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Energy Price Reforms in the GCC—What Can Be Learned From International Experiences?

Prepared by Staff of the International Monetary Fund

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CONTENTS

EXECUTIVE SUMMARY[1]

Energy prices in the GCC countries are low by international standards. These low prices have co-existed with rapid economic development in the region over the past 50 years, but the costs of this policy have also risen in terms of very high energy usage per capita. Providing energy at low prices has also effectively absorbed resources that could otherwise have been invested in human and physical capital or saved for future generations. The implicit cost of low energy prices in the GCC, in terms of foregone revenue, is estimated to be around 5 percent of GDP (about 8 percent of non-oil GDP) this year.

GCC countries have been embarking on energy price reform in recent years. The recent decision of the UAE to remove fuel subsidies is an important initiative. Nevertheless, energy prices are generally still below international levels and differ substantially across the GCC countries. In most countries, further steps are needed to raise energy prices to reduce the growth in energy consumption and to support the fiscal adjustment that is necessary in the current lower oil price environment.

Evidence in this paper suggests the inflationary impact of higher energy prices in the GCC is likely to be small, and while there may be some adverse effect on growth in the near-term, over the longer-term the growth benefits should be positive. Given the low weight of energy products in the CPI, first round effects of higher energy prices should be limited, while well anchored inflation expectations should help prevent second-round effects. On growth, a gradual increase in energy prices should have a manageable impact on industrial activity, although energy intensive industries will be adversely affected and will need to adjust. In the longer-term energy price reforms could generate significant permanent real income gains for the economy as a whole.

More broadly, international experiences suggest that the likelihood of success with energy price reforms increases if the reforms are:

- Discussed with, and communicated to, stakeholders;
- Introduced gradually to allow consumers and energy intensive firms to adjust their consumption and production. This should also help minimize the inflationary impact;
- Appropriately sequenced to minimize the impact on poor households and allow time to strengthen the social protection system, including targeted mitigating measures;
- Resilient, to avoid a reversal of reforms. This could require a transparent rules-based mechanism for setting energy prices ranging from smoothing price mechanisms in the short and medium-term to full price liberalization over the longer-term.

[1] Prepared by Sergio Rodriguez, Malika Pant, and Juan Carlos Flores. Diana Kargbo-Sical provided editorial assistance.

A. Introduction

1. Energy prices in the GCC countries are low by international standards. These low prices have co-existed with the rapid economic development in the region over the past 50 years, but the costs of this policy have also risen in terms of very high energy usage per capita. Providing energy at low prices has also effectively absorbed resources that could otherwise have been invested in human and physical capital or saved for future generations. Furthermore, the drop in global oil prices has brought to the fore the need for fiscal adjustment. Energy price reform, which has started or is being considered in each GCC country, should be an important element of fiscal consolidation strategies going forward.

2. Energy price reforms, however, pose a number of challenges. Beneficiaries of low energy prices are reluctant to give up their benefits. Governments are concerned about the adverse impact of higher energy prices on poor households, inflation, and growth, as well as the potential for social discontent. In countries where energy-intensive sectors compete in domestic and foreign markets with international suppliers, policy makers are also worried about the adverse impact on competitiveness. Despite these challenges, GCC countries have been reforming energy prices in recent years, most recently in the UAE, but more needs to be done in most countries. As many countries have embarked on energy price reforms in recent years, the GCC countries can learn from this international experience.

3. This paper provides analytical elements to help GCC countries design and implement a successful energy price reform. It provides analysis on the possible inflation and growth consequences of energy price reforms in the GCC and also draws lessons for the GCC based on the international experience with reforms. The paper is organized as follows. Section B discusses energy efficiency in the GCC in terms of energy prices and consumption; it also discusses estimated costs for the economy from low energy prices, as well as other relevant consequences. Section C discusses recent energy price initiatives in the GCC and Section D summarizes the lessons for the GCC in light of international experience with energy price reform. Section E analyses the potential impact on inflation and economic growth from energy price reform in each of the GCC countries. The last section concludes.

B. Energy Prices and Their Impact in the GCC

4. Energy products in most GCC countries are sold considerably below international prices, with large price differences within the region. As in many other oil exporting countries, energy products in GCC countries are relatively cheap when compared with international prices (Table 1) despite the drop in international energy prices over the last year. Average gasoline and diesel prices in the GCC, except the UAE, are about 40 percent and 90 percent below pre-tax prices in the U.S., respectively. The largest difference in diesel and gasoline prices is in Saudi Arabia and the smallest in the UAE, where prices are significantly above prices in the rest of the GCC. Natural gas prices are also generally lower than prices in the U.S. The average pre-tax natural gas price in the U.S. of about $2.8 per MMBtu (average January-August 2015) compares with prices that range from

$0.75 per MMBtu (Qatar, Saudi Arabia, and the UAE) to $3 per MMBtu (Oman). Electricity tariffs are also low when compared with tariffs in the U.S. (again UAE is an exception).

Table 1. Prices for Energy Products: GCC and the USA
(January - August 2015)

	Gasoline	Diesel	Natural Gas	Electricity
	US dollars per liter		US dollars per MMBtu	US dollars per KWh
Bahrain	0.27	0.27	2.50	0.03
Kuwait	0.24	0.39	1.50	0.01
Oman	0.31	0.38	3.00	0.04
Qatar	0.27	0.27	0.75	0.05
Saudi Arabia	0.14	0.06	0.75	0.09
UAE	0.59	0.56	0.75	0.10
GCC Average	0.30	0.32	1.54	0.05
GCC Maximum	0.59	0.56	3.00	0.10
USA Pre-Tax	0.53	0.64	2.80	0.10

Sources: Prices in GCC countries come from GlobalPetrolPrices.com; government agencies; and country authorities. USA gasoline and diesel prices come from IEA. Natural gas price for the USA is spot prices at Henry Hub taken from World Bank Commodity Price Data. Electricity tariffs for the USA include taxes and come from US EIA. MMBtu stands for million British thermal units, KWh for Kilowatt-hour.

5. Low domestic energy prices represent a significant budget cost for the GCC economies. GCC governments, excluding Saudi Arabia, report an on-budget fiscal cost from low energy prices that is estimated at $16.2 billion in 2015 budgets (2.1 percent of GDP), of which Kuwait and UAE account for $11.6 billion (Table 2). While varying by country, in general budget fiscal costs reflect payments made to energy producing companies to compensate for the difference between production cost and the domestic selling price. Budget costs, however, do not include the loss of potential revenue or opportunity cost. A more comprehensive measure of the cost of low energy prices is the opportunity cost which could be estimated using the difference between a benchmark price –often the U.S. price– and the domestic energy price, scaled by consumption volumes.[2]

[2] See Koplow, D. (2009) and IMF (2013a) for a discussion of the price gap approach, including the attributes that the benchmark price should have. In general, when the energy product is traded internationally the benchmark price is given by an export price; when the product is not traded internationally, the appropriate benchmark is the cost-recovery price for the domestic producer, with inputs valued at their opportunity cost, including raw materials, labor, capital, and distribution costs. Using pre-tax prices, however, does not account for the environmental damage caused by high energy consumption. Using a price benchmark that accounted for environmental costs would lead to a larger estimated cost than shown in this paragraph. See Coady et al., 2015, for a comprehensive discussion of this issue.

Table 2. GCC Explicit Energy Cost in the 2015 Budget

	Billion of US dollars	Percent of GDP
Bahrain	1.1	3.6
Kuwait 1/	7.8	6.4
Oman	2.2	3.7
Qatar 2/	1.2	0.6
UAE	3.8	1.1
GCC 3/	16.2	2.1

Sources: Country authorities; and IMF staff estimates.
1/ Includes water subsidies.
2/ 2015 staff estimates are based on historical data.
3/ GCC total excludes Saudi Arabia.

