropylene products. Similarly, in 2009, China imposed anti-dumping taxes on methanol imports from Saudi Arabia. Given the cyclical nature of the energy-intensive industries into which Saudi Arabia is diversifying, the problems of anti-dumping measures are likely to persist, especially during downturns.

⁶⁸ Aissaoui (2012a).

3.3. Backward Linkages

The oil and gas sector may also help ‘pull’ other local sectors, which serve as input factors to the functioning of the energy sector and its forward production chain. Such ‘pull effects’ are often referred to as *backward linkages*. The employment of nationals, and the use of local content in the supply chain are primary examples of where backward linkages can pull other parts of the economy along. The oil and gas sector also relies heavily on the service industry, which provides equipment, technologies and services both to the upstream and the downstream sectors. For instance, the upstream oil sector relies heavily on oilfield services – drilling equipment, technology providers, information technology, security, and logistics. Since the nationalization of the oil industry in the 1970s, many of these services have been provided in-house and hence it is possible to argue that the change in ownership has already contributed to the development of backward linkages. However, national oil companies still rely on services from foreign suppliers and hence the opportunities for backward linkages abound.

3.3.1. Employment Linkages

One of the most striking features of the Arab world has been its relatively rapid population growth which, although it has slowed in recent years, still exceeds the world’s average. In addition, the Arab region has one of the youngest population structures in the world. An increase in the participation rate of women in the labour force (though starting from very low levels) especially in the Gulf is putting additional pressures on labour markets. This trend is likely to consolidate as more women gain access to higher education. A young population should be an asset for a country, but only if these young people are able to enter employment and fulfil their potential. Unfortunately, unemployment rates remain stubbornly high, hitting young people hardest.⁶⁹

In response to the unemployment challenge, most Arab governments have been expanding their bureaucracies and their public sectors to absorb new labour market entrants, particularly during the 1950s, 60s and 70s. In the GCC, governments have also been ‘nationalizing’ employment in the public sector by replacing foreign employees with nationals. However, past strategies of expanding government employment and nationalizing jobs in ministries, the bureaucracy, and the public sector have reached their limits in recent years, even in resource-rich economies. The trend of slowdown in public sector employment growth has been reversed in recent years in the GCC, but this has occurred at the expense of sharp declines in public sector productivity. There is also wide recognition among GCC leaders that government can no longer act as the employer of first and last resort, even if oil prices remain at their current relatively high level.

The nationalization of oil assets in many Arab oil producing countries in the 1970s and the emergence of national oil companies (NOCs) has put pressure on the NOCs to maximize backward

⁶⁹ Official unemployment figures in the Arab world are to be taken with care; the GCC economies’ official statistics suggest unemployment rates of between 3.8 and 5.4%, although unofficial estimates are a multiple higher for several GCC countries. For an official estimate, see AMF (2011, Tables 2/18, 2/8 and 2/10). For a detailed discussion of the cases of Saudi Arabia and the GCC, see Aissaoui (2012a).

linkages through providing employment for nationals, increasing reliance on local companies, and designing and implementing local content policies. However, there are limits to the depth of these linkages. The energy sector is a capital-intensive sector and is limited in its ability to attract employment. For instance, in Saudi Arabia, the country with the largest oil and gas sector in the Arab world, the number of people employed in the Mining, Oil, Gas and Quarrying sector stood at 74,212 in 2010, this is only 1 per cent of the total labour force in the private sector. Putting pressure on a national oil company to increase employment can only undermine the functioning and the efficiency of NOCs. Therefore, in all oil exporting countries, the main focus has been on forward linkages to generate employment.

3.3.2. Linkages to the Service Sector

Evidence on the extent of backward linkages in the Arab world is scarce, but some anecdotal evidence suggests that these linkages, though growing, are few and weak. For instance, a recent study looking at the oil and gas sector in selected MENA countries found that in the case of Kuwait:

*There is no data regarding how much of the supply chain comes from Kuwaiti companies. This suggests that local content is fairly limited. But it can hardly be argued that this lack of backward linkages in the supply chain is in any way related to the way in which the sector is structured. Given the relatively limited scope of the rest of the Kuwaiti economy, limited linkages are hardly surprising.*⁷⁰

In the case of Yemen, the situation is more serious as:

*... the oil and gas sector in Yemen is decidedly 'technologically strange' to the economy. It is therefore not surprising that backward linkages are limited.*⁷¹

Saudi Aramco, the largest NOC in the Arab world, also tries to maximize procurement from local sources, but there is no clear policy on local content. For instance, Saudi Aramco preferentially purchases products manufactured in Saudi Arabia. There is some sort of pecking order which starts with goods and services originating from national companies, goods stocked by national companies, foreign goods and services provided by foreign companies located in the Kingdom, and finally goods and services provided by foreign companies. The extent to which this has helped promote the service industry is not clear, but the following quote from Mr Khalid Al-Falih, the CEO of Saudi Aramco, suggests that there is still a long way to go:

[Saudi Aramco] had pioneering initiatives to encourage the private sector. These initiatives covered development of the capabilities of local vendors by procurement of the bulk of our requirements from the domestic market whenever possible. More than 90% of company purchases are now procured from local vendors and manufacturers. However, despite many incentives, the national industrial sector has failed to keep pace with the company's growing demands and its

⁷⁰ ESMAP (2007).

⁷¹ ESMAP (2007).

contribution to meeting these demands does not exceed 20 to 25% ... Notwithstanding Saudi Aramco's efforts in support of local industries, these industries are hardly adequate. It is our hope that the private sector will play a greater role in promoting the industrialization sector.

In fact, the literature from different countries and industries has shown that the depth of backward linkages depends to a large extent on the development of local industry and the service sector. It is often the case that local suppliers tend to underperform in a number of areas – such as trust, innovation, technological capabilities, and lead times – pushing the national oil company to rely on imports.⁷² Furthermore, evidence suggests that governments play a key role in promoting these linkages, through developing a realistic strategic vision and designing specific policy instruments to implement the vision. As in the case of employment, forcing the national oil company to procure from local sources through regulation could increase the cost and delay the implementation of projects, and may undermine the strength of fiscal linkages.

⁷² Kaplinsky (2011).

4. Energy and Regional Arab Integration

The Arab world's hydrocarbon resources remain unequally distributed, which means that the region's small- or non-oil and gas producers have benefited significantly less from the kind of direct economic growth linkages discussed above. Many of the region's small- and non-oil and gas producers have, however, benefited indirectly from the enormous energy revenues their Arab neighbours have received since the 1950s and 1960s. Many of these intra-regional links have affected the economic integration of the Arab region as a whole, in the form of intra-regional trade, labour, and investment flows. In this section we examine the impact energy has had on other regional economies, apart from its main oil and gas producers, and hence on the level of intra-regional economic integration. We suggest that while the Arab world's oil and gas wealth has influenced intra-Arab economic linkages (on the whole positively but only to a marginal extent) it has been unable to fundamentally change the wider picture, which is generally lacking in intra-regional cooperation, albeit with the important exceptions of investment and aid.

4.1. Intra-Arab Trade

4.1.1. *Crude Oil and Products*

Intra-Arab commodity trade exemplifies the absence of intra-regional economic integration in the Arab world. Total intra-regional trade in 2010 accounted for less than 10 per cent of the Arab region's total exports, and less than 12 per cent in imports. Of what is traded between Arab economies, energy contributes significantly. Some 27 per cent of regional exports, and a fifth of regional imports consist of mining products, primarily crude oil and to a lesser extent natural gas.⁷³ Hydrocarbon resources are also traded indirectly in the form of chemicals, petrochemicals, and refined products, which form an unknown proportion of 'manufactured goods' the region's largest traded commodity group, the combined figure for which accounts for more than half of intra-regional trade.⁷⁴ Saudi Arabia, Kuwait, Algeria, and Iraq are the region's largest crude oil suppliers, together accounting for over two-thirds of regional crude exports. Saudi Arabia dominates intra-regional trade with a share of more than 40 per cent alone.⁷⁵

Nevertheless, the economic importance of regional markets for Arab energy producers remains small. Intra-regional trade in crude oil and natural gas exports typically generates less than 1 per cent of exporters' export revenues, including those of the largest intra-regional suppliers Saudi Arabia and Kuwait.⁷⁶ The reasons for this marginal role of the region in total Arab energy trade lie primarily in its domestic supply and demand balances. Nearly three quarters of total regional

⁷³ AMF (2011, Table 8/8, 131).

⁷⁴ The trade item 'Manufactures' is not broken down into clear components, e.g. refined products, so the share of oil and gas products in these countries' manufactured exports is statistically intransparent.

⁷⁵ AMF (2011, Table 8/9, 132).

⁷⁶ Authors' calculation based on AMF (2011, Tables 8/9 and 6/2, 132 and 102).

oil consumption originates in key Arab producing countries, the GCC, Iraq, Algeria, and Libya. Saudi Arabia alone accounts for more than a quarter of total Arab oil consumption and, like many of its oil-producing neighbours, is a self-supplier in crude oil as well as in most refined products as well. The bulk of Arab import demand for crude oil comes from medium-size to smaller oil consumers, who have additional access to crude from a variety of world market sources. Of these, Jordan, Egypt, and Morocco combined account for nearly three quarters of total Arab oil imports from regional producers.⁷⁷

4.1.2. Natural Gas

The regional trade picture is most surprising in the case of natural gas. To a greater extent than oil and oil products, which can be shipped flexibly, natural gas is traditionally a much more regional commodity, owing to its preferred form of transport via regional pipelines as opposed to the more recently evolving trade in more flexible LNG. Given the Arab world's rapidly rising consumption of natural gas in absolute terms, the share of natural gas in intra-regional trade is somewhat disappointing; in 2011, the region's share in total Arab gas exports reached no more than 12 per cent, and with 22.82 Bcma at a relatively small total trade volume compared with many other regions with similar levels of energy intensity.⁷⁸

The reasons for the lack of regional Arab gas trade are manifold. The region's aggregate consumption of natural gas remains, in many cases, at levels far below those of oil, owing to a more limited role for natural gas in power generation,⁷⁹ where natural gas as a key fuel has only begun to take root since the 1980s and 1990s. Lack of own natural gas reserves and of feasible regional import options in cases such as Lebanon, Jordan, and Tunisia delayed a systematic switch-over of these countries' power industries towards natural gas, thus limiting their demand for gas.⁸⁰ Pricing disagreements with potential neighbouring suppliers meant that many net energy importers during the 1990s continued to prefer oil imports, which at the time involved significantly lower prices than has been the case since the early 2000s.

