productivity initiative can offer the GCC countries the means to achieve long-term growth, as well as showing solid commitment to green growth. Ambitious initiatives have already been seen in the GCC: what is needed now is the integration of sound policies to create a sustainable energy productivity ecosystem for higher economic value and lower energy demand per dollar output.

The potential for the GCC's industries to become major players in the developments of these technologies already exists. Beyond its domestic potential, MENA's renewable energy sources are abundant but very under-tapped, offering a promising market. The design of residential and commercial buildings in the GCC is largely flat and unutilized, offering much potential for rooftop solar (PV). As peak domestic demand for power coincides with maximum solar radiance, the GCC countries could give consumers incentives to install rooftop PV, and perhaps even transform their homes into sources of electricity supply to the grid. Done successfully and at a scale, this could offset significant investment in inefficient peaking thermal units, until now barely used, and help governments to lessen the impact of tariff reforms.

Similarly, GCC countries are leaders in water desalination, which has significant amount of brine as a byproduct. This brine could be a major revenue stream because of its richness in minerals which, once recovered, could serve several industries, including the potential production of lithium batteries – an area where global demand is envisaged to grow by 60 per cent in 2017 compared to 2014 (according to figures for 2014 from the US DOE).

'ENERGY PRODUCTIVITY COULD HELP THE GCC'S DIVERSIFICATION POLICIES TO EVOLVE AND TO MINIMIZE THEIR EXPOSURE TO THE NATURAL RESOURCE CURSE.'

In sum, energy productivity could help the GCC's diversification policies to evolve and to minimize their exposure to the natural resource curse. The GCC countries have sufficient financial buffers to be able to revamp their economies through making investments in clean technology innovation and manufacturing. Capitalizing on the strengths of each country could create collaboration and integrative supply chains that maximize economic resilience and shared prosperity.

Finally, in order to weave energy productivity into different economic sectors, a vision and a range of actions are needed. Some examples are: which members of the private sector should be in the driving seat; investing in human capital (beyond formal education) and local community partnerships; scaling up R&D investments; incentivizing industries to venture into clean energy technologies; realigning existing utilities models to deliver utility-driven energy efficiency and renewable energy programmes; incentivizing distributed generation; and investments in cross-cutting areas such as brine from desalination.

Eliminating fossil fuel subsidies is good for the planet – and more than ever for the GCC

Jason Bordoff and Akos Losz

Fossil fuel subsidy reforms are in fashion these days. The 2014 oil price collapse offers what has been called a 'golden opportunity' for cash-strapped governments around the world to phase out energy subsidies by taking advantage of lower fuel prices that reduce both the political cost of liberalizing energy prices and the risk of runaway inflation resulting from price reforms. More than two dozen governments have undertaken some form of fossil fuel subsidy reform since the beginning of 2014. The list includes India, Iran, and Indonesia, which are not only among the world's largest energy consumers, but also some of the largest subsidizers of fossil fuels. As our colleagues Johannes Urpelainen, Keit Benes, Andrew Cheon, and Joonseok Yang explain in a new briefing paper ('Low Oil Prices: An Opportunity for Fuel Subsidy Reform') for Columbia University's SIPA Center on Global Energy Policy, the three main barriers to fuel subsidy reform – popular opposition, vested interests, and low institutional capacity – are all reduced by low oil prices.

'SUBSIDIZING FOSSIL FUEL USE IS BAD ECONOMIC POLICY, BAD ENVIRONMENTAL POLICY, AND BAD SOCIAL POLICY.'

The rationale for subsidy reform is straightforward. Subsidizing fossil fuel use is bad economic policy, bad environmental policy, and bad social policy. Keeping fossil fuel prices at artificially low levels drains fiscal

resources – either directly in net importers of fossil energy, or indirectly in net exporters. Subsidies can create immense budgetary pressures in developing countries, where they can easily exceed 10 per cent of GDP – as in Iran, Venezuela, or Egypt. Fossil fuel subsidies are also harmful for the environment. They not only incentivize greater fossil fuel use, and thus carbon emissions and pollution, but also undermine renewable energy sources – including in locations with great renewable potential like the Middle East. Fossil fuel subsidies also perform poorly as a social policy tool. As the richest households tend to be the largest energy consumers, fossil fuel subsidies are naturally regressive. A 2013 IMF study estimated that the richest 20 per cent of households in low- and middle-income countries captured six times more of the total fuel subsidies than the poorest 20 per cent. However, poor households typically spend a greater portion of their income on energy, and thus may be more severely affected by the removal of fossil fuel subsidies. Targeted measures to help them cope with higher energy prices – such as direct cash transfers – have proven to be more effective according to a wide body of research by the IMF, the World Bank, and others.