6. The opportunity cost from low energy prices is significantly larger than the budget cost, with a lower bound estimate of 5.2 percent of GDP in 2015. The opportunity cost for the GCC is estimated at $111 billion in 2014 and $73 billion in 2015, using U.S. pre-tax prices as the international benchmark —equivalent to 6.8 percent and 5.2 percent of GDP for 2014 and 2015, respectively (Table 3). In terms of GDP the largest costs are estimated for Saudi Arabia and Kuwait, and the lowest for the UAE, with the differences in ranking explained by differences in the energy consumption mix and domestic prices. Estimated costs still amount to a significant 4.8 percent of GDP for the GCC in 2015 if prices were set at the maximum price in the region. Naturally, with higher benchmark (export) prices—which are country and market specific—the estimated opportunity cost would be larger. Estimated costs for the GCC are relatively large when compared with costs in other regions.[3]

7. In Bahrain and Kuwait, the estimated opportunity cost of low energy prices (using the price gap approach) was larger than public capital spending in 2014 (Figure 1). While in periods of high energy prices when financial resources are plentiful, this opportunity cost may be less of an issue (although low prices may still imply the current generation is using more of the resource than optimal), in periods of lower oil prices, there may be more significant trade-offs. Other things equal, higher domestic energy prices could support higher public investment or lower debt. More broadly, for a sample of 109 countries Ebeke and Lonkeng (2015) assess whether countries more prone to have low domestic energy prices also tend to have less public social spending. They find that public spending on education and health was on average 0.6 percentage point of GDP lower in countries where the opportunity cost of low energy prices was one percentage point of GDP higher.

[3]For instance, for 2011 when the average oil price was $104 per barrel (almost twice the estimated average for 2015 at $52 per barrel) IMF (2013a) reports estimated costs for Emerging and Developing Asia (1 percent of GDP), Central and Eastern Europe and Common Wealth of Independent States, CIS (1.5 percent of GDP), Latin America and the Caribbean (0.5 percent of GDP); estimates for the Middle East and North Africa, which includes the GCC, amounted to 8.5 percent of GDP.

8. Per capita energy consumption in the GCC has grown substantially and is among the highest in the world. GCC countries consumed 9.2 tonnes of oil equivalent (TOEs) per capita in 2014, which compares with a world average of 4 TOEs per capita. GCC countries rank among the largest consumers on a per capita basis in a sample of 67 countries, led by Qatar (23 tonnes per person) (Figure 2). GCC countries' energy consumption is not only currently high, but also it has been growing rapidly. In particular, energy consumption per capita in Qatar, Saudi Arabia, and the UAE has grown at an annual average rate of 2.6 percent, 2.5 percent, and 1.9 percent during the last 40 years –the average growth rate for countries with similar income per capita has been only 1 percent. While Kuwait's energy consumption growth is lower than its GCC peers (0.9 percent per year on average during the last 40 years), it compares with average negative growth in the UK, Germany, the USA, and Denmark.

Table 3. GCC: Opportunity Cost from Energy Products Priced Below Benchmark 1/

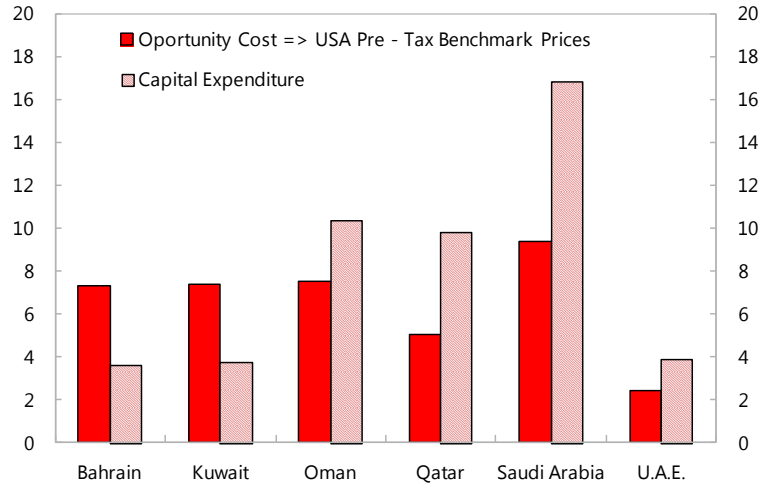
	Benchmark: USA Pre-Tax Prices			Benchmark: Maximum Price in GCC		
	2013	2014	2015	2013	2014	2015
	(Billions of US dollars)			(Billions of US dollars)		
GCC	102.4	111.1	72.5	58.4	61.6	67.6
Bahrain	2.1	2.5	1.6	1.2	1.3	1.5
Kuwait	12.0	12.7	9.3	8.7	9.0	8.7
Oman	5.2	5.8	2.8	2.6	2.7	2.6
Qatar	8.7	10.6	7.7	5.2	5.8	7.6
Saudi Arabia	66.0	69.9	47.3	38.9	40.9	44.1
UAE	8.3	9.6	3.8	1.9	2.0	3.0
	(Percent of GDP)			(Percent of GDP)		
GCC	6.3	6.8	5.2	3.6	3.8	4.8
Bahrain	6.4	7.3	5.1	3.5	3.8	4.9
Kuwait	6.8	7.4	7.2	4.9	5.2	6.8
Oman	6.8	7.5	4.6	3.4	3.5	4.1
Qatar	4.3	5.0	4.0	2.5	2.7	3.9
Saudi Arabia	8.9	9.4	7.4	5.2	5.5	6.9
UAE	2.1	2.4	1.1	0.5	0.5	0.9

Sources: Staff calculations with data from IEA, US EIAI, World Bank Commodity Price Data, GlobalPetrolPrices.com, and GCC countries' government agencies.

1/ Energy Products include gasoline, diesel, electricity, and natural gas. The set of energy products and the underlying assumptions about their consumption and international benchmark prices that are used to compute the overall cost estimates have been standardized across the 6 GCC countries to allow for cross-country comparison. Hence, the estimate for the opportunity cost of low energy prices may differ from those stated in IMF reports for individual GCC countries. Prices: for gasoline, price for premium unleaded (95 RON); for diesel, average prices for commercial and non-commercial use. Electricity tariffs for the USA, average all sectors. Natural gas price in the USA is Henry Hub price. Energy consumption data comes mainly from IEA for 2013, projected using non-oil GDP growth. 2014 energy consumption data for Saudi Arabia was provided by the authorities. Consumption of natural gas excludes the natural gas used as input to produce electricity.

Figure 1. Government Expenditure and Estimated Opportunity Cost from Low Energy Prices, 2014

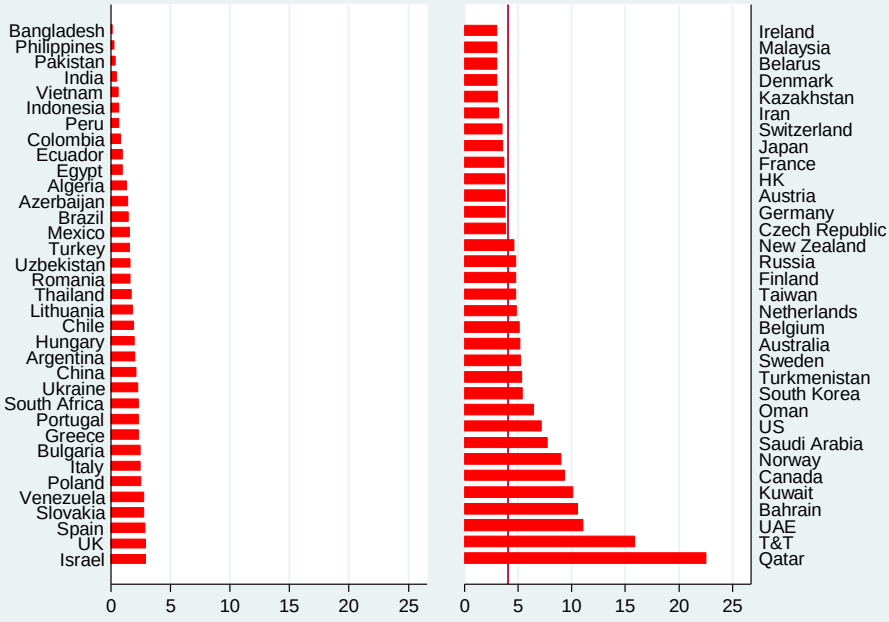
(In percent of GDP)



Sources: Country authorities; and IMF staff estimates.

