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Reforming Energy Subsidies

Initial Lessons from the United Arab Emirates

TIM BOERSMA AND STEVE GRIFFITHS

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Abbreviations and Acronyms

ADNOC	Abu Dhabi National Oil Company
ADWEA	Abu Dhabi Water and Electricity Authority
DEWA	Dubai Electricity and Water Authority
FEWA	Federal Electricity and Water Authority (UAE)
GCC	Gulf Cooperation Council
GDP	Gross domestic product
GSEC	General Secretariat of the Executive Council (Abu Dhabi)
IEA	International Energy Agency
IG	Imperial gallons
IF	International Monetary Fund
kWh	Kilowatt hours
LNG	Liquefied natural gas
MENA	Middle East and North Africa
MMBtu	Million British thermal unit
MW	Megawatt
OPEC	Organization of Petroleum Exporting Countries
RCREEE	Regional Center for Renewable Energy and Energy Efficiency
RSB	Regulation and Supervision Bureau (Abu Dhabi)
SEWA	Sharjah Electricity and Water Authority
UAE	United Arab Emirates
WTO	World Trade Organization

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Introduction

For many years, reducing energy subsidies in the Gulf Cooperation Council (GCC) countries was largely a taboo. Energy subsidies have served as a key social safety net for citizens, albeit an expensive and inefficient one.[1] The contrast with 2015 is remarkable: In a context of substantially fallen oil prices, in all countries in the GCC region a debate about energy subsidy reform has become prominent, and, as we discuss in this paper, increasingly reforms are being prepared and/or implemented.

The reasons why energy subsidies are problematic have been well documented, and range from market distortion and inefficient use of resources to depressing foreign direct investment and fueling overconsumption.[2] To give an example, the International Energy Agency (IEA) estimates that in the Middle East,[3] one third of all the electricity is generated using subsidized oil, absorbing almost 2 million barrels per day, or 7 percent of OPEC's output.[4] At the same time, energy subsidies have for a long time been a key element of a social contract, where governments in the GCC extract their countries' oil and gas, and distribute a part of the rents in return for social participation and compliance with the status quo. As energy subsidies increasingly have become engrained in GCC countries, in turn it has become economically and politically challenging to alter and reform them. Simultaneously, energy subsidies place enormous constraints on government budgets. In the wider Middle East and North Africa (MENA) region, a number of countries have been forced to reform subsidies in recent years, in particular the ones where hydrocarbon reserves were depleting or not present in significant quantities to begin with, such as Egypt, Morocco, and Jordan. In fact, the IEA and the International Monetary Fund (IMF) have documented reforms undertaken in nearly 30 countries during 2013 and 2014, and several are located in the MENA region.[5]

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[1] Laura El-Katiri and Bassam Fattouh, "A Brief Political Economy of Energy Subsidies in the Middle East and North Africa," Country and Regional Studies, The Oxford Institute for Energy Studies, 2015, http://www.oxfordenergy.org/2015/02/brief-political-economy-energy-subsidies-middle-east-north-africa/.

[2] Shanta Devarajan, Lili Mottaghi, Farrukh Iqbal, Gabriela Mundaca, Thomas Laursen, Maria Vagliasindi, Simon Commander, and Isabelle Chaal-Dabi, "Corrosive Subsidies," *MENA Economic Monitor*, World Bank Middle East and North Africa Region, October 2014, http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/10/08/000350881_20141008084801/Rendered/PDF/912100WP0Box380RSION0OCTOBER0402014.pdf.

[3] The IEA definition of Middle East includes the Gulf Cooperation Council (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and UAE), Iraq, Iran, Yemen, and the East Mediterranean (Jordan, Lebanon, and Syria).

[4] Stefan Nicola, "Fossil Fuel Subsidies Fall in Gain for Renewables," *Bloomberg Business*, 30 January 2015, http://www.bloomberg.com/news/articles/2015-01-30/fossil-fuel-subsidies-fall-in-gain-for-renewables.

[5] Shelagh Whitley and Laurie van der Burg, "Fossil Fuel Subsidy Reform: From Rhetoric to Reality," Working Paper, The New Climate Economy, 2015, http://2015.newclimateeconomy.report/wp-content/uploads/2015/11/Fossil-fuel-subsidy-reform_from-rhetoric-to-reality.pdf.

On aggregate the attitude is still more hesitant amongst major hydrocarbon exporting countries, where the political leadership seems to prefer to maintain the status quo. Iran may be a notable exception, though it has been significantly constrained because of international sanctions. Therefore, the country is not really comparable to neighboring oil and gas producing countries that have played a major role in international energy markets. However, also in the GCC the aforementioned social contract has come under substantial pressure since protests erupted in Tunisia in 2010.[6] In addition, since June 2014 global oil prices have fallen substantially, further exacerbating already existing constraints on national fiscal budgets. Perhaps more importantly, falling oil prices have given local leadership an argument to work on reforms, albeit cautiously.[7] Whether oil prices were in fact a reason to initiate reforms is debatable. As one respondent remarked, "I have never seen decision-making in any government agency take place that quickly." It is actually more likely that the true reasons for reform are related to longer-term concerns over the balance-sheet, and the fall in oil prices made reforms for transportation fuels much simpler to absorb, since it reduced the gap between subsidized prices and world market levels. As this paper shows, in the United Arab Emirates (UAE), where fuel imports for power and water production have risen together with sky-rocketing demand for resources (in particular electricity and water), authorities have been incentivized to initiate change. The cost of water is closely related to that of electricity, since, apart from agricultural use, most is provided by desalination of seawater, either in co-generation plants using waste heat from fuel combustion, or in reverse-osmosis plants running on electricity.

At first glance, the UAE stands out amongst its peers in the GCC, in that in fact reforms have been initiated in recent years. Of the emirates, Dubai implemented initial electricity and water reforms in 2008 and made further pricing reforms in 2011. In January 2015, after years of internal debate, Abu Dhabi followed suit. Electricity and water tariffs for the Northern Emirates (Ajman, Fujairah, Ras al-Khaimah, and Umm al-Quwain) were revised upwards as well in 2015, but the primary focus was on prices charged to expatriates. In the emirate of Sharjah a new tariff system was introduced in 2014 for the consumption of electricity and water for commercial and industrial entities, but residential prices were not increased. In addition, throughout the UAE fuel subsidies (i.e. gasoline and diesel) have been removed to ease pressure on the state's budget, and prices are set each month based on global prices.[8] Importantly, gasoline and diesel prices apply equally to expatriates and UAE nationals, which could have made the extent of pricing change a potentially more controversial topic had global oil prices not fallen by more than 60 percent by now. As we discuss in more detail in this paper, opinions can vary whether these reforms are significant or whether authorities have just put their toe in the water and in fact missed certain opportunities. In addition, these reforms may or may not be readily transferable to other contexts in the GCC.

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[6] El-Katiri and Fattouh, "Brief Political Economy."

[7] Anthony McAuley, "UAE energy minister says urgent need to cut subsidies in the region as oil prices decline," *The National*, 4 October 2015, http://www.thenational.ae/business/energy/uae-energy-minister-says-urgent-need-to-cut-subsidies-in-the-region-as-oil-prices-decline

[8] Philippa Wilkinson, "Taking the plunge with subsidy cuts," *Middle East Economic Digest*, vol. 59, no. 30/31, 2015, p. 34-35.

