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***Securing the  
future of natural  
gas in the GCC***

**Time for sustainable  
price reforms**

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# Executive summary



**Gulf Cooperation Council (GCC) countries<sup>1</sup>** should reform how they price domestic natural gas in order to incentivize upstream gas investments. The prevailing regime of low and fixed prices — which power producers, downstream industries, and consumers have enjoyed for decades — is unsustainable. Reforms should define a mechanism that prices natural gas closer to its true market value and that in some manner reflects the global and regional dynamics of supply and demand. As a consequence, prices will inevitably increase and can have an adverse socioeconomic impact on consumers. These effects can, and should, be mitigated by offering incentive packages to industrial customers and instituting targeted compensation mechanisms for the poorest households. A regulator for gas should be established to govern the new gas-pricing regime and monitor its application. The time to act is now, while oil prices are low and reducing gas subsidies will have a less severe impact on the region's economies.

# ***Low natural gas prices are not sustainable***

Abundant and cheap gas has played a critical role in the development and diversification of the economies of the GCC. Long considered a by-product of oil production, gas was almost entirely flared until the 1970s when governments and their national oil companies (NOCs) began to harness gas firstly for power generation and, subsequently, as a feedstock for petrochemicals and for export in the form of liquefied natural gas (LNG).

Gas supplies in each GCC country have been regulated by state monopolies with prices set considerably beneath comparable international prices. Low prices have reflected the relatively modest cost of capturing and processing gas that has been predominantly associated with oil production. For decades, this policy supported local economies by providing stability and competitive advantage to petrochemicals and energy-intensive industries, even though approaches to gas pricing vary across the GCC. In some cases, such as Saudi Arabia, gas prices have been stable and uniform across the industrial and power sectors. However, in a move in the right direction, Saudi Arabia decided on December 28, 2015 to increase methane and ethane prices from US\$0.75/mmbtu for both to US\$1.25/mmbtu for methane and \$1.75/mmbtu for ethane. Other countries apply somewhat similar prices for their power and industrial sector albeit with some benchmark indexation in select joint-venture petrochemical industries.