Figure 2. Primary Energy Consumption Per Capita, 2014

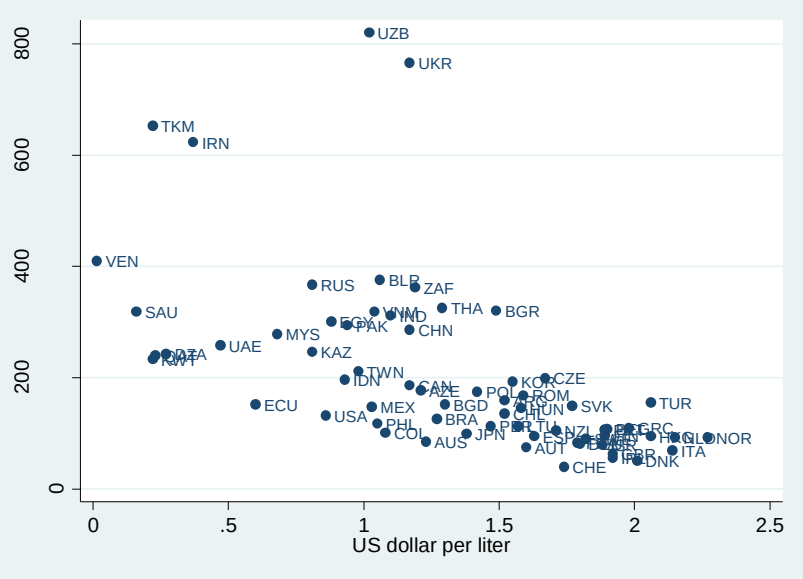
(Tonnes of oil equivalent, TOEs, per person;
average in sample is 4 TOEs per person)



Sources: British Petroleum Statistical Review of World Energy and IMF Staff Calculations

9. Relatively cheap energy has contributed to high energy consumption in GCC countries. While energy consumption is determined by several factors, including income, climate, and geography, there is a clear negative association between energy prices and energy consumed. The correlation between primary energy consumption per dollar of income produced and the price of gasoline and/or diesel (a proxy for the price of energy) is about 57 percent and strongly statistically significant using data for 2014 (Figure 3), suggesting that after controlling for income, countries with lower energy prices tend to consume more energy.[4]

Figure 3. Energy Consumption to GDP and Price of Energy, 2014



Sources: British Petroleum Statistical Review of World Energy; Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH; and IMF staff calculations.

10. Low domestic energy prices may also have held back the growth of skill intensive sectors as well as long-term economic diversification. Over the longer term, technology and factor endowments are key determinants of a country's output mix, such that countries relatively abundant in energy resources would tend to have relatively large energy intensive sectors and export relatively energy intensive products (see Leamer (1995) and Schott (2003)). Hence, it is not a surprise that GCC countries have relatively large energy intensive sectors—which are also capital intensive—and are net exporters of energy intensive commodities. In the short and medium term, low domestic energy prices reduce production costs and create incentives for expanding production

[4] In fact, regressing energy consumption per unit of GDP against the price of gasoline (in natural logarithms) produces an estimated price elasticity of minus 0.5, with confidence interval of (-0.62, -0.28) –in line with other estimates in the literature; note that this estimate imposes income elasticity equal to one. See Charap et al. (2013) for a more comprehensive analysis of energy consumption elasticities, which takes into account other variables such as climate. In particular, they find that having a winter (summer) period that is on average 10 degrees Celsius colder (hotter) will increase energy consumption by 2.9 (2.6) percent.

in energy intensive industries. However, the expansion of energy intensive activities absorbs capital that could have been used to expand other sectors, including skill intensive sectors. This might help to explain why skill intensive sectors, including those that could be engines of economic diversification, have not grown as much as they could have if a policy that favors low domestic energy prices had not been in place.

11. Higher-income households tend to be the main beneficiaries of low domestic energy prices. International experience shows that generalized support programs for energy products do not always reach the most vulnerable segments of the population and are not particularly effective at redistributing income. The World Bank reports that the poorest 25 percent of the population in countries like Egypt, Jordan, Mauritania, Morocco, and Yemen, received only 1–7 percent of the resources used to support diesel consumption. In Egypt, the poorest 40 percent of the population received only a modest amount of the resources used to support consumption of energy products (3 percent for gasoline, 7 percent for natural gas, and 10 percent for diesel). IMF (2014) reports that in Jordan amount of resources to support energy consumption received by the richest quintile were about 20 percentage points higher than those received by the poorest quintile. IMF (2013) indicates that the leakage of program resources to rich households was most pronounced in the cases of gasoline and diesel, where the richest quintile received nearly 20 (6) times more resources when consuming gasoline (diesel) than the poorest quintile. The IEA (2011) reports that the poorest 20 percent of households receive only about one tenth of the resources spent to keep prices low for natural gas and electricity.

12. High energy consumption places GCC countries among the world largest emitters of carbon dioxide per capita. World average carbon dioxide emissions per capita was about 10 tonnes in 2014; except for Trinidad and Tobago, GCC countries are the largest carbon dioxide emitters on a per capita basis. Qatar is the largest emitter (56 tonnes per person, tpp), followed by the UAE (29 tpp), Kuwait (28 tpp), and Bahrain (22 tpp). These emission rates are even more striking given that GCC countries use little coal, the most carbon intensive fuel. The magnitude of carbon dioxide emissions per capita points to the existence of significant environmental distortions, including health impacts on GCC residents, which could be reduced through adjustment in domestic energy prices.[5]

13. Low domestic energy prices also create opportunities for smuggling and black markets. If domestic prices are substantially lower than those in neighboring countries, there are strong incentives to smuggle products to higher-priced destinations (see Heggie and Vickers (1998) and IMF (2014), which increases the opportunity cost for the country with lower prices, including administrative cost.

[5] See Coady et al. (2015) for a discussion and estimation of the costs associated with the environmental damage created by energy consumption. The authors conclude that in many countries domestic energy prices do not reflect the cost of domestic environmental damage, which suggests that unilateral reform of energy prices is mostly in countries' own interest.

C. Recent Energy Price Initiatives in the GCC

14. Energy price reforms have started in the GCC, albeit at varying pace (Table 4). Most recently, the UAE reformed the fuel pricing policy by adopting a mechanism to adjust monthly gasoline and diesel prices against an international benchmark price; previously, the UAE had increased electricity tariffs. Qatar has also increased fuel and electricity prices. Kuwait has increased diesel and kerosene prices and is studying increasing gasoline and electricity prices. Bahrain and Saudi Arabia have increased electricity tariffs for industries, while Oman and Bahrain have increased the price of natural gas for industrial users. Despite these reforms differences in domestic energy prices across the region are still significant.

Table 4. Recent Energy Price Reforms in the GCC

Bahrain	Gas price for existing industrial customers was increased 50 percent starting in January 2012, from $1.50 to $2.25 per mmbtu, while the price for new industrial customers remained at $2.50 per mmbtu (prices for new customers were increased from $1.30 to $2.50 In April 2010). In March 2015 the authorities announced annual increases of $0.25 per mmbtu in the gas price for industrial user starting in April 1, 2015 until the price reaches $4.0 per mmbtu by April 2021. In March 2015 the authorities increased the fuel price in marine stations. The electricity and water tariff structure was adjusted for non-domestic users, increasing tariffs for higher consumption levels (October 2013).
Kuwait	A study on the impact of a differentiated electricity and water tariff structure was completed in 2014. Kuwait doubled the price of diesel prices in January 2015.
Oman	An energy sector study is ongoing, with a view to gradually reducing the overall fuel subsidy. In January 2015, the industrial price for natural gas has doubled.
Qatar	Qatar raised the pump prices of gasoline by 25 percent and of diesel by 30 percent in January 2011. Diesel prices were again raised in May 2014, by 50 percent. Water and electricity prices were raised and tiered according to consumption in October 2015.
Saudi Arabia	Saudi Arabia increased the average price of electricity sold to nonindividual users by over 20 percent on July 1, 2010.
UAE	The UAE increased gasoline prices in 2010 to the highest level in the GCC. In August 2015 the UAE reformed the fuel pricing policy by adopting a mechanism to adjust monthly gasoline and diesel prices against an international price benchmark; with the reform gasoline prices were increased 25 percent and diesel prices were reduced 29 percent. Abu Dhabi is developing a comprehensive electricity and water consumption strategy, which led to an increase in tariffs in January 2015 (by 170 percent for water and 40 percent for electricity). Dubai raised water and electricity tariffs by 15 percent in early 2011.