Clearly, each country in the GCC, or wider MENA region for that matter, has its own political dynamics and unique political economy. At the same time, we believe that the case of the UAE can provide important lessons regarding energy subsidy reform in hydrocarbon-exporting countries, which may well be valuable to other GCC members. In order to make that assessment, this article is organized as follows. The first section briefly sets the stage, and further defines energy subsidies. It also touches upon some recent reforms that have taken place in the wider MENA region, and lessons that those cases provide. The second section then turns to the specific case of the UAE, and provides details regarding energy subsidies that have been in place, their impact, what reforms have been initiated, and whether those are significant or not. Subsequently we explore the particular case of Dubai, one of the two major emirates, and the one where sufficient time has elapsed since the most recent reforms to gain insights on the reform outcomes. As such, the case of Dubai provides initial data related to changes in consumption patterns, and the often-feared social backlash following reforms. Finally, we discuss the main lessons that follow from this analysis, and to what extent these are transferable to other cases in the GCC.

Our analysis is based on primary and secondary data. In the spring and summer of 2015, Brookings and Masdar Institute scholars conducted a series of interviews with a wide variety of stakeholders in both Abu Dhabi and Dubai, including industry representatives, regulatory authorities, policy makers, financial specialists, analysts, and representatives of NGOs. As discussed in more detail later in the paper, our fieldwork, and in particular our search for initial lessons learned, suggested that energy subsidies are still surrounded with a fair amount of secrecy, and data are not always published. Nevertheless, we believe that we can draw initial conclusions about the case of the UAE, specifically Dubai and Abu Dhabi. We are grateful to all those who participated in our research. However, the contents of this paper solely reflect our views.

Men stand in front of solar panels at the Mohammed bin Rashid Al Maktoum Solar Park in Dubai, November 28, 2015. REUTERS/Stringer

1: Energy subsidies and recent (attempts to) reforms in the GCC

A brief examination of the existing literature confirms that there is no universally accepted definition of energy subsidies, although organizations such as the IEA, World Trade Organization (WTO), and International Monetary Fund (IMF) have clear definitions of their own. The latter accounts for both pre-tax subsidies, which is defined as the difference between the price consumers pay and the cost of supplying energy, and post-tax subsidies, which include the estimated cost of environmental damage and foregone consumption taxes that may rightfully be applied to energy products. Previous studies have given detailed descriptions of the various views on subsidies.[9] For the purpose of this paper, we avoid an in-depth discussion about the various methodologies that can be applied. We appreciate that there are different schools of thought, but accept the definition that characterizes subsidies as measures that keep prices for consumers below the market level or keeps prices for producers above the market level or that reduce costs for consumers and producers by giving direct or indirect support.[10] These subsidies can be explicit or implicit.[11] To give an example of the explicit form, international companies operating in Algeria are required by law to sell a certain percentage of their produced natural gas domestically, at prices significantly lower than the international price. Still, these international companies receive an international benchmark price for their product, with the gap funded directly by the Algerian authorities. Implicit subsidies are less obvious, and are one of the main reasons for the ongoing debate about what constitutes an energy subsidy. An example of an implicit subsidy is a government in an oil producing country mandating the state owned oil producing company to sell their products at a cost that is above the production cost, yet far below the international market price. This is easier to establish in the oil market, where there are only three main international benchmarks, which are reasonably aligned. The market for natural gas continues to be fragmented (though liquefied natural gas, which can readily be shipped internationally, is making strides and comprises roughly 20 percent of the global market) and therefore the international benchmark prices vary widely. Because the oil producer in the example may be selling his product at a price lower than international benchmarks would prescribe, but still above production costs, it has been

[9] See, for example, Bassam Fattouh & Laura El-Katiri, "Energy Subsidies in the Arab World," Arab Human Development Report Research Paper Series, United Nations Development Programme, 2012, http://www.undp.org/content/dam/undp/library/Environment%20and%20Energy/UNDP-EE-AHDR-Energy-Subsidies-2012-Final.pdf and David Coady, Ian Parry, Louis Sears, and Baoping Shang, "How Large Are Global Energy Subsidies?" IMF Working Paper (WP/15/105), Fiscal Affairs Department, International Monetary Fund, 2015, https://www.imf.org/external/pubs/ft/wp/2015/wp15105.pdf.

[10] André de Moor and Peter Calamai, "Subsidizing Unsustainable Development Undermining the Earth with Public Funds," Earth Council, 1997, https://www.cbd.int/doc/case-studies/inc/cs-inc-earthcouncil-unsustainable-en.pdf.

[11] See also Fattouh and El-Katiri, "Brief Political Economy."

argued that this does not constitute a subsidy but rather selling a product at an opportunity cost, and several respondents during our research in the UAE in fact made that point. Certainly for natural gas, of which a substantial share is produced as a byproduct (associated) and the cost for which the Abu Dhabi National Oil Company (ADNOC) calculates at $1/MMBtu, it is difficult to determine what the exact production cost is, and therefore calling this a subsidy is empirically challenging.

In recent years, a number of countries in the MENA region have started to reform energy subsidies, or attempted to do so. Some of these cases were successful, others less so. Morocco initially froze its fuel product prices in 2011 in fear of popular protests, but when the national energy bill soon grew out of control the government agreed with the IMF on far reaching reforms. Eventually these reforms largely passed unnoticed, one of the reasons being that they targeted predominantly those people who could afford higher prices.[12] Similarly, in Egypt reforms were long overdue as a result of underinvestment in the country and sky-rocketing consumption of petroleum products and electricity. In 2013 alone, Egypt's fossil fuel subsidies accounted for approximately 12 percent of Egypt's GDP and absorbed roughly 20 percent of public spending, exceeding expenditure on health, education, and infrastructure combined.[13] In 2014, most Egyptian petroleum product prices were raised

Camels seek shade from the sun underneath a pylon near Fossil Rock July 21, 2009. REUTERS/Steve Crisp

[12] Ibid., p. 9.
[13] Whitley and van der Burg, "Fossil Fuel Subsidy Reform."

up to 70 percent overnight, a rather bold move in what already were rather turbulent times in the country. Anecdotal evidence suggests that the popularity of President Al-Sisi enabled these drastic reforms, with one of our respondents saying "arguably we *loved* him before the reforms, but most Egyptians still *liked* him after." Other examples have been less successful, the case of Yemen being the most obvious one, though this can hardly be a surprise given the dire state of the country's economy.

The most important lessons that can be learned from these examples are that reforms are better initiated on a timely basis, and not when a crisis is near. The Moroccan case suggests that though there may be discomfort about rising prices, if the government explains why reforms are necessary, the majority of the population may well support the policy. Public support can be harnessed further by sparing the most vulnerable in society, who conveniently also generally benefit the least from existing subsidy regimes. As a respondent in a related research project in Algeria noted, "citizens, in particular the younger generation, are well aware that gasoline, electricity, and water are produced at a cost, and that the cost that they are paying, if any at all, unlikely is an adequate reflection of that cost."

In the GCC, governments have, with the exception of the UAE, long been reluctant to endorse reforms. In January 2015, Kuwaiti authorities announced and implemented an increase in fuel prices, but the move was met with fierce debate in Parliament and was swiftly reversed. In September 2015, the Kuwaiti Ministry of Finance announced that it was studying the consequences of fuel subsidy reform and that until further notice, it would not consider implementing reform measures.[14] In October 2015, Oman announced that the country is likely to start with additional gradual subsidy reforms in early 2016 to follow increased prices to industry for natural gas that were set in early 2015, as relatively low oil prices are constraining the Sultanate's budget.[15] Also in October 2015, Qatari former Minister of Energy and Deputy Prime Minister Abdullah bin Hamad Al Attiyah called for subsidy reform when he launched his Foundation for Energy and Sustainable Development.[16] Earlier in 2015, the head of the central bank of Saudi Arabia called for subsidy reforms,[17] presumably to take place in 2016. Finally, Bahrain removed subsidies on meat prices, compensating local citizens for additional costs, but not expats, who comprise roughly half of the population.[18] Bahrain has clearly signaled an intent to phase out power and water subsidies and, like Oman, has already increased industrial gas use prices in 2015. Figure 1 below gives an estimate of the relative size of energy subsidies as a share of GDP and in comparison to other countries. It shows that in 2013, UAE subsidies were estimated at just over $20 billion, of which approximately half was for natural gas. Importantly, however, falling international oil prices and, to a lesser extent, initial impacts from subsidy reforms have

[14] "Kuwait waits on study before considering end to fuel subsidies," *Platts*, 1 September 2015, http://www.platts.com/latest-news/oil/dubai/kuwait-waits-on-study-before-considering-end-26196666.