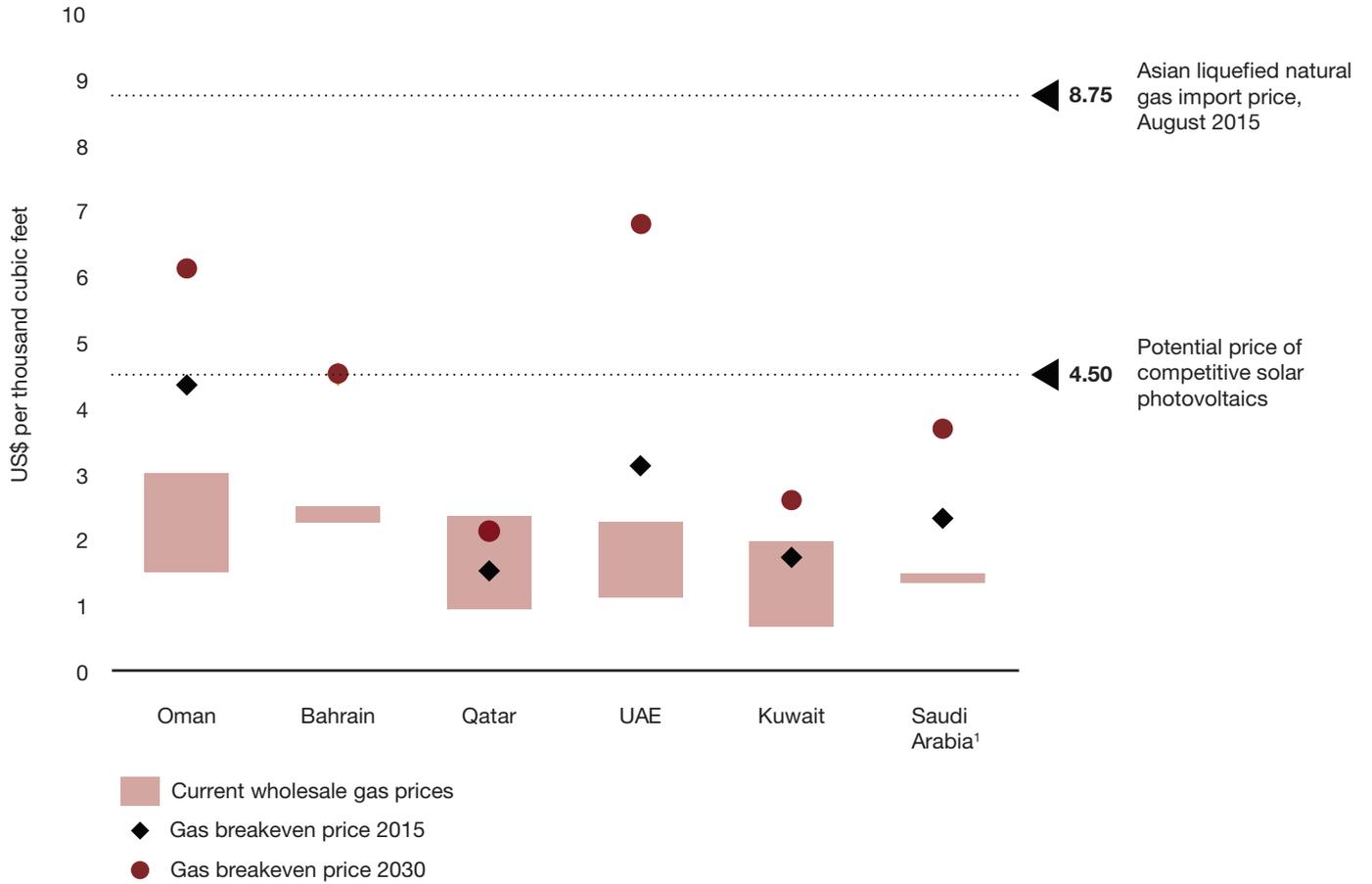
Despite an abundance of gas resources, the current position is not sustainable. Production costs are set to rise steeply in coming years as output shifts from low-cost associated gas to increasingly challenging non-associated gas fields with greater technology requirements. Strategy&'s evaluation of future production costs, taking into account field-by-field variations, expected decline rates of existing production, and potential new developments, suggests that weighted average costs of gas production across the GCC will rise by one-third to two-thirds between 2015 and 2030 — from US\$1.50 to \$4.50 per thousand cubic feet in 2015, to \$2.00 to \$7.00 per thousand cubic feet in 2030. GCC governments will find it increasingly difficult to maintain current prices, which range from just \$0.75 to \$3.00 per thousand cubic feet, given the growing gap with production costs (*see Exhibit 1*).

*Despite an abundance of gas resources, the current position is not sustainable.*

Exhibit 1

Production costs are set to rise significantly

GCC Gas Breakeven Prices 2015–2030 and Current Wholesale Prices for Domestic Supply of Methane



<sup>1</sup> Methane price, effective as of December 29, 2015

Note: Breakeven prices are volume weighted averages, and are presented from the perspective of an external investor including assumptions on future capital and operating costs, government take, and a 10% rate-of-return for the investor.