Source: Country authorities.

15. Besides price reforms, GCC countries have also embarked on non-price measures to address their energy challenges. In particular, all GCC countries have begun to investigate and implement policies to improve energy efficiency. Saudi Arabia, UAE, and Qatar have set-up independent bodies to overlook energy efficiency awareness programs for energy users and have established tougher building codes and appliance standards. Many GCC countries have also started exploring the feasibility of generating electricity through renewable sources to meet additional energy demand in the future and curb carbon dioxide emissions. However, low energy prices are

considered one of the biggest obstacles to increasing investments to improve energy efficiency.[6] Furthermore, energy efficiency policies may be less effective than higher fuel prices as they do not reduce vehicle miles travelled, which accounts for around half of the long-run fuel demand elasticity (as documented for the U.S. by Small and Van Dender (2006)).

D. International Experience with Energy Price Reform: Lessons for the GCC

16. International experience suggests there are several main elements of successful energy price reforms. IMF (2013a) summarizes findings of 22 country case studies covering 28 major energy price reform episodes over the past two decades (early 1990s – 2010s). Twelve reform episodes were classified as a success, 11 as a partial success —often because of reversals or incomplete implementation— and five as unsuccessful.[7] Fourteen case studies address fuel price reform, seven electricity sector reform, and one involves coal sector reform. These case studies suggest that the elements discussed below can increase the likelihood of a successful energy price reform and help avoid policy reversals. Box 1 briefly summarizes the main events characterizing Indonesia's and Malaysia's successful reform episodes.

- **A comprehensive energy sector reform plan**: the reform strategy should be formulated in consultation with stakeholders, establish clear long-term objectives –including a sustainable approach to energy pricing, assess the likely impact of the reform on various stakeholders, and identify measures to mitigate adverse reform impacts.

  Ten out of 23 successful or partially successful episodes (44 percent) engaged in reforms addressed the points above. Reform episodes in this category include Armenia, Brazil, Kenya, Ghana, Iran, Namibia, Niger, Philippines (1996 and 2001), and Turkey.

- **An extensive communication strategy**: A well-planned communication campaign is essential to help generate broad political and public support, and should be undertaken throughout the reform process. The campaign should inform the public of the cost of current policies and the benefits of the reform, including how costs are financed and the budgetary savings generated to finance high-priority spending or reduce debt.

  In 17 out of 28 episodes (60 percent), the lack of information regarding the magnitude and shortcomings of energy price distortions was a barrier to reform (Ghana, Mexico, Nigeria, Philippines, Uganda, Yemen, and Uganda). Information campaigns underpinned the success of reforms in Armenia, Ghana, Iran, Namibia, Philippines, South Africa, and Uganda. Furthermore,

[6] Meltzer, J., Hultman, N., and Langley, C., (2014). "Low-Carbon Energy Transitions in Qatar and the GCC Region," Brookings Institution, February.

[7] Successful cases are those where countries implemented reforms that led to a permanent and sustained reduction of subsidies; partially successful cases are those that achieved a reduction of subsidies for at least a year, but where subsidies have reemerged or remain a policy issue; unsuccessful cases are those where energy price reforms failed, with price increases or efforts to improve efficiency in the energy sector being rolled back soon after the reform began.

IMF (2011a) found that the likelihood of success almost tripled with strong public support and proactive public communication.

- **Appropriately phased and sequenced price increases:** This element will depend on a number of factors, including the magnitude of the price increase, the fiscal position, the political and social context in which the reform is taking place, and the time needed to develop an effective communication strategy and social safety nets. A phased approach to reform provides time to households and firms to adjust and helps reduce the impact of the reform on inflation, whereas a large increase in energy prices can generate opposition to reform. However, a gradual reform reduces budgetary savings in the short-term and runs the risk of providing space to build up opposition to the reform.

  Seventeen out of the 23 reform episodes (74 percent) that were successful or partially successful involved a phased reduction of subsidies; seven out of 28 reform episodes sequenced price increases across energy products, focusing initial price increases in products consumed more by higher-income groups and industry. Reform countries include Brazil, Iran, Kenya, Namibia, Peru, and Uganda.

- **Targeted mitigating measures:** Well-targeted measures to mitigate the impact of energy price increases on the poor are critical for building support for reforms. Mitigating measures include cash transfers, vouchers, and expansion of social programs. The degree of mitigation should balance the trade-offs between fiscal savings, capacity to target, and the need to achieve broad acceptance of the reform.

  Eighteen out of 28 reform episodes (65 percent) relied on targeted mitigating measures. Targeted cash transfers to protect poor households were used in nine out of 28 reform episodes. In 15 reform episodes social programs already in place were expanded to protect the poor. In Indonesia and Armenia, transfer programs were an important component to gain support for the reform. Mitigating measures to help the productive sector include gradual adjustment in prices (for instance, electricity tariffs in Jordan, and natural gas in Bahrain), and financial support to selected enterprises to reduce energy intensity (Iran).

- **Depoliticize energy pricing**: Successful and durable reforms require a depoliticized mechanism for setting energy prices, which range between full price liberalization (prices are aligned and move freely with international prices) and automatic pricing mechanisms through a pricing formula that reflects international prices (Box 2). Automatic price mechanisms can help reduce the chances of reform reversal and can facilitate the transition to a fully liberalized pricing regime.

  Eleven reform episodes in the sample (40 percent) were not considered fully successful because after having implemented successful energy price reforms, relatively low domestic prices reappeared due to unwillingness to pass through continued increases in international oil prices. Examples of successful automatic price mechanism implementations include South Africa (five decades), Philippines and Turkey (as transition to liberalization of fuel prices). Other countries include Chile, Colombia, Malawi, Nigeria, Peru, Thailand and Vietnam. A number of countries that

successfully reformed energy prices, including Armenia, Kenya, Philippines, and Turkey gave the responsibility to an independent agency for reforming and regulating energy prices.

- **Improve efficiency of state-owned energy producers**: Improving the efficiency of SOEs reduces the fiscal burden of the energy sector and could help to address public concerns about lack of government credibility and administrative capacity, as well as opposition to the reform from interest groups within SOEs. These barriers could be significant, particularly in countries with history of widespread corruption, lack of transparency in the conduct of public policy, and perceived inefficiencies in public spending.

  Lack of credibility was seen as an important factor behind less successful reforms in Indonesia (2003) and Nigeria (2011), while labor unions in the electricity sector prevented a successful electricity sector reform in Mexico (1999, 2001, 2002).

Box 1. Energy Price Reform in Indonesia and Malaysia[1/]

Indonesia

Reforming energy subsidies in Indonesia has been challenging. The Indonesian authorities have implemented several measures since 1997 to reduce subsidies with mixed success:

- In the aftermath of the 1997 Asian financial crisis, the government attempted to cut energy subsidies by increasing the prices of diesel and gasoline by 60 percent and 71 percent, respectively. The attempt was not successful as the announced increases in fuel prices were too large.
- In 2000-01, fuel prices were raised for households and industries and in 2003, the government attempted to introduce an automatic pricing mechanism. Reforms were poorly communicated, and some of the announced compensation programs did not materialize; the government was forced to roll back some of the price increases and discontinue the implementation of the automatic pricing mechanism.
- In 2008, with international fuel prices at their peak, domestic fuel prices were successfully raised (by 29 percent on average) and subsidies to larger industrial electricity consumers were discontinued.
- In 2010, the government announced plans for removing fuel subsidies in the period ahead, but at the end of the year, budget allocations for subsidized fuel consumption were raised.
- In 2013, the government raised fuel prices by 44 percent for gasoline and 22 percent for diesel. Electricity tariffs were increased for almost all types of customers—the increase in tariffs was levied every three months up to total capped increase of 15 percent year-on-year.
- In December 2014, the government announced the removal of gasoline subsidies and introduction of fixed per-liter subsidy for diesel, effective on January 1, 2015. Because of lower international oil prices, gasoline and diesel prices were actually reduced in January 2015. A new pricing mechanism was introduced: (i) gasoline to be sold at market prices and the price of diesel adjusts to changes in market prices and the exchange rate (to maintain the fixed per-liter subsidy), and (ii) price changes to be announced every two to four weeks. Nevertheless, implementation of the new pricing system has been uneven, with fuel prices kept unchanged since April 2015. The government has started raising electricity tariffs on a monthly basis while publishing monthly electricity tariff since May 2014. Tariffs for small- and medium-size retail users are still subsidized.