[15] Neha Bhatia, "Oman to cut fuel subsidy in 2016 amidst oil slump," *Arabian Business*, 6 October 2015, http://www.arabianbusiness.com/oman-cut-fuel-subsidy-in-2016-amidst-oil-slump-608226.html.

[16] Pratap John, "Al-Attiyah urges GCC rethink on subsidies," 3 November 2015, http://www.gulf-times.com/qatar/178/details/461425/al-attiyah-sees-gcc--rethink-on-subsidies.

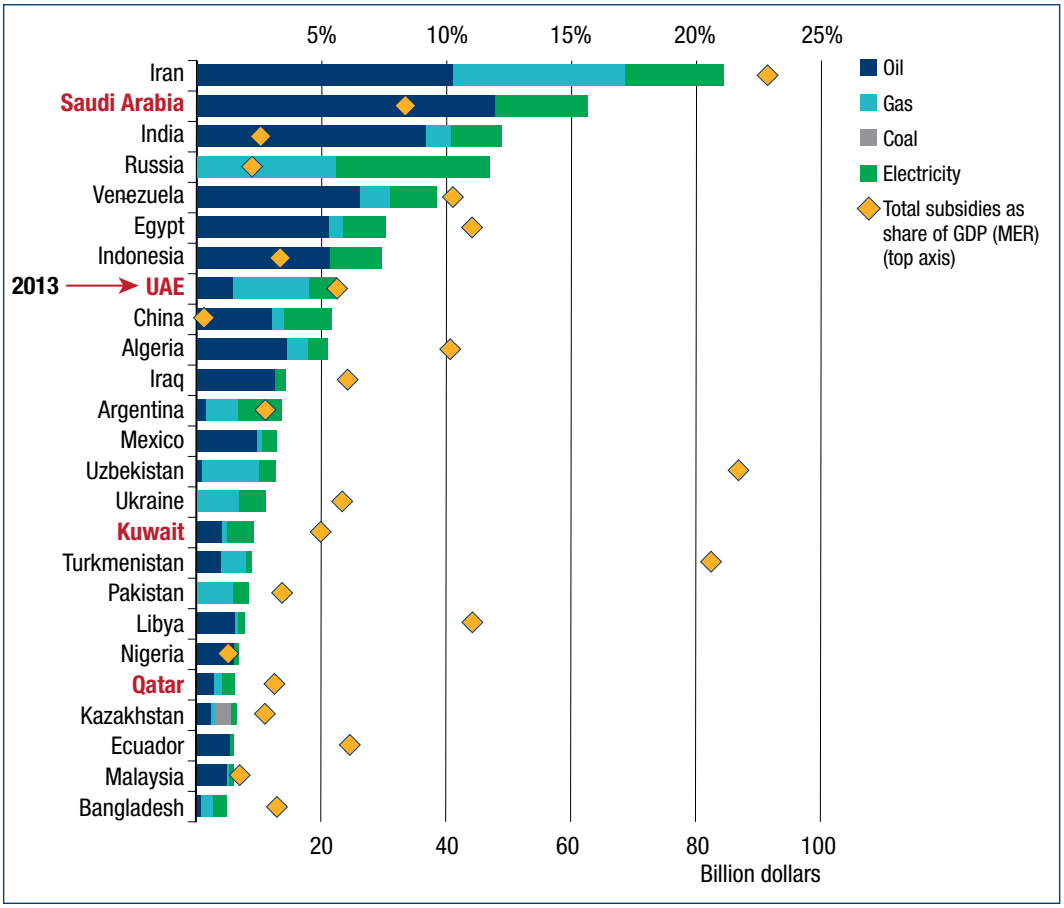
[17] "Saudi central bank chief calls for energy subsidy reform," *Reuters*, 9 February 2015, http://www.reuters.com/article/2015/02/09/saudi-subsidies-idUSL5N0VJ0RV20150209

[18] "Bahrain to remove meat subsidies from September 1 as cheap oil hits budget," *Reuters,* 16 August 2015, http://www.thenational.ae/business/economy/bahrain-to-remove-meat-subsidies-from-september-1-as-cheap-oil-hits-budget.

reduced GCC energy subsidies to 3.4 percent of aggregate GDP in 2015 from 6.5 percent of GDP in 2013.[19] According to Emirates NBD, the UAE has reduced energy subsidies by about 30 percent since 2013 with direct energy subsidies estimated at $12.6 billion in 2015, just shy of 3 percent of GDP.[20]

Figure 1: International fossil fuel subsidies in 2013

Source: International Energy Agency, World Energy Outlook 2014, November 2014.

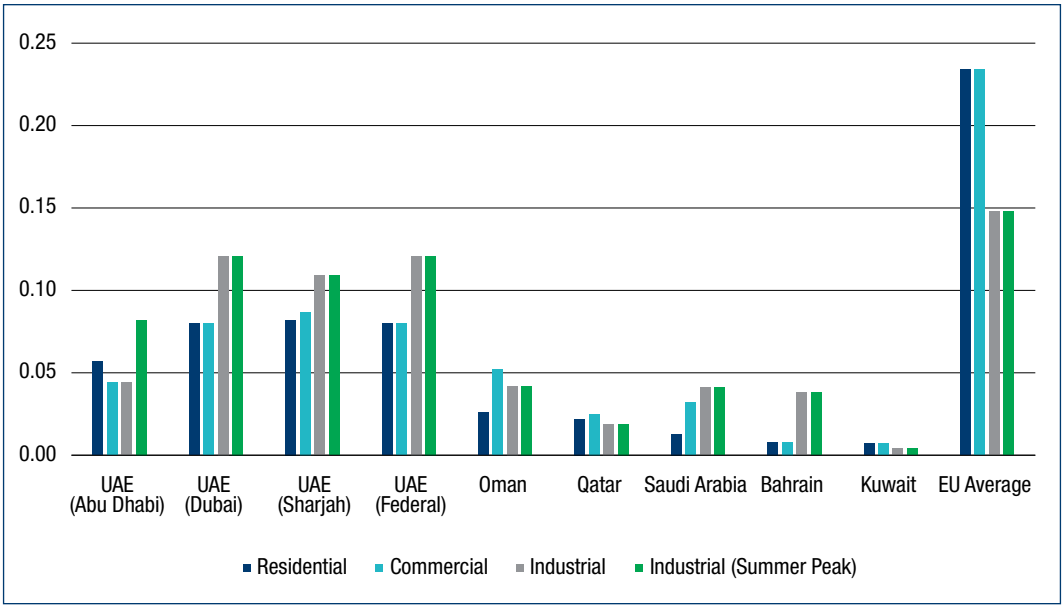


As **Figure 2** shows, electricity costs are heavily subsidized throughout the GCC. In the UAE too electricity costs are relatively low, though the comparison with its peers makes clear that it truly matters the sectors within which you compare electricity costs in the UAE. Electricity costs in the UAE are generally higher than its neighbors for residential, commercial, and industrial usage, with the single exception of commercial electricity costs, which are a fraction higher in Abu Dhabi than in Oman (though the other UAE emirates have substantially higher benchmarks). Overall, electricity costs, in particular for residential and commercial usage, are dwarfed by those in the European Union.

