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Developing a green economy in Saudi Arabia

Decarbonisation policies are gaining serious traction in the kingdom, as the pressing need to reduce CO2 emissions forces a rethink of the oil giant's priorities

Across the MENA region, the awareness of environmental issues and the need to reduce domestic energy consumption have risen to the top of the political agenda. Since the beginning of the 2010s, the Gulf countries have engaged in an incremental process of energy pricing reconfiguration, promulgation of energy efficiency policies, and national strategies to reduce their domestic hydrocarbon demand/carbon emissions. Saudi Arabia is not an exception to the general regional trend. Yet, little focus has been paid to its recent efforts to promote domestic decarbonisation. Although Saudi Arabia still has a long way to go, it has implemented a number of policies to attempt a comprehensive reduction of its greenhouse gas emissions.

Over the past several decades, Saudi Arabia's greenhouse gas emissions rapidly increased and are expected to increase further over the coming decades due to demographic increases and industrial capacity expansion. Globally, Saudi Arabia has the second largest carbon emissions per capita, which increased by nearly 75pc between 1990 to 2013 (from 9 tonnes of CO_2 /capita (tCO_2 /capita)) to over 16 tCO_2 /capita. In terms of aggregate emissions, Saudi Arabia emits 542.1mn tonnes of carbon dioxide equivalent, residing at number eighteen by global ranking. Despite the push to introduce renewable energy, Saudi Arabia is still quite carbon intensive, principally due to the central focus that hydrocarbon consumption and production has in its economy.

Saudi Arabia's increasing demographic growth, rising living standards, extensive urbanisation and the expansion of government directed downstream hydrocarbon industries led to a continuous rise in energy demand and carbon emissions over the years. If current trends continue, population growth in the kingdom will expand by approximately 1.71pc from between 2010–20 (currently at nearly 34mn), with more than ninety percent of the population living in cities. Therefore, a business as usual development cycle will only increase carbon emissions, with some estimates projecting that they could double by 2030.

Saudi Carbon Reduction Initiatives

Historically, while Saudi Arabia has been an active participant in international climate negotiations, it attempted to water down any emergent carbon consensus. Yet, Saudi Arabia changed course during the 2015 UN Climate Change Conference (COP 21) held in Paris. Saudi negotiators agreed to take steps to reduce domestic greenhouse gas emissions and submitted its Nationally Determined Contribution (NDC) on 10 November, 2015. The Saudi NDC indicated that the kingdom is planning to reduce its carbon emissions annually by approximately 130mn tonnes of CO_2 equivalent (tCO_2e) in 2030 with measures that have co-benefits in its pursuit of non-oil based economic diversification.

Still, even prior to the Paris climate negotiations, Saudi Arabia has been reducing its carbon emissions since the early 2010s through a multi-pronged strategy of reducing domestic hydrocarbon/power consumption, implementing energy efficiency projects, investing in renewable energy deployment and lowering methane leakage/gas flaring levels. There has been some success to date in carbon emissions reductions as the Saudi Electricity Company programs on greenhouse gas reductions saved more than 24.8mn barrels of equivalent fuel and 13mn barrels of diesel in 2016. Additionally, Saudi Arabia has been entering into bilateral carbon reduction agreements, such as in 2017, when the Saudi Ministry of Energy and Industry signed a carbon emissions control agreement with the US Department of Energy.

Saudi Arabia's primary hindrance for carbon market development is the lack of policy coherence as it relates to carbon emission

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The two countries created the partnership to engage in joint research regarding carbon, capture and storage (CCS) technology and the development of new carbon management strategies. The goal of the collaboration is to achieve near zero carbon emissions for power plants and carbon intensive industries. To further research into the design and testing of advanced CCS as part of the collaborative venture, the US Department of Energy's Office of Fossil Fuel provided nearly $36mn in federally-funded financial assistance.

Much of the knowledge sharing between Saudi Arabia and the US is also predicated upon the successful CCS testing and deployment carried out at the Petra Nova facility in Texas, the largest post-combustion CCS project in the world. Meanwhile, Aramco committed nearly a third of its research budget on research in CCS and energy efficiency. Aramco is building upon its experience with its CCS plant in Hawiyah, the largest CCS project in the region. The project will utilise 40mn cf/d of carbon dioxide. The carbon dioxide produced at Hawiyah will be extracted and treated at the natural gas extraction plant and transported through pipeline to be injected into oil reservoirs to assist in oil recovery.