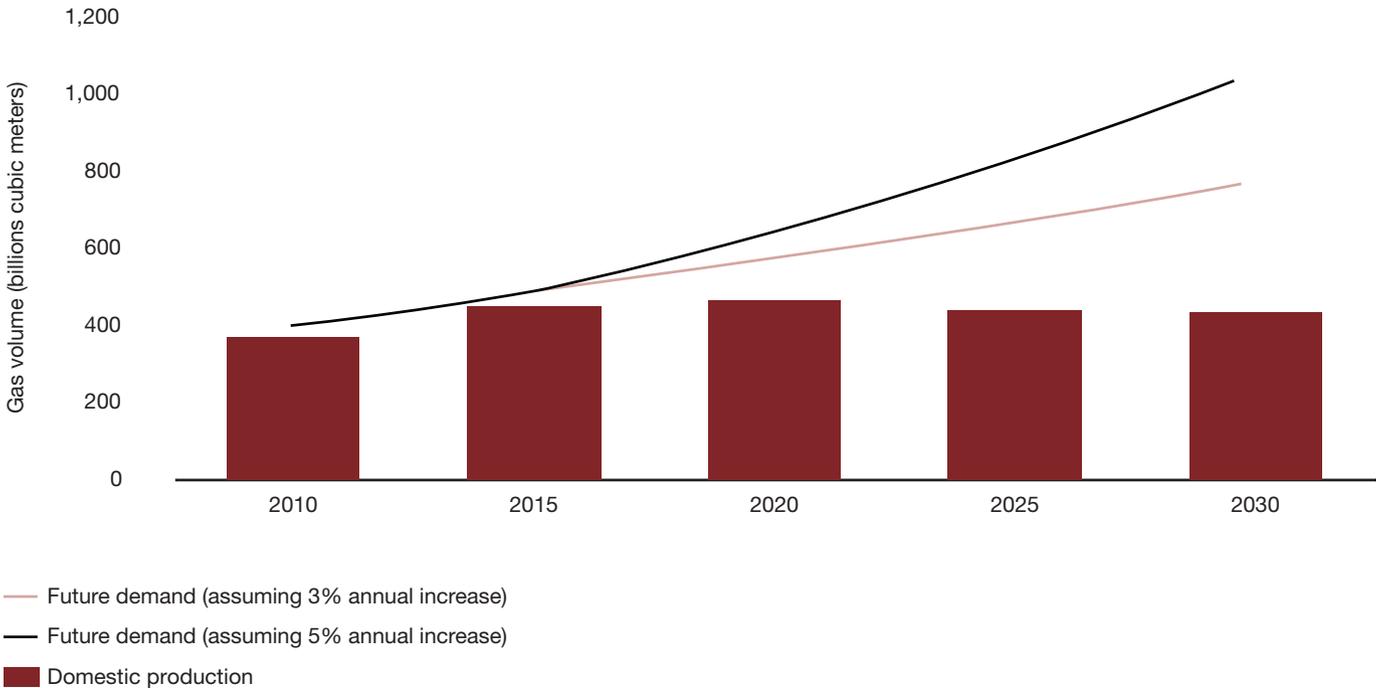
Source: IRENA; Rystad Energy; Saudi Arabia, Council of Ministers decree December 28, 2015; Strategy& analysis

Without substantive reform of gas pricing, the gap between domestic production and future demand in the GCC is forecast to widen significantly by 2030 (see Exhibit 2). The shortfall will emerge in part because low wholesale gas prices provide a disincentive to develop new domestic gas supplies, which are required to replace stagnating production from currently producing fields. Indeed, the failure to agree on an appropriate gas price has been cited as a main reason for the decision not to proceed with the development of the Kidan sour gas field in Saudi Arabia.<sup>2</sup>

As Exhibit 2 illustrates, a projected gas demand growth rate of 3 percent per annum implies a potential supply gap of over 300 billion cubic meters by 2030. In recent years, governments sought to temper gas demand and manage gas shortages by supplying liquid fuels for power and naphtha for petrochemicals. Taking these measures into account, unmet gas demand may actually be higher. Using an estimated 5 percent increase in gas demand per annum to account for such unmet demand, we forecast that the supply gap by 2030 may be over 600 billion cubic meters.

**Exhibit 2**  
**Production will not keep pace with demand**

GCC Natural Gas Production and Demand, 2010–2030



Source: OPEC Statistical Bulletin 2015; Oman National Centre for Statistics; BP Statistical Review of World Energy; Rystad Energy; Strategy& analysis

# How to bridge the gap

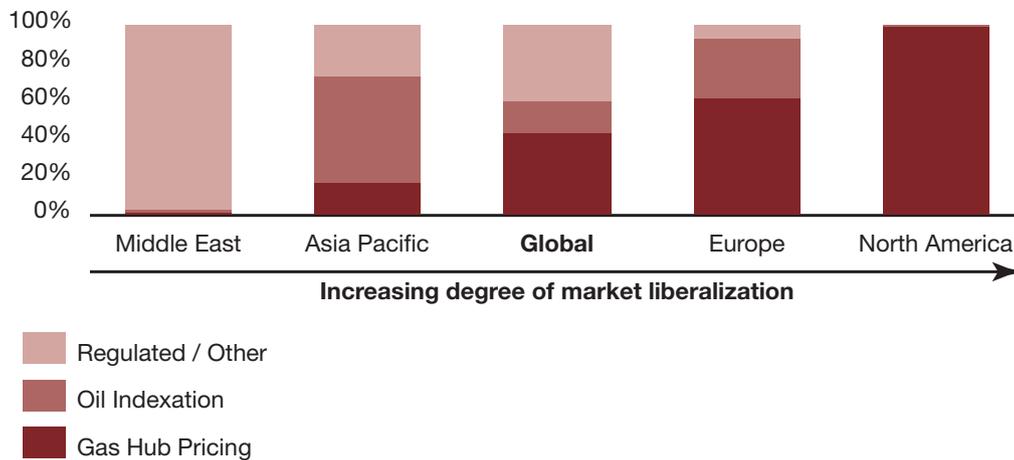
The best approach to setting gas prices — and incentivizing investment in new production and demand management — is to use market mechanisms. Broadly speaking, there are two approaches for market-based gas pricing. The first is “oil indexation,” in which gas prices are linked to a basket of commodities including crude oil and oil products. The second is “gas hub pricing,” also known as “gas-to-gas competition,” in which gas is traded based on spot prices set by the market in a liquid trading hub and which better reflects the true price of gas to consumers.