[19] Khatija Haque, "GCC energy subsidies have declined over the last 2 years," Emirates NBD, 22 July 2015, https://www.emiratesnbd.com/plugins/ResearchDocsManagement/Documents/Research/20150721_GCC%20energy%20subsidies.pdf.
[20] Ibid.
[21] Prices based on assumed average monthly consumption amounts for residential (500 kWh), commercial (1,500 kWh), and industrial (30,000 kWh) sectors. See Regional Center for Renewable Energy and Energy Efficiency (RCREEE), "Arab Future Energy Index 2015," Cairo, Egypt: 2015, http://www.rcreee.org/sites/default/files/afex_ee_2015_engish_web_0.pdf.

Figure 2: Electricity costs in the GCC (per kWh)[21]

Source: Regional Center for Renewable Energy and Energy Efficiency (RCREEE), "Arab Future Energy Index 2015," Cairo, Egypt: 2015, http://www.rcreee.org/sites/default/files/afex_ee_2015_engish_web_0.pdf.



In the next section, we explore the reforms that have been initiated in the UAE, and examine to what extent these are substantial, and possibly different than the aforementioned reforms in peer countries.

2: Reforms in the United Arab Emirates

This section outlines the various reforms that have been initiated in Abu Dhabi and Dubai, and provides a brief evaluation thereof. They are presented separately, as the reforms are not identical, nor are their timelines. We start with Dubai, where electricity and water prices were most recently reformed in 2011. We then turn to Abu Dhabi, where water and electricity price reforms became effective in January of 2015. Subsequently, we discuss fuel subsidies, which were altered in June 2015. Finally, we return to Dubai for initial lessons.

It is important to keep in mind who sets energy prices in the UAE. While petrol and diesel prices are set at the federal level, electricity and water prices are applied independently by the four UAE electricity and water authorities, namely the Abu Dhabi Water and Electricity Authority (ADWEA), the Dubai Electricity and Water Authority (DEWA), the Sharjah Electricity and Water Authority (SEWA) and the Federal Electricity and Water Authority (FEWA).[22] In Abu Dhabi, tariffs are annually proposed by the Abu Dhabi Regulation and Supervision Bureau (RSB), although it is worth keeping in mind that prior to the reforms in 2015 the tariffs had in fact not changed for 15 years. This time around, the General Secretariat of the Executive Council (GSEC), tasked to set strategic plans and policies for the emirates and positioned close to its rulers, reviewed the RSB proposals, and amended them. The fact that not RSB but GSEC made the final decision regarding the actual tariffs makes this a clear political decision. At the same time, and even though possible reforms had been discussed for many years and communicated in a months-long public information campaign, the actual decision still seemed to come as a surprise to many. Indeed, we talked to several government employees who learned about the final decision only through the local newspaper.

Electricity and water tariffs in Dubai

Subsidy reform in Dubai is directly linked to its energy portfolio in the late 2000s. The emirate has long been import-dependent, and energy prices have therefore always been relatively high. At the time, soaring demand for energy resources (in particular natural gas) outstripped supplies. Subsequently, the emirate turned to imports of liquefied natural gas (LNG) and the costs rose as well. There is a widely shared view that this, combined with

[22] FEWA supplies the four northern emirates: Ajman, Fujairah, Ras Al Khaimah, and Umm Al Quwain.

rising demand, incentivized the emirate to further reforms in 2011. The Dubai Supreme Council of Energy, which was established in 2009 to serve as a gathering place for all key stakeholders to discuss long-term targets and objectives, mostly focusing on increased renewable energy and energy demand reduction, announced the reforms as one of its first acts after installment.[23] Dubai had an extensive public relations campaign, in which the incoming tariff changes were explained, and the population was urged to reduce consumption. Prior to that, a system of four tariff slabs had been introduced in 2008 by the Dubai Electricity and Water Authority (DEWA). As costs rise per slab, this system is designed to reward the most efficient users, with prices rising for higher tranches of consumption.

In 2011, a 15 percent to 20 percent increase in the slab unit cost of electricity and water was introduced for residential expats, industry, and government. For UAE nationals, a modest electricity tariff increase was introduced (roughly three times lower than for expats), and a modest water tariff for nationals with a consumption level exceeding 20,000 imperial gallons (IG) per month. Next to the slab tariffs, DEWA adds a fuel surcharge to the water and electricity costs. This surcharge is supposed to vary monthly, and is based on the cost of the fuel source that is supplied to DEWA generation plants.[24] Nationals are exempted from the surcharge. Most end consumers stay in slab one for the bulk of the year, except during peak demand in summer. We estimate that total electricity and water price increases for residents, government and industry in Dubai have varied between 35 percent and 48 percent. Dubai electricity and water tariffs are shown in Figure 3. As a point of reference, the Abu Dhabi Regulation and Supervision Bureau 2013-2014 published statement on electricity and water costs indicates that the cost reflective electricity tariff for residential consumers in Abu Dhabi is $0.089/kWh and $0.066/kWh for commercial and industrial customers. The cost reflective water tariff in Abu Dhabi is $2.84/$m^3$ for all customers.

These data tell us several things. First, even though electricity and water prices have increased significantly with the reforms that were installed in 2011, by international standards these prices are still modest. It is important to consider that the vast majority of the population of Dubai consists of expats, who often have a different reference framework than nationals. Official data are not available, but estimates suggest that slightly more than 10 percent of the population of the UAE, which is estimated at approximately 9.5 million, consists of nationals and the rest of expats (specifically in Dubai, the share of expats may be even higher).[25] Second, even though the share of nationals in the total population is very small, not all reforms apply to them, such as the fuel surcharge. Electricity and water prices continue to be significantly lower for nationals than for expats. Third, as a result of the reforms, for the first time in history nationals have to pay for their water usage. That is significant by any standard.

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[23] Dubai Supreme Council of Energy, Government of Dubai, last modified 26 October 2015, http://www.dubaisce.gov.ae/default.aspx.

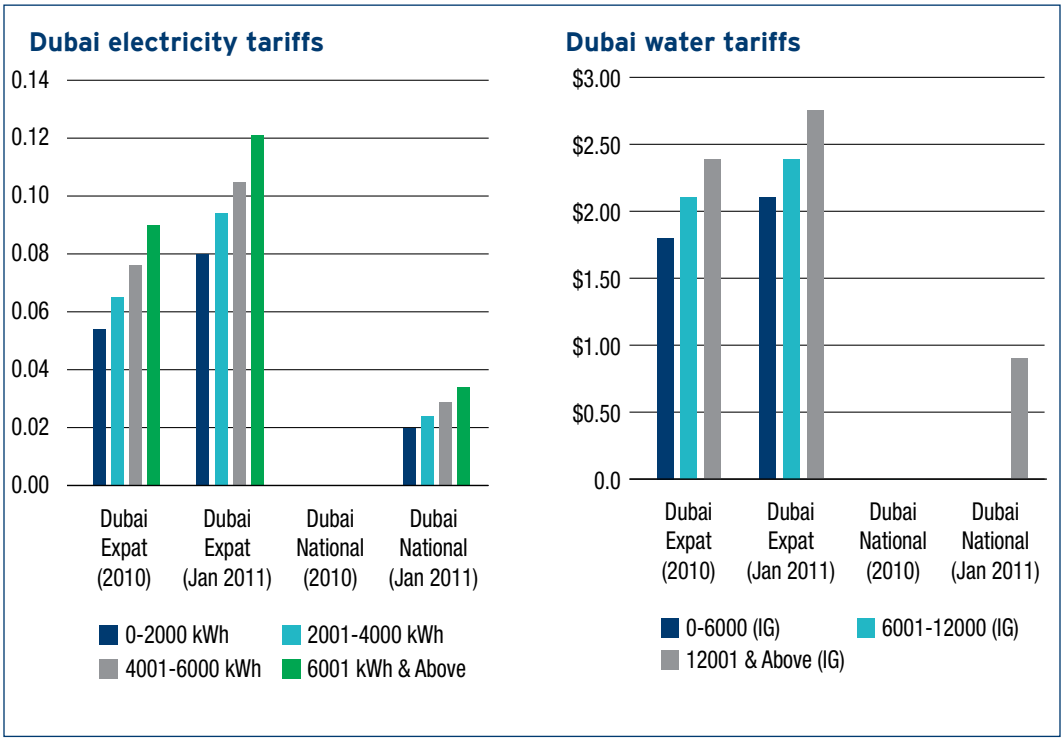
[24] Dubai Electricity & Water Authority, "Slab Tariff," Government of Dubai, accessed 27 December 2015, https://www.dewa.gov.ae/tariff/tariffdetails.aspx.