Saudi Arabia has also been progressing in the area of energy efficiency through broadening the usage of energy efficiency standards and labels. The Saudi Energy Efficiency Center (SEEC), the agency responsible for the development of energy efficiency and conservation policies in relevant economic sectors, formulated energy efficiency labels for air conditioners since 2014. Due to the region's high temperatures, air conditioning is a substantial portion of energy demand in the kingdom. Moreover, the Saudi government established the National Energy Services Company (National Esco) in October 2017 to further the country's economic diversification and environmental sustainability objectives. National Esco estimated that it will be able to implement energy savings totaling approximately 40GW by the end of 2018.

As a critical portion of Saudi Arabia's commitments under the Paris Accord and its Vision 2030, the government is planning investment of between $5–7bn in renewable energy projects by 2019 for eight projects equaling 4.125GW of capacity. And, by 2023, the Saudi government desires to have 9.5GW of solar and wind power installed. Saudi Arabia is also benefiting from record low cost solar plant construction. These investments represent a key pillar of the Vision 2030 strategy by the Saudi government, the National Renewable Energy Plan. This is designed to stimulate renewable energy development to deliver long term economic diversification and economic stability by reducing domestic fossil fuel consumption.

The Saudi government has recently understood the complex interaction between economic growth and climate change, and under the 10th Development Plan (2015–19), began merging environmental issues with the government's macroeconomic restructuring. As a result of these policy objectives, Saudi Aramco has been developing significant carbon management strategies with the support of various research centers in the kingdom, such as the King Abdullah Petroleum Studies and Research Center and the King Abdulaziz City for Science and Technology (KACST). In order to accurately detail its greenhouse gas emissions, a team of experts from the then Presidency of Meteorology and Environment, Saudi Aramco and King Fahd University of Petroleum and Minerals (KFUPM) jointly developed a national greenhouse gas inventory for the kingdom and published their results in 2015.

Additionally, in February 2017, Saudi Arabia established the Green Saudi Company for Carbon Services. This organisation's goals are to develop and manage carbon emission reduction programmes and sustainable development mechanism projects, in accordance with regional and international agreements. The Green Saudi Company for Carbon Services is a partnership between Petroleum, Chemicals and Mining Company Limited and the Saudi Electricity Company. Overall, the organisation attempts to assist the government achieve its objectives consistent with the Vision 2030 and the National Transformation Program 2020. The development of this organisation is important as it has the support of the senior management of the Ministry of Energy, Industry and Mineral Resources and various other Saudi agencies concerned with alternative energy development. The endorsement by the Saudi government for this organisation telegraphs its commitment to the carbon reductions that the government pledged under the Paris Agreement. The Green Saudi Company for Carbon Services also seeks to register renewable energy projects and carbon emissions reduction programs within the United Nations Framework Convention on Climate Change. The organisation would then issue carbon emissions reduction market certificates from renewable energy projects, both regionally and globally.

The Saudi government has been attempting to educate a new generation of government officials through various joint research programs with foreign universities. The KFUPM and Berkeley Global Science Institute established the KACST Technology Innovation Center of Carbon Capture and Sequestration in 2011. And, an outgrowth of this collaborative venture was formed with the Saudi Aramco Carbon Capture and Utilization Chair Program to broaden and extend research into carbon emissions mitigation methods. These joint research programs are assisting the Saudi government to create a cohort of future policymakers with the necessary skillsets to facilitate the transition to a low carbon economy.

Future Outlook: How Saudi Arabia Could Establish a National Carbon Market

Despite the clear political will to implement its carbon reduction policies, Saudi Arabia faces unique challenges in creating an internally consistent carbon reduction platform, due to the fundamental paradox of producing/exporting hydrocarbons globally, while pledging to reduce domestic carbon emissions. The global climate debate has sharpened these contradictions and thereby provided the impetus for Saudi Arabia to arrive at a solution to what appeared as an insoluble problem—when it became evident that a means of lowering its energy consumption was interrelated to greenhouse gas reduction. As Saudi Arabia began to struggle with policies to reduce its rising energy demand, the same technology which could serve that purpose would also reduce greenhouse gas emissions. And, with the realisation of that concept, it curtailed its resistance to global climate negotiations.

As Saudi Arabia recognised the value in diversification of its downstream gas industries during the late twentieth century, there was the corresponding realisation that renewable energy development is not necessarily a threat and would not merely displace domestic hydrocarbon consumption. Rather, it could lead to the development of burgeoning industries that could then facilitate technology transfer in advanced technology, the growth of the non-oil job sector, and the gestation of a knowledge-based economy, as well as forge backward and forward linkages throughout the national economy in a way that the mere export of non-value added crude oil was not able.

The best method for Saudi Arabia to meet its Paris Agreement obligations would be for it to construct a carbon trading market as opposed to a carbon tax. Saudi Arabia, like its neighbors, has been loath to institute a national taxation regime. As a result, the industrial and business sector in Saudi Arabia would be much more accepting of a carbon trading framework by a phased process, as discussed below, that would allow the market to establish a carbon price.