Box 1. Energy Price Reform in Indonesia and Malaysia (concluded)

Programs to protect the poor were introduced to accompany the energy subsidy reforms. The 2014 fuel subsidy reform was accompanied by compensating measures such as unconditional cash transfer payments targeted at poor households, including through the Poor Student Education Support program, the Hopeful Family Program conditional cash transfer, and the Productive Family Program, which cover education, financial assistance, and healthcare support implemented with card technologies. The government aimed to use savings from fuel subsidy reform to increase social and infrastructure spending.

Malaysia

Starting in 2010, the government indicated its intention to reform energy subsidies and replace universal subsidies with targeted cash transfers and it initiated reform of some fuel prices. The pace of reform was accelerated by first gradually raising prices for remaining subsidized fuels (2013-14) and most recently (April 2015) by liberalizing (floating) diesel and gasoline prices. In anticipation of substantially lower oil- and gas-related budget revenues the authorities brought forward by nearly two years the process of price rationalization that began in 2010. The reform plan constituted the second pillar in Malaysia's medium-term fiscal adjustment and reform strategy.

With the removal of gasoline and diesel subsidies, a 15 percent increase in electricity prices in January 2014, and the removal of sugar subsidies, the authorities are closer to eliminating untargeted price subsidies. LPG use in the fishing and transportation sectors is still subsidized at an estimated cost of RM 2 billion (0.2 percent of GDP) in 2015. To mitigate the impact of subsidy rationalization and GST, the 2015 budget calls for increased cash transfers to poorer households (those earning less than RM 4,000 per month). The authorities are also reviewing overlapping and fragmented cash transfer programs.

Lessons

The Indonesian and Malaysian experiences present interesting lessons. First, excessively rapid reduction of subsidies can generate opposition to reform. Second, durable and successful reform requires a long-term commitment to it. Third, ad hoc price adjustments and the inability to depoliticize pricing policy will likely lead to the reemergence of subsidies. Fourth, targeted cash transfers can reduce opposition to subsidy reform and assist the poor. Fifth, effectively communicating the reform objectives and planned mitigating measures to the public can help promote the acceptance of reforms.

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1/ Based on *Case Studies on Energy Subsidy Reform: Lessons and Implications*, IMF (2013); *Indonesia Energy Subsidy Review*, GSI/IISD (2014); *Indonesia Energy Subsidy Briefing*, GSI/IISD (2015). IMF (2015)

Box 2. Automatic Price Setting Mechanisms [1/]

Over the longer term, energy price reform should aim to fully liberalize the pricing regime. This policy tends to be more robust to the reintroduction of price distortions than other pricing policies, including automatic price setting mechanisms. However, an automatic price setting mechanism, including with technical decisions on prices delegated to an independent body, could pave the way for a fully liberalized pricing regime.

Automatic pricing mechanisms are intended to fully transmit price fluctuations in international prices to domestic retail prices. They avoid an *ad hoc* approach to fuel pricing where governments change prices at irregular intervals and could incorporate smoothing rules to avoid excessive price volatility. Implementing an automatic pricing mechanism requires specifying the price structure (pricing formula) to link international and domestic prices, the timeline for updating the components of the price structure, and a rule determining when retail prices are changed and by how much.

The most common types of smoothing mechanisms include:

- Moving Average Mechanisms (MA): Retail price adjustments are based on changes in the average of past international prices, where the period to calculate averages could be set in days, weeks, or months. Longer averaging periods tend to reduce the magnitude of prices changes.

- Price Band Mechanisms (PB): A maximum limit is set on the retail price variation (a cap). If the required retail price increase is larger than the cap, the maximum allowed increase is implemented. If the implied price increase is below the cap, then the full adjustment is allowed.

Examples of countries that have adopted automatic price mechanism include: Jordan resumed a monthly fuel price adjustment mechanism in January 2013; Tunisia increased fuel prices on an ad hoc basis in 2012–13 and re-introduced an automatic price formula for gasoline in January 2014 to allow for future convergence to international prices over time; Mauritania adopted a new automatic diesel price formula in May 2012; Morocco started implementation of a partial indexation mechanism for certain petroleum products in September 2013, eliminated regulating gasoline and industrial fuel prices in January 2014, and introduced bimonthly reviews of these prices; and Cote d'Ivoire, which used to have fixed prices for fuel products, adopted an automatic pricing mechanism with smoothing in 2013. In August 2015 the UAE introduced a price mechanism to set monthly gasoline and diesel prices based on international prices.

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1/ See Baig et al (2007), Bridel et al. (2014), Coady et al. (2012), and IMF (2014).

E. What to Expect from Energy Price Reform in the GCC

17. Energy price reforms will impact inflation and the productive sector, particularly in the near-term. These two issues are considered below, with the analysis suggesting that the inflation impact is likely to be small and, while there may be some negative impact on growth in the short-term, growth is likely to benefit in the longer term.

Inflationary Pressures

18. The pass-through of higher energy prices to overall inflation is determined by the share of energy products in the consumption basket, how well inflation expectations are anchored, and by the magnitude of the increase in energy prices. For a given increase in energy prices, the higher the share of energy products in the consumption basket –typically captured by their weight in the consumer price index (CPI) – the higher the first-round effects on headline inflation. If inflation expectations are well anchored, they should respond little to higher energy prices, and the second-round impact on inflation should be limited as discussed in IMF (2011b) and IMF (2014). However, the larger the adjustment in energy prices, the larger the first-round effects on inflation and the higher the chances that inflationary expectations may be affected by the energy price reform.

19. Cross country experience suggests that the pass-through of energy price increases to headline inflation could be relatively small. While there is limited evidence on the propagation of domestic energy prices changes to headline inflation, the empirical work that assesses the inflationary impact of global energy price shocks on the CPI suggest that the impact is relatively small. Studies estimate that a ten percent increase in global oil prices increases headline inflation by between 0.5 and 1.4 percentage points (See for instance Ghezzi et al (2011) and De Gregorio (2012); IMF (2011) reports that the median pass-through of an oil price shock to transportation prices is 0.13 percent for advanced economies and 0.17 percent for emerging and developing economies.

20. In the GCC, the first-round effects from energy price reform on inflation are likely to be low given the weight of energy products in the CPI. Disaggregated data for Bahrain, Kuwait, and Saudi Arabia indicate that the importance of energy products in the CPI is relatively small, particularly when compared with other countries (Table 5), suggesting that higher prices for energy products would have limited direct impacts on the CPI.[8] Indirect impacts would also be limited; for example, Table 5 shows that other products/services that are relatively intensive in the use of energy, particularly transportation services, also have a relatively low weight in the CPI. For instance, gasoline and diesel –products included in the sub-index Transport, account for 1.79 percent and 3.26 percent of the CPI in Kuwait and Bahrain, respectively. A 10 percent increase in the price of gasoline and diesel would increase inflation by 0.2 percentage points (pp) in Kuwait and 0.3 pp in Bahrain. In Saudi Arabia the first-round impacts are expected to be lower than in Kuwait given the lower relative importance of households' spending in these items. If electricity tariffs –captured in the sub-index Housing and Utilities, were increased 10 percent, CPI will increase 0.04 pp in Kuwait, and 0.2 pp in Bahrain and Saudi Arabia.

[8] Weights in the CPI reflect both prices and amounts consumed. Low prices of energy products tend to reduce spending and CPI weights. Given the relatively low price elasticity for energy products it is expected that spending on energy products would increase if energy prices were raised.