Fiscal burden of subsidies

When countries embark on the path to subsidy reform, a key motivation is often the severe fiscal burdens imposed by subsidies, particularly when oil prices are high. The most prominent reform efforts in Egypt, India, and Iran were chiefly motivated by unsustainably growing subsidy bills and precarious fiscal balances. Egypt, for example, spent 25 per cent of the government budget on fossil fuel subsidies in 2013, seven times more than on health care, according to the IEA.

'WHEN COUNTRIES EMBARK ON . . . SUBSIDY REFORM, A KEY MOTIVATION IS OFTEN THE SEVERE FISCAL BURDENS IMPOSED BY SUBSIDIES …'

The arguments for reform, however, have often been more compelling for net importers of fossil energy than for exporters. Indeed, whereas 70 per cent of the US$550 billion spent on fossil subsidies in 2013 occurred in major energy producers, less than a third of the countries that have recently undertaken subsidy reforms were net exporters of energy.

Factors affecting exporters

Major oil exporters can be more reluctant to phase out fossil fuel subsidies for a number of reasons:

Benefits for citizen. Many resource-rich countries nationalize domestic natural resources, thus creating a sense of entitlement that there is a 'right of citizenship' to their own resources at low cost. Fossil fuel subsidies are considered part of an unwritten 'social contract' in Saudi Arabia (and indeed in other Gulf oil monarchies as well). Gulf citizens tend to regard cheap energy as their 'birthright' and view any efforts to raise energy prices as illegitimate. Saudi Arabia, for example, does not even acknowledge in the G20 that it subsidizes fossil fuels because its domestic fossil fuel 'prices reflect the country's comparative advantage in oil production and are above the production costs.'

Role of national oil companies. Producing countries are more likely to have national oil companies, which have also been a key mechanism perpetuating fossil fuel subsidies. Indeed, Gulf Cooperation Council (GCC) countries have often used national oil companies for broader social policy implementation. Energy subsidies are easier to administer through a company such as Saudi Aramco than via targeted redistribution schemes, such as direct cash transfers run by the government.

Direct and indirect nature of subsidies. There can be greater pressure to reform subsidies when the cost is a direct outlay from the government budget than when it manifests itself as an opportunity cost in the form of lost additional sales. This is especially true in today's oversupplied market, when there may be limited scope to sell additional oil abroad. In Saudi Arabia, the opportunity cost argument may not even hold, as production and export decisions have at times been based on non-market factors and thus reduced domestic consumption would not necessarily have led to increased oil export sales.

Effect of oil price collapse. A sudden oil price collapse has fundamentally different political consequences in major oil exporting and major oil importing countries. When international oil prices fall, oil importers have a unique opportunity to remove fuel subsidies without causing severe price increases for their consumers. Major oil exporters, on the other hand, are more likely to view lower oil prices as a threat to political stability and a potential source of social unrest. Ruling elites across the GCC, for example, have cautiously maintained – and in some cases even increased – public spending since the 2014 oil price collapse, with the Arab Spring uprisings still fresh in their minds. Energy subsidies are an important policy tool in the hands of many petrostates for the maintenance of social stability. As lower oil prices undermine economic growth in large exporters, therefore, they can hinder reform efforts even as they lower the cost to the consumer of paying market prices.