The region's largest consumers of natural gas – Saudi Arabia, the UAE, and Egypt – combined account for nearly two thirds of regional gas consumption, and are all producers of own-gas reserves on their own; only the UAE decided to import natural gas in 2008 following substantial domestic gas shortages and the completion of a pipeline system from Qatar in the same year (see Table 8 and Table 9 below). An environment of very low domestic prices for natural gas (in comparison with significantly higher import costs) in many of these states further reinforced a reliance on domestic reserves, including in oil, to leverage on during times of peak demand.⁸¹

⁷⁷ AMF (2011, Table 8/9, 12). The dataset does not contain statistics for Lebanon, another regional importer of oil, which probably features alongside Jordan, Egypt, and Morocco as one of the biggest regional customers for Arab oil and oil products.

⁷⁸ BP (2012).

⁷⁹ Crude oil and oil products are widely used in power generation, energy-intensive industries such as petrochemicals, steel and aluminium production, as well as the highly oil-intensive transport sector.

⁸⁰ Cleary (2011).

⁸¹ See Sections 5.3. and 5.4. for a more detailed discussion.

Regional trade in pipeline gas has remained, up to now, a politically and economically thorny issue, not least because pipeline imports tend to involve long-term strategic dependence by the importing party on its exporting neighbour. In the GCC – the Arab world’s most rapidly growing natural gas market – during the 1990s the original plans for a GCC-wide gas grid failed due to intra-regional tensions over border and transit questions.⁸² A smaller version of the gas grid has translated into the far more successful Dolphin pipeline, which connects Qatar with the UAE and Oman, and transports Qatari gas at relatively low cost to Abu Dhabi, Dubai, and Oman – arguably one of the most successful forms of intra-regional cooperation to this date. Dolphin now accounts for the bulk of intra-Arab gas trade with some 19.2 Bcma (see Table 9).⁸³ An extension of the project to Bahrain and Kuwait has repeatedly been discussed, but unresolved border issues have kept this option from progressing.⁸⁴ Both Kuwait and Bahrain have since looked to LNG imports. Kuwait, having begun to import seasonal LNG cargos in 2010, has been considering permanent import facilities for the next decade.⁸⁵

TABLE 8: ARAB NATURAL GAS EXPORTS, 2011

From	To	Type	Volume (Bcma)	Of which intra-Arab exports (Bcma)
Algeria	Europe; South East Asia	LNG and Pipeline	10.9	0.0
Egypt	Mainly Europe; South East Asia; Middle East	LNG and Pipeline	121.8	1.1
Libya	Europe only	LNG and Pipeline	8.0	0.0
Oman	Mainly South East Asia	LNG	43.3	0.0
Qatar	All continents	LNG and Pipeline	18.9	19.2
UAE (Abu Dhabi)	Mainly South East Asia	LNG	2.4	0.0
Yemen	Europe; North America; South East Asia	LNG	8.9	0.0
Total Arab Exports	All continents	LNG and Pipeline	214.3	20.3
Total World Trade	All continents	LNG and Pipeline	1,025.4	-

Source: BP (2012)

⁸² See Hashimoto, Ellass, and Eller (2004) for a detailed discussion of the background of the project and its failings.

⁸³ Dargin (2008).

⁸⁴ The critical variable in this dispute has been a Saudi refusal to allow a Qatari gas pipeline to cross Saudi waters on its way towards Bahrain and Kuwait. Dargin and Flower (2011).

⁸⁵ In Kuwait, LNG imports were initially conceived of as a stop-gap measure – thus making a floating LNG terminal a more attractive option than pipeline gas. The country is now considering long-term imports under a permanent facility.

TABLE 9: INTRA-ARAB TRADE IN NATURAL GAS, 2011

Regional Pipeline	From	To	Trade volume (Bcma)	% of total imports	% of total exports
Arab Gas Pipeline	Egypt	Lebanon	0	100%	0.0%
		Jordan	0.8	100%	9.7%
		Syria	0.3	100%	2.9%
		Total (3)	1.1	100%	12.8%
Dolphin	Qatar	Oman	2.0	100%	1.6%
		UAE	17.3	92%	14.2%
		Total (2)	19.2	93%	15.8%

Source: BP (2012)

In North Africa, both Algeria and Libya have shown interest in exporting natural gas to their immediate neighbours Morocco and Tunisia, which are also transit countries for both states' gas exports to their main market, Europe. Both Morocco and Tunisia have been reluctant to import natural gas from their direct neighbours, due primarily to security of supply questions – Morocco and Algeria having had a record of military confrontations and allowing, up to now, no official border crossings.⁸⁶ Decades of talks about regional integration and various projects of cooperation, such as a North African-wide regional gas grid, have failed owing to political disputes between all four North African states. Morocco in 2011 eventually contracted for small volumes of Algerian gas, a move determined by economic necessity owing the country's high oil import bill for its aging power plants.⁸⁷

In the Mashreq, Jordan, Syria, and Lebanon have imported small volumes of natural gas via the Arab Gas Pipeline from Egypt, but supplies have been erratic, owing to Egypt's own domestic gas shortfalls and, since early 2011, recurring sabotage of Egyptian gas pipelines by political insurgent groups.⁸⁸ Both Lebanon and Jordan have in recent years discussed possible LNG import options at their coasts, which offer both countries more import options than others in their immediate region. Like their Gulf neighbours, the Levant's gas importers remain exceptionally dependent on neighbouring gas supplies; Jordan currently relies on Egyptian gas imports for 80 per cent of its power generation capacity, a factor which has rendered Egyptian supply disruptions since early 2011 particularly damaging to the country's economy.⁸⁹ Similarly, most of the UAE's gas imports originate from Qatar; while Oman remains a net exporter of natural gas, although importing small seasonal volumes to supply its domestic market.⁹⁰ With the UAE

⁸⁶ Otman

⁸⁷ *L'Economiste*, 22 August, 2011, 'Maroc/Algerie: La Diplomatie du Gaz'

⁸⁸ The political uprisings in Egypt since early 2011 have led to more than a dozen bombings of pipeline infrastructure between Egypt and Jordan, which renders Egyptian gas an increasingly unreliable source for the country. Hence the new energy security strategy which builds on a diversification of supply sources for energy, including natural gas, through systematic infrastructure investment. 'Egypt Resumes Gas Exports To Jordan', *MEES*, 55:20, 14 May 2012. See also Darbouche and Mabro. (2011).

⁸⁹ Darbouche and Fattouh (2011).

⁹⁰ Oman only imports small volumes (1.95 Bcma) of natural gas from Qatar and occasionally swaps unneeded supplies with the UAE. The country itself is a net gas exporter with an annual export volume of some 10.92 Bcma,

currently investing in what will be their second LNG import terminal, the federation's import options for natural gas will be significantly enhanced in the coming years.

Other intra-regional gas trade happens incidentally. LNG shipments have gone from both Qatar and Abu Dhabi to Kuwait as part of Kuwait's LNG supply contract with Royal Dutch Shell and Vitol. Both companies hold contingents in neighbouring Gulf countries with LNG export facilities, and can swap regional for extra-regional gas. The resulting gas trade transaction is not concluded between neighbouring countries but between the importing supply company in Kuwait and its international trading partners, Shell, Vitol, and potentially others.⁹¹

4.1.3. Electricity

The Arab world has no commercially functioning integrated electricity market comparable to the European, or some sub-regional Latin American, electricity markets. Sub-regional electricity network interconnections exist between the Maghreb states, the Mashreq states (Egypt and Libya being linked to both), and the GCC states with the exception of Oman, which has yet to join the GCC common network scheme. The sub-regional Mashreq and Maghreb networks have been the Arab world's longest established grids and as such attract the bulk of intra-regional electricity exchanges. Commercial trade across all three networks remains nevertheless marginal, most transactions taking the shape of electricity exchanges that can be settled both in cash or kind. In 2008, for instance, Egypt, the region's largest electricity exporter, exported some 790 GWh of electricity to neighbouring countries, some 0.6 per cent of its total annual electricity generation; in the same year Jordan, the Arab world's largest electricity importer, imported some 548 GWh of electricity, some 4.5 per cent of its total annual consumption (see Table 10).

The GCC states inaugurated their own regional electricity grid in July 2009, at first linking only the networks of Bahrain, Saudi Arabia, Kuwait, and Qatar. The UAE joined the interconnection grid in April 2011, with Oman planning to be connected by 2013. As yet, with the grid standing in its very early stages, electricity exchanges have so far not moved beyond occasional exchanges in spinning power (see Table 11), with the exception of a few commercial transactions which involved cash-settled transfers of power supplies at times of expected power shortages.⁹²

which is shipped as LNG to its main export markets in Asia and Europe.

⁹¹ Formally, these shipments do not account for bilateral trade between sending and receiving countries but between the sending and receiving company.

⁹² The press reported that, for instance, Bahrain imported electricity from Qatar for a scheduled period of time (a few hours each day for about a month) in September 2010. The details of the agreement behind these scheduled transfers is not public, nor does the GCCIA, which manages the grid, publish regular statistics about the origin and direction of electricity trade and exchanges between GCC countries. 'Firm rapped for violating terms', *Gulf Daily News*, 9 September 2010; 'States benefit from the unified grid', *Middle East Economic Digest*, 9 July 2010; 'Bahrain commends GCCIA backup to EWA', *Kuwait News Agency*, 1 September 2010.