[25] Jure Snoj, "UAE's population – by nationality," *BQ Magazine*, 12 April 2015, http://www.bq-magazine.com/economy/socioeconomics/2015/04/uae-population-by-nationality.

Figure 3: Dubai electricity and water tariffs

Source: Dubai Electricity and Water Authority.

Note that bands are for monthly consumption amounts.



We discuss initial effects of these reforms later in this paper, and have a more elaborate discussion in our concluding session. We now first turn to electricity and water price reforms in Abu Dhabi.

Electricity and water tariffs in Abu Dhabi

According to our interviews, internal debates about water and electricity price reforms in Abu Dhabi date back to the mid-2000s. Contrary to Dubai, Abu Dhabi has not faced steep price increases due to imports of LNG, though the costs of domestic production of natural gas have gone up (mostly due to the fact that new domestic supply is increasingly expensive to produce given high hydrogen sulfide and to a lesser extent carbon dioxide content). Several sources indicated that currently there are no direct incentives for reforms, and suggested that the authorities have just deemed the time right. Several respondents have suggested that at the highest levels there may have been coordination with the leaders in Dubai as well, though we have not been able to confirm this. Second, even absent a steep import bill, the costs of subsidies were still rising, and the authorities may have wondered whether this is a wise way to spend its funds. That ties into a societal factor that should be taken into consideration, which is that in particular the younger generation appreciates the need for modest reforms, and is more susceptible to sustainability and more constrained resource usage than the older generations.

Regardless, in late 2014, Abu Dhabi too announced that it was going to increase tariffs for water and electricity starting January 2015. Similarly to Dubai, the government in Abu Dhabi also first launched a campaign explaining the changes that were at hand and why that was the case. This campaign, which started in the summer of 2014, contained key messages

Watering the public garden in Abu Dhabi, May 2015. Tim Boersma

about sustainability and conservation, amongst others. For example, house owners were urged to run their air conditioning at 24 degrees Celsius during the summer instead of 20 degrees Celsius, or to turn off the water tap while brushing one's teeth. While in Abu Dhabi the percentage of expats is lower than in Dubai–though estimated as still close to 80 percent of the population—here too the costs and extent of change for UAE nationals were manageable. For residential expats electricity prices rose 40 percent in the unit cost of electricity, whereas there was no significant change for UAE nationals. For commercial and industrial users under 1 megawatt (MW) there was a 7 percent increase, and, more significantly, a 100 percent increase for industry users that are larger than 1 MW during the summer peak, between 10 AM and 10 PM local time, the latter policy aiming to limit summer peak demand that is largely responsible for marginal new electricity generation capacity. For government entities the subsidies on electricity have been removed. The unit cost of water for residential expats was increased by 170 percent. In addition, a new tariff for UAE nationals was introduced, though this is still about three times lower than the costs for expats. Commercial and industrial users saw their water costs rise by 82 percent, and again for the government the subsidy was removed. **Figure 4** depicts electricity prices in Abu Dhabi in both 2014 and 2015, and includes data for Dubai for comparison. Subsequently, **Figure 5** represents water tariffs in Abu Dhabi in 2014 and 2015, and also includes data from Dubai for comparison.

From these tariff changes we can discern a number of things. The electricity reforms for UAE nationals are modest by all standards, and in our view this may have been a missed opportunity, as it may take years before a new round of reforms becomes politically viable. The counterargument, however, is that UAE nationals are a relatively small

Figure 4: Abu Dhabi and Dubai electricity tariffs, 2014-2015[26]

Source: Abu Dhabi Regulation and Supervision Bureau and Dubai Electricity and Water Authority.

Note that bands are for monthly consumption amounts.

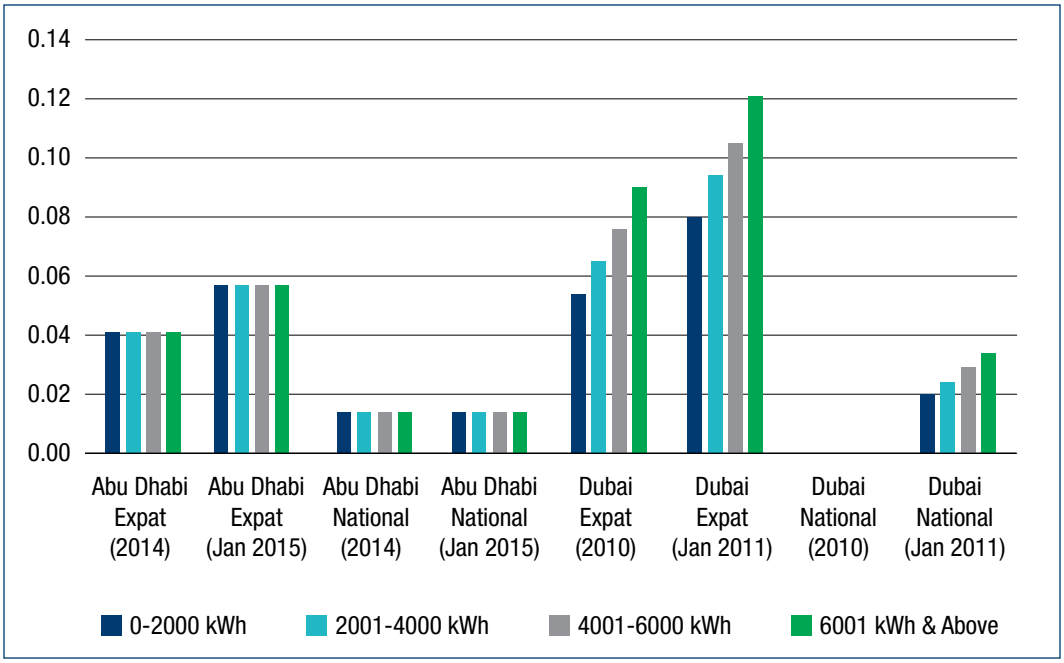
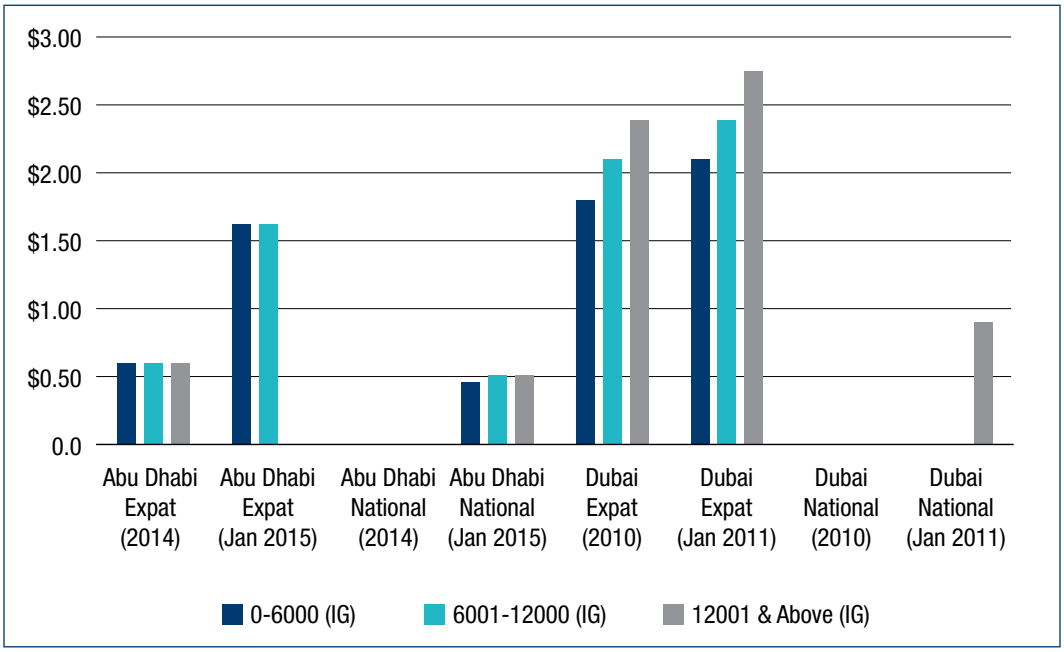


