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Stability versus Sustainability: Energy
Policy in the Gulf Monarchies

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Keywords Subsidies, energy policy, natural gas, electricity tariffs, Persian Gulf, GCC, OPEC, rentier state, monarchy, energy consumption, political economy

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Stability versus Sustainability: Energy Policy in the Gulf Monarchies

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31 January 2013

Abstract

The six Persian Gulf monarchies are home to some of the world's largest hydrocarbon reserves, and also some of the cheapest energy prices and highest per-capita consumption. Government subsidies based on socio-political objectives have contributed to regime longevity, but they have also stimulated demand for resources comprising the region's chief export and biggest contributor to GDP. This paper finds that these monarchies – Qatar excepted – face an increasingly acute conflict between maintaining subsidies and sustaining exports. A shift to a higher-cost model of energy provision is underway. The era when primary energy was considered nearly free is being eclipsed by one where new sources of demand are met by more expensive resources. For now, governments have

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Introduction

The hydrocarbon bounty held by the six Gulf Cooperation Council countries, Saudi Arabia, the United Arab Emirates, Kuwait, Qatar, Oman and Bahrain, represents one of the world's vital supplies of energy for the coming decades. Global dependence on these resources stems not just from the size of the reserves or the level of production, but from the small populations in these Persian Gulf monarchies and their historically low levels of consumption. It is the GCC's large resource *per capita* that has allowed it to export most of its production and to become a dominant force in international markets.

This story is beginning to change. Rising populations and consumption in these producer states threatens assumptions about the sustainability of GCC energy exports (Gately et al., 2012). At current rates of consumption growth, Saudi Arabia could see oil exports reduced by the end of the decade, much sooner than expected. Those discussing these trends include Mitchell and Stevens (2008), Lahn and Stevens (2011), Bourland and Gamble (2011), and Tottie (2011). Kuwaiti consumption is already reducing exports (Wood, 2011). Oman and Bahrain, the GCC states with the smallest endowments, are in depletion-led decline.

This scenario presents a policy puzzle. Petroleum exports form the bedrock of the GCC political economies. Distribution of oil and gas revenues has cemented near-absolute monarchs in power long after the demise of this form of government elsewhere.² **Given the vital importance of these revenues, what factors have driven these monarchies to encourage domestic consumption of their chief exports? How have these policies shaped energy balances?**

This paper combines descriptive statistics with fieldwork research data to present a deep empirical examination of the drivers of domestic hydrocarbon demand in these six countries. It discusses seemingly paradoxical government encouragement of local consumption of exportable hydrocarbons, through subsidies on electricity, desalinated water, industrial feedstock and transportation fuel. Also examined is the electricity market, where unconstrained consumption is most effectively addressed by breaking a political

² A large body of political economy literature has made this case, under the rubric of "rentier state theory" and the "resource curse." Works include: Beblawi (1987), Luciani (1987), Anderson (1987), Crystal (1990), Gause (1994 and 2000), Chaudhry (1997), Ross (2001), Smith (2004), Herb (2005), Schlumberger (2006), and Schwarz (2008).

taboo on raising prices; and the underdeveloped market for natural gas, the main feedstock for power generation, where low pricing is driving a shortage.

The paper finds that these monarchies – Qatar excepted – face an increasingly acute conflict between maintaining subsidies and sustaining exports. The GCC is in the midst of a shift to a higher-cost model of energy provision. The era when primary energy was considered nearly free is being eclipsed by one where new sources of demand are met by more expensive resources, either unconventional domestic energy or market-priced imports. For now, governments have absorbed the increased cost and insulated consumers from price signals that might otherwise moderate consumption. This counterproductive practice only intensifies the call on exportable resources.

The consumption dilemma, coming at a time when opportunity for reform has been constrained by pan-Arab uprisings, presents difficult questions for these tribal-autocratic regimes. Hydrocarbons help ruling families buy political support, through in-kind domestic distribution; and they provide regimes with economic viability, through export revenues, some of which are also distributed. For the system to continue functioning, resource revenues from the international side of the equation must not be displaced by resource demand from the domestic side.

The choice for regimes is one of short-term political stability versus longer term economic sustainability. As populations rise and energy production reaches a plateau, domestic consumption will gradually displace exports, as has happened in other oil exporting states. Politically difficult reforms that moderate consumption can therefore extend the longevity of exports, and perhaps, the regimes themselves.

This paper illustrates this quandary by examining regional energy supply and demand. Section 1 describes the state of primary energy consumption in the Gulf producer countries and the economic short-sightedness of subsidized resource distribution. Section 2 examines demand-induced stresses in electricity markets and the mounting cost of keeping pace. Section 3 looks at the equally beleaguered market for natural gas, where underpricing has skewed demand and transformed the Gulf into an importing region. The discussion and conclusion examines the political implications of shrinking exports and rising fiscal burdens that are symptomatic of resource depletion.

1. GCC Energy Consumption Dynamics

In the past four decades, energy demand in the Gulf Arab countries has undergone a dramatic transformation. At the start of the 1970s, these territories were poor and underdeveloped, with tiny populations emerging from centuries of isolation. Energy consumption in Arabia was less than one percent of global demand. Forty years later, the Gulf monarchies, with just 0.5% of the world's population, consume 5% of its oil. Primary energy consumption in the past decade has grown more than twice as fast as the world average of 2.5% per year, but slower than that of China and India. (Fig. 1) Its 2001

consumption of 200 million tonnes of oil equivalent (mtoe) nearly doubled by 2010 and is expected to nearly double again by 2020. (Fig. 2)

Energy demand in the Gulf has escaped notice until recently because of its large reserves, with oil reserves-to-production ratios of 65 years in Saudi Arabia, 80 years in the UAE, 97 years in Kuwait; and, for Qatari gas, more than 100 years. However, with oil production reaching or nearing a plateau, rising domestic consumption will begin to displace exports, regardless of the reserve base, unless production is also increased.

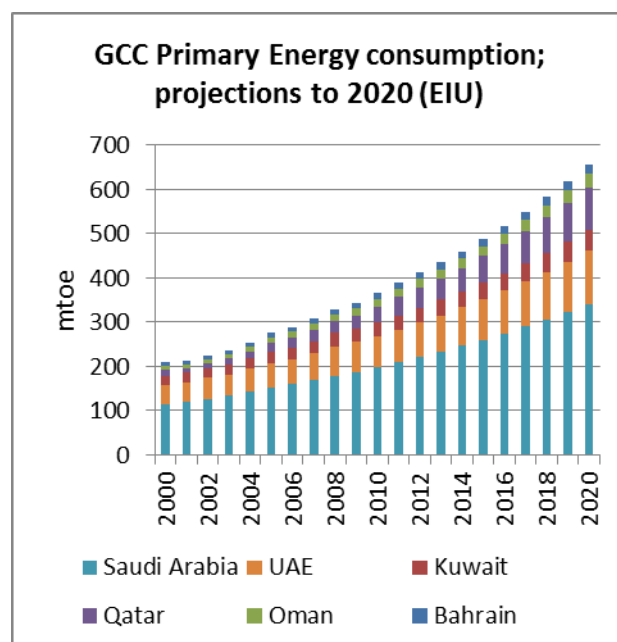
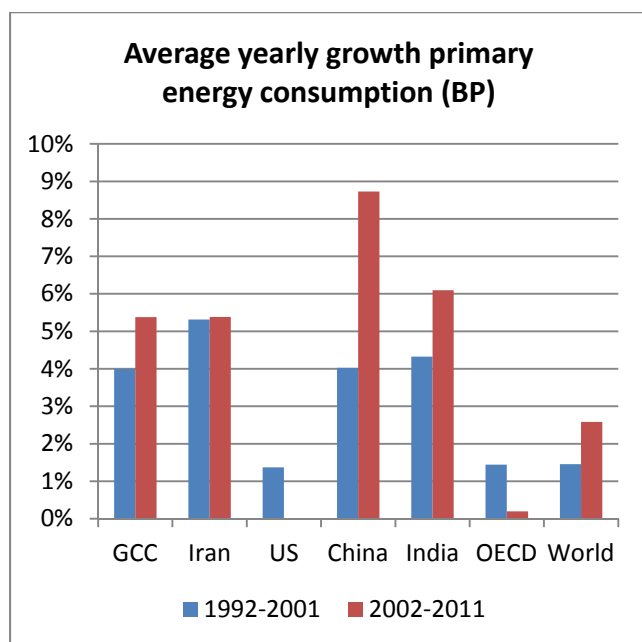


Figure 1: GCC energy consumption vs others (Source: BP, 2012)

Figure 2: Projected GCC PE consumption to 2020 (Source: Economist Intelligence Unit, 2010)

1.1 Oil and Gas Balance

The GCC represents a major repository of natural gas, but most production is consumed domestically. Only Qatar is a major exporter. The remaining five countries produced 189 bn cubic meters (bcm) in 2010 and consumed nearly all of it, 185 bcm. Overall the GCC held more than a fifth of global reserves, but represented only 6.3% of global gas demand, which foreshadows difficulties in production, trade and pricing. Natural gas consumption has exceeded production in the UAE and Kuwait since 2008. (Fig. 3) In Bahrain and Saudi Arabia consumption and production are matched. Neither exports raw gas. Oman remained a small net exporter in 2011, since its LNG exports were larger than its pipeline imports.