TABLE 10: INTRA-ARAB ELECTRICITY TRADE, MASHREQ AND MAGHREB GRIDS (GWH), 2000–2008

Origin	Destination	2000	2005	2006	2007	2008
Mashreq Grid		45.0	757.0	563.1	646.3	1,135.3
Egypt	Jordan	45.0	741.0	472.0	200.0	535.0
	Libya	-	10.7	30.3	6.6	49.0
	Syria	-	-	50.0	274.0	206.0
Jordan	Egypt	-	0.3	8.6	1.0	8.6
	Syria	-	-	-	159.0	244.5
Libya	Egypt	-	5.0	0.2	1.9	87.0
Syria	Egypt	-	-	2.0	3.8	5.2
	Jordan	-	241.0	41.0	8.0	13.0
Maghreb Grid		786.0	747.0	676.0	710.0	477.0
Algeria	Morocco	171.0	136.0	159.0	152.0	186.0
	Tunisia	148.0	139.0	142.0	122.0	137.0
Egypt	Libya	115.0	119.0	119.0	77.0	n/a
Libya	Egypt	129.0	105.0	105.0	104.0	n/a
	Tunisia	-	-	-	-	-
Morocco	Algeria	76.0	106.0	136.0	125.0	10.0
Tunisia	Algeria	147.0	142.0	15.0	130.0	144.0
	Libya	-	-	-	-	-
Total Maghreb and Mahreq		831.0	1,504.0	1,239.1	1,356.3	1,612.3

Source: Barudi (2012).

TABLE 11: INTRA-ARAB ELECTRICITY TRADE, GCC GRID (GWH), 2009 – 2010

	Bahrain		Saudi Arabia		Kuwait		Qatar	
	Export	Import	Export	Import	Export	Import	Export	Import
2009 (1)	18.7	15.4	51.6	44.8	57.8	36.8	43.7	43.6
2010	36.9	24.5	0.6	1.0	82.9	38.2	62.7	44.0

Notes: (1) 2009 Numbers for July – December
Source: GCCIA

Part of an explanation for the relative lack of coordinated Arab trade in electricity lies in the region's relative lack of coordination on the one hand, and lack of sufficient capacity on the other. Across much of the Arab world, periods of insufficient generation capacity occur particularly in summer, when demand peaks lead to regular regional blackouts – an obvious hurdle to heightened electricity trade. Investment in new capacity, which could build on economies of scale for regional electricity exporters, have so far not been realized; lack of a diversified base of energy sources, such as renewables and nuclear, limit the cost advantage of importing neighbouring countries' electricity over own generation, as has been the case in more active regional networks such as in central Europe.⁹³ As in the case of natural gas, many neighbouring countries also

⁹³ 'Riadh and Cairo consider plans to connect power grids', *MEED*, 2 May 2008; 'Linking grids is good first step',

lack the political will to render themselves dependent on such a strategically important service as electricity, thus hindering long-discussed plans to create a larger, interlinked Arab electricity grid, with possible links towards Europe and the Mediterranean. Intra-regional electricity trade, therefore, still remains primarily a system providing security when needed – with much of the region’s infrastructure hence remaining under-utilized.⁹⁴

4.2. Labour Flows and Remittances

The oil boom in 1973 was associated with the largest wave of intra-regional migration in the history of the region. The large inflow of oil revenues following the price hike in 1973 allowed resources-rich economies to embark on a very ambitious programme of building a modern infrastructure and developing key sectors of their economies, especially the public service sector.⁹⁵ Given the limited size of their national labour force, the GCC countries had to rely on foreign labour, mainly Arabs and Asians. Due to cultural, religious, and language factors, in the initial phase, GCC countries relied heavily on Arab workers. In the 1970s, Arab expatriates had comparative advantage in filling certain types of occupations such as education, the judiciary, and administration while Asian expatriates were concentrated in jobs that required high technical skills and/or low skills such as construction.

Following the decline in the oil price in the mid-1980s and the subsequent decline in government spending, the flow of Arab workers to the GCC countries started to slow down. Furthermore, during this phase, Asian workers started to replace Arab workers, as they were less expensive and more skilled than Arabs in maintenance and technical occupations. The nationalization programmes, which aimed at providing job opportunities for nationals squeezed further the Arab workers, especially in the public sector and administration. As these trends consolidate, Arab workers will continue to find jobs in low- to medium-skill occupations, but at a much more limited scale than in the past. At the beginning of the 1970s, the percentage of Arab workers in the GCC was 72 per cent. By 1985, the percentage has fallen to 56 per cent, and further again to 31 per cent in 1996. The latest available data suggest that the percentage stands at around 25 per cent.⁹⁶

Notwithstanding this decline, inter-regional migration is still significant. Recent data suggest that out of the 13 million Arab migrants, 5.8 million reside in Arab countries, with two thirds of the migrants from the Mashreq region living in other Arab countries. In contrast, inter-regional migration from the Maghreb region is quite limited, with one million migrants from the Maghreb working in the region.

Inter-regional migration has had both direct and indirect impacts on the oil-poor labour-exporting economies. First, it helped ease unemployment in labour-exporting countries. Second, it increased

MEED, 20 March 2009; ‘Kingdom, Egypt to enhance cooperation in energy sector’, *Saudi Economic Survey*, 15 July 2010.

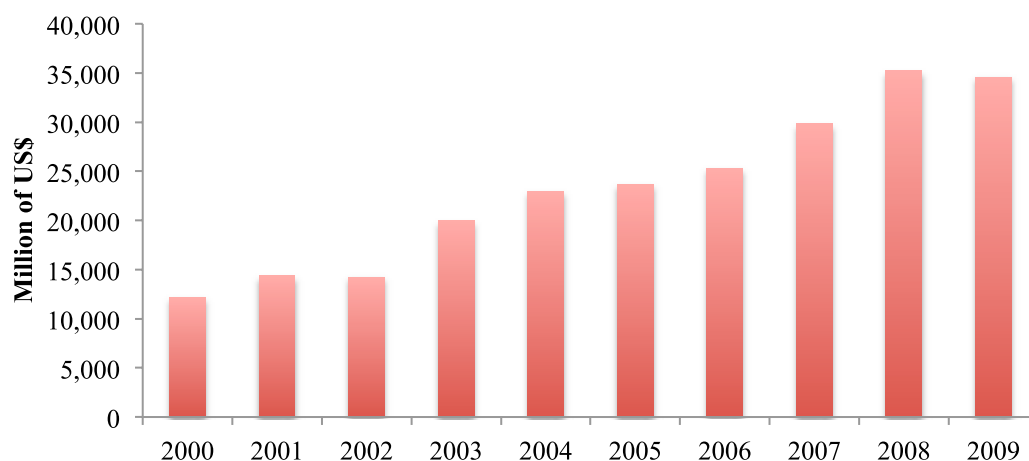
⁹⁴ For a more detailed discussion, see El-Katiri (2011).

⁹⁵ Girgis (2002).

⁹⁶ IOM (2010).

the flow of remittances into these economies. These remittances have become an important component in the balance of payments for these countries. It is estimated that the Arab world received a total of US\$35 billion inflows in 2009 alone (see Figure 9).

FIGURE 9: REMITTANCES INTO THE ARAB WORLD (2000–9)



Source: Arab Joint Economic Report

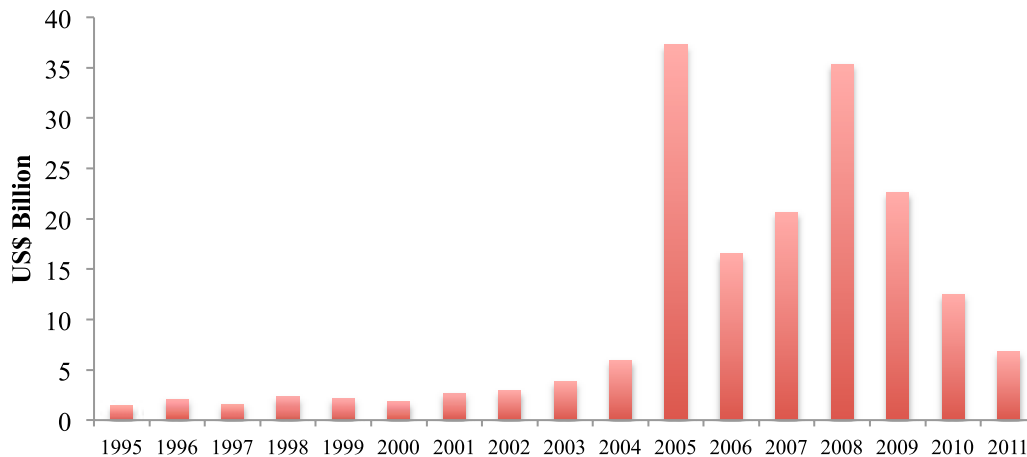
However, the increasing importance of remittances made labour-exporting countries highly vulnerable to oil price shocks and other political shocks affecting resource-rich economies. For instance, the counter oil price shock in the mid-1980s and the Iraqi invasion of Kuwait in the 1990 resulted in the return of many immigrants (especially those from Jordan, Yemen, and Palestine) to their countries. Furthermore, there is controversy concerning the impact of the remittances on the recipient economies, with some studies suggesting that the benefits are marginal at best, as remittances can exacerbate problems relating to balance of payments, are usually channelled into the non-tradable sector (mainly invested in real estate and land acquisition) fuelling inflation, and distort the work incentive for the family members receiving the remittance.⁹⁷

4.3. Investment Flows

Thanks to the large inflow of oil revenues, resource-rich countries have become important sources of foreign investment to the rest of the world, including the Arab world. The influx of oil revenues (accompanied by the opening of Arab economies), improvement in the legal and regulatory environment, and knowledge of the business culture all contributed to intra-regional investment flows. It is estimated that intra-Arab foreign direct investment (FDI) has increased significantly over the last decade, rising from US\$1.4 billion in 1995 to US\$35.4 billion in 2008 (see Figure 10). The 2008 financial crisis and the political shockwaves hitting the region in 2011 resulted in the slowdown of intra-Arab investment flows, and by 2011 intra-Arab FDI had fallen to US\$6.8 billion.

⁹⁷ See Looney (1990), Chami et al. (2005).