Although gas pricing in the Middle East is overwhelmingly regulated by national governments, elsewhere markets are increasingly liberalized and are gradually moving from oil indexation to gas hub pricing as the preferred pricing mechanism. In 2014, some 43 percent of all gas sold was subject to gas hub pricing, whereas only 17 percent was indexed to oil (see Exhibit 3).

## Exhibit 3

### Gas hub pricing is increasingly prevalent in liberalized markets

World Gas Price Formation, 2014



Source: International Gas Union Wholesale Gas Price Survey (2015); Strategy& analysis

In the Asia Pacific region, just under 60 percent of the gas sold in 2014 was directly oil-indexed. However, discussions on the ways to delink gas prices from oil and reduce the import bill are becoming more frequent, as Asia Pacific gas importers pay the highest prices in the world. A number of parallel, though uncoordinated, developments are afoot to develop a price benchmark in the region. Japan, for example, has listed a dollar-denominated LNG futures contract on the Tokyo Commodity Exchange. Also, Singapore started commercial operations of its LNG import terminal in May 2013, and has ambitions to develop an LNG hub in the region to set its own LNG price benchmark.

In Europe, the gas market is rapidly moving from an oil-indexed to a gas-to-gas competition regime. Today, over 60 percent of European gas is sold directly or indirectly linked to gas hub pricing. This is a significant increase from 2005, when only about 15 percent of the gas sold was gas-indexed. The rapid change in the European pricing mechanism was primarily due to the significant over-supply of gas in Europe during the recent recession. Demand fell below “take-or-pay” levels specified in long-term gas supply contracts. This meant that consumers had to pay financial penalties because they were not consuming the agreed amount of gas. As a consequence, long-term contracts were ended or renegotiated to move to partial or complete gas hub indexation. Other factors have also accelerated gas-to-gas competition. These include increased infrastructure connections within Europe, in terms of both pipelines and LNG supply; end-consumer activism; and a concerted push by national regulators and the European Commission.

In North America, which is a fully liberalized market, the gas hub has been the pricing method since 1990. Since then, the New York Mercantile Exchange (NYMEX) has used the Henry Hub to set the price of what is considered the first futures contract for natural gas. The Henry Hub has become the world’s most heavily traded gas market and is the benchmark for wholesale gas prices in the U.S.

As a result of those distinctive pricing mechanisms, the U.S., European, and Asian gas prices have evolved differently over time (*see Exhibit 4*).

Taking the global trends and the specifics of the GCC into account, the region should consider gradually moving toward pricing that more accurately reflects the cost of supply and value of the gas to consumers. There are four possible short-term and longer-term gas-pricing regimes that should be considered.

- 1. Use a cost-plus price:** At a minimum, GCC countries should seek to increase wholesale prices to match increasing production costs and encourage investment in new sources of supply. Such an approach can be considered on a country-by-country basis, or even on a field-by-field basis through the implementation of a cost-plus formula. Although such