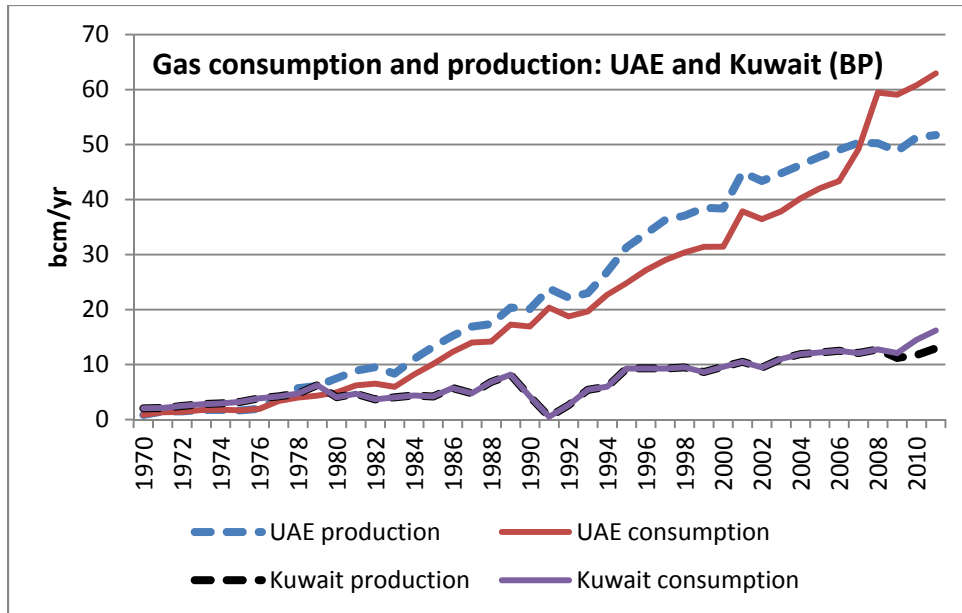


Figure 3: Gas consumption surpasses production in UAE and Kuwait (Source: BP, 2012)

In contrast with gas, most GCC oil production is exported. But domestic use is on the rise. Between 2000 and 2009, yearly consumption grew by an average of 6.5%. Among major oil exporters, only Angola, Algeria and Kazakhstan maintained similar growth. Production consumed domestically in 2009 ranged from a low of 13% in Qatar to a high of 26.5% in Saudi Arabia. (Fig. 4)

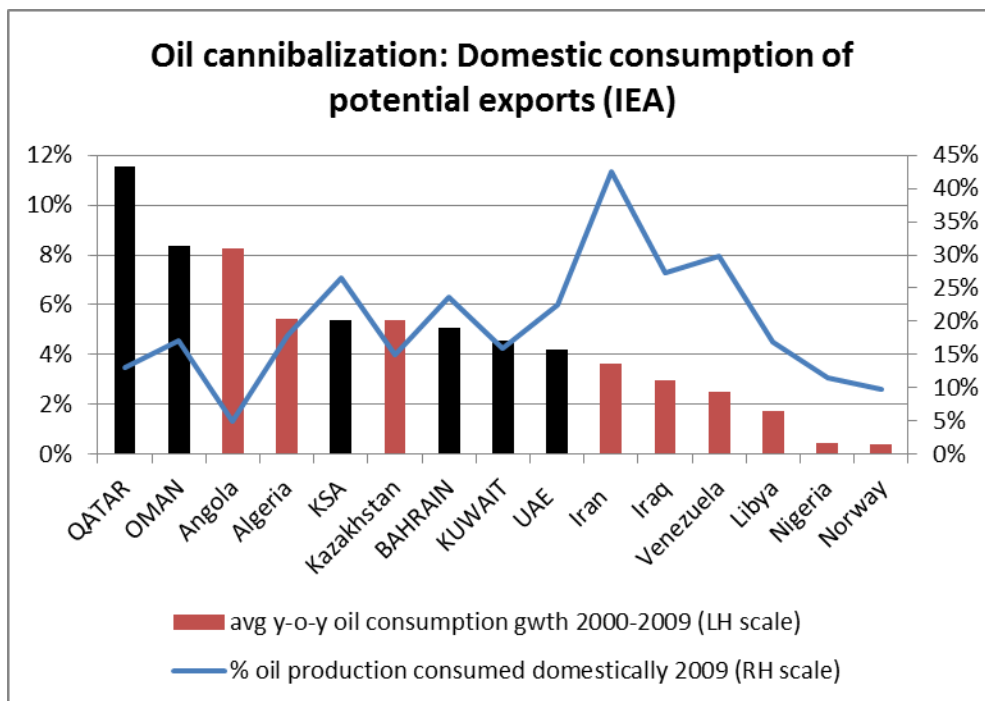


Figure 4: Avg. yearly growth in oil consumption, with production consumed domestically in 2009 (Source: IEA, 2012)

A remarkable run of rising consumption in Saudi Arabia pushed the kingdom past Brazil and Germany to become the world No. 6 oil consumer in 2009, despite its comparatively small population, economy, and industrial base. In 2011, the kingdom's domestic oil consumption represented lost revenues of more than \$80bn, or 13% of GDP, given the average price of Saudi Arabian light crude that year of \$107.80/bbl.³

Country	Oil consumed 2011 (m b/d)	GDP 2011 \$bn	Population (2011)	Oil consumption per capita
Saudi Arabia	2.86	\$578 bn	28 million	37.2 bbl/yr
Brazil	2.65	\$2,493 bn	195 million	5 bbl/yr
Germany	2.36	\$3,577 bn	82 million	10.5 bbl/yr

Sources: IMF, BP

Table 1: Saudi oil consumption in perspective

Simultaneous increases in internal and external demand appear to be eroding the spare production capacity which Saudi Arabia deploys to calm volatile markets (Krane 2012). In April 2012, Saudi Arabia was reported to be producing oil at its highest levels in 30 years, only to be moving some of that production to storage. An investment bank surmised that the kingdom was storing oil so that power generation could meet peak summer air conditioning demand (Kaminska 2012). In recent years, Saudi Arabia has been unable to meet summer electricity demand without importing heavy fuel oil and diesel feedstock (Pamuk and Choo 2012).

In Kuwait, domestic burning of crude oil, diesel, and heavy fuel oil is already reducing exports and state income. Fuel consumption in power generation was equivalent to 12% of the country's oil production in 2010. This figure is expected to rise to 21% by 2030 (Wood 2012).

1.2 Energy Intensity

Energy is a key input for industrial development. Most countries increase consumption and improve efficiency as they develop. But in the GCC, energy demand is rising *alongside* energy intensity. Thus, as the world squeezes more economic growth from each barrel, the GCC countries are moving in the opposite direction. (Fig. 6) On a per capita basis, most GCC countries, as well as oil and gas exporters Trinidad and Tobago, Canada and Norway consumed more energy than did the United States. Residents of Qatar and the UAE burned

³ This calculation ignores varying prices for grades of crude and market effects of an additional 2.86m b/d of oil.

more than four times as much as did counterparts in Japan. (Fig. 7) Differences in development, geography and climate explain some of the disparities, as does price.