FIGURE 10: INTRA-ARAB FOREIGN DIRECT INVESTMENT FLOWS (1995–2011)



Source: Inter-Arab Investment Guarantee Corporation

The data on intra-Arab FDI is of very poor quality and the country coverage tends to vary significantly over time. However, it is possible to draw some anecdotal evidence regarding the importance of these flows. Based on data from five recipients in 2011 (Algeria, Egypt, Jordan, Tunisia, and Yemen), the most important sources of investment flows into these economies have been the UAE (US\$5.8 billion), followed by Qatar (US\$235 million), Saudi Arabia (US\$219.6 million), and Kuwait (US\$89 million), in other words, the main oil exporters in the region. For some of the Arab recipients, intra-Arab investment flows are by far the most important source of such flows. For instance, in 2010, out of the US\$3.6 billion foreign investment received by Sudan US\$2.9 billion originated from Arab countries (mainly Egypt). In Yemen, out of the US\$196.3 million received, US\$192 million originated from Arab countries (mainly Egypt and Kuwait). In Egypt, out of the US\$6.3 billion received in 2010, US\$1.5 billion originated from Arab countries, with resource-rich economies such as Saudi Arabia, UAE, Libya, and Kuwait constituting the main sources of these flows. For other economies, intra-Arab FDI constitutes a small percentage of total FDI. For instance, intra-Arab FDI accounted for around 15 per cent of total FDI received by Jordan in 2010.

Saudi Arabia is by far the most attractive destination for Arab FDI, followed by Sudan, Egypt, Lebanon, Algeria, and the UAE. The data available for a few Arab countries indicate that most of the investment is concentrated in the service sector. Investment in the industrial sector (which includes the energy sector) is rather limited. Given the richness of the region in oil and gas resources, one would expect to see more investment links between the energy sectors of the region. However, NOCs in Arab countries have been reluctant to expand abroad for a variety of strategic and technical reasons, and have concentrated on developing their own oil and gas reserves. In recent years, there has been a massive increase in overseas investment in downstream assets, but this has been mainly concentrated in Asian markets, the main source of global oil demand growth. Private Arab energy companies have been more willing to invest in the oil and gas sector of other Arab countries, but the scale of investment remains limited.

4.4. Arab Aid Flows

The flow of aid from resource-rich economies to other Arab economies has been another important channel for the transmission of oil revenues within the region. The oil boom in the 1970s and early 1980s saw the establishment of a number of specialized financial institutions to provide development assistance to poorer countries. Abu Dhabi, Kuwait, and Saudi Arabia all established their national financial funds: the Abu Dhabi Fund for Development, the Kuwait Fund for Arab Economic Development, and the Saudi Fund for Development. In addition to these national agencies, five main regional funds or development institutions were established between 1971 and 1980: the Arab Fund for Economic and Social Development (AFESD), Arab Bank for Economic Development in Africa (BADEA), Islamic Development Bank (IsDB), OPEC Fund for International Development (OFID), and the Arab Monetary Fund (AMF).⁹⁸

TABLE 12: TOP 10 RECIPIENTS OF ARAB BILATERAL ODA (CUMULATIVE NET DISBURSEMENTS AT 2007 PRICES, IN US\$ MILLIONS)

	1973–2008		2000–8
Syria	33,361	WBG	1,657
Egypt	31,022	Lebanon	834
Jordan	21,606	Morocco	771
Morocco	11,179	Egypt	596
Yemen	10,021	Yemen	688
Sudan	7,259	Sudan	498
Pakistan	4,832	Pakistan	366
Bahrain	4,678	Bahrain	349
Lebanon	4,510	Lebanon	342
Oman	4,404	Oman	203

Source: World Bank (2010)

According to a recent World Bank report (World Bank, 2010), Arab countries (mainly Saudi Arabia, Kuwait, and the UAE) have been the most generous donors in the world, with official development assistance (ODA) totalling US\$272 billion (in 2007 prices) between 1973 and 2008. This represents an average 1.5 per cent of combined GNI during the same period, more than double the United Nations (UN) development assistance target of 0.7 per cent. Arab countries have benefited the most from these aid flows. Over the period 1973–2008, nine out of the top ten recipients (Pakistan being the only non-Arab country) were Arab countries, with Syria, Egypt, and Jordan receiving the most aid during this period (see Table 12). The pattern of aid flows, however, has changed over the years. For instance, during the period 2000–8, Syria dropped from the list of top ten recipients while the West Bank and Gaza, Lebanon, and Morocco assumed the top three positions. For some countries such as Bahrain and Oman, Arab ODA accounts for the bulk of their total ODA. For Syria, in the 1970s, Arab ODA accounted for over 90 per cent of

⁹⁸ Strictly speaking, IsDB and OFID are not exclusively Arab-financed institutions, but Arab countries provide the largest share of their funding.

total ODA, but this has declined in the last decade to less than 20 per cent. For countries such as Yemen, Lebanon, and Jordan, the ratio varies between 20 and 40 per cent (World Bank, 2010).

It is important to note that the share of Arab countries in total Arab aid flows has been in decline in the last decade, as Gulf donors have widened the geographical scope of recipient countries to include very poor countries in sub-Saharan Africa and Latin America. Arab countries have accounted for around 61 per cent of the cumulative total official development assistance from Arab Development Institutions in the past three decades or so.⁹⁹ In 2010, this share stood only at 53.6 per cent.¹⁰⁰ The 2010 data shows that in Arab countries, the bulk of aid flows were concentrated in energy projects (mainly in the power sector), followed by transport and communication, and water and sewerage.

⁹⁹ AMF (2011, Annex Table (11/5)).

¹⁰⁰ AMF (2011, Annex Table (11/3)).

5. Challenges to the Energy-led Development Model

While energy has played a key role in shaping the development path and growth patterns in local economies and at the regional level, Arab energy producers face many challenges. In what follows, we focus on four such challenges: Investment in the energy sector; economic diversification; energy sustainability, and domestic energy pricing reform.¹⁰¹

5.1. Investment in the Energy Sector

The issue of investment in the energy sector has two inter-related dimensions: local and international. Oil and gas revenues will continue to play an important role in shaping the development path of Arab economies, at least into the foreseeable future. Thus, maintaining a well-functioning oil and gas sector and expanding oil and gas output capacity is of key importance to the region's economic, social, and political stability. At first sight, fiscal linkages may appear as a one-way flow of revenues from the oil sector to the state. But the ability of the petroleum sector to generate revenues needed by the government also depends on ownership structures, the incentives faced by the energy sector, pricing issues, and most importantly the mechanisms available to channel part of the revenues back to the energy sector.¹⁰²

Given the large concentration of oil reserves in the Arab world, investment in the oil sectors of the region also has an international dimension, when most international organizations such as the IEA and EIA project that much of the increase in global oil demand needs to be met by increasing supplies from Arab OPEC members.¹⁰³ There are some concerns that if this investment is not undertaken, global oil supply (*ex ante*) may fall below global oil demand, with the effect that the oil price has to increase to high levels to ration oil demand. While high prices generate high revenues for producers in the short term, they pose a big challenge as high and volatile oil prices could induce global economic slowdowns, reducing the oil demand. In the long term, they can also cause demand destruction – a particular concern being that high and volatile prices will accelerate current policies aimed at substituting oil in the energy mix, driven by energy security concerns and climate change agenda. These recent concerns about investment are very different from those prevailing in the 1980s and 1990s, when many Arab producers had to manage excess

¹⁰¹ The literature identifies many other challenges – including the management of oil revenues, reform of the political system, reform of the labour market, and reform of the education system – just to mention a few. While these play a key role in shaping the future development path of the region, they have been discussed extensively in the literature. Instead, in this paper we focus on energy-related challenges.

¹⁰² ESMAP (2007).

¹⁰³ IEA(2005).

capacity induced by slowdown in global oil demand and rapid increase in supplies from outside the region, which reduced the flow of oil revenues.

These two dimensions – local and international – highlight the issue of how much of the revenues generated from the energy sector should be reinvested to expand the sector's capacity. Until the early 2000s, investment in the energy sector of the Arab world was stagnant (with some notable exceptions such as Qatar which embarked on a massive investment programme to develop its gas reserves, and Algeria which revised its legal framework and fiscal terms to attract foreign investment). The large spare capacity and the oil price decline in the 1980s and most of the 1990s threw the energy industry into deep recession, reduced the attractiveness of existing investment plans, and adversely affected the incentive to invest. This was accompanied by widespread oil demand pessimism and exaggerated expectations of non-OPEC supply, reducing the incentive for Arab producers to invest.

Geopolitics has also prevented capacity expansion in many Arab countries. For example, the Iran–Iraq war, the Iraqi invasion of Kuwait, the US invasion of Iraq and the lack of security and instability that followed has prevented these countries from undertaking the necessary investment in their oil sectors. Sanctions against Libya, Iraq, and Sudan limited the access to technology and foreign capital, and hindered capacity expansion.

In countries such as Kuwait and small producers such as Yemen and Syria, the relationship between the owner of the natural resource (the government) and the national oil company that extracts the resource is highly inefficient, yielding low rates of investment. In many countries in the region, the national oil company does not determine its capital budget, and the decision on how much funding to divert into the oil sector is usually determined subject to general government budgetary requirements. As a result, the capital budget for national oil companies is often quite tight, preventing them from either undertaking new projects or upgrading human capital and technological capabilities. Consequently, NOCs in the Arab world are not of uniform quality, and while some are relatively well managed and score highly on commercial performance, human resources, and technology, others perform very poorly and have to rely heavily on foreign companies for exploration and development of oil and gas reserves.

Since many countries will have to rely on foreign oil companies if they are to expand capacity, the relationship between governments and/or national oil companies and international oil companies becomes a key determinant of investment. Many consider that restricting access to reserves is an important barrier to investment in the region. However, access is effectively restricted only in Saudi Arabia and Kuwait, and then only in the upstream sector. All other Arab countries allow some form of foreign involvement in the upstream sector. What is more important than access is the nature of the relationship between the parties. Experience has shown that even in countries where access to reserves is allowed, there may be important obstacles that could delay or prevent investment by international oil companies.¹⁰⁴

¹⁰⁴ See for instance Fattouh and Darbouche (2010).