Figure 5: Abu Dhabi and Dubai water tariffs, 2014-2015

Source: Abu Dhabi Regulation and Supervision Bureau and Dubai Electricity and Water Authority.

Note that bands are for monthly consumption amounts.



fraction of the population and so the targeted energy and water savings can be largely achieved without increasing costs for citizens. This does perhaps make sense for a country with the demographics of the UAE but of course would be a transferable rationale to most other contexts where energy and water pricing reform is needed. In addition, it is important to note that given the high income and very high consumption levels of nationals, their consumption is in fact significant despite their small share of the population. Regardless, a number of changes are of

[26] Note that Abu Dhabi operates with a flat tariff structure while Dubai has a tiered structure based on consumption.

note. First, it is good that government entities are paying for electricity. It sets an example and a precedent that the end-user is in fact the one that is paying the bill. In terms of expectations of demand reductions in overall electricity usage after these reforms, several respondents indicated that overall consumption may grow by 1 percent less as a consequence of the tariff changes, but that this could easily get lost in an overall increase of demand of 6 or 7 percent. Second, the fact that UAE nationals for the first time in history are paying for their water is, like in Dubai, significant, because entire previous generations had grown up with the idea that the resource was free of charge. As one national described it "my father may now instruct his personnel to use buckets of water instead of the hose when washing the car. That may sound ludicrous, but it is not insignificant." It is too early for definitive conclusions; initial data indeed suggest a drop in water usage of up to 10 percent, though other sources believe that 5 to 6 percent is more reasonable.

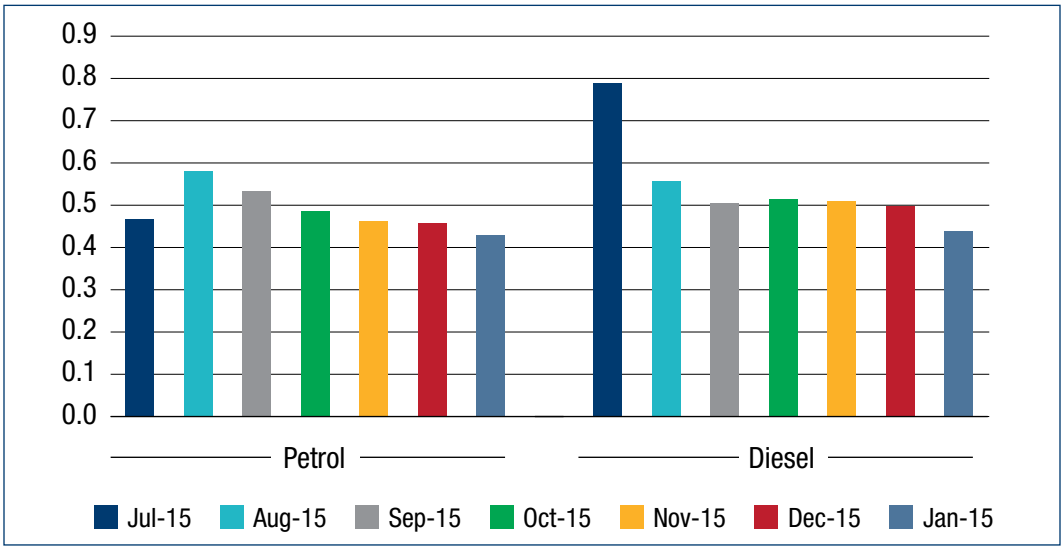
A more in-depth discussion about these findings is included at the end of this paper. First, we discuss fuel price reforms, before we return to the case of Dubai and discuss initial data about the effects that subsidy reforms in that emirate achieved.

Fuel price reforms in Abu Dhabi and Dubai

At the end of July 2015, fuel prices (gasoline and diesel) were structurally, and rather substantially, reformed in the UAE. *The Economist* called July 31 a "day of reckoning for fuel prices in the Gulf."[27] Reforms were incentivized by the significant burden that fuel subsidies put on state coffers, estimated at $7 billion in 2013. Currently, prices for gasoline and diesel are not entirely deregulated, but set monthly by a commission based on international prices.[28] **Figure 6** below shows the price development of both diesel and gasoline in the UAE in the months after the reforms were installed.

Figure 6: Gasoline and diesel prices in the UAE from August to December 2015

Source: UAE Ministry of Energy.



[27] "A day of reckoning for fuel prices in the Gulf," *The Economist*, 5 August 2015, http://www.economist.com/news/middle-east-and-africa/21660490-emirates-move-improve-its-federal-budget-day-reckoning-fuel-prices-gulf.
[28] Wilkinson, "Taking the plunge with subsidy cuts."

What stands out from these data is that timing matters when initiating reforms. As a result of collapsed oil prices, per December 2015 prices for both gasoline and diesel are actually lower (significantly lower in the case of diesel) than they were prior to the reforms. An environment of low oil prices has therefore facilitated the UAE authorities in making these reforms, and helps UAE nationals and expats absorb the fundamental changes. In due time it is likely that oil prices rise again, and time will tell whether the commission that sets the prices will follow international prices for diesel and gasoline accordingly.

Initial consequences of electricity and water subsidy reforms in Dubai

As previously discussed, electricity and water price reforms in Dubai were particularly substantial for the expats, industry, and the government. For nationals the price increases were modest, though for water this reform marked the first time in history that UAE nationals had to pay anything for the resource. Anecdotal evidence suggests that the rulers of Dubai hoped that the reforms would achieve several things. First and foremost, surging demand and costs had to be curtailed, as the emirate had increasingly been turning to the (often expensive and surely volatile) international market for imports of LNG. Second, and more implicitly, in the long term it was considered preferable that the costs for resources were carried by those who actually consume them. At the same time, there was a persistent fear of social backlash, and cautious reform therefore made sense.