Table 5. Weights of Energy Products in the CPI, in Percent 1/

CPI Item	Bahrain	Kuwait	Saudi Arabia 2/	Brazil	Korea	Malaysia	Mexico	Poland	Peru
Housing									
Electricity, gas and other fuels	2.02	0.53	1.83	5.23	4.80	3.34	4.54	12.04	4.44
Electricity	1.73	0.35	1.59	4.08	2.05	2.88	2.81	4.42	2.95
Gas	0.27	0.12	0.18	1.15	2.23	0.46	1.73	2.53	1.50
Other fuels	0.02	0.05	0.07	0.01	0.52	0.00	--	5.09	--
Transport									
Fuels and lubricants	3.42	2.11	1.46	5.00	5.22	8.77	4.34	6.70	1.30
Gasoline/Diesel	3.26	1.79	--	4.89	--	--	4.24	5.46	--
Lubricants	0.16	0.31	--	0.10	--	--	0.10	1.24	--
Energy Products	5.44	2.63	3.29	10.23	10.02	12.11	8.88	18.74	5.74
Memo items									
Water	0.27	0.81	0.35	1.46	0.78	1.14	--	--	1.64
Transport services	1.31	1.64	0.81	18.26	2.50	0.94	13.58	1.10	--
by road	0.53	0.22	--	18.25	1.65	0.76	13.30	--	--
by air	0.77	1.42	--	--	--	0.11	0.28	--	--
by sea	0.01	0.01	--	0.01	--	0.07	--	--	--

Sources: Haver; Central Informatics Organization, Bahrain; and country authorities.
1/ CPI Base years are 2005 (Poland), 2006 (Bahrain, Brazil), 2007 (Kuwait), 2009 (Peru), and 2010 (Korea, Malaysia, Mexico).
2/ Weights calculated based on average monthly household expenditure by expenditure group.
Note: "---" indicates "Data Not Available".

21. The inflation response to previous domestic price shocks also suggests a modest impact on domestic inflation if energy prices were raised in the GCC. In particular, monthly inflation shocks to CPI sub-indices Housing and Transport -which include energy products, do not seem to translate into higher headline monthly inflation during the 12 months after a shock occurred –i.e. first round effects are modest and propagation effects are limited.[9] Results indicate that on average when an inflation shock to Housing or Transport occurs, headline inflation remains broadly similar before and after the shock, suggesting that monthly headline inflation is not materially affected by the shock. Table 6 summarizes these findings. For instance, for Bahrain, it indicates that the average monthly shock to Housing (i.e. the average for the top decile monthly changes in the CPI sub-index "Housing") was 3.02 percent; average headline monthly inflation when shocks occurred was 0.81 percent; average headline monthly inflation before and after the shock was 0.21 percent, indicating that headline monthly inflation after a price shock to Housing occurs is the same (on average) than before the shock, i.e. the price shocks to Housing did not seem to affect

[9] Monthly inflation is defined as the percent change in prices in one month with respect to the previous month. Domestic inflation shocks were selected as follows: for each CPI sub-index monthly inflation was calculated during the sample period, which varies between 11 and 6 years, depending on data availability for each country. For each sub-index (e.g. Transport) the 10 percent largest monthly price changes were defined as "shocks". Each shock was compared with monthly headline inflation during the 12 months after and before the price shock occurred. For instance, let's assume that one of the largest monthly price changes in Transport prices occurred in March 2008. To assess whether the shock to Transport prices in Mach 2008 had an impact on headline inflation, the exercise looks at headline monthly inflation between March 2007 – February 2008 (12 months before the price shock) and between April 2008 – March 2009 (12 months after the price shock). If monthly headline inflation is broadly the same before and after the identified shock to transport prices, then the finding would suggest that the shock to transport prices did not propagate into headline inflation.

headline inflation. Differences between average inflation before and after the shock were not statistically significant, except for Transport in Qatar and Housing in the UAE.

Table 6. Average Domestic Monthly Price Shocks to Housing, Transport and Headline Inflation

(Monthly price changes in percent)

	Domestic Price Shock	Headline Inflation when the Shock Occurs	Average Headline Inflation during the 12 Months	
			Before the Shock	After the Shock
Bahrain				
Housing	3.02	0.81	0.21	0.21
Transport	2.31	0.28	0.13	0.17
Kuwait				
Housing	2.67	1.21	0.41	0.47
Transport	1.75	0.96	0.41	0.44
Oman				
Housing	1.49	0.74	0.74	0.48
Transport	1.48	0.83	0.46	0.39
Qatar				
Housing	0.97	0.35	0.22	0.20
Transport *	1.74	0.36	-0.06	0.15
Saudi Arabia				
Housing	1.35	0.22	0.32	0.39
Transport	1.39	0.46	0.36	0.32
UAE				
Housing *	1.68	0.77	0.25	0.08
Transport	1.64	0.41	0.15	0.13

Sources: IMF staff calculations with data from Haver; and country authorities.

* Statistically significant differences at 5 percent significance level. See footnote 10 for details about calculations.

22. The increase in diesel prices in Kuwait in January 2015, and gasoline prices in the UAE in August 2015, did not have a noticeable impact on headline inflation. While assessing the pass-through of diesel prices to headline inflation would require a more detailed and technical analysis, the 100 percent increase in diesel prices in Kuwait in January 2015 had no significant impact on inflation (data as of July 2015); transport prices did not increase in January, fell in March, and were flat in July, with no apparent changes in the headline inflation pattern when compared with the second half of 2014. More recently, the gasoline price increase of 25 percent in the UAE in August 2015 –combined with a 29 percent reduction in the price of diesel, had a modest impact on annual inflation (4.4 percent in July versus 4.9 percent in August).

Short–term impact on growth

23. Initially, an increase in domestic energy prices represents a negative shock to the productive sector. The increase in energy prices would increase production costs, particularly in energy intensive sectors such as aluminum, chemicals, metals, mining, plastics, petroleum refining, and steel. Firms in export oriented sectors, which are price takers in global markets, are likely to be particularly affected since they would have difficulty passing on the increase in costs to consumers.

Affected firms would see reduced profits and/or would need to increase the efficiency of their production process to compensate for higher energy costs. Economy wide, other things equal, an energy price reform may be equivalent to a reduction in spending, which would adversely affect economic activity.

24. Evidence for Kuwait suggests that transport sectors, particularly transport by air and water, would be the most impacted sectors if energy prices were increased. The transport sector is the largest consumer of fuel and oil products. For instance, if fuel and oil product prices increase by 10 percent, the increment in energy cost would be about 30 percent of value added for sea transport and 10 percent of value added for air transport. Other activities that could be most affected include: renting of construction equipment, manufacturing of basic metals, and nonmetallic products. The existence of energy intensive sectors favors adopting a gradual approach for raising energy prices, particularly if higher prices could generate systemic impacts. Aluminum Bahrain's (ALBA) experience with recently increased gas prices suggest that a gradual increase could be manageable (Box 3).

Box 3. Aluminum Bahrain's (ALBA) Experience with Higher Natural Gas Prices

A gradual increase in energy prices could have a manageable impact on industrial activity. This is suggested by Aluminum Bahrain's (ALBA) experience with announced higher natural gas prices starting in April 2015 (Table 4).

At current consumption rates, the estimated annual cost impact on ALBA from higher natural gas prices is about $30 million (ALBA Press Release, January 29, 2015). Based on 2014 financial statements, the impact represents 1.7 percent of the cost of sales and 12.1 percent of net profits; higher profits during the first semester of 2015, in line with efficiency improvements in recent years, suggest a lower impact in terms of profits of about 8.7 percent (the impact in terms of cost of sales is about the same, 1.8 percent). Aluminum production has not been affected.

The reaction of ALBA stock price also suggests that the impact for the company is manageable. The day before ALBA released its assessment on the cost impact of higher gas prices (the exact day the stock market knew about the gas price increase is not clear) ALBA's stock price fell 1.21 percent –which compares with average daily returns of minus 0.09 percent during the month before the press release. The stock price change, however, does not appear to be out of line in light of daily returns volatility; the price change falls within the range set by average daily return plus/minus two standard deviations during the month before the press release. In fact, price changes for other aluminum companies also fell within the range set by the average daily returns plus/minus two standard deviations.

Longer–term impact on growth

25. In the longer-term energy price reform has a positive effect on growth. Lower price distortions increase the efficiency for using resources in the economy, including through more rational energy use, higher export revenues and/or lower import bills, and combined with a stronger budget structure create an environment conducive to economic growth. In the longer term, firms that are not competitive at higher energy prices will need to adjust, and the capital and labor currently employed in such activities would need to be relocated to more efficient activities.