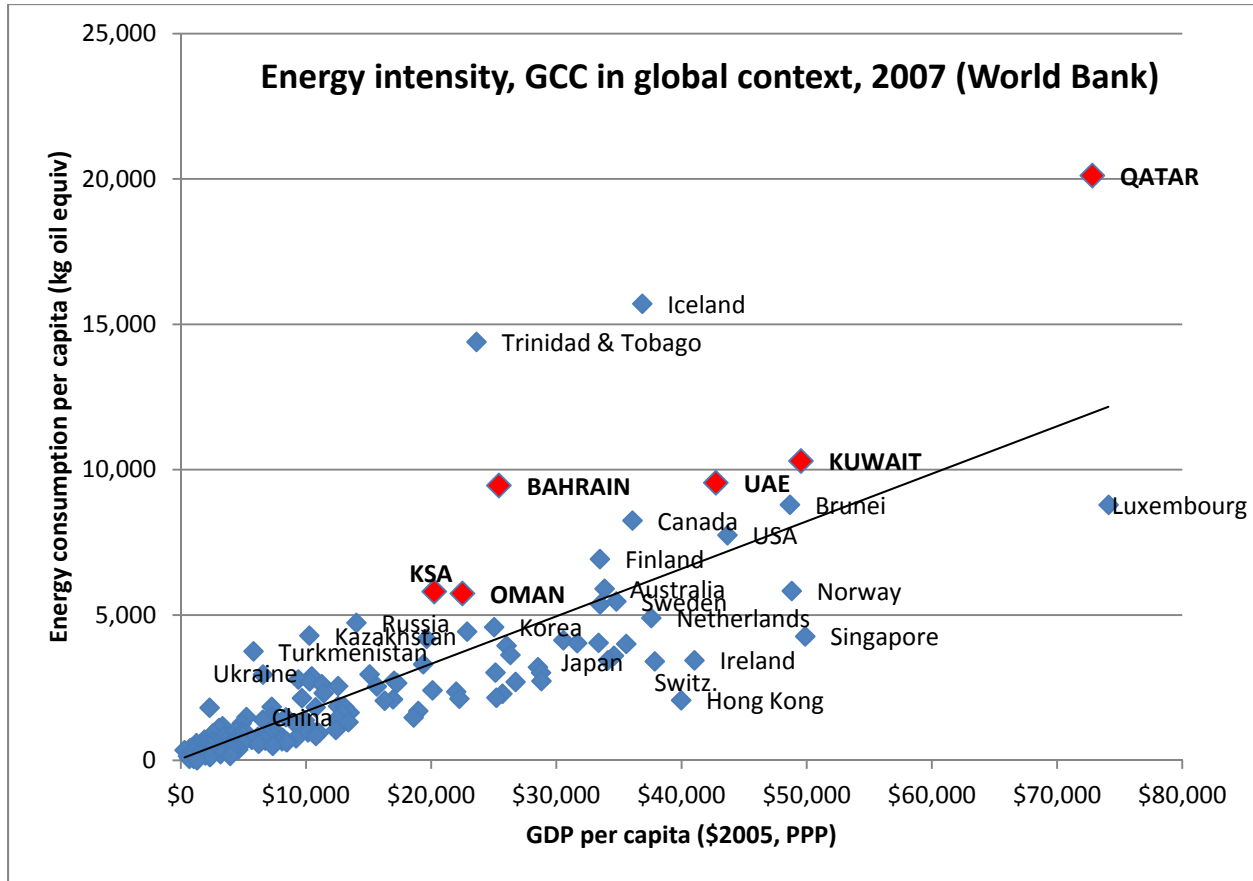


Figure 5: Global energy intensity (Source: World Bank, 2011)

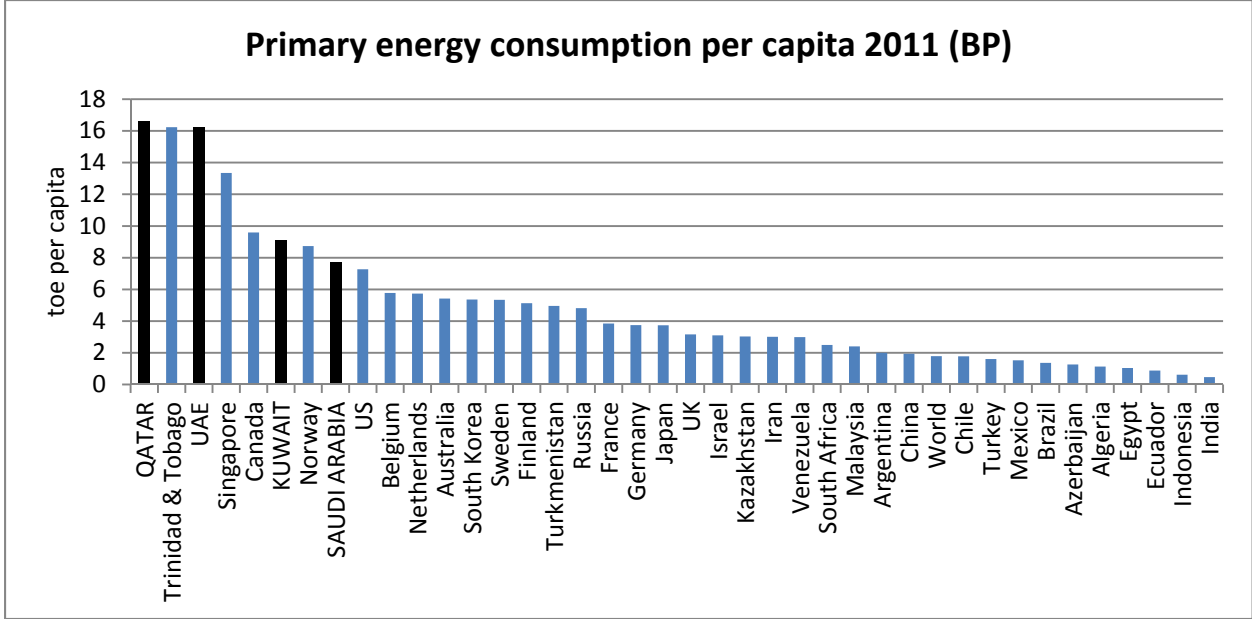


Figure 6: Energy consumption per capita, selected countries (BP, 2012)

1.3 Consequences of Energy Mispricing

There is a disconnect between energy *price* and *value* in these six economies. When a liter of gasoline is often cheaper than a liter of bottled water, pricing signals to the consumer that energy is a resource that can be wasted. Low pricing encourages consumption at rates above those warranted by the opportunity cost of these fuels on global markets. Low prices also distort energy allocation preferences while undercutting upstream investment and efficiency incentives. Each of these factors has contributed to ongoing shortages of natural gas (Darbouche and Fattouh 2011; Razavi 2009). But the lack of constraints on consumption in the GCC is at odds with its near-total dependence on export revenues. Oil and gas exports typically provide 40% of collective GDP and 80% of government revenues. Such one-sided dependence confers a high value on energy resources that is not reflected in prices.

Intensity of domestic consumption is a key determinant of the longevity of a country's status as an oil exporter, as Lahn and Stevens (2011) have shown. As domestic consumption outstripped production in China and the United States, for example, these former oil exporters became net importers. Their diversified economies were able to absorb the loss. Oil and gas exporters Malaysia and Indonesia are reaching this stage. Chatham House research has shown how both have diversified their economies for the transition.

Oil exporting countries face depletion at varying time horizons, based on the level of production relative to the size of their resources, and the cost of production relative to the commodity's price. As production reaches a plateau, exports tend to drop as domestic

consumption rises. This is the typical depletion trajectory of oil exporting countries. Unless an increase in the commodity price makes up for exports foregone, the producer experiences a decline in export revenues as resources sent abroad are gradually displaced by domestic consumption. This trajectory suggests that deriving maximum benefit from natural resources requires careful consideration of domestic use.

Encouraging demand through subsidies and underpricing runs counter to economic logic, especially when, as in the Gulf, most consumption does not contribute to productive activity. Energy economists such as Heal (2007), Mitchell (2006) and Stauffer (1987) write that converting depletable resource stocks into cash revenues represents a transfer of one type of asset to another. These revenues should not be considered income. Sustainable depletion requires conversion of below-ground assets into new forms of above-ground wealth. Heal and Stauffer argue that oil revenues should not even be reflected in GDP figures, since revenues stem from “asset disposal” rather than earnings. Heal is especially pessimistic, writing that a country becomes poorer by spending resource income for any purpose other than capital investment.

By this reckoning, the GCC countries are poorer for not deploying the full investment value of their depleting resource. Much of the Gulf’s consumption does not even cover cost, let alone create above-ground wealth. Domestic sales of potential oil and gas exports are usually done near the cost of production, rather than at global market prices. Instead of providing income, local consumption thus serves to *reduce* the state’s revenue, either real or potential. Rents are foregone in the failure to sell energy at market prices (an implicit subsidy), and further costs are accrued by below-cost sales of refined fuel and electricity (an explicit subsidy).

The region’s well-documented distributive political structures sit behind this misuse of resources. Rent distribution was a pre-oil political tool even before the formation of independent states in the Gulf, as Foley (2010) and Davidson (2005) have shown.⁴ The arrival of oil revenues into this distribution framework magnified the political clout of Gulf rulers, helping them maintain power long after the sweeping aside of counterparts whose resource endowments relative to population did not provide them the same co-optive power.⁵

But the practice of *in-kind distribution* of energy commodities (distinct from distribution of export rents) encumbers these regimes with structural encouragement of economically counterproductive consumption. The result is a self-defeating pyramid scheme. A state that misprices a key export (to buy domestic popularity or for any other reason) will run into problems if supply of that resource rises less quickly than domestic demand. As production plateaus, Gulf economies face the choice between reducing domestic subsidies or exports.

Aggregated results of an expert elicitation exercise conducted for this paper found that experts consider current levels of domestic energy consumption a threat to GCC economies

⁴ Among the examples Foley documents are the al-Saud’s distribution of revenues from Hajj fees.

⁵ Egypt’s monarchy was overthrown in 1952, Iraq’s in 1958, Yemen’s in 1962, Libya’s in 1969 and Iran’s in 1979.

other than that of Qatar.⁶ The author did not specify what constituted a “threat,” nor was information supplied about the size of consumption. Responses reveal a divide among the countries. For Saudi Arabia, 24 of 29 respondents (83%) chose either “agree” or “strongly agree” when asked whether energy consumption threatened the economy. In Qatar, by contrast, only 3 of 21 respondents (14%) made that judgment. Kuwait and the UAE received less urgent assessments, with 11 of 19 respondents (58%) on Kuwait choosing “agree” or “strongly agree,” and 19 of 37 (51%) in the UAE. (See Fig. 7) These results appear to correlate with trends emerging from descriptive statistics that reveal a serious policy challenge for these monarchies.