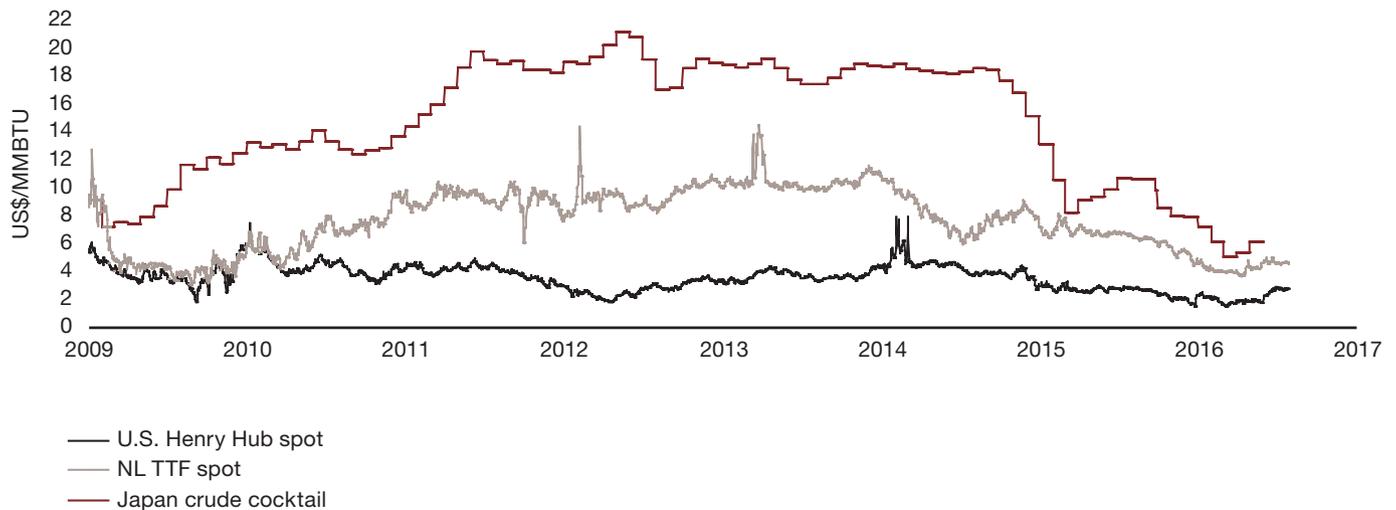
*Taking the global trends and the specifics of the GCC into account, the region should consider gradually moving toward pricing that more accurately reflects the cost of supply and value of the gas to consumers.*

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## Exhibit 4

### Global prices reflect different pricing mechanisms

U.S., European, and Asian Wholesale Day Ahead Prices



Note: NL TTF = the Netherlands' Title Transfer Facility trading hub

Source: Bloomberg; Strategy& analysis

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an approach does not require regional coordination, it does require a full understanding of how production costs are likely to evolve, and the establishment of transparent procedures for price setting.

- 2. Index to oil:** GCC countries could adopt a formula that indexes the gas price to oil prices, or a combination of oil and other products used in the sector (e.g., fuel oil) to reflect better the value of gas as an alternative to oil in the power and industrial sectors. Such an approach would require an evaluation of the role that gas plays in the sector and potential alternatives, along with the establishment of a formula that reflects the full range of possible oil prices. Such formulae typically include S-curves, whereby gas prices move in tandem with oil prices in the middle of the oil price range, but the curve flattens when oil prices are at the high or low end of the range to reduce volatility.
- 3. Link to existing gas hub pricing:** As an alternative to establishing a dedicated gas hub, GCC countries could link domestic gas prices to prices in existing hubs in other geographies. Such an approach would reflect the growing convergence of gas markets around the world, for example through LNG. An example of such an approach is India where the domestic gas prices are tied to a combination of gas hubs through a

complex formula (see “Reforming gas prices in India”). As India’s experience shows, such an approach would require significant efforts to align national and regional stakeholders and ensure common understanding of the indexation formula.

4. **Establish a GCC gas hub price:** As an ambitious, longer-term option, GCC countries could consider establishing a dedicated GCC gas hub. Establishing such a hub would require investment in physical infrastructure at the national and regional levels, the implementation of a trading platform to set a benchmark price, and the establishment of a supra-national regulatory system. A prerequisite for such a hub would be extensive linkage of regional supply and demand centers. Given its infrastructure connections to Abu Dhabi and Qatar, as well as its LNG import and gas storage facilities, Dubai could be an option for a future GCC gas hub, although export infrastructure is currently lacking.

Making any change to the gas-pricing regime will require careful consideration to ensure a proper risk–reward balance. The first consideration is the extent to which this will indeed create more appetite for domestic gas upstream investments and the degree to which the new regime reflects the true value of gas in a particular market. Second is the magnitude of the “shock” that can be reasonably absorbed by the economy, taking into account the effectiveness of mitigation actions, and the cost and effort of establishing a more complex price-setting mechanism. Proactive communication will be required with all key stakeholders to assess preparedness and key risks.