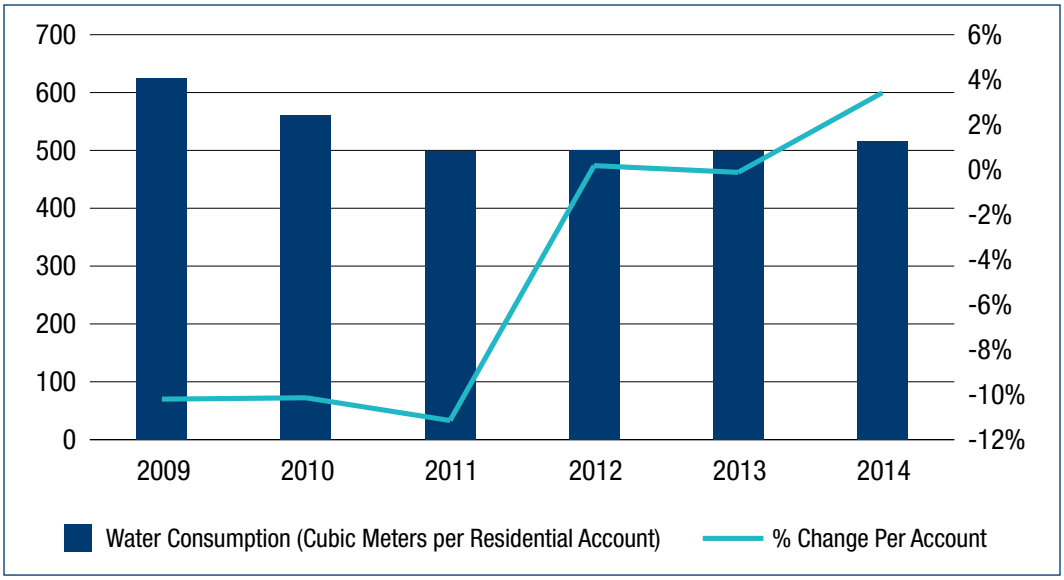
So did the reforms in fact put a plateau on energy and water consumption? The authorities in Dubai are generally reluctant to publish data, but did some preliminary work in 2012 to assess the impact of the reforms.

The DEWA assessment showed that during the year following the electricity and water tariff increases, the residential, commercial, and industrial sectors all reduced consumption of water and electricity, except the government. Electricity consumption of UAE nationals in the residential sector was reduced modestly by only 3 percent. Consumption was reduced most substantially amongst expats (down 8 percent) and industrial users (down 7 percent), which corresponds with the significance of their respective price increases relative to other users. The data also suggest a significant impact on water pricing for UAE nationals, the first in history. In comparison to 2010, water consumption amongst nationals in 2011 dropped by 16 percent. Unfortunately, our data suggest that these changes are not necessarily structural. Furthermore, it is difficult to draw definitive conclusions about actual impact on demand from just one year of data with other factors, particularly the state of the overall economy, having strong influence. Nonetheless, sources close to the study indicate that the impact of the tariff increases seemed to hold for about three years, and then started to vanish.

Figure 7 displays residential water consumption per residential customer account in Dubai in between 2009 and 2014. As one can see, before the reforms were installed a decline in water consumption per residential account was already underway, and continued through 2011 after the reforms had been implemented. Water demand then stabilized, and in 2014 a marginal increase occurred.

Figure 7: Residential water demand in Dubai between 2009 and 2014

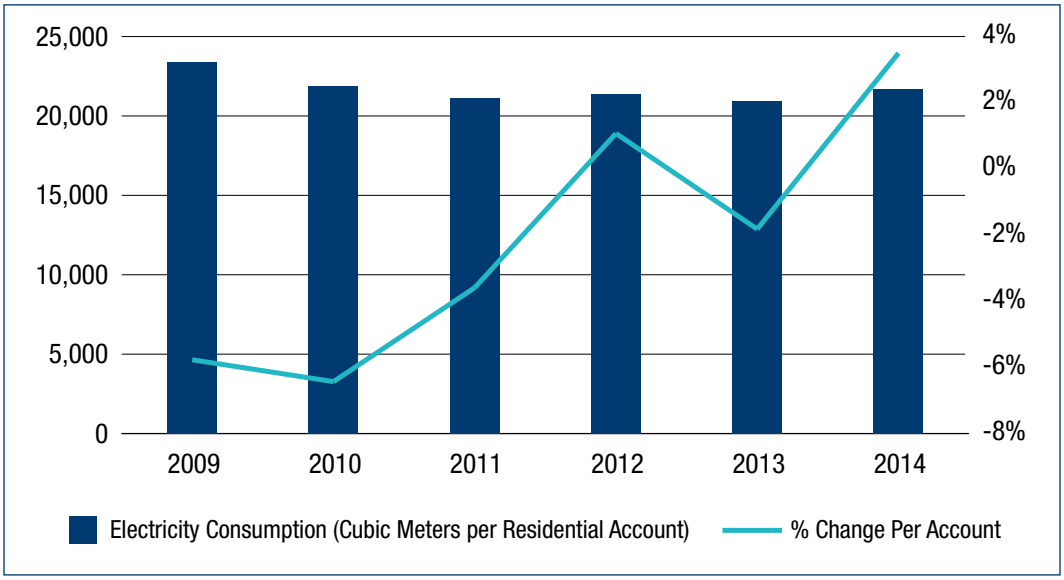
Source: Dubai Electricity and Water Authority.



A very similar pattern with regard to electricity demand in Dubai occurred in the same time period (see **Figure 8**). Here too, a decline in consumption levels per residential customer account had started prior to the reforms, and this continued after the reforms were installed in 2011. This was followed by a leveling off of electricity consumption.

Figure 8: Residential electricity demand in Dubai between 2009 and 2014

Source: Dubai Electricity and Water Authority.



One suggested reason for the diminished impact is the turnover of the large expat community. Expats tend to stay in the UAE for a few years and then move on as their careers dictate. As discussed, for newcomers with a different reference framework, prices are still relatively low in the UAE compared to Western Europe and elsewhere in the world, and therefore the incentive to consume less may not be that substantial. Second, and more fundamentally, we have to consider the broader economic context in the GCC. Per definition it is challenging to link energy price impacts directly to energy demand, as the latter is influenced by other economic factors as well. The data suggest that the reduction in demand for both

water and electricity in Dubai had already set in prior to the price reforms, most likely as a consequence of the impacts still lingering from the 2008 global financial crisis. While reforms may surely have reinforced, or even intensified, that trend, we cannot claim that the decrease in residential water and electricity consumption in Dubai was only a consequence of the price reforms.

In terms of social backlash, reports from Dubai have overall been positive. Indeed, there were some negative reports on social media, as citizens worried about the breakdown of the social contract between locals and the government. However, these responses did not evolve into large-scale protests, and so the wider concern about backlash proved unsubstantiated. Again, however, the large expat population in Dubai makes the UAE reform context somewhat different than in other locations in the GCC and elsewhere.

Lessons and Conclusions

From this analysis we derive four main lessons.

1 Modest electricity, water, and fuel reforms are underway in the UAE.

In essence that is good news, though some of the actual reforms are somewhat disappointing. What is noteworthy is that reforms were initiated before they became urgent. In addition, in Dubai prices for water and electricity are essentially cost reflective for expats. What is also positive is that in both Dubai and Abu Dhabi, government entities are now paying their own costs, and UAE nationals for the first time in history are paying for water.

At the same time, UAE nationals still pay up to three times less than other users, even though they are also among the most intensive users. In addition, recent reforms in Abu Dhabi have been based on historic consumption patterns, and are therefore rather generous. Unlike Dubai, Abu Dhabi does not have a tiered tariff system and cost-reflective tariffs only start at very high levels of power and water consumption. For instance the cost-reflective tariff for electricity starts at 200 kWh per day for expats living in villas. This is clearly a very high level of consumption by any standard. It is also unclear when further reforms can be anticipated, and most anecdotal evidence suggests that this should not be expected before the end of this decade. The fact that the governments in both Dubai and Abu Dhabi organized an extensive information campaign prior to the reforms in order to explain the upcoming changes, may limit the prospects for additional change in the nearby future, because the reforms have been presented as significant (though as discussed that all depends on your perspective).

It is also important to keep in mind that an issue related to water and electricity consumption that is high on the government agenda, i.e. peak demand in summer, is not completely addressed by these subsidy reforms. Current tariffs in both Abu Dhabi and Dubai are now higher for peak demand relative to prior years, but it is yet to be seen if they are set high enough to limit peak demand to the extent needed during the summer months given that consumers in the UAE will generally pay whatever it takes to stay cool in the UAE's hot climate when energy prices are low to moderate and prices are not reflective of demand. In order to address this problem, a broader demand side management strategy is necessary and such initiatives are visible now in Abu Dhabi and Dubai.