Saudi Aramco has committed nearly a third of its research budget on research in CCS and energy efficiency

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Phase One: First and foremost, Saudi Arabia would need to improve basic coordination amongst the various governmental agencies that assist in environmental policy formation. Saudi Arabia is still quite weak in terms of basic policy coordination. Additionally, while the General Authority of Meteorology and Environmental Protection (GAMEP) promulgated a multitude of environmental regulations over the past decade, compliance and enforcement still tends to lag behind other countries in the region.

For Saudi Arabia to be successful in implementation of a carbon market, it would need to focus on making its basic compliance/enforcement regime more proactive. Nonetheless, the Saudi government is currently telegraphing to companies in its jurisdiction that they must begin to follow environmental regulations or face stiff fiscal and legal sanctions.

After Saudi Arabia strengthens its environmental enforcement regime, it would need to launch several pilot schemes in the three key industrial and manufacturing areas, such as in Riyadh, the Eastern

Province and Jeddah. Initially, Phase One would focus on market development, and the pilot scheme would
cover any industrial entity that emits more than 10,000 tonnes of carbon in any sector. The pilot schemes would construct the sinews of a forthcoming national carbon market and inculcate in the various industries in the country the need for future carbon pricing planning. The Saudi carbon regulators could begin to collect company-wide data that would create the framework for the complete legal basis for the carbon market.

Essentially, this would begin as a "learning by doing" phase that would educate both industry and governmental regulators on the intricacies on the functioning of the carbon market. Furthermore, this period would also assist in creating a baseline of emissions data in the various industrial and manufacturing sectors. The GAMEP would also likely create an updated inventory for greenhouse gas emissions as Saudi Arabia's last official greenhouse gas inventory took place in 2000, with an unofficial one in 2015. An updated national assessment would be required to create a baseline and a Monitoring, Enforcement, Reporting and Verification (MERV) framework.

Firstly, the GAMEP would develop a list of the industries that would be covered, while the local GAMEP offices would create a specific list of enterprises. Secondly, the national authorities would determine the allowance allocation method, while the local regulators would be responsible for creating the localised granting procedures. Thirdly, the national authorities would likely develop the MERV methodology and appoint third party auditors and regulatory standards. The local authorities would likely be responsible for organising data verification and reporting for submission to the GAMEP. Lastly, the national authorities under the GAMEP would construct and manage the registration framework and assess the enterprise compliance status, while the local authorities would supervise the covered entities and account for whether they are fulfilling their carbon emissions reduction/trading obligations. During this phase, data collection will also be carried out among the thirteen administrative regions in the kingdom by the GAMEP for all carbon emitting economic sectors. This would also assist in capacity building at the local and regional level country-wide.

40GW—the amount of energy savings that National Esco estimates it will have achieved by the end of 2018

Phase Two: This would provide the national policymakers with the assurance, hard data, enforcement authority and the requisite evidence needed to apply the pilot schemes at the national level. The Saudi regulatory authorities will need to analyse mock trading of the allowances at the national level, while setting up a national baseline at the same time. This will examine the durability and effectiveness of the critical market actors and allow the regulatory authorities to implement a robust early warning and prevention framework for any emergent market risks, while assisting the supporting mechanisms of the carbon market's governance framework. Moreover, a stakeholder platform should be organised to support the development of the national market by engaging in stakeholder dialogues while also building up the capacity of financial intermediaries to offer advisory, risk management and brokerage services to their clients.

Phase Three: This phase would launch the official national carbon market that would cover all industrial and economic sectors that emit more than a certain amount of carbon emissions. The Saudi regulatory authorities would also be able to tighten or loosen the nationwide carbon cap based on national priorities and future obligations under global climate accords.

Outlook

As Saudi Arabia is currently undergoing significant macroeconomic change and is attempting to allow the private sector to assume a larger role in the economy, a carbon trading framework aligns neatly with this policy. Nonetheless, Saudi Arabia's primary hindrance for carbon market development is the lack of policy coherence as it relates to carbon emissions and domestic hydrocarbon demand reduction. Additionally, it suffers from lax enforcement and robust policy coordination of existing environmental laws and regulations. The first step that Saudi Arabia would be required to undertake is to strengthen its enforcement regime. And from a firm enforcement regime, standardisation of data collection methodology would be an important next step. It is likely that if Saudi Arabia were to pursue carbon market development, it would require approximately ten years to develop a fully viable national system. Saudi Arabia could develop a pilot scheme in several cities, initially, with a transition to a nascent national scheme. And, with the pursuance of carbon reduction policies, Saudi Arabia could transform itself into a regional leader in greenhouse gas reductions.

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