Effect of foreign currency reserves. Many oil exporters – including most GCC countries – have substantial foreign reserves, which can help them cover budget shortfalls in the medium term and ease the fiscal pressures at a time of low oil prices. On the eve of the 2014 price collapse, Saudi net foreign assets, for example, approached 100 per cent of the country's GDP and amounted to 2.5 times total government spending in 2014. Public debt levels are also comparatively low across the GCC, ranging between less than 2 per cent of GDP in Saudi Arabia to 43 per cent of GDP in Bahrain. This leaves some room for GCC governments to issue bonds to finance part of their looming fiscal deficits, as the Saudis recently did. In addition to tapping into foreign reserves and bond markets, GCC governments can also slow down infrastructure investments. In a recent report, Goldman Sachs identified more than US$600 billion worth of 'active' infrastructure projects in Saudi Arabia alone, noting that the pace of project awards appears to be slowing in the Kingdom since the beginning of 2015.

Ineffective use of resources – incentive for change

Even if the urgency of subsidy reform may appear greater in oil importing countries, there remains interest in eliminating inefficient fossil fuel subsidies in GCC countries. The halving of international oil prices since the middle of 2014 will likely push this year's budget deficits into the double digits in Saudi Arabia, Oman, and Bahrain, according to the IMF. The UAE has recently decided to deregulate motor fuel prices starting in August 2015 – although its fuel prices are already high by regional standards, representing twice the GCC average for petrol and three times the regional average for diesel. Kuwait enacted diesel and kerosene price increases in early 2015 (but had to backtrack due to the initial public outcry), and Bahrain has been cautiously planning to reform fuel and electricity pricing for some time. By contrast in Saudi Arabia (which has greater social inequality than other GCC countries and thus greater potential backlash against fuel price hikes) there has been less progress toward reforming subsidies.

Today's new world of oil, however, provides new and added incentives for GCC countries, particularly for Saudi Arabia, to reform domestic fossil subsidies. In November 2014, Saudi Arabia signalled to the global oil market that it intended to boost production (which rose to 10.6 million barrels/day), maintain market share, and keep limited supply in reserve as spare capacity. In an interview with the *Middle East Economic Survey*, Saudi Oil Minister Ali Naimi said that the low-cost producers in OPEC 'deserve market share'. Reminding long-time market observers of the Saudi experience in the 1980s, he explained: '*If I reduce [production], what happens to my market share? The price will go up and the Russians, the Brazilians, US shale oil producers will take my share.'* As Oxford University's Bassam Fattouh aptly notes: '*the ultimate nightmare for any exporter is a reduction in both its market share and its revenues'*.

'FOSSIL FUEL SUBSIDIES HAVE PROMOTED THE OVERCONSUMPTION OF OIL IN THE GCC AT AN ENORMOUS SCALE …'

The continuing use of fossil fuel subsidies that induce oil consumption growth are at odds with the key GCC producer's new market share strategy. Fossil fuel subsidies have promoted the overconsumption of oil in the GCC at an enormous scale – oil demand in Saudi Arabia, Kuwait, and the UAE increased by about seven times the world average in 2014 alone. Refined product demand in the three largest GCC producers increased by 9 per cent over the previous year and direct crude burning in power generation rose by 16 per cent in 2014, according to the JODI database. This rate of domestic consumption threatens the ability of the region's oil exporters to maintain exports at anywhere near the current elevated levels over the coming years. Thus, fossil fuel subsidies not only undermine the long-term sustainability of the oil export-dependent economic models of most GCC countries, but also the stated near-term oil market strategies of the low-cost Gulf producers – particularly of Saudi Arabia, Kuwait, and the UAE – to maximize market share in today's oversupplied global oil market.

With Iranian barrels returning to the market and Iraqi exports reaching new records in almost every month, rather than GCC producers striving to maintain market share through costly new drilling plans, it makes more sense to rein in domestic demand for crude oil used in electricity and refined products. Fossil fuel subsidy reforms offer the most effective tool to achieve this goal.

Benefits to be gained from limiting fossil fuel use

According to our preliminary estimates, based on IEA reports, eliminating fossil fuel subsidies can free up close to a million barrels/day of oil in Saudi Arabia, Kuwait, and the UAE for exports over the longer term. Eliminating direct crude burning in power generation alone could save, on average, more than 600,000 barrels/day for the three GCC governments. Developing the same amount of production capacity could cost more than US$10 billion. (For comparison, the development cost of Saudi Aramco's Manifa development, which added 900,000 barrels/day of production capacity and

took eight years to complete, totalled an estimated US$17 billion.)