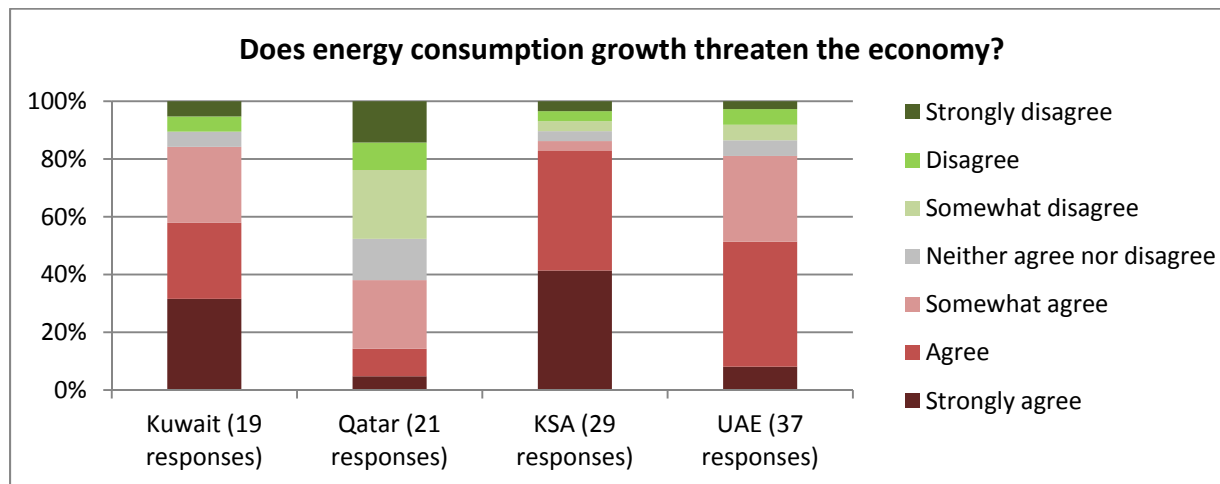


Figure 7: Expert Elicitation Responses on Energy Consumption

2. Electricity Policy: Generation, Fuels and Prices

The arrival of electricity in the Arabian Peninsula is a relatively recent development, coming within the lifetimes of many residents. Much of the region was un-electrified as late as 1960. Electrification in Oman did not begin in earnest until the 1970s. Since then, growth in power generation has been dramatic, especially in the richer states of Kuwait, Qatar and the UAE. These states now consume more electricity per-capita than the United States. Aggregate (unweighted) power generation growth averaged 7% per year between 2000 and 2010, slightly faster than average (unweighted) GDP growth of 6.5%.

	Avg. yearly GDP growth (1999-2008)	Avg. yearly power gen growth (1999-2008)
Bahrain	6.1%	7%

⁶ The Expert Elicitation was held from November 2011-2012. The author collected 135 responses by country from 92 experts. The survey was conducted online, through emailed invitations to Gulf energy and power sector experts, academics, economists, and government officials. Bahrain and Oman are not included here because of small sample size.

Kuwait	5.8%	5.1%
Oman	4.8%	6.3%
Qatar	13.5%	9.3%
KSA	3.3%	5.6%
UAE	6.3%	9%
Source: IEA, IMF		

Table 2: GCC GDP vs power generation growth

In 2009, power generation consumed about a third of all GCC gas production (85 bcm of the total 265 bcm). Gas, in turn, accounted for 60% of total generation, versus 40% for liquid fuels.⁷

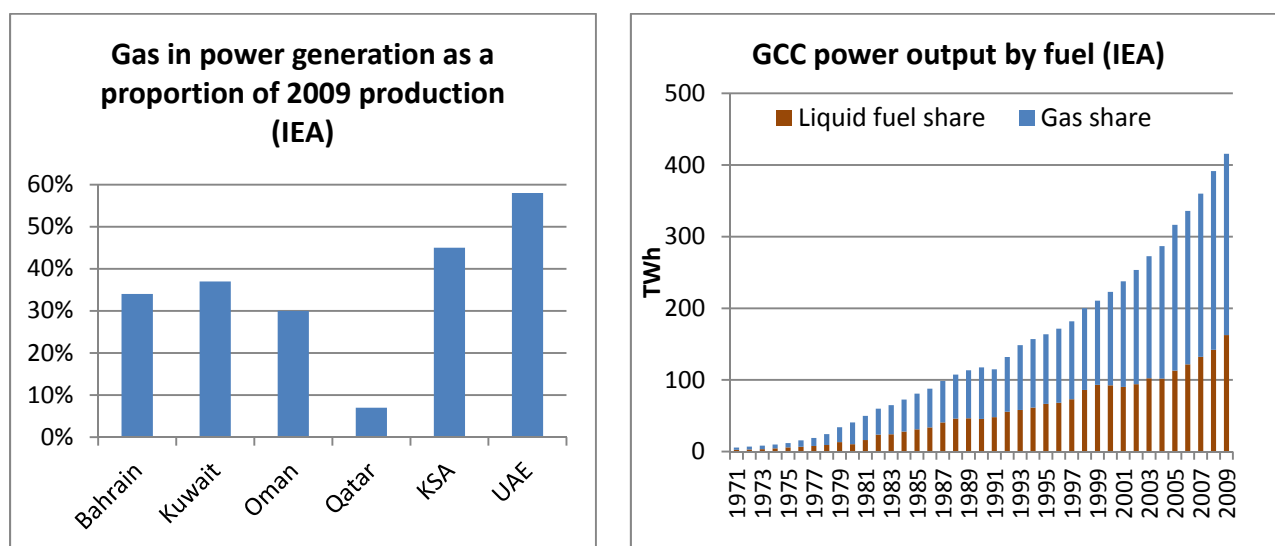


Figure 8: Proportion of gas used in power sector **Figure 8: Electricity generation by feedstock**

In all but Qatar, growth in electricity demand has outstripped domestic supply of natural gas, the region's chief generating feedstock. This shortage heralds an important shift in the Gulf power generation paradigm. In the past, governments had to cope with the cost of building power plants, while feedstock came from cheap and plentiful domestic sources. Now, regimes must cope with an array of new costs: market-priced imports, expensive production of unconventional gas⁸, or the opportunity cost of burning crude oil and other liquids.

⁷ 55% of Saudi power was derived from liquid fuel-based generation, as was 71% in Kuwait and 18% in Oman, where (as in Saudi Arabia) diesel generation provides electricity in areas beyond transmission grids (IEA 2011).

⁸ Unconventional gas developments such as the Shah project in Abu Dhabi, Khazzan Makarem in Oman, and others under consideration in Kuwait and Saudi Arabia entail much higher lifting costs.

The rising costs of electricity generation are not, for the most part, offset by rising end-user prices. Most electricity and water prices in the GCC, as well as those of retail fuels, are fixed at some of the lowest levels on earth. As feedstock shortages emerged, power demand began to be described as a challenge, even an economic threat (Moody's 2008; IEA 2008). This characterization contrasts with the more typical welcoming of growing electricity demand as a driver of economic growth. During their boom phases, Korea, Japan and China outpaced the GCC's recent growth. (Table 3) The difference in perception in the Gulf stems from the increasing call on exportable resources, as well as the dominance of electricity demand by the residential sector, which does not contribute to economic productivity.

	Avg. yearly GDP growth	Avg. yearly power generation growth
GCC 2000-2010	6.5%	7%
Korea 1972-2000	7.4%	12%
Japan 1960-1970	9.4%	11.5%
China 1998-2008	10%	11%
Source: IMF, IEA		

Table 3: GDP vs power generation growth, selected boom periods

2.1 Electricity Prices

GCC residents enjoy some of the world's lowest electricity prices. When prices were set, associated gas was considered a nuisance by the international oil companies operating Gulf concessions; it was often flared off, rather than exported or put to productive local use. Marcel (2006) describes how Kuwait's 1975 nationalization of the Kuwait Oil Co. and its concession, then held by BP and Gulf Oil, was driven in part by wasteful flaring of gas. In the 1970s and '80s, when newly nationalized Gulf NOCs diverted associated gas to the power sector, the feedstock seemed like a gift.⁹ Logic dictated that, if "stranded" gas could produce power, tariffs ought to reflect the near-zero domestic value of the gas. Electricity prices were calibrated to cover costs of infrastructure, operation and maintenance (Scott 2010). Since there were few export prospects, gas was used to develop these lightly populated states, providing improvements in lifestyle while shoring up the political legitimacy of ruling families.¹⁰

Once fixed, electricity tariffs that might have covered costs in the 1970s or '80s have stagnated, or been reduced. Kuwait's price of 2 fils (0.7 US cents) per kilowatt-hour has been fixed since 1966, five years after independence. Residential tariffs in Saudi Arabia have been reduced six times since 1950. (Fig. 10)

⁹ Aramco World Magazine. "Foundations: The Keystone." Vol. 33 No. 6. Nov/Dec 1982. Accessed Aug. 24 2012 at: <http://www.saudiaramcoworld.com/issue/198206/foundations-the.keystone.htm>

¹⁰ There is debate about whether electricity provision was an explicit quid pro quo for citizen political support, or whether its subsidization owes itself to a more "accidental" failure to index tariffs to inflation.