*As an ambitious, longer-term option, GCC countries could consider establishing a dedicated GCC gas hub.*

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## **Reforming gas prices in India**

Before reforms in 2014, gas prices in India had been either set on a “cost-plus” basis or indexed to oil. The approach taken, and the formula used for indexation, varied depending upon the vintage of the upstream production licence. As a consequence, gas prices varied from \$3.50 to \$5.70 per thousand cubic feet in 2014. Price regimes were complicated, not linked to market dynamics, and subject to frequent government intervention. These challenges coupled with the complications faced by the government in administering the upstream contracts failed to incentivize significant investments into the gas exploration and production sector. The growing supply–demand gap has been filled by importing LNG at prices from \$7 to \$18 per thousand cubic feet.

The decline in domestic gas production and the challenges with the upstream fiscal regimes encouraged the government to reform the gas-pricing regime based on the principles of “arms-length” involvement and domestic gas-on-gas competition. Under this reform, a new gas-pricing formula was implemented in November 2014 after a series of deliberations and revisions. The new gas-pricing formula is based on a weighted average of the prices and volumes of four markets: Henry Hub, Alberta Hub in Canada, the U.K.’s National Balancing Point (the main EU hub), and Russia. Gas prices based on the new formula are reviewed every six months. The most recent review, on September 30, 2015, set the gas price at \$3.82 per thousand cubic feet.

# Mitigation mechanisms

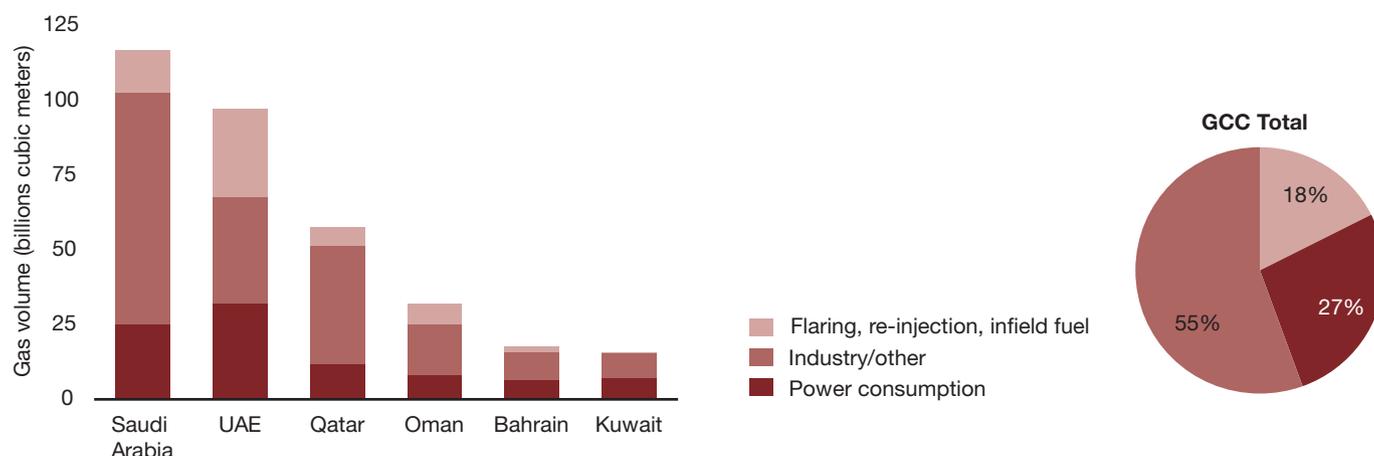
The impact of a new gas-pricing mechanism would require proactive and targeted mitigation measures to ensure that the considerable benefits of low-cost gas to the broader economy are captured.