Importantly, fossil fuel subsidy reform in GCC countries would also have environmental benefits. In the past, environmental considerations for subsidy reform in the GCC were often trumped by other factors. (A Chatham House report from 2011 notes that the word 'sustainability', or '*istidaama*', is a relatively recent addition to the Arabic vocabulary.) If Saudi Arabia, Kuwait, and the UAE reduced domestic oil consumption by one million barrels/day by removing fossil fuel subsidies, the corresponding reduction of carbon dioxide (CO_2) emissions could be as high as 160 million tonnes (or 15 per cent of the three countries' combined CO_2 emissions in 2014), assuming that oil use is displaced with zero-carbon fuels or completely eliminated via energy efficiency and global demand were unchanged. It would also reduce local air pollution caused by SOx and NOx.

'SUBSIDY REFORMS CAN HELP CEMENT THE POSITION OF THE LEADING GCC OIL EXPORTERS IN THEIR DRIVE FOR GLOBAL MARKET SHARE …'

As the oil market has changed in the past year, so too has the oil policy of GCC countries, especially Saudi Arabia. The result of these changes is that removal of fossil fuel subsidies is increasingly in the GCC countries' self-interest. Subsidy reforms can help cement the position of the leading GCC oil exporters in their drive for global market share, and help them boost exports or increase their spare production capacity at little cost. Subsidy reforms could financially strengthen the GCC economies in the current weak oil price environment, and make it more likely they emerge as winners when prices begin to rise again. These changes will also slow the consumption of hydrocarbons, reduce carbon emissions and local pollution, and boost energy efficiency and renewable energy. Without subsidy reforms, Saudi Arabia and the other leading oil exporters in the GCC risk losing, both in the short and the long run.

Alternative industrial fuel prices could benefit the Saudi economy

Walid Matar

Oil consumption in Saudi Arabia has grown at around 5 per cent annually since the year 2000. This growth has raised concerns over the Kingdom's ability to maintain its large export capacity in the future. Limited supply of natural gas and low energy prices have contributed to the substantial use of oil for domestic industrial production. The low administered oil and gas prices offered to industrial firms have further discouraged investment in non-hydrocarbon power generation technologies, and the production of higher value-added products. In this respect, decision-makers in the Kingdom have particularly expressed interest in displacing the use of oil in inefficient power plants by deploying other technologies. Alternative industrial fuel pricing policies can mitigate the growth in domestic oil consumption and facilitate investment in non-hydrocarbon power generation.

Employing the KAPSARC (King Abdullah Petroleum Studies and Research Center) Energy Model (KEM) for Saudi Arabia, in this article we study the impact of economic policies, such as those pertaining to industrial fuel prices and technology change. The model characterizes the operational and investment decisions of the electricity, refining, water desalination, petrochemicals, cement, and upstream industries in the Kingdom. It has been designed from the outset to represent the government-set energy prices that permeate the Saudi economy. Energy prices in Saudi Arabia are generally set by the government. Crude oil is sold to industrial firms at US$4.24/barrel, and methane and ethane are sold at US¢75/MMBtu; refined oil products are even less expensive per unit of energy content. The current mix of equipment and fuels in the industry and, in particular, in the power and water desalination sectors, reflects the low administered fuel prices.

'ELECTRICITY IN SAUDI ARABIA IS ALMOST EXCLUSIVELY GENERATED BY BURNING CRUDE OIL, REFINED OIL PRODUCTS, AND NATURAL GAS.'

Electricity in Saudi Arabia is almost exclusively generated by burning crude oil, refined oil products, and natural gas. While simple-cycle gas turbines have historically been favoured because of low fuel prices (the gas price was even lower, at US¢50/MMBtu, before 1998), their quick lead time for construction, and low investment cost, utilities are now mitigating the growing use of fossil fuels by upgrading simple-cycle gas turbines to combined-cycle plants, and installing power capacity with higher thermal efficiency.