There is also wide uncertainty facing Arab producers regarding the long-term demand on their oil. As suggested in the literature regarding irreversible investment under uncertainty, the large investment outlays in oil projects and the irreversible nature of these investments have the effect of increasing the value of the option to wait. There is thus a case for delaying the investment until new information emerges about market conditions, especially information about expected global demand and oil supplies from other countries. One key area of uncertainty is the impact on long-term demand of oil substitution policies in consuming countries. While the impact of such policies is small in the short-term, the effects on long-term oil demand are cumulative and irreversible, and hence can be large.

The above discussion suggests that the determinants of investment in the energy sector are various and interrelated: some are driven by local factors and others by international market dynamics. Consequently, the flow of investment in the energy sector is expected to vary considerably across the region, with some countries failing to modernize their oil and gas sectors. As to the international dimension, while in recent years some Arab countries have managed to invest heavily in their energy sector and expand output capacity (most notably Saudi Arabia, which increased its oil capacity to 12.5 million b/d in 2009), whether the region will meet most of the surge in expected growth in global demand should not be taken for granted. First, there is the issue of willingness: Are key Arab producers willing to increase capacity in the current environment of high uncertainty? Second, there is the issue of capability: Can Arab producers increase their capacity in the current political and economic context? In this respect, countries with more competent NOCs, a stable legal framework, attractive fiscal terms, and a clear and effective fiscal system which allows revenues to be channelled back into the sector, are better equipped to undertake the necessary expansion.

5.2. The Diversification Challenge

Levels of economic diversification differ significantly across the Arab world. The region's most diverse economies – Morocco, Tunisia, Lebanon, and Jordan – are all net importers of oil and natural gas. In the absence of dominant hydrocarbon industries and a revenue base established on extractive industries, these economies have had to develop a range of long-term productive industries to sustain their development process.¹⁰⁵ In contrast, the economies of many Arab oil and gas producers are still considerably less diversified, with a higher rate of economic reliance on the oil and gas sector as the single most important productive factor in the economy. The six GCC economies, together with Libya and Iraq, generally remain some of the Arab world's least diversified economies, with the highest degree of economic dependence on the hydrocarbon sector for the generation of economic output, export, and government revenues (see also Table 3 in Section 2.2. above).

¹⁰⁵ Typically, their geography has helped them in doing so; all four countries occupy relatively fertile ground, possess sufficient land area and, with the exception of Tunisia, a sufficiently large population to build up diversified economies that include a range of well-established manufacturing and service industries.

The dominance of the oil and gas industry in many Arab oil and gas producers' economies is largely the result of deferred investment in alternative sectors. A number of different explanations exist: Some have argued that the main reason for lack of diversification is the emergence of vertically integrated state-owned companies promoted by state sector-specific policies and the persistence of old-style industrial policies. Despite serious strains on the economic development model in many Arab resource-rich economies, the flow of oil revenues often reduces the pressure for change.¹⁰⁶ The core of the argument is contained in the debate surrounding many regional oil and gas producers' strategies of diversification into energy-intensive industries such as refining and petrochemicals production. While seen by producers as a strategy of raising the value-added of their exports, and of diversifying away from crude exports, many critics of this policy suggest such forward linkages reinforce rather than mitigate energy producers' dependence on energy.¹⁰⁷ Furthermore, several of the smaller Gulf oil producers have begun industrialization at a much later stage than many of their neighbouring countries, typically following costly state-coordinated industrialization strategies, a position which, in the eyes of many development economists, renders these countries less likely to change their industrial strategies once they are in place, even if the economic outcome is below the optimum level.¹⁰⁸ Finally, varying levels of resource endowments beyond oil and natural gas – including the size of the economy, the availability of a skilled workforce, a history of established local manufacturing sectors, or the availability of arable land – have been put forward as factors putting a strain on economic diversification in some Arab hydrocarbon producers.

Significant variations exist between individual Arab oil and gas producers. Among the GCC states, Bahrain and the UAE have diversified their economies to a larger extent than have their more oil-rich neighbours Kuwait and Saudi Arabia, due primarily to the need for Bahrain and Kuwait to build up alternative industries in view of a decreasing resource base in Bahrain and lack of oil and gas resources in the UAE emirates other than Abu Dhabi.¹⁰⁹ Smaller oil and gas

¹⁰⁶ E.g. Nabli et al. (2005).

¹⁰⁷ Producers of both oil and gas would in many cases argue differently; that energy-intensive industries merely make the most valuable use of these domestic natural resources, particularly in the absence of other natural assets such as large acreages of arable land, a sufficiently large, and skilled local workforce, and the size of an economy able to sustain multiple large, internationally competitive industries. Producers' arguments also suggest that the value added by industries such as refining and petrochemicals production exceeds the value of crude exports; and that the revenues for these products are more closely protected against international price fluctuations than exports of crude oil and natural gas. For instance, see Al-Falih (2009); SAMBA (2009), 'Saudi Petrochemicals Sector: Current Situation and Future Prospects', August 2008. For a critical view, see Luciani (2007). For a more detailed discussion, see Sections 3.2.1. and 3.2.2 above.

¹⁰⁸ This concept is known in development economics as a 'low-equilibrium trap' whereby an economy is stuck at low levels of economic efficiency while a better equilibrium would be possible assuming all economic agents approve and coordinate their actions accordingly. A low-equilibrium trap might occur because economic structures (such as industrial patterns) are already in place and adaptation costs are high; or because of a massive coordination failure, for instance in economies with few developed institutional structures and high levels of future uncertainty. Rosenstein-Rodan (1943).

¹⁰⁹ This observation is also seen in a recent survey, which calculates the economic concentration ratio and diversification quotient for the GCC economies and a number of comparative economies for 2005. The two measures likewise find wide variations in both indicators even between different GCC economies. Qatar, Abu Dhabi emirate, Kuwait, and Saudi Arabia have some of the highest economic concentration ratios in the world; Dubai and Bahrain, with the GCC's lowest ratios, lie at comparable levels to economies such as Norway and South Korea. Moreover the disaggregated data for Abu Dhabi and Dubai (Abu Dhabi facing more than 2.5 times Dubai's

producers, especially Egypt and Syria, have maintained a far smaller role for their hydrocarbon industries in terms of their contribution to both export revenues and gross economic output, with other strong and long-established key sectors. Conversely, years of international economic sanctions, as applied to Iraq and Libya, have left their mark on these economies' levels of industrial diversification, leaving both states more dependent on oil and natural gas exports than any of their Arab Gulf neighbours.

Low levels of economic diversification amongst the Arab world's oil and gas producers raise a number of different long-term policy challenges. The most immediate concern relates to the fiscal sustainability of economies relying to such an extent on oil and gas revenues as do some of the GCC states, particularly Iraq and Libya. A high rate of dependence on oil and gas revenues reinforces patterns of volatile government revenues, whose level and stability remains outside producing countries' control. The negative long-term impact of a fluctuating revenue base on public spending and savings levels has been covered in much more detail above in Section 4.1. High levels of economic dependence on the oil and gas sector also reinforce established patterns of long-term dependence on export revenues. Furthermore, over the past decade rising levels of government expenditure in a number of Arab oil and gas producers have raised the fiscal break-even price for crude oil which is needed to sustain balanced budgets. There is thus the threat of long-term budget deficits as a consequence of lower-than-needed hydrocarbon export receipts resulting from falling oil prices.¹¹⁰

Moreover, high levels of oil and gas sector dependence in Arab producing economies do little to help the region deal with its looming unemployment challenge, the gravity of which has been felt across the entire Arab region – not least since the beginning of the Arab uprisings since late 2010. In the GCC, the oil and gas sector contributes nearly half of GDP, but employs less than 5 per cent of the workforce.¹¹¹ A large part of the remaining workforce in many Arab oil and gas producing countries is employed by the public sector – known in many cases to be overstaffed, and hence losing out on factor productivity.¹¹²

Other economies with a high inflow of natural resource rents, such as Canada and Norway, have begun to invest in pensions and sovereign wealth funds earlier in their histories, which has helped to manage governmental revenue fluctuations and to secure resource export revenues for future generations.¹¹³ Several Arab oil and gas exporters have similarly embarked on the creation of national investment funds which save current oil and gas receipts or invest them in productive assets in other parts of the world: Kuwait, Abu Dhabi, and Qatar being some of the most

economic concentration ratio) show the disparity of levels of diversification within a single country. The GCC's aggregate economic diversification quotient is nearly half that of the G7 economies in the comparison sample. Shediak, Abouchakra, Moujaes, and Najjar (2008).

¹¹⁰ In 2012, the estimated-break-even price which OPEC members needed for the coming year was put at US\$90–110/bl, a significant increase since the early 2000s. For instance, see Aissaoui (2012b).

¹¹¹ We discuss the region's unemployment problem in greater detail in Section 3.3.1 above. Global forecasts such as by the IEA (2011: 82) project the Middle East (including Iran) to be the world's second most important energy demand centre after India and China. See also BP (2012); EIU (2010, 7–8).

¹¹² For instance, see Shediak, Abouchakra, Moujaes, and Najjar (2008).

¹¹³ Segal (2012).

prominent examples.¹¹⁴ The share allocated to many of these funds remains small in comparison to the sums these economies allocate to general government expenditure on an annual basis; and despite their importance for the region's future economic macro-management, sovereign wealth funds do not generate employment opportunities within their investing countries. In-country economic diversification will hence remain an important long-term challenge in several Arab oil and gas exporters.