2 The case of the UAE provides little evidence of the often feared social backlash of subsidy reform.

In both Dubai and Abu Dhabi there were some reports of dissatisfaction on social media, but the issue did not gain traction and a true backlash did not occur. There are probably multiple reasons for this. First, the most substantial reforms were introduced at the expense of the large expat community, which mostly views the costs of electricity, water and fuel as low given their different reference framework. Furthermore, even if expats would find the costs of energy high, it is unlikely that they would take the streets and protest, something that rarely happens in their home countries either (though it does on occasion, e.g. Bulgaria). Also, the basic idea that nationals do not accept any price increase can be flawed. Even though there are a number of examples where indeed price increases caused protests and upheaval (e.g. Indonesia and Kuwait), our research also suggests that younger generations in particular have a better appreciation of the actual costs of resources like water and electricity, and more affinity with conservation and sustainability, and therefore do not per definition obstruct change. At the same time, we have to be cautious about transferring those lessons one-on-one to other cases. Even other emirates within the UAE have different demographic structures—in other words fewer expats—and therefore nationals would likely carry more of the burden as is the case for the electricity and water pricing reforms undertaken by FEWA in 2015 and hence of FEWA's reluctance to apply rate increases on UAE nationals. It may be that a case like that of Qatar is reasonably well comparable to those of Dubai and Abu Dhabi, in the sense that here too a substantial expat community is likely to be more susceptible to carry a part of the burden. However, if prices for resources eventually are to be cost reflective, then governments in the GCC and beyond will have to start explaining to their citizenry what the true costs of resources are, and probably redesign the historic social contract and the role that resources play herein. It is therefore important that both Abu Dhabi and Dubai have developed electricity and water bills that educate customers on their consumption.

3 The jury on the long-term impacts of price reforms is still out.

Our data have suggested some initial effects of the reforms on demand for both electricity and water in Dubai, though it is too early to determine what long-term consequences will be. The impact of pricing reform in both the short run and long run depends on the underlying price elasticity of demand, which is the percentage reduction in demand for each percent increase in price. The elasticity is sector, time and baseline pricing dependent. That is, for very low initial prices, even relative large percentage changes in pricing may not have a significant impact on demand. The common observation is that short run electricity price elasticities of demand are -0.1 to -0.2 for the residential, commercial, and industrial sectors.[29] Long run elasticities internationally are often on the order of -0.3 to -1 across end use sectors. Hence, in the short run demand is generally inelastic while over the long run demand is generally more elastic and influenced by pricing increases. The short term demand

[29] Agustin J. Ros, *An Economic Assessment of Electricity Demand in the United States Using Panel Data and the Impact of Retail Competition on Prices*, NERA Economic Consulting, 9 June 2015, http://www.nera.com/content/dam/nera/publications/2015/PUB_Econometric_Assessment_Elec_Demand_US_0615.pdf.

reductions observed in Dubai are very consistent with the generally observed short run elasticities discussed. However, the lack of longer term demand reduction observed is contradictory to international experience and hence suggests other factors at play. Specifically, the Dubai data show an initial drop in electricity consumption following 2011 reforms, but after three years demand stabilized. There may be several underlying reasons for this apparent contradiction to generally observed long run trends, such as the turnaround time for the large expat community. We also cannot rule out macroeconomic reasons, particularly the economic recovery in the UAE that ensued following the global crisis of 2008. Finally, long-term impacts may only become more visible once long-term investments in energy and water efficiency are made, for instance based on changing building standards. With regard to water consumption, we observed a major drop in water consumption amongst UAE nationals in Dubai, a trend which could have been reinforced by the fact that for the first time history nationals were paying for water. Net water consumption levels are still relatively high though, and water consumption levels too stabilized after roughly three years, prohibiting us to draw any final conclusions. At the same time, as a result of these initial reforms in the UAE, consumption of resources is increasingly paid for by consumers themselves and not the authorities, and that is an important step forward. As we discuss below, a next important step could be to give industries and electricity generators better incentives to use resources more efficiently.

The fact that natural gas prices have not been reformed is a missed opportunity.

This study has focused on reforms that have taken place, but we cannot neglect one major flaw in these efforts. As we indicated earlier in this paper, subsidies for natural gas, a feedstock for electricity generation, desalination, and manufacturing industries, amount to roughly 50 percent of all subsidies in the UAE. Unfortunately, these subsidies have to date remained untouched. As a result of low feedstock prices, there is no incentive for more efficient electricity production, even though most existing electricity plants could, with the right incentives, perform more efficiently.[30] During the course of our research, we got strong indications that natural gas is still viewed mostly as a waste product, and as a result thereof the national oil company is generally not interested in immediate reform. Large amounts of natural gas had historically been flared. For the associated gas that ADNOC delivers to the Abu Dhabi Water and Electricity Company, allegedly there is currently not even a supply contract with a stable delivery quantity or price. At the same time, it is important to note that increasingly more domestic natural gas reserves are expensive because of their high Sulphur content, and Abu Dhabi too is importing more natural gas (from Qatar). This is increasingly acknowledged by UAE policymakers, which in turn may signal an avenue for new, and necessary, reforms. As with power and water subsidies, the UAE will benefit greatly from identifying the true opportunity cost of high gas usage for power and water and then basing pricing policies and energy strategies accordingly. Even if increased liquefied natural gas (LNG) exports are not likely from the UAE (Abu Dhabi has been ex-

[30] For an in-depth study, see for instance Glada Lahn, Paul Stevens, and Felix Preston, *Saving Oil and Gas in the Gulf*, Chatham House, August 2013, https://www.chathamhouse.org/sites/files/chathamhouse/public/Research/Energy,%20Environment%20and%20Development/0813r_gulfoilandgas.pdf.

porting natural gas in the form of LNG since 1978), gas is a valuable feedstock for key UAE industries such as steel and petrochemicals. Therefore, utilizing precious gas resources for higher value products would be a positive move for the UAE as it continues forward with energy sector reform initiatives.

Conclusion

Subsidy reform has become a priority for many countries due to the high budgetary costs incurred and the often regressive nature of subsidies that limits effectiveness. The UAE has been a leader among GCC countries in its subsidy reform initiatives, having reduced or eliminated subsidies for electricity, water, petrol, and diesel in recent years. The lifting of subsidies for petrol and diesel in 2015 was supported by the recent and dramatic fall in international oil prices that has resulted in a situation where the lifting of subsidies has actually lowered prices for consumers, at least for now. We observe that the UAE have taken very meaningful initial steps in recent years to reform existing subsidy schemes. At the same time, we have concluded that not all reforms were as significant as may have been desirable and arguably more work remains to be done in the coming years. Unlike petrol and diesel subsidy reforms at the federal level, power and water subsidy reforms have taken place separately for the emirates of Abu Dhabi, Dubai, Sharjah, and the Northern Emirates. The most significant reforms have taken place in the emirate of Dubai although Abu Dhabi has taken the most recent positive steps. In both cases, there has not been a significant social backlash as a result of the reforms, although this must be qualified by the fact that the majority of the tariff increases have been levied on expatriate populations, rather than UAE nationals.

The transferability of the UAE approach to other hydrocarbon rich nations, particularly in the GCC, is not certain since the UAE is one of the wealthiest, and has the smallest indigenous population as a percentage of total population amongst all GCC countries and therefore a somewhat less challenging context than other Gulf countries, with the exception of perhaps Qatar. Nonetheless, the UAE initiatives underline that hydrocarbon wealth must be exploited for optimal purposes and that excludes indefinite underpricing of hydrocarbon resource utilization.

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