26. While difficult to quantify, estimates suggest that the GCC could generate permanent real income gains between 1.0 and 1.4 percent of GDP (between $14 and 20 billion) if the price gaps are closed. Estimated gains represent the efficiency gain for the economy from increasing domestic prices to an international benchmark; it assumes that energy consumption price elasticity is in the range (-0.3, -0.5) and consumers are fully compensated, with the compensation being equal to the consumer surplus lost due to higher prices and lower amounts of energy products consumed. Annex 1 describes the methodology to estimate efficiency gains. Using US pre-tax prices as the international benchmark, the estimated gains in percent of GDP for 2015 are the lowest in the UAE (0.1-0.2) and Oman (0.4-0.7), and the largest in Saudi Arabia (1.5-2.1) and Kuwait (1.6-2.2); estimated gains in Qatar and Bahrain are (0.5-0.8) and (0.6-0.9), respectively (Table 7). Real income gains for the GCC would be in the range of 0.9-1.3 percent of GDP using maximum prices prevailing in the GCC as the benchmark.

27. If income gains from the reform were invested, GCC GDP could increase further. The average return on equity in the GCC corporate sector (2013-2014) varies between 3.7 percent in Kuwait and 14.3 percent in Qatar, with an average rate in the region of about 8.8 percent.[10] If GCC countries invest the income gained at a return similar to the return in the corporate sector, investments would generate between $1 billion and $1.5 billion of additional income (using 2015 GDP as reference). Saudi Arabia would receive the largest income from investments (between $0.7 billion and $1 billion) and the UAE the lowest (less than $0.05 billion), mainly due to the size of their gains from the reform.[11] Nevertheless, these gains are still smaller than the welfare gains estimated in Coady et al. (2015) from increasing post-tax energy prices to a level that accounts for externalities effects. For the MENA region in aggregate, these gains are estimated at 4.7 percent of regional GDP.

[10] Average (2013 -2014) corporate sector return on equity for Bahrain is 8.3 percent; for Kuwait, 3.7 percent; for Oman, 11.9 percent; for Qatar, 14.3 percent; for Saudi Arabia, 7.5 percent; for the UAE, 7.1 percent. See Corporate Vulnerability Utility, IMF.

[11] A more appropriate rate of return to assess the contribution to growth from an energy price reform would be the economic opportunity cost of capital, the weighted average of the return to capital in the private sector and the return on savings, the return of return used to assess public investment projects in several countries.

Table 7. Estimated Income Gain and Return on Income if Domestic Energy is Priced at Benchmark

	Income Gain if Price Elasticity is				Return on Income Gain if Price Elasticity is			
	-0.3	-0.5	-0.3	-0.5	-0.3	-0.5	-0.3	-0.5
	2014		2015		2014		2015	
	(Percent of GDP)							
GCC	1.4	2.0	1.0	1.4	0.11	0.15	0.07	0.10
Bahrain	0.9	1.4	0.6	0.9	0.08	0.12	0.05	0.08
Kuwait	1.6	2.3	1.6	2.2	0.06	0.08	0.06	0.08
Oman	0.9	1.4	0.4	0.7	0.11	0.17	0.05	0.08
Qatar	0.8	1.2	0.5	0.8	0.12	0.17	0.07	0.11
Saudi Arabia	2.2	3.0	1.5	2.1	0.17	0.23	0.12	0.16
UAE	0.3	0.5	0.1	0.2	0.02	0.03	0.01	0.01
	(Billions of US dollars)							
GCC	23.3	32.4	13.8	19.4	1.80	2.51	1.04	1.47
Bahrain	0.3	0.5	0.2	0.3	0.03	0.04	0.02	0.02
Kuwait	2.8	3.9	2.0	2.8	0.10	0.14	0.08	0.10
Oman	0.7	1.1	0.3	0.4	0.09	0.13	0.03	0.05
Qatar	1.8	2.6	1.0	1.5	0.25	0.37	0.14	0.22
Saudi Arabia	16.4	22.5	9.8	13.7	1.24	1.70	0.74	1.03
UAE	1.2	1.8	0.5	0.7	0.09	0.13	0.03	0.05

Source: IMF staff calculations.
Income gain is calculated as one half of the opportunity cost times the percent change in quantity consumed of energy products that result from higher prices. The opportunity cost is the difference between benchmark price and domestic price times the amount consumed of energy product. The percent change in quantity consumed is calculated as the ratio of world prices to domestic prices raised to the price elasticity minus one. See Annex I for further details.

28. Given the short-term costs, but longer-term benefits of energy price reforms for growth, the authorities should phase-in the reforms at a gradual pace and if needed provide temporary support to the productive sector. For balancing benefits and costs, gradual energy price increases could help the productive sector to adjust to higher energy prices and reduce the need for policy support. However, it might also be desirable to adopt specific temporary policies towards the most tradable and energy-intensive sectors to mitigate the short-term impact of the reform. The exact design and implementation of such policies would need to consider the economic competitiveness of these sectors as well as the functioning of capital markets that provide credit for investments. Temporary support should be restricted to sectors that at post-reform prices can remain economically competitive with foreign producers; these sectors can become part of the engine of growth and support diversification into tradable sectors. Sectors with monopoly power on domestic markets should only be included if there are additional reforms to increase competition in the sector, otherwise the mitigating measures may serve simply to protect already inflated profits.

F. Conclusions

29. The opportunity cost of maintaining a policy of low domestic energy prices is substantial. GCC countries have a long history of providing energy products to their population at prices that are well below international levels. Low energy prices have helped achieve rapid economic development and rising living standards, but they have had costs in terms of the very

rapid growth in domestic energy consumption and the opportunity costs of the resource usage. The opportunity cost for the GCC is estimated at $73 billion or 5.2 percent of GDP in 2015 using the price gap approach with US pre-tax prices as benchmark for gasoline, diesel, natural gas, and electricity. While the estimation is sensitive to the price benchmark used, the opportunity cost is very similar if the maximum prices prevailing in the GCC are used as the reference price instead.

30. GCC countries have been embarking on energy price reform in recent years. Most recently, Kuwait have raised diesel prices and the UAE gasoline prices, bringing the domestic price in line with the export prices. Nevertheless, energy prices are generally still below international levels, although prices differ substantially across the GCC countries. In most countries, further steps are still needed to raise energy prices to reduce the growth in energy consumption and to support the fiscal adjustment that is needed in the current lower oil price environment.

31. As they consider energy price reforms, governments are understandably concerned about the economic and social implications. Although most of the benefits of low energy prices are enjoyed by better off households, higher energy prices do have an impact on poorer households. Further, higher prices could also lead to higher inflation and hurt competitiveness and growth. Evidence from the GCC region and elsewhere with energy price reforms suggests, however, that these potential downside risks can be managed and proper design of reform programs can greatly enhance prospects for success.

32. Evidence in this paper suggests the inflationary impact of higher energy prices in the GCC is likely to be small, and while there may be some adverse effect on growth in the near-term, longer-term growth benefits should be positive. Given the low weight of energy products in the CPI, first round effects of higher energy prices should be limited, while well anchored inflation expectations should prevent second-round effects. On growth, preliminary analysis suggests that a gradual increase in energy prices should have a manageable impact on industrial activity, although energy intensive industries might need some support as they adjust. Longer-term, energy price reforms could generate permanent real income gains between 1.0 and 1.4 percent.

33. More broadly, international experience with energy price reforms suggests that the likelihood of success is increased if the reforms are:

- Discussed with, and communicated to, stakeholders;
- Introduced gradually to allow consumers and energy intensive firms to adjust their consumption and production. This should also help minimize the inflationary impact;
- Appropriately sequenced to minimize the impact on poor households and allow time to strengthen the social protection system, including targeted mitigating measures. Evidence from the reform efforts in other countries suggests that transfers to lower income households can mitigate the impact of higher energy prices on their well-being; and
- Resilient, to avoid a reversal of reforms. This could require a transparent rules-based mechanism for setting energy prices ranging from smoothing price mechanisms in the short and medium-term to full price liberalization over the longer-term.