5.3. Energy Sustainability

The Arab world's rapidly rising energy consumption, as shown in Section 2.3, raises the question of how sustainable their energy consumption patterns are. This issue not only highlights the region's past demand growth history, but also its development into a major growth market for energy in the coming decades, if demand continues to grow at the past decade's pace.¹¹⁵ Continuing population growth and rising living standards in many Arab economies are likely to set a trend of rising per capita energy consumption, as has been experienced in many parts of the developing world. This situation has already become particularly urgent in the Arab Gulf economies – the GCC states and, to a lesser extent up to now, conflict-torn Iraq. The GCC members' stellar economic growth and a dedicated focus on energy-intensive industrialization, coupled to low domestic energy prices, imply that the GCC states are among the most energy-intensive economies in the world.¹¹⁶ Per capita primary energy consumption in the GCC states today is among the highest in the world (plotted against per capita GDP levels in Figure 11), well above the average for the OECD and other industrialized economies. This development stands in marked contrast to a mere forty years ago, when Middle East per capita consumption was less than half that of OECD countries.¹¹⁷

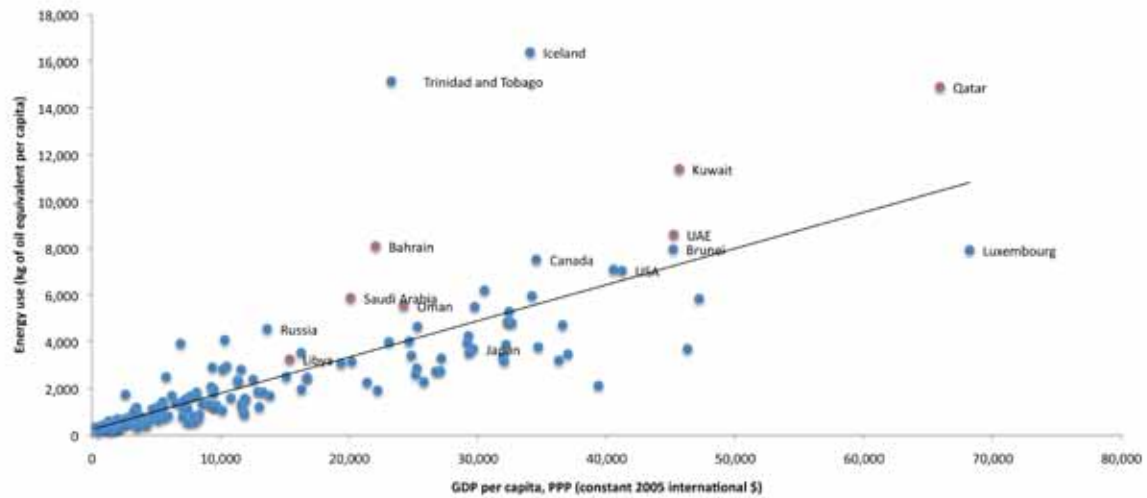
¹¹⁴ Setser and Ziemba (2009); Shediak and Samman (2009). For a discussion of Kuwait's Reserve Fund for Future Generations, see El-Katiri, Fattouh, and Segal (2011).

¹¹⁵ Global forecasts project the Middle East (including Iran) to be the world's second most important energy demand centre after India and China. See IEA (2011, 82), and also BP (2012); EIU (2010, 7–8).

¹¹⁶ See Fattouh and El-Katiri (2012, 25–8).

¹¹⁷ BP (2012, 55).

FIGURE 11: ENERGY INTENSITY IN THE WORLD, 2009

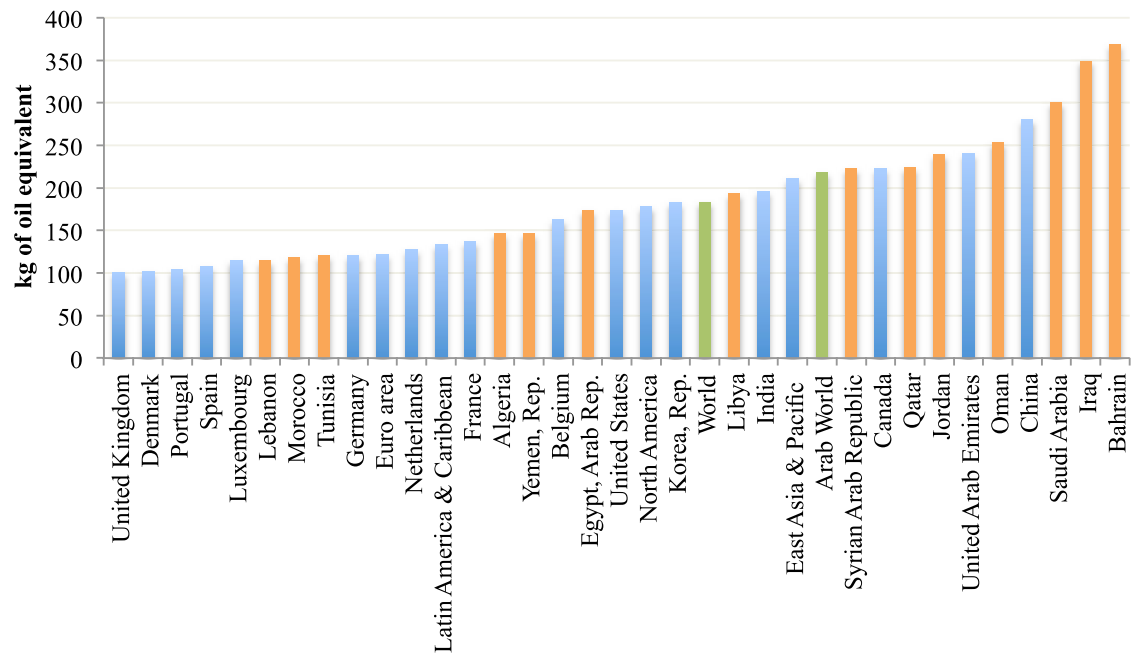


Source: World Bank

Low-cost energy has particularly reinforced a region-wide reliance on energy as an integral part of GDP. In contrast with most other parts of the world, the energy intensity of many Arab economies has been rising consistently over past decades and stands now, like per capita energy consumption, at levels which are among the highest in the world. The GCC economies, together with the more diversified economies such as Jordan and Syria, require more than twice as much energy per unit of GDP output than the more energy-efficient economies of central Europe. They are also more energy intensive than other Arab economies such as Lebanon, Morocco, and Tunisia (see Figure 12). Diversification strategies into energy-intensive industries such as steel, aluminium, and petrochemicals production have reinforced these patterns. At the same time, energy efficiency levels are low, particularly in those economies most reliant on energy as an industrial input, primarily because of the decades-long perception of energy as a low-cost input factor (compare with Figure 13).¹¹⁸

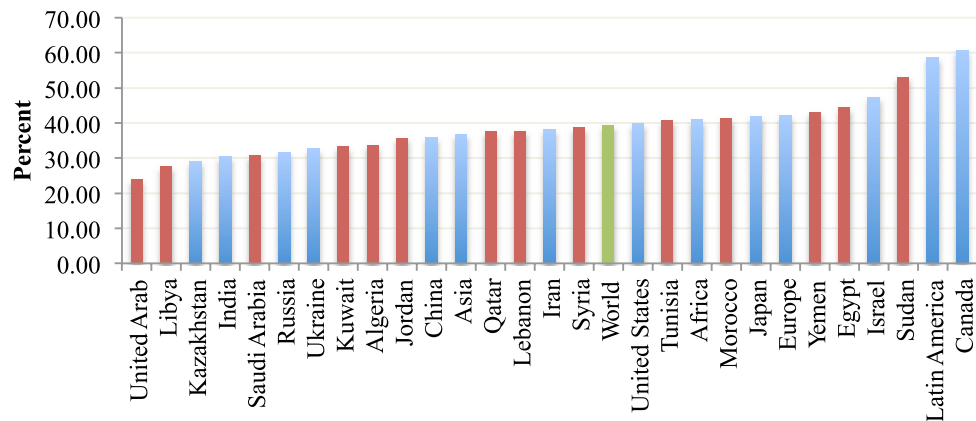
¹¹⁸ See Bressand, Farrell, Haas, Morin, Nyquist, Remes, Roemer, Rogers, Rosenfeld, and Woetzel (2007).

FIGURE 12: ENERGY USE (KG OF OIL EQUIVALENT) PER \$1,000 GDP (CONSTANT 2005 PPP) IN SELECTED ECONOMIES, 2008



Source: World Bank

FIGURE 13: ENERGY EFFICIENCY IN POWER GENERATION IN SELECTED ECONOMIES (%), 2009



Source: ABB

For many Arab net energy importers (or small net exporters such as Egypt, Syria, and Jordan) a chief question in the future will be whether or not they can afford to continue to waste increasingly scarce, and increasingly precious, energy resources. Over the past ten years, import options for both oil and natural gas have become more expensive. In addition, the locations of some growing energy consumers are not necessarily favourable for regional energy trade.¹¹⁹ In several smaller Arab economies, the cost of current levels of energy consumption, often at highly subsidized prices, has become an insurmountable fiscal burden, with the result that some have attempted careful reform of their domestic regulatory and pricing framework, discussed below in section 6.

For the large Arab oil and gas producers, the most immediate question is not one of immediate lack of energy reserves, for many of the region's crude oil producers continue to leverage on their production to compensate for shortfalls in natural gas. Burning crude oil in summer to overcome shortages in domestic supplies of natural gas in some Gulf countries has become the norm. This generates vast losses in foregone export revenues, in contrast with the comparably benign cost option of importing natural gas – an option which so far only Kuwait has tentatively begun.¹²⁰ The question is rather whether or not many of these producers can, and want to, continue consuming rising shares of their own depletable energy resources at the cost of exports – and hence export revenues.¹²¹ From a fiscal point of view, what is at stake for large oil and gas exporters is their ability to collect export revenues, which have kept and will continue to keep these economies running for as long as no alternative industries have been developed.¹²²

As yet unachieved remains both the diversification of the Arab world's energy base – an objective which is important for security reasons as much as for economic reasons – and the oft-quoted desire for access to technology. The majority of Arab primary energy demand up to now has been met by the region's two chief energy resources, crude oil and petroleum products on the one hand, and natural gas on the other. Combined, these resources account for over 98 per cent of regional energy consumption.¹²³ Tentative moves towards including renewable energy on Arab governments' agendas have been pushed forward by only a few Arab countries, namely Morocco,

¹¹⁹ See Section 4.1. for a discussion of regional energy trade options.