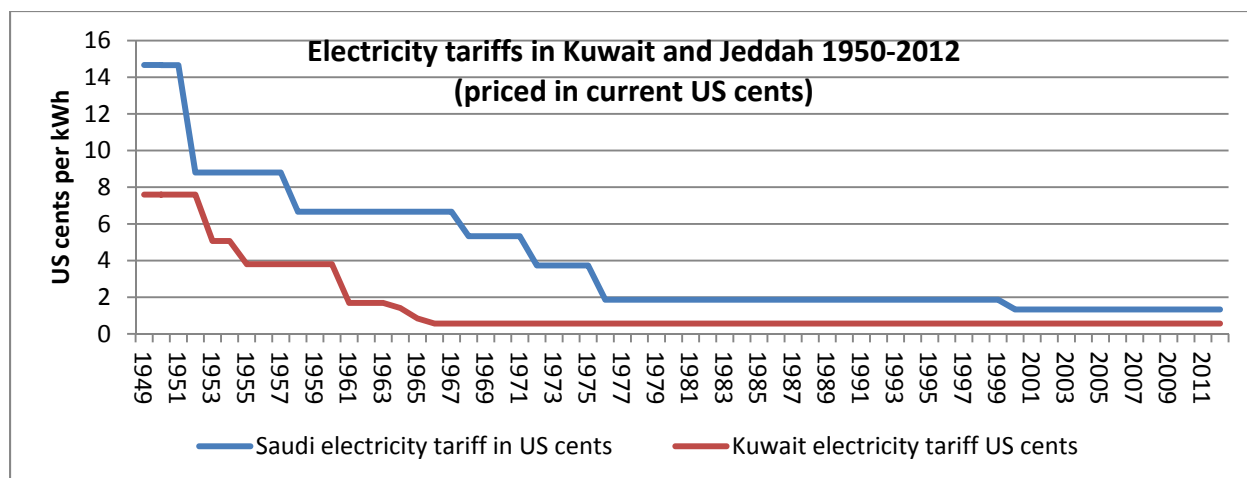


Figure 9: Electricity prices since 1950 (Source: Kuwait Ministry of Electricity and Water; Saudi Electricity Cogeneration and Regulatory Authority)

Nowhere in the GCC were tariffs indexed to inflation. Electricity has thus grown cheaper in real terms, year by year. Low pricing contributed to path dependence on high consumption, encouraging big homes, preferences for cool indoor temperatures, and luxuries like artificially chilled swimming pools and gardens irrigated by desalinated water. Some governments imposed rising price bands to discourage excess consumption, but even then most electricity was provided in the lower bands at unchanged prices. By the mid-2000s, these (by then) subsidized prices were seen as a convenient way to distribute oil rents and maintain regime legitimacy. In Kuwait, power that costs nearly 14 US cents per kWh to generate and deliver is still sold for less than 1 cent, or just 5% of the cost.¹¹ Abu Dhabi's electricity costs 8.7 US cents to generate and deliver, and is sold for 4.1 cents to non-citizens and 1.4 cents to citizens. Cheap tariffs have contributed to social expectations for welfare benefits, even becoming regarded as rights of citizenship, according to expert elicitation responses gathered for this paper.¹² Lax enforcement of consumer bill payment exacerbates this feeling.

Several academics have stated that subsidies in the GCC are perceived by nationals as rights of citizenship. Do you agree?

Yes	80%	61 responses
No	20%	15 responses

By the mid-2000s, as gas supply came under pressure, governments began raising tariffs on customers deemed less politically important: industrial and commercial customers in Saudi Arabia, the UAE and Qatar. In Qatar and the UAE, where expatriate residents far outnumber citizens, policymakers also reduced or eliminated subsidies given to foreigners. Low tariffs

¹¹ In Kuwait any attempt to raise tariffs would have to be approved by the parliament, which is firmly opposed to rate increases despite research suggesting that a significant drop in consumption would stem from doubling or tripling current prices. See Eltony and al-Awadhi 2007.

¹² Author's expert elicitation results, 2011-2012.

for citizens were deemed a crucial endowment within the paternalistic social contract between ruling sheikhs and their subjects. Expatriate residents were more likely to see low pricing as a windfall. In the UAE, non-citizen prices were raised to triple the level of citizens. In Qatar, citizens continued to receive free power, while foreign residents were charged 2.5 US cents per kilowatt-hour. (Fig. 11)

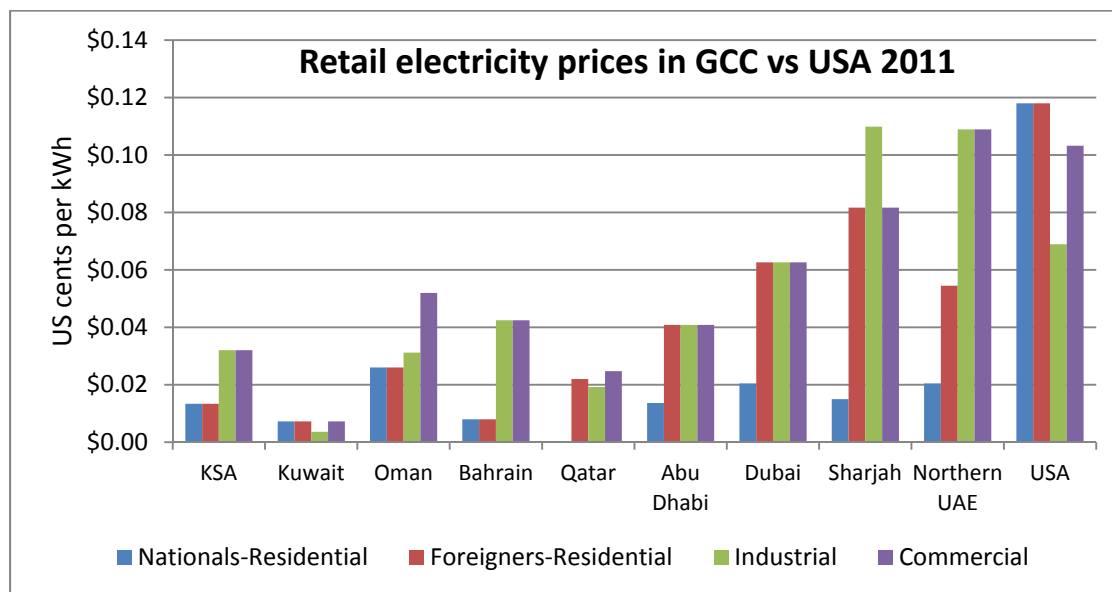


Figure 10: Electricity prices for initial 2,000 kWh in comparison across sectors and countries (Source: Author's compilation from utilities, interviews, media sources, EIA.)

2.1 Electricity Subsidy and Consumption by Sector

One of the consequences of policies that reserve the cheapest electricity for residential customers has been that sector's rise to dominance. In all but Qatar the residential sector is the largest consumer of electric power, most of which is used in cooling. In Kuwait, Saudi Arabia, Oman and Bahrain, it represents more than 50% of national power consumption.¹³ Residential overconsumption poses three policy problems for governments. First, electricity is sold at a loss, so its provision is a drag on the economy. Second, this demand is diverting exportable hydrocarbons into the domestic economy. The third challenge is political. The residential sector is most difficult to reform because removing citizen utility subsidies represents a risky reneging on the unwritten state-society social contract.

The difficulty in reforming residential demand is apparent in Oman's 2009 proposal for cost-reflective tariffs. Prices for commercial and industrial customers, already at the upper end of those in the Gulf (3 to 6 U.S. cents per kWh) were expected to rise to cost-reflective levels in 2013. The intent is to reduce Oman's recent 10% yearly increases in electricity demand, which claim an ever-larger share of the sultanate's depleting natural gas resources and government budget. However, the residential sector will be unaffected by the new

¹³ In the UAE, homes were responsible for 43%, the largest sector overall. IEA, 2011.

rates.¹⁴ An electricity official said that it was likely that some residential tariffs representing excessive consumption would be raised in the future, but that the government had a “duty to protect” low-income customers. He said the Arab Spring uprisings, which included virulent demonstrations in Oman in 2011, increased government sensitivity to potentially unpopular measures (Cunneen 2011). Among the nine tariff-setting entities in the GCC, only Dubai has raised prices on citizens’ residential consumption in the last decade. In 2011, the emirate raised all electricity prices by 15% and imposed a surcharge that passes along LNG import costs.

In summary, 40 years of rising electricity consumption has been exacerbated by subsidies based in distributive patrimonial politics. Regimes have failed to expose consumers to price signals that might reduce consumption despite rising government costs and evidence of wasteful consumption. The GCC’s energy subsidies now lead the world, on a per capita basis. (Fig. 12) In 2009, discounted electricity accounted for more than a third of energy subsidy in Saudi Arabia and Qatar, 40% of that in the UAE, and more than half of Kuwait’s. In total cost terms, Saudi Arabia’s \$35bn subsidy made it the No. 2 energy subsidizer in the world, behind Iran.