Annex I. Efficiency Costs of Price Distortions: Estimating the Deadweight Loss and the Impact on Income (Growth)

The three basic postulates for applied welfare economics are the pillars for assessing efficiency costs and calculating the deadweight loss. The postulates are: [1]

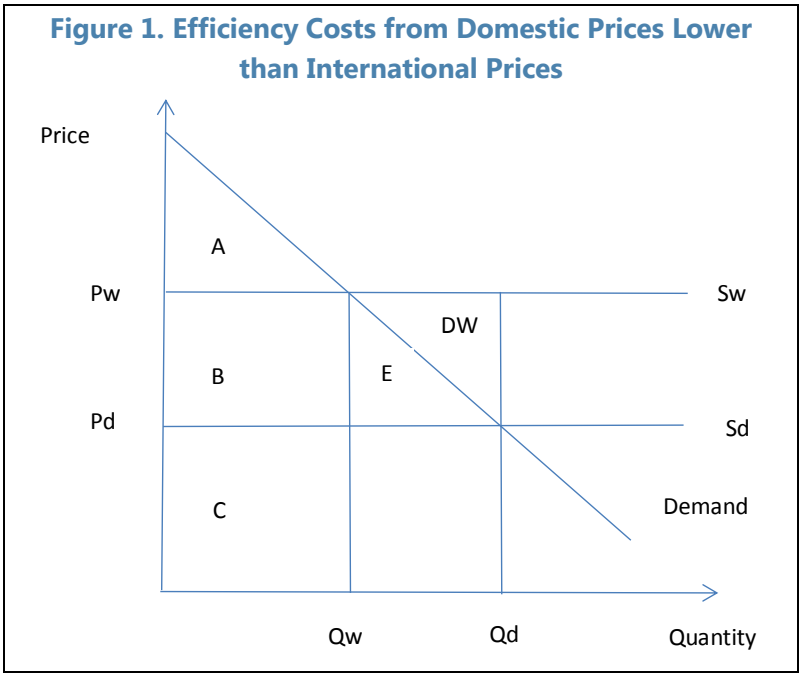
a) The demand price for a given unit measures the value of that unit to the demander;

b) The supply price for a given unit measures the value of that unit to the supplier;

c) When evaluating the net benefits or costs of a given action (program, project, or policy), the costs and benefits accruing to each member of the relevant group should be added.

Assume for simplicity a perfectly elastic supply curve –i.e. the marginal cost is zero and the country is a price taker in global markets, at world prices Pw (international benchmark prices). Market equilibrium is reached when consumers buy Qw (Figure 1). Postulate a) indicates that consumers' valuation for Qw is given by the area below the demand curve (A+B+C); however, from postulate b) we know that for getting Qw individuals pay Pw*Qw is equivalent to area B+C. From postulate c), the net gain for the economy is given by A, which in this case (perfectly elastic supply curve) is equal to the consumer surplus.

Figure 1. Efficiency Costs from Domestic Prices Lower than International Prices



If the government decides to sell Q in the domestic market (e.g. energy products) at a price Pd, which is below international prices Pw, then the amount consumed domestically will increase to Qd. The per unit opportunity cost of this policy is given by the price gap Pw – Pd, i.e. the difference

[1] Harberger, A. C. (1971). ''Three Basic Postulates for Applied Welfare Economics: An Interpretative Essay.'' *Journal of Economic Literature*. September, 9:3, pp. 785–97.

between the international price Pw –the price at which the economy could sell in the international market, and the domestic price Pd –the price the government receives for Q given the price policy; the opportunity cost for the government is given by areas B, E, and DW, commonly referred as "implicit subsidy" (or forgone revenue).

However, higher consumption increases consumers' welfare in an amount given by the increase in the area below the demand curve (areas B and E). The difference between the extra benefits for the consumers and the costs for the government provide the net gain or loss for the economy; in this case, the economy as a whole loses DW, also called deadweight lost or excess burden from the policy of relatively lower domestic prices.[2]

Deadweight Loss Estimation

DW could be estimated using data on international and domestic prices (Pw and Pd), amounts consumed (Qd), and estimates on the price elasticity of demand.[3] In particular:
For a Cobb-Douglas type demand function, the ratio of quantities consumed at international and domestic prices could be expressed as:[4]

$$DW = \frac{1}{2}\left(Pw - Pd\right)(Qd - Qw) \tag{1.1}$$

$$DW = \frac{1}{2}\left(Pw - Pd\right)Qd\,\frac{(Qd - Qw)}{Qd} \tag{1.2}$$

$$Opportunity\,Cost = \left(Pw - Pd\right)Qd \tag{1.3}$$

[2] Estimation of areas below and above the demand and supply curve is a routine exercise in Cost – Benefit Analysis. Applications of this methodology for assessing efficiency costs in output and input markets, including for labor, capital, and foreign exchange are discussed in Jenkins, G.P., Kuo, C., and Harberger, A.C. (2011) Cost Benefit Analysis for Investment Decisions.

[3] For a discussion on the estimation of efficiency costs arising from price distortions see Hines, J. R. (1999) "Three Sides of Harberger Triangles," *Journal of Economic Perspectives*. Volume 13, Number 2, pages 167–188. In particular, note the discussion on general equilibrium considerations:

> "Harberger's papers do not take explicit account of all possible general equilibrium price interactions between markets, relying instead on the assumption that the effects of any unaccounted price changes are unlikely to overturn the qualitative conclusions of his analysis. The general equilibrium work of numerous writers —for example, Shoven and Whalley (1972, 1977), Shoven (1976), Ballard, Shoven and Whalley (1985) and Ballard et al. (1985)—largely supports this assumption."

[4] Charap et al. (2013) estimate the price elasticity of the demand for energy products between -0.3 and -0.5.

$$Percent\,Change\,in\,Quantity\,Consumed = \frac{(Qw - Qd)}{Qd} \quad (1.4)$$

For a Cobb-Douglas type demand for Q: [4/]

$$\frac{Qw}{Qd} = \left(\frac{Pw}{Pd}\right)^{\beta}; \beta\,is\,the\,elasticity\,of\;demand \quad (1.5)$$

Estimating Impact on Income (Growth)

The energy price reform impact is better assessed when measured in terms of the effect on income (GDP). The impact of the reform in terms of growth is not uniform over time, particularly when investments depreciate over time, and the assessment in terms of the effect on average growth rate is affected by the number of years assumed for the assessment.

For instance, assume initial income (GDP) is $100 at t=0, an energy price reform occurs at t=1, efficiency gains from the reform amount to $10 materialize during the year of the reform, the rate of return on investments is 10 percent, and the depreciation rate is 10 per cent. Under these assumptions the economy's income increases from $100 in year t=0 to $110 in year t=1. If the extra income is used for consumption, then the economy will have a once-and-for-all increase in income from $100 to $110 only. The economy grows 10 percent during the first year and zero percent afterwards. Over a 10-year period the average growth rate increases one percent per year; over a 20-year period the average growth rate increases half a percentage point per year.

If the economy invests the income gain ($10), returns materialize one year after invested, and investment does not depreciate, then the investment will produce $1 extra of income per year starting in year t=2 (investment income is consumed). The income path for the economy would be $100, $110, $111, $112, $113, and so on; after 50 years income would be $159. The growth rate would be 10 percent in t=1; starting in t=2 the growth rate would continuously fall from 0.9 percent in t=2 to 0.6 percent in t=50. Over a 10-year period the average growth rate would be 1.79 percent; over a 20-year period the average growth rate would be 1.3 percent. In other words, over the longer term the reform increased income form $100 at t=0 to 159 at t=50, with the largest impact occurring at t=1 when income increases to $110; the average impact on growth declines as the period considered increases.

If investments depreciate at 10 percent per year (and investment income is consumed), the income path for the economy would be $100, $110, $111, $111.9, $112.71, and so on; after 50 years income would be $119.94. The growth rate would be 10 percent in t=1; starting in t=2 the growth rate would continuously fall from 0.9 percent in t=2 to almost zero percent in t=50. Over a 10-year period the average growth rate would be 1.54 percent; over a 20-year period the average growth rate would 0.87 percent.

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