Domestic gas production has allowed power generators to provide a regular and reliable source of power that enabled industry and services to flourish throughout the region, diversifying the economy and providing employment opportunities outside of the oil sector. Power generation now accounts for some 27 percent of domestic gas consumption in the GCC (see Exhibit 5), with Bahrain, Qatar, and the United Arab Emirates almost exclusively dependent upon gas for their power generation.<sup>3</sup>

Similarly, the growth of gas production has allowed the establishment of large-scale gas-based industries across the region, with industry accounting for 55 percent of domestic gas consumption in the GCC. Based

## Exhibit 5 Gas is used widely for both power and industry

GCC Domestic Natural Gas Consumption, 2014



Source: OPEC Statistical Bulletin 2015; Oman National Centre for Statistics; Arab Union of Electricity; BP Statistical Review of World Energy; Strategy& analysis

largely on gas, the petrochemicals industry accounted for \$87 billion in sales revenues in 2014. The petrochemicals sector now employs over 150,000 people directly, and supports 460,000 jobs indirectly, providing an important source of local employment.<sup>4</sup>

#### *Impact on the power and liquid petroleum gas (LPG) sector*

An increase in gas prices would require electricity companies to raise electricity tariffs to cover fuel and operating costs and depreciation, and to provide returns on assets to fund expansion. Tariff increases are the best policy tool to curb the fast-growing domestic demand that most power companies are struggling to meet.

Consequently, policymakers should introduce support programs, such as financial assistance to the poorest households that cannot afford a large price hike in their energy bills or the cost of LPG bottles. As an example, the Bolsa Familia program in Brazil uses a cash transfer directed to poorer families that is also conditional on sending children to schools and vaccinating them. The Pratyaksha Hastaantarit Laabh (PaHaL) scheme in India, the world's largest cash transfer program for households implemented after LPG price reform, is a highly effective way of protecting the poorest segments of the population.

#### *Impact on the industrial sector*

A hike in GCC gas prices would curtail the profitability of industrial concerns and risk eroding their competitiveness in global markets. Mitigation mechanisms may include a “grace” period for price rises to allow industrial enterprises the time to adjust to the new cost structure. Another approach is targeted financial support for industrial sub-sectors that provide high levels of employment or have a significant multiplier effect in the economy. Such support could include differentiated feedstock or energy prices, export subsidies, financing assistance, or land provisioning.

These industrial-sector mitigation measures must be carefully crafted, focused on energy-intensive industries, and backed by a strong business case. Examples of such measures include subsidized loans that help an industry adopt energy-efficient technologies, or new credit lines to help mitigate the impact of higher gas prices on industrial-sector cash flows.

Governments also need a means of ensuring that “savings” created from reduced subsidies are channelled to where they are really needed, whether to industries or households. Several ministries, authorities, and other relevant governmental bodies (e.g., industrial zone authorities) can participate but only as part of a cohesive governmental policy. Households, for example, will most likely deal with a ministry of social affairs, or its equivalent, to receive cash transfers or similar support. Industries will need a one-stop-shop to guide them through the specific benefits they can receive. Many such entities already exist in the GCC. They can adapt and build on their current capabilities relatively easily to assist enterprises.

#### *The importance of a gas regulator for price reform*

Implementing gas price reform also requires an autonomous and empowered gas regulator to manage, monitor, and enforce the gas price mechanism. The regulator’s oversight should cover well head gas and all the costs associated with the processing and transportation of the gas to its final destination. In addition, the regulator should be able to set and control technical standards and guidelines pertaining to the gas industry, in a manner akin to what electricity regulators do for private investments in power generation. When it is not legally possible for joint ventures to explore and develop gas fields — as is the case in some GCC countries — the gas regulator should subject the NOCs or their affiliated companies to oversight.

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# ***Conclusion***

Although a regime of low fixed gas prices in the GCC has proven beneficial over the past 30 years, it is unsustainable. A new price regime is required to bring supply and demand into balance, and to avoid economic inefficiencies and distortions. Some countries have already taken steps in this direction but more is needed to advance this vital reform across the region. Although a new regime will result in higher gas prices, carefully crafted mitigation measures can help with the transition. These will allow the economy as a whole to benefit from increased diversification, private investments, true competition, and a greater sense of energy security.

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# Endnotes

<sup>1</sup> The GCC countries are Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.

<sup>2</sup> “Shell quits Saudi sour gas project, leaving \$4 billion first-phase in limbo,” *Platts*, July 8, 2014 (<http://www.platts.com/latest-news/natural-gas/dubai/shell-quits-saudi-sour-gas-project-leaving-4-21871641>).

<sup>3</sup> Arab Union of Electricity Statistical Bulletin (2013).

<sup>4</sup> Gulf Petrochemicals and Chemicals Association, “The GCC Chemical Industry, Facts and Figures 2014.”

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