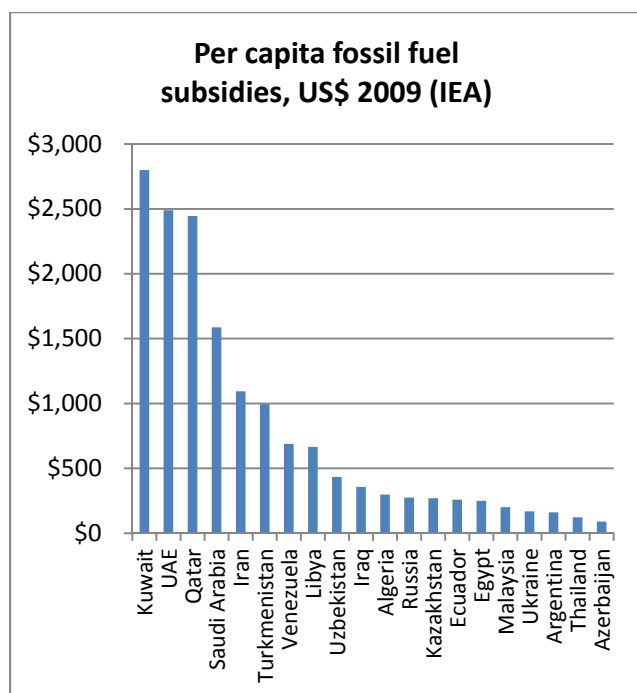


Figure 11: Fossil fuel subsidy rankings on per capita basis (Source: IEA, 2011)

¹⁴ Authority for Electricity Regulation, Oman (2009). Note that the new tariff had not been imposed at the time of writing, but was expected to be in force

3. Natural Gas: Price, Production and Shortfalls

The Gulf monarchies sit in one of the most gas-rich regions on earth, with more than a third of the world's proven conventional reserves. (Table 5) Why, then, would five monarchies find themselves in short supply? In similar fashion to the electricity sector, underpricing is driving demand. But in the gas sector, underpricing is also stifling production. Partly as a result, the gas-short GCC is being transformed into an importing region.

Most current GCC gas production stems from low-cost associated gas yielded in tandem with oil. By contrast, unassociated gas reserves in the five gas-short monarchies tend toward the geologically difficult: very deep formations, rock-bound “tight” gas, and sulfuric “sour” gas. Production costs run between \$3 and \$9 per MMBtu.¹⁵ Such costs render upstream investment commercially unviable in countries with bulk gas prices capped under \$2. And, since most production is sold in-country, the typical incentive for IOC investment – a profitable netback – is eliminated.¹⁶

Natural gas reserves of the Gulf and Arabian Peninsula	Size (Tcm)	Share of world total
Bahrain	0.3	0.2%
Iran	33.1	15.9%
Iraq	3.6	1.7%
Kuwait	1.8	0.9%
Oman	0.9	0.5%
Qatar	25.0	12.0%
Saudi Arabia	8.2	3.9%
UAE	6.1	2.9%
Yemen	0.5	0.2%
GCC total	46.0	20.3%
Region total	79.5	38.2%
World total	208.4	100%
Source: BP 2012		

Table 4: Gas reserves in the region

3.1 Gas Trading in the Gulf

Unmet demand suggests that pipeline imports from gas-rich neighbors, especially Qatar and Iran, would be attractive. But the Persian Gulf region is underserved by cross-border gas pipelines. The only such conduit is the Dolphin Pipeline, with a capacity of 33 bcm/year. In 2011, it operated at about two-thirds capacity, carrying 17 bcm from Qatar to Abu Dhabi and Dubai, and a further 2 bcm to Oman. (Tables 7 and 8) Other pipeline proposals have failed, curtailing supply, particularly in Kuwait and the UAE. (Table 6)

¹⁵ Gulf-based IOC executive, interview with author on condition of anonymity, Nov. 15, 2011.

¹⁶ Mabro and Razavi argue that Mideast gas exports are also driven by subsidies, since low prices incentivize executives to reap higher export returns, even when those gains are outweighed by the economic benefits of using gas domestically. See Mabro (2006) and Razavi (2009).

Failed gas pipeline projects in the Gulf region	Year launched	Gas source	Importing countries	Reason for failure	Source
GCC gas grid	1988	Qatar	KSA, Kuwait, Bahrain, UAE	Political and territorial disputes	Dargin, 2008
Crescent Petroleum pipeline	2001	Iran	UAE (Sharjah)	Pricing disagreement. Contract nullified by Iran after pipeline built	Jafar, 2012; Carlisle, 2010; Adibi and Fesheraki, 2011
Peace Pipeline	1995	Qatar	Israel	Approval depended on peace settlement between Israel and Palestinians	Dargin, 2008
GCC pipeline to Pakistan and India	1995 and 2000	Qatar	Pakistan, India, via Oman	Pricing disagreement, competing pipeline proposals	Jafar, 2012; and Dargin, 2008
Dolphin Pipeline extension to Kuwait	2005	Qatar	Kuwait	Saudi refusal to grant access to territorial waters	Dargin, 2008

Table 5: GCC gas pipeline proposals that failed

Regional gas trade by pipeline 2011, bcm (BP)				
To ↓	From Azerbaijan:	From Turkmenistan:	From Qatar:	Total imports
Iran	0.39	10.20	-	10.59
Oman	-	-	1.95	1.95
UAE	-	-	17.25	17.25
Totals	0.39	10.20	19.20	29.79

Table 6: Gas trade by pipeline in the region (BP, 2012)

GCC LNG imports and sources 2011, in bcm (BP)									
To ↓	Trinidad & Tobago	Spain (re-export)	Qatar	UAE (Abu Dhabi)	Egypt	Nigeria	Australia	Malaysia	Total imports
Kuwait	-	0.08	1.52	0.05	0.07	0.80	0.26	0.39	3.18
UAE (Dubai)	0.25	-	0.92	-	-	0.09	0.08	0.08	1.43
Totals	0.25	0.08	2.45	0.05	0.07	0.89	0.34	0.48	4.60

Table 7: GCC LNG imports and source countries (BP, 2012)

Gulf LNG exports 2011, bcm (BP)	
Qatar	102.60
UAE (Abu Dhabi)	7.96
Oman	10.92
Yemen	8.94
total	130.42

Table 8: LNG exports from the region

Also stifling gas trade is the lack of a benchmark pricing formula. Prices set at or below production cost are too low to attract sufficient regional supply. Most bulk gas is sold at government-fixed prices of around \$1 per MMBtu. Unable to secure sufficient supply at this price, Kuwait and the UAE have resorted to LNG imports, with Kuwait reportedly importing cargoes priced above \$15 per MMBtu. (Figure 15) Given the GCC's unrealistic price expectations, it is unsurprising that three monarchies export it outside the region as LNG. (Table 9)

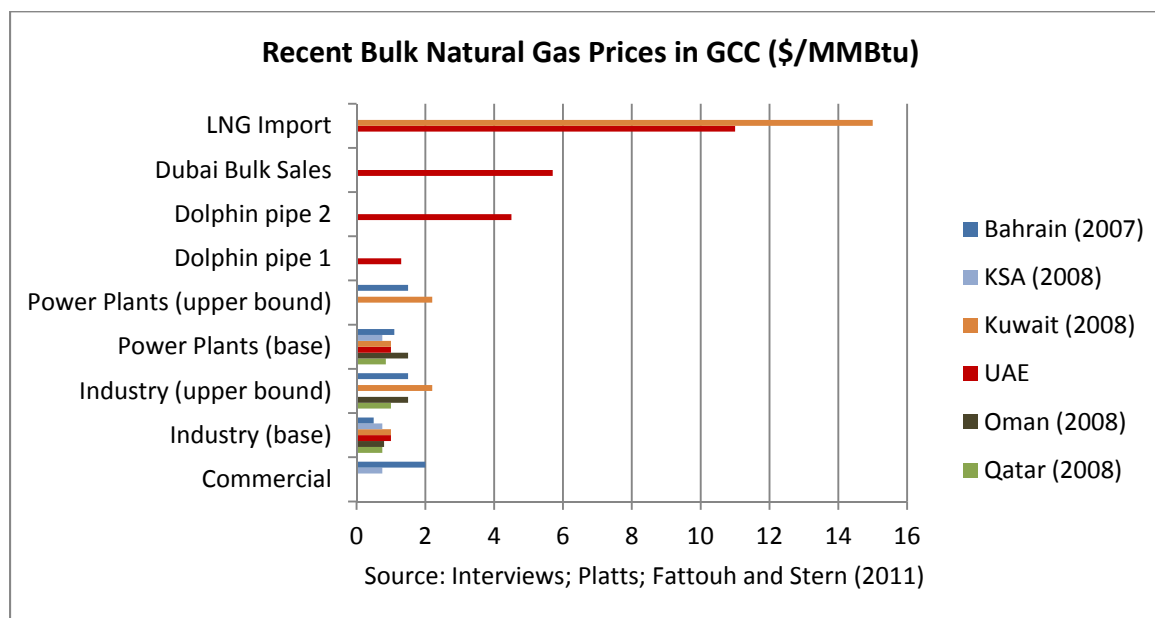


Figure 15: The broad range of GCC natural gas prices (Sources: Interviews; Platts; Fattouh and Stern, 2011)

3.2 Historical Pricing Background

In 1982 a cross-border gas pipeline brought 5 bcm/yr of associated gas from the UAE emirate of Sharjah, where it was being flared, to Dubai, where it replaced diesel fuel in power generation. The price agreed was \$1.25/MMBtu, which was half the diesel price of \$2.50. The \$1.25 price – rather than the more flexible “half the alternative” formula – set the benchmark for subsequent cross-border gas trading, including the initial \$1.25 price for Qatari gas purchased via the Dolphin Pipeline (Jafar 2012). Dolphin-delivered gas rises in price slightly each year, with UAE prices around \$1.50 per MMBtu in 2012. That is considered a significant underpricing, and has pushed Qatar to seek oil-linked prices and markets outside the Gulf, while refusing to transmit gas sufficient to fill the pipeline’s entire capacity. The pricing conundrum has created a stalemate based on opposing valuation methods. Qatar’s neighbors are willing to pay what they consider a reasonable markup on production costs below \$1/MMBtu. But Qatari officials who value gas by the far higher netbacks from customers in Asia and Europe, view regional requests for “discounted” gas as akin to subsidy pleas.