¹²⁰ Saudi Arabia burns up to 800,000 b/d of crude oil during the peak summer period in domestic power generation, in addition to other fuels such as fuel oil and resid. Kuwait burns between 200,000 and 300,000 b/d of crude oil and refined products. Saudi Aramco's CEO Khaled Al-Falih publically expressed his worries in 2010 about the levels of domestically consumed oil in Saudi Arabia. The kingdom currently burns as much as 1mn b/d in summer in power plants, out of a total production of some 8–8.5mn b/d in 2010. Al-Falih expressed worries that by 2028, exports could hence fall by as much as 3mn b/d. 'Saudi Arabia, Kuwait Seek Gas to Supplant Use of Oil for Power', *Bloomberg*, 30 November 2010; 'Saudis Struggle to Curb Domestic Demand', *Petroleum Intelligence Weekly*, 27 August 2012; 'Saudi oil chief fears domestic risk to exports', *Financial Times*, 26 April 2010.

¹²¹ A Citibank report in September 2012 in this context outlined the supposed dangers of Middle East oil producers, particularly Saudi Arabia, continuing to consume at current growth rates. One of the central messages of the report is that 'If Saudi Arabian oil consumption grows in line with peak power demand, the country could be a net oil importer by 2030.' While being mainly directed for discussion, the report and its reception in the Saudi and wider Arab media underlines the need for more systematic engagement by governments with the issue. 'Kingdom addresses domestic energy consumption head-on', *Saudi Gazette*, 16 September 2012.

¹²² For further discussion, see Al-Moneef (2006), 32–35.

¹²³ Oil covers 52.9 % of the Arab world's energy needs, and natural gas 45.4 %. Numbers for 2010. AMF (2011, 81, 89).

Algeria, and Tunisia under the European-led Desertec initiative,¹²⁴ and in more limited form by some of the Gulf States, which have pledged and begun tentative renewables initiatives themselves.¹²⁵ Nuclear power is also likely to form a part of the region's energy base within the next ten years, although only marginally, the UAE and Egypt having the most advanced nuclear plans at present; but along with this technology come a number of unanswered questions and caveats which are likely to plague the region for the years to come, including the unclear financial cost and likely repercussions for national security.¹²⁶

5.4. Domestic Energy Pricing Reform

Domestic energy prices remain a vexed question in many parts of the Arab world. Energy prices throughout the region – including those for oil and oil products, natural gas, and electricity – have for many decades been among the lowest in the world. Energy subsidies are in many cases policies that follow very legitimate government objectives; in many developing countries, subsidies reduce the cost of essential forms of energy to ensure universal access to energy. Particularly in large countries with poor populations and little state capacity to administer and direct a targeted social protection system, broadly targeted energy subsidies may indeed prove a practical step to alleviate poverty and protect poor households' income. Fixed government-administered prices for some fuels and electricity also protect households against large energy price – and hence disposable income – fluctuations.

Furthermore, in many large hydrocarbon-producing economies, low energy prices are often not conceived of as being part of a subsidy; the marked reference price for domestic pricing here is often the marginal cost of production – for instance of crude oil – rather than the achievable export price for the barrel of crude on international markets. The resulting opportunity cost is often not seen as a direct form of subsidy, while the state incurs a quasi-fiscal loss, which remains invisible in fiscal terms. Low energy prices in these countries are frequently also regarded as a birthright by citizens who have been used to static prices, often for more than a generation.¹²⁷

The various, unintended, consequences of energy subsidies and low energy pricing are visible throughout the Arab world, both in energy producing and importing economies. Energy subsidies

¹²⁴ Desertec's website is available at www.desertec.org. See also 'Morocco, Greece Eye Schemes to Send Solar Power North', *World Gas Intelligence*, 9 November 2011; 'Algeria Fleshes Out Renewables Plan', *EI New Energy*, 5 July 2012.

¹²⁵ The emirate of Abu Dhabi, for instance, has begun to invest in solar technology and has built a small but symbolically significant project in the form of a carbon-neutral city, called Masdar City. Saudi Arabia has likewise pledged to invest in small-scale solar technology, although the contribution of these energy forms is likely to remain insignificant over the coming decade. Masdar City's website is available at www.masdar.ae/en/home/index.aspx. See also 'Saudis look to alternatives', *International Oil Daily*, 2 June 2011.

¹²⁶ For an overview over different nuclear programmes in the Middle East, see Ebinger, Banks, Massy, and Avasarala, (2011); Luciani (2009); and Krane (forthcoming 2013). See also 'Ra'is hai'at mahattat iatakalamu 3an awal mufa3il nawawi misri', *Al-Ahram*, 19 September 2012; 'Jordan's Nuclear Program Progresses Despite Snags', *Nuclear Intelligence Weekly*, 3 January 2011; 'Saudi Arabia: Nuclear Plans Remain Stalled', *Nuclear Intelligence Weekly*, 1 February 2012.

¹²⁷ For a more comprehensive discussion, see Fattouh and El-Katiri (2012, 16–18).

distort market signals and lead to an inefficient allocation of depletable resources. They encourage waste and an overconsumption of energy, and disincentivize investment in energy-saving technology and behaviour, as well as in alternative energies such as renewables which are unable to compete with highly subsidized fossil fuels. Energy subsidies are key contributing factors to many of the region's consumption patterns observed above, including fast growth in consumption of various fuels and electricity, high energy intensity and the reliance on energy-intensive industries rather than alternative industries, and low levels of efficiency in the use of electricity.

Where energy subsidies are poorly implemented and do not allow energy producers to recover the full cost of production, they may also defer necessary investment in the energy sector, and hence exacerbate existing or expected capacity shortcomings. The Arab world's electricity sector is an important case in point. In many cases, decades of subsidized electricity have left their mark on public utility companies' access to capital for investment in new capacity and infrastructure. This has resulted in poor service and frequent service disruptions, due to both insufficient generation capacity and aging infrastructure. Lebanon and many of the GCC countries experience regular power shortages during peak hours in summer, with devastating consequences for businesses and industry.¹²⁸ Yemen's electricity situation is possibly the most precarious one in the entire Arab world; the country allocated more than a third of its budget on fuel subsidies, but a mere half of the population has access to some form of electricity, and two thirds of the country are not connected to national or local electricity grids.¹²⁹ Subsidy policies which do not adequately compensate producers may also lead to recurring fuel shortages, as was most recently (in 2011) observed in the UAE – paradoxically so since the country is one of the world's most important crude oil producers.¹³⁰ Additionally, many of these losses are further exacerbated by region-wide, and highly damaging, cross-border fuel smuggling, which is incentivized by price differences between neighbouring countries.¹³¹

Furthermore, contrary to their original objective, energy subsidies tend to be socially regressive, that is they benefit primarily high-income groups. This effect has been shown by various research studies, suggesting that energy subsidies are at best an inefficient way to alleviate poverty, and are at worst counterproductive, for they consume government funds which would otherwise be

¹²⁸ Bhattacharya and Wolde (2009) identify lack of secure access to electricity as one significant causal factor having impacted long-term economic growth in the MENA region over the past three decades. See also World Bank (2008); El-Katiri (2011, 26–31).

¹²⁹ El-Katiri and Fattouh (2011, 37–9).

¹³⁰ In summer 2011, Northern Emirates fuel supplier ENOC closed many of its petrol stations following years of fuel pricing policies that prevented ENOC from recovering its costs. ENOC, as well as other local fuel suppliers such as Emarat, have imported oil products, mostly gasoline, and pay international prices for these products. UAE domestic fuel prices remain fixed at rates far below market prices, with supply companies like ENOC and Emarat assuming the bulk of the cost difference. Unable to finance this difference any longer, ENOC turned to the public by writing an open letter in a UAE newspaper outlining the problems the company faced in view of rising domestic consumption and unsound company finances in view of existing subsidy policies. 'Fuel Shortages Hit the UAE, Threaten Power Supplies', *MEES*, 54:26, 27 June 2011.

¹³¹ For instance, see 'Contrebande d'essence entre l'Algérie et le Maroc', *Algérie DZ*, 2 July 2008; 'La contrebande vers la Libye assèche les pompes à essence dans l'Est algérien', *France 24*, 11 August 2011; 'Syria to Raise Fuel-Oil Price to Limit Smuggling', *Bloomberg*, 10 August 2011; Wahab (2006); 'Subsidized fuel smuggling costs Kuwait KD 245m yrly', *Arab Times*, 17 November 2011.

available for targeted social benefit schemes.¹³² IEA data, moreover, show that the Arab world's largest subsidizers are economies with some of the highest per capita incomes in the world, suggesting that the bulk of the region's energy subsidies benefits populations in comparatively wealthy economies, rather than countries which have significant proportions of poor people (see Table 6).

Perhaps the most acutely visible consequence of energy subsidies in the Arab world is the budgetary burden they cause in some of the region's energy importing countries. Egypt's¹³³ official energy subsidy bill rose from E£40 billion (US\$7.2 billion) in 2005/6 to E£68 billion (US\$11.9 billion) in 2009/10, some 21 per cent of the country's budget and equalling Egypt's expected budget deficit for the fiscal year.¹³⁴ A recent calculation by the African Development Bank suggests that Egypt's actual costs incurred by direct and indirect energy subsidies are substantially higher, with a total estimate of E£140 billion (\$23 billion) – equivalent to 11.9 per cent of GDP.¹³⁵ Yemen's budgeted expenditure on fuel subsidies (excluding electricity subsidies, which are budgeted separately) in 2008, the last year with data available, amounted to more than 34 per cent of total government expenditure – more than one and a half times its expenditure on education and health combined.¹³⁶ Syria, prior to the political turmoil the country has experienced since early 2011, intended to significantly reduce its fuel subsidy burden, which by 2008 was consuming more than 34 per cent of total government spending.¹³⁷

In many Arab energy importing countries the fiscal burden of energy subsidies has, over the past years, become increasingly unsustainable, rendering reform a necessity rather than a choice. Countries such as Jordan¹³⁸ and Iran,¹³⁹ in which a comprehensive reform of energy subsidies has been implemented in recent years, underline the political and economic feasibility of such a reform effort. The rewards of the Iranian case, in the form of some US\$44bn billion budgetary savings made in 2011 in addition to a reduction in domestic fuel consumption, serve as strong

¹³² See for instance, Del Granado Coady, and Gillingham. (2010); Alderman (2002); Coady, El Said, Gillingham, Kpodar, Medas, and Newhouse (2006). For country case studies, see Abouleinein, El-Laithy and Kheir-El-Din (2009); El-Katiri and Fattouh (2011); Assamiee, M. (2010); Breisinger, Engelke, and Ecker (2011); Clements, Gupta, and Jung (2003).