Recent sales provide further information on the value of gas in Persian Gulf. First among them is the so-called “interruptible supply” of Qatari gas sold to Abu Dhabi via the spare capacity in the Dolphin Pipeline. That gas is reportedly priced near \$5/MMBtu. In 2011, Dolphin Energy, the joint venture which owns and operates the pipeline, resold Qatari gas in the UAE for \$7 to \$10 per MMBtu (Michel 2011). And, perhaps validating Qatar’s fears of subsidizing its neighbors, Abu Dhabi in 2012 was re-exporting Qatari gas as LNG to East Asian customers at prevailing market prices, which were around \$17.¹⁷

3.3 Increasing Reliance, Increasing Cost

Despite these difficulties, the GCC is expected to grow even more reliant on gas, given increasing demand for power and desalinated water, and plans for industrial diversification. Drivers include rising population and energy intensity, gas-intensive job creation, and gas-for-oil substitution to maximize exports (Darbouche and Fattouh 2011; Lamotte 2012). U.S. Energy Information Administration (EIA) projects that gas consumption in the Middle East’s generating sector will grow by nearly 150% by 2035, accompanied by only small amounts of nuclear and renewable generation that replaces declining liquid fuels.¹⁸

In the gas-short GCC, the marginal cost of procuring additional gas to meet these needs is far higher than the cost of domestic associated gas. For example, Figure 16 projects Abu Dhabi’s large potential shortfalls to 2020. The Abu Dhabi leadership opted to import LNG to bridge this deficit and in 2012 launched construction of a regasification terminal.¹⁹ The price differential is roughly sevenfold. Current supply costs roughly \$1.50 per MMBtu. LNG imports will be priced above \$10.²⁰ The gas deficit only reverses after 2017, when the first of four 1.4 GW nuclear power stations is scheduled to begin operating.

¹⁷ UAE official with knowledge of the sales, author interview on condition of anonymity, July 19, 2012.

¹⁸ U.S. Energy Information Administration. (September 2011). International Energy Outlook 2011. Chapter 5: Electricity. Figure 83. Middle East net electricity generation by fuel, 2008-2035.

¹⁹ Note that Abu Dhabi is an exporter of LNG under long-term contracts that end in 2019.

²⁰ Abu Dhabi energy sector official, author interview on condition of anonymity, March 12, 2012.

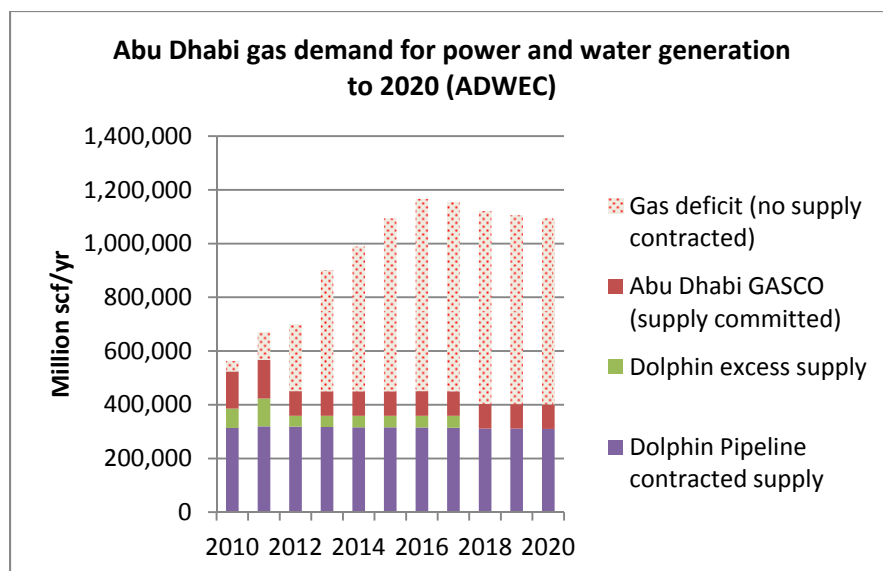


Figure 16: Abu Dhabi's gas deficit to 2020 (Source: Abu Dhabi Water and Electricity Co.)

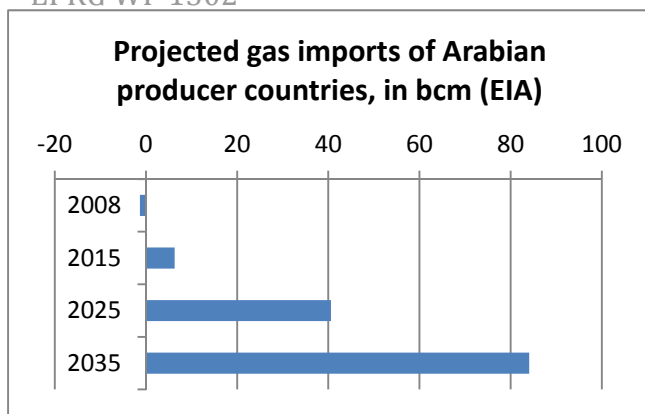
In Oman, a government that had considered coal-fired generation in 2009 has re-embraced natural gas. However, with conventional reserves expected to be depleted by the mid-2020s, Oman is developing unconventional reserves where lifting costs could run beyond \$8/MMBtu. Energy sector executives predict that Oman will cease LNG exports when contracts end in 2024, with priority shifted to job creation and power generation.²¹

In Saudi Arabia, a \$9bn gas exploration and production campaign aims to slow the growth of crude oil and diesel in the power sector by substituting with gas. Saudi Aramco hopes to increase gas output by 50% above 2011 production of 280MMcm/day (Lamotte 2012), but, like Oman, most of its unassociated reserves consist of difficult formations of tight or sour gas. The kingdom has also announced plans to invest in nuclear power, but long lead times imply increasing medium-term reliance on fossil fuels. Kuwait appears likely to maintain its liquid fuel-dominated feedstock mix. Increased refinery production of heavy fuel oil (HFO) intends to reduce burning of more valuable diesel and crude, while gas plants will probably increase reliance on LNG imports (Wood 2012). Nuclear power, once considered a possibility, was rejected after the 2011 earthquake and tsunami in Japan.

3.4 The Gulf as an Importing Region

Despite the discomfort of paying global market prices for a commodity recently considered “free,” the GCC – Qatar excepted – is becoming a gas importing region. The EIA projects that the Arabian producer countries (UAE, Kuwait, Bahrain, Oman and Yemen) will require 40 bcm in yearly imports by 2025 and double that in 2035. The EIA expects that Saudi Arabia, which consumes all of its gas production domestically, will remain self-sufficient. However,

²¹ Author interviews with officials in Oman Ministry of Oil and Gas and an Oman-based IOC executive, October-November 2011.



a top official in the Saudi Ministry of Petroleum and Minerals said that gas imports were a possibility: “Everything is on the table. You can’t rule anything out.”²²

From which countries will these imports be sourced? Supply from some of the largest resource holders in the region, Qatar, Iran and Iraq, appears unlikely. In the short term, Qatar’s moratorium on further North

Field production removes it from consideration. If the moratorium is lifted after 2015, Qatari policymakers have signaled that the country will market any increased production on a strict commercial basis.²³ Imports from Iran have been thwarted by price disputes, as mentioned, as well as by Iran’s prioritizing of reinjection. Close ties between the GCC and the United States make a pipeline deal with Iran politically difficult. Nevertheless, the EIA expects Iran, currently a net importer, to become a net exporter by 2015, with Pakistan and Armenia the most likely importers (Adibi and Fesheraki 2011). Iraq also appears a doubtful source. It also requires gas for reinjection, power generation and industry. The most likely destinations for any Iraqi exports are said to be Turkey and Europe (Yacoub and Rutledge 2011).

Barring major discoveries, it appears that the limits of the GCC’s inexpensive gas supply have taken shape. In all but Qatar, marginal increases in gas demand will be met by higher-cost sources, mainly unassociated and unconventional gas, or market-priced imports. Policymakers have sought other avenues of redress from their gas challenge, as evidenced by investments into nuclear and renewable generation. But, as we have seen, these technologies are likely to provide only marginal relief.

Section 4: Discussion

Rising domestic consumption is a familiar menace to oil-dominated economies. Venezuela, Iran and Indonesia have experienced similar quandaries. These were addressed in Iran and Indonesia by subsidy reductions. Rarely a straightforward process, the subsidy challenge in the Middle East has been magnified by the pan-Arab uprisings. The overthrow of neighboring autocrats has infused caution into Gulf regimes, which responded by increasing social spending and withdrawing subsidy reforms. This author’s 2012 survey of UAE policymakers found a deep reluctance to raise electricity and water prices, and a heightened sensitivity to citizen opinion.²⁴ (Figs. 13 and 14)

²² Saudi energy official, Ministry of Petroleum and Minerals, author interview in Riyadh, Oct. 15, 2012, on condition of anonymity.