¹³³ The government of Egypt, for instance, calculates its subsidy based on the losses incurred by national oil and gas companies when selling petroleum products below their cost (i.e. the financial cost only). In the case of some petroleum products, which Egypt imports, this cost is the incurred cost of import; in the case of domestically produced natural gas, it is typically the marginal cost of production.

¹³⁴ Al Ahram Online, 'Egypt budget deficit may top 10 per cent in 2011, says minister', 26 April 2011, available at: <http://english.ahram.org.eg/NewsContent/3/12/10830/Business/Economy/Egypt-budget-deficit-may-top-per-cent-in-,says-mi.aspx>.

¹³⁵ Castel, V. (2012).

¹³⁶ Breisinger, Engelke, and Ecker (2011).

¹³⁷ Syria's 2008 'subsidy' item includes 'other subsidies' which are combined in the IMF published revised budget numbers for 2008 (a total of S£66.3 billion). In October 2008, Syria's Minister of Petroleum and Mineral Resources Sufian Alaw stated that Syria's total fuel subsidies in 2008 stood instead at S£340 billion, more than five times this amount, owing to higher than expected international prices. Alaw is cited by MEES commenting at the time that by liberalizing the prices of fuel oil and diesel oil, the Syrian government could double public sector salaries and still have some surplus left. MEES (2008); IMF (2010a, 18).

¹³⁸ IMF (2009); IMF (2010b); Al Arabiya News (2011).

¹³⁹ Guillaume, Zyteck, and Farzin, (2011); Tabatabai, H. (2011).

incentives for other regional subsidizers, including large oil and natural gas producers.¹⁴⁰ The Iranian case also illustrates a potential scheme whereby the reform of domestic energy prices can be made politically more acceptable – by coupling price rises to a parallel compensatory cash scheme which hands out fiscal savings to households instead of energy subsidies.¹⁴¹ Similar schemes, which may include an element of coupled social security system reform (as in Jordan) and more gradual price rising schemes, may also allow governments in energy importing countries to reform their energy prices in a socially acceptable way.

¹⁴⁰ ‘Iranian Parliament Gives Green Light For Second Stage Of Subsidy Reform Plan’, *MEES* 55:21, 21 May 2012; ‘Price Hikes Squeeze Iranian Gasoline Demand’, *International Oil Daily*, 17 January 2011.

¹⁴¹ Tabatabai, H. (2012 forthcoming).

6. Conclusions

The findings of this paper suggest a highly multi-faceted development experience in the Arab world tied pivotally to its energy resources. Below, we offer some main conclusions.

Energy has played a defining role in Arab economic development...

Energy has undoubtedly played a defining role in the Arab world's economic development over the past fifty years, if not more. The region's energy resources have affected development choices, shaped economic structures, promoted certain patterns of industrial activities, and have integrated the Arab world into the global economy. More than any other economic activity, oil and gas industries have provided the most important source of income for many producing countries' governments, allowing for the creation of modern welfare states among the GCC states, and similar development programmes in a number of other large and medium sized producers. Many other parts of the Arab world have benefited from the region's large hydrocarbon reserves via intra-regional labour and remittances flows, financial investment, and aid from large oil and gas producers.

... however, this impact has not been entirely positive...

Nevertheless, the role played by energy resources in the Arab world is by no means positive by default. Energy export revenues have fuelled the development of some industries more than others, particularly of energy-intensive manufacturing at the expense of organically grown, alternative economic sectors and small and medium enterprises, particularly in the large oil and gas producers. Oil and gas reserves have also proven to have the potential to exacerbate differences between countries, and possibly even to be a source of conflict, both nationally and bilaterally. Countries such as Sudan, Iraq, and Yemen suggest that energy wealth does not automatically translate into higher levels of prosperity and human development; effective government management, and a local modus operandi that allows many, rather than just a few, to prosper from their country's natural resources, are essential ingredients to making energy resources a fuel for growth, rather than economic decline.

... and the region's economic performance has trailed expectations

As such, the Arab world illustrates the classical dilemma of resource-led growth: its economic performance as a region has perhaps been lower than expectations that would have seen the

Middle East as an Asian growth miracle, owing to its oil and gas reserves. But as shown above, the region holds a number of very different development trajectories, which include energy-rich economies both at the top and at the bottom of rankings for both per capita income and wider development indicators, suggesting that some parts of the region have used their natural resources significantly more to the benefit of socio-economic development than others. The Arab world hence is clearly not just one country; it is a mosaic of very different ways of managing and benefiting from natural resource wealth.

1. Energy is linked to Arab producers' economies in many more ways than often thought...

Energy is much more interwoven with a producing country's macro economy than is at first apparent. On the most basic level, oil and gas exports provide producers with an important revenue stream that determines government budgets and congruent levels of investment and savings. The more detailed picture, however, shows that the oil and gas sector's contribution reaches far beyond that. Hydrocarbon exports push forward various related industries, the two most prominent examples of which are given in this report: refining and petrochemicals, both key contributors to the Arab world's output in manufactured goods. Hydrocarbon exports also pull other sectors along, for instance various service industries; and they could create key employment opportunities, particularly in the region's more favoured skilled labour segment. Much existing research does not yet fully capture the strength of these various economic linkages.

... but the effect of these linkages on growth remains ambiguous

That many of these linkages have also established entrenched chains of interests, and energy-producer-typical development patterns, is most evident in the Arab world. With an industry focus on energy-intensive activities, the Arab world supposedly built its own competitive advantage, but at substantial cost; while many industries in the Gulf and North Africa benefit from cost-competitive fuel and feedstock in both crude oil and natural gas, the value added in some of these industries may be low. Existing hydrocarbon wealth also implies a tendency to overstaff and use various sectors as employers of the first and last resort, which can dampen the value of energy resources in driving productive economic growth. Some observers might hence take Arab oil and gas producers as key examples of economies where industrial and labour market policies have negatively affected long-term economic growth – a development pattern fed by hydrocarbon rents as much as by political decision-making.

2. Energy has brought the Arab world a little closer together...

Its energy resources have undoubtedly helped the Arab world in some respects to move more closely together. Most channels are financial in nature, via intra-regional investment and aid flows, primarily from the oil-rich Gulf towards other Arab economies and financed through the

inflow of increasing energy export rents into Arab oil and gas producers. Labour flows have characterized, decreasingly in recent years, the relations between some of the Gulf countries and their fellow Arab neighbours, much as a result of a gradual trade flow of human capital in return for oil-based remittances. Much of these flows have not been mutual; North African and Levantine investment flows into the Gulf do not play a significant role until today, nor do labour flows from the Gulf to other Arab countries.

... but this has notably not been the case for actual trade in oil and gas

Trade in energy itself has notably been unable to lift what has otherwise been a relatively small amount of intra-Arab trade in commodities. While oil and oil products are traded flexibly both intra- and extra-regionally, other types of energy have not yet become part of larger intra-regional trading transactions. The political obstacles to increased intra-regional trade in natural gas illustrate this continuing problematique best. Despite the availability of significant regional resources and rapidly growing demand markets within the region, most Arab gas exports are sent outside the region. Both natural gas and electricity are energy commodities which are traditionally traded regionally, making use of the proximity of markets and hence lower transportation costs. However, the Arab world's unique domestic price environment for energy, coupled to the lack of political will, means that many regional energy options have remained under-utilized.

3. One of the most important future challenges for the region will be domestic energy demand...

Rising levels of domestic energy consumption in the Arab world will undoubtedly constitute one of the future's most pressing challenges for the region and its continued economic growth. Far from being immune to challenges in the way the region consumes energy, the Arab world is as vulnerable as many net importing regions of energy with regards to the effects of wasteful consumption, and the impact of climate change. Arab oil and gas producers, particularly the Arab Gulf monarchies, already consume more energy on a per capita basis than most other parts of the developed and developing world. In the absence of suitable strategies to manage the region's growing energy demand, domestic consumption may well compromise future regional energy exports. There is no better time to understand the importance of choices made today: in the wake of the street protests which have shattered political regimes across the Arab world, ensuring the long-run prosperity of the region and its people should stand at the heart of policy-making in every Arab country.

... rendering domestic energy pricing policies ever more important...

A change in the way Arab economies consume energy will undoubtedly need to be an important part of these countries' future policy agenda. Reforming domestic energy pricing frameworks will form an essential part of managing future regional energy demand. As part of our work on the issue of energy subsidies, we have encountered time and again the very real concerns

of both Arab and non-Arab countries in reforming a policy area as sensitive as energy prices – both in net importing and in oil and gas producing countries. Recent reform efforts by countries such as Jordan and Iran, however, serve as encouraging examples of how such reforms can be implemented in a way that protects energy access but incentivizes more efficient energy use, while avoiding the type of protest that prevents many Arab governments until now from overdue reforms.

... and suggesting a new look at energy sources for the region

Increasingly, the rise in the Arab world's own energy consumption will raise the question whether a diversification of the region's energy sources could help render its energy use more sustainable in the long-run. Oil and natural gas, both depletable fossil fuels with significant environmental footprints, do not constitute a sufficient energy base for a region consuming by now more energy than Latin and Central America combined. Mirroring similar developments elsewhere in the developing world, the future of Arab energy consumption will likely no longer rely only on fossil fuels, but on a more diverse fuel mix which includes renewables, and which will likely include nuclear power as well.

4. Unresolved remains the question of wider economic diversification...

Beyond the consumption of energy, increasing numbers of oil and gas producers will need to pose the question of whether or not their economic diversification efforts over the past four decades have been effective. Many Arab economies, those of both large and medium-size producers, remain exceptionally dependent on oil and gas revenues. Diversification into energy-intensive industries, as has been demonstrated above, raises questions over how energy-independent such policies render the region's oil and gas producers, in reality. This should not detract from the fact that many of these industries have created added value, and have created valuable high-skill employment opportunities; but the question is whether or not alternative industries might have achieved the same objectives, while reducing the region's own energy demand. In light of the above, the Arab world is likely to yet face many emerging new policy questions, which should do nothing to diminish the essential role played by energy in the region.

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