²³ Author interviews with IOC executives and government consultants in Qatar, Spring 2012.

²⁴ Anonymous online survey of 36 UAE government policymaking employees conducted by the author between Feb. 22 and March 5, 2012.

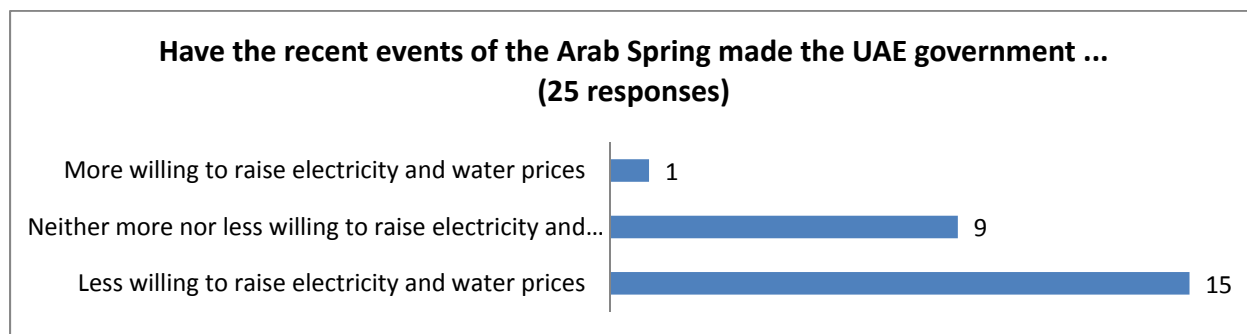


Figure 12: UAE policymakers' responses on Arab Spring effect on subsidy reform

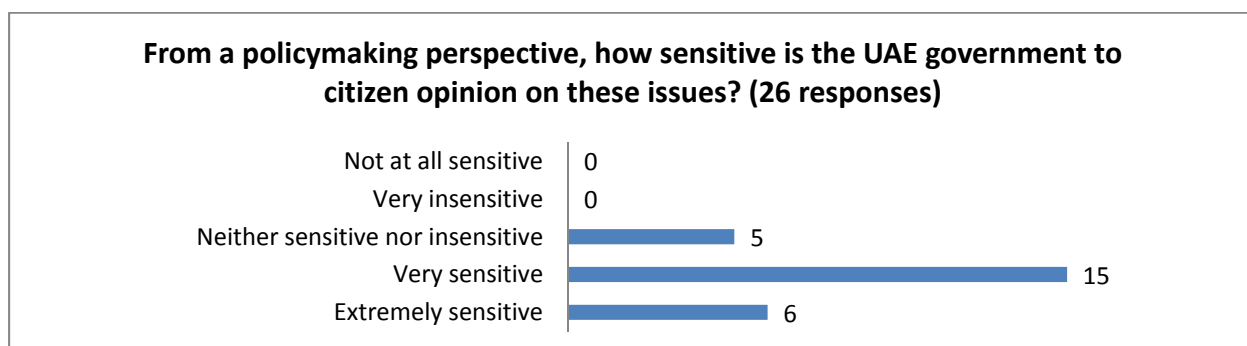


Figure 13: UAE policymakers' responses on government sensitivity to citizen concerns about tariff increases

Despite the difficulty in reforming energy policy, alternatives appear far worse. It is hard to overstate the importance to the Gulf monarchies of preserving hydrocarbon export revenues. Despite modest success with economic diversification, energy exports still comprise the largest share of GDP and government budgets. These earnings provide the hard currency required to maintain imports, to meet social welfare outlays, to develop infrastructure that can drive industrial growth and diversification, and to create jobs for burgeoning workforces.

The Gulf energy conundrum can be read in two ways. On the one hand, it provides an impetus for these historically durable monarchies to renegotiate socio-economic relations between government and citizen, and to begin the inevitable journey toward more efficient and diversified economies. In other hydrocarbon exporters, such as Indonesia, Malaysia and Mexico, political liberalization has been part of this journey. On the other hand, this conundrum could lead to crisis responses that damage state-society relations, if unsustainable welfare regimes are not reframed on agreeable terms (Coates Ulrichsen 2011).

The few academic works that examine this issue are split on the likelihood of continued stability. On the pessimistic side are arguments like Davidson's (2012) that shrinking resource rents per capita are undercutting the ruling families' levers of power as globalized media tools undermine their controls on political discourse. This argument is fashioned after Huntington's somewhat discredited 1968 Modernization Theory hypothesis that

monarchs' social and economic reforms would inevitably lead to their downfall, via increasing demands for democracy. Other scholars point to the accumulating pressure from prohibitions on political participation, which, in some states, became a conduit for the spread of Arab Spring uprisings (Brynen, et al. 2013).

More optimistic voices argue that deficits in the non-hydrocarbon fiscal and current accounts are being addressed through industrial diversification that will supplant depleting hydrocarbon sectors.²⁵ Some believe that energy consumption will be addressed through upgrades in efficiency and largely without antagonizing citizens. Others, including policymakers and experts in Saudi Arabia, the UAE and Oman, believe that energy prices can and will eventually be raised, even on the sensitive residential sector.²⁶ The optimistic view is bolstered by the historical resilience of the GCC monarchies, which managed to emerge intact from the oil bust of the 1980s and '90s. In Saudi Arabia, oil revenues plummeted from \$120bn to \$17bn over the four years to 1985, while GDP per capita fell from its 1980 peak of \$19,000 to reach \$6,900 in 1996. Then, too, scholars predicted the fall of the sheikhs²⁷ but none of the six Gulf ruling families was toppled.

Assessments of the well-being of the Gulf monarchies tend to revolve around global oil prices, and it has been the rising oil price that has enabled recent increases in social welfare, rather than a rise in productivity. However, assuming steady global demand, the crisis covered here is playing out independently of oil prices. That is not to say a falling oil price would be irrelevant, but that a rising price can only temporarily hide the growth of domestic consumption.²⁸ This paper argues that the ruling sheikhs face a new and distinct challenge. Besides the more familiar brushes with globalization, internal opposition, and external market forces, regimes must renounce energy subsidies, a homegrown policy tool that has outlived its benefit.

The Gulf monarchies, like exporters before them, have encountered the need to prepare their political economies for the plateau and inevitable decline of oil exports. The policies behind their quandary – and the pressures to overcome it – are internal. Regimes have not been galvanized to seek energy efficiency by an economic shock or international outcry. Rather, energy policy has drifted along on domestic formulae set in the 1970s until becoming apparent that overconsumption is shortening the lifespan of exports and reserves. Increasing populations have added to the pressure, since shrinking revenues per capita implies reduced government co-optive power. The Arab Spring uprisings add contradictory pressure to increase or prolong subsidies, deepening the medium-term resource predicament in the name of short-term political expediency.

Further, it appears that any international outcry will be muted. The Gulf energy crunch coincides with a global boom in unconventional energy exploration and production. Whether one looks at the shale oil and gas production in the United States; the huge finds off Brazil, East Africa, and the Levant; or the ramping up of LNG exports from Russia and

²⁵ See Chatham house papers cited previously

²⁶ For more detail, see Krane and Reiner (2013)

²⁷ Sick (1998), p. 211. See also: Hunter (1986); Roberts (1987); Al-Ebraheem (1996); Al Rumaihi (1996).

²⁸ For a projection on oil prices required to accommodate future Saudi consumption, see Bourland and Gamble (2011)

Australia, the world appears less in need of Mideast supply and less alarmed by the potential of its unavailability than otherwise might have been the case. In fact, cheaper outside gas supply could help the “Arabian producers” transition to “Arabian importers.”

Section 5: Conclusion

This paper has endeavored to show the factors driving Gulf monarchies to encourage local consumption of export commodities, and the resulting changes to energy balances and electricity models from these unsustainable practices. It has presented a detailed picture of regional energy supply and demand to advance the argument that maintaining in-kind resource distribution entails rising *direct costs* in the form of subsidies, rising *opportunity cost* in the form of lost export earnings, premature *displacement* of exports, and premature resource *depletion*, due to uneconomic demand. Reforms can therefore extend the monarchies’ status as exporters, bring them higher value from natural resources, and assist with maintenance of prudent fiscal balances. Distributional politics has long been understood as a key element in the Gulf’s vaunted political stability. In this sense, resource distribution has proven effective over the past 40 years, but the practice now comprises a structural contradiction that threatens the GCC’s economic and political models.

Fast-rising demand for electricity is shifting the region to a higher-cost model of provision that poses an economic drag on the state, since the largest source of demand – the residential sector – is not linked to productive activity. The shortage of natural gas that affects five of the GCC states is ultimately due to the pricing disincentives on production and the distributional imperatives of the social contract that bind the regime to low energy prices.

The political-stability-versus-economic-sustainability puzzle illustrated here suggests a response. Gulf ruling families will be forced to protect their oil revenues – their key resource for maintaining power – before preserving energy subsidies, which are a manifestation of surplus production. Whether regimes can meet their medium-term imperative without triggering their short-term fear – a popular uprising – remains to be seen. But the future of monarchies that depend so heavily on exports of hydrocarbons cannot be protected unless their leaders can find ways to maintain them.

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