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INVESTORS SERVICE

SECTOR IN-DEPTH
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Oil & Gas – Global

Energy transition poses varying degrees of credit risk to national oil companies

» **National oil companies (NOCs) play a critical role in the world's energy markets.** The NOCs we rate collectively account for a sizable chunk of global oil and gas production and reserves, dwarfing in these terms their counterparts in the private sector, the international oil companies (IOCs). NOCs also carry some of the largest debt. However, not all NOCs are alike and their business models vary substantially. While the symbiotic relationship between many NOCs and their sovereign sponsors can confer a number of competitive advantages over the IOCs, it can also have its drawbacks.

» **NOCs' exposure to carbon transition risk will vary.** Our baseline expectation is that there is a reduction in oil and gas demand growth to 2040, but we also consider alternative scenarios of an abrupt and potentially disorderly shift to a lower level of demand. NOCs in oil importing countries where consumption will keep growing are less exposed in these scenarios than those in oil exporting countries because they are unlikely to see a large decline in their sales volume, provided they are not inefficient/high cost producers. Characteristics such as low production costs, a high proportion of natural gas or liquefied natural gas (LNG) assets, low leverage and social obligations also imply lower risk. A sovereign could provide support or act as a drag on the NOC's credit quality depending on its ability and willingness to provide support even when oil consumption is declining, the degree of its reliance on the NOC for its revenue and whether it is rated above or below the NOC's rating. While these risks have not been the primary driver of specific rating actions to date, we expect the credit impact of energy transition to grow in importance in the medium term.

» **Sovereign strategies will affect the risks NOCs face from the carbon transition.** While some NOCs are changing for business reasons or to align with government climate-change imperatives, the ability of others to make the transition to less carbon-intensive models is constrained by fiscal obligations to or the social objectives of their sponsoring governments. Exposure to prolonged low oil prices for NOCs in countries which rely materially on oil export revenues to cover public expenditure such as those in GCC region will be particularly at risk. In some emerging market countries, the need to direct capital to grow and develop their economies will make it hard for NOCs to reduce dependence on hydrocarbons. In general, NOCs are not that well prepared for the carbon transition and lag behind the IOCs in this area.

Moody's Energy Summit series

Analysts from across Moody's recently met over two days to discuss the future of energy transition. In a series of reports, we summarize our discussions about overall risk to energy demand, frequently asked investor questions, and the evolving strategies, capital, insurance, and systemic risks for the independent oil and gas industry. In this report, we look more closely at how sovereign linkages and country strategies affect the transition risk faced by state-owned national oil companies.

NOCs play a critical role in the world's oil and gas markets

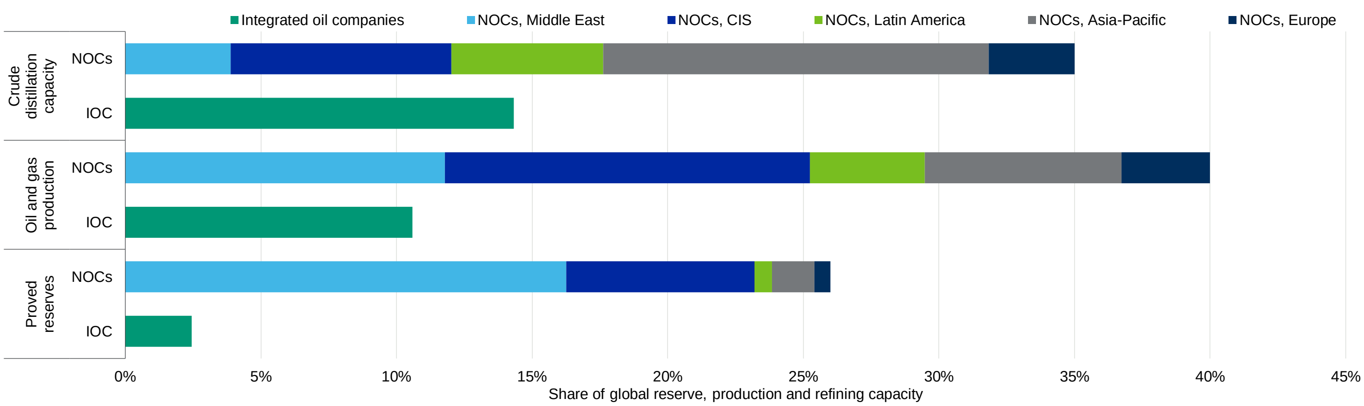
Nymia Almeida, Senior Vice President, Corporate Finance Group

NOCs play a critical role in the world's oil and gas markets. These state-sponsored companies collectively account for a sizable chunk of global oil and gas production and reserves, and are significantly larger than their international counterparts in the private sector on this basis. As national champions, NOCs also tend to benefit from privileged positions in their domestic markets and have an easier time in accessing capital given their status as partially or wholly owned government companies. However, the investment strategies that NOCs adopt as the world transitions to a low-carbon economy will depend on how crucial these companies are as a source of funding for their sovereign sponsors and in meeting broader government social or economic objectives.

As Exhibit 1 shows, the NOCs we rate account for a considerable share of global oil and gas production with most reserves located in the Middle East, Russia and the broader Commonwealth of Independent States (CIS). The NOCs dominate the industries in their countries.

Exhibit 1

Rated NOCs account for a significant proportion of global production and reserves



Note: Rated coverage figures exclude Petróleos de Venezuela, S.A. (PDVSA)
Sources: Company filings, Moody's Investors Service, BP Statistical Review of World Energy, 2019

Rated NOCs' oil and gas assets are also considerably larger than those of rated international oil companies (IOCs). For example, the top six rated NOCs[1] had proved reserves of around 673 billion barrels of oil equivalent (boe) and had combined oil and gas production of 30 million barrels of oil equivalent per day (boepd) in 2019 versus 66 billion boe and 17 million boepd, respectively, for rated IOCs, based on our estimates and company filings. Rated NOCs also carry some of the largest debt in the oil and gas sector.

However, not all NOCs are alike. Some NOCs are domiciled in oil exporting countries, while others are based in countries that are major oil importers. Levels of government ownership can also vary substantially from full ownership to a partial stake. Some NOCs are largely domestic, whereas others are international players with assets in many geographies. The structure of NOCs businesses might be fully vertically integrated or largely focused on the upstream.

The symbiotic relationship between the NOCs and their sovereign sponsors can confer a number of competitive advantages over IOCs, but can also have its drawbacks. Typically NOCs have a monopoly position or the market position is protected with high barriers to entry within the domestic market. In some cases, NOCs have a special legal status. NOCs also tend to face lower risk from carbon regulations because they operate in regulatory frameworks that make it easier for them to get permits or be granted waivers. NOCs also benefit from superior access to domestic (as well as international) capital markets given status as government-owned companies. However, NOCs face higher demands for dividends or taxes, especially in cases where governments are highly reliant on oil revenues. Decision making can also be influenced/determined by the government given the impact on the domestic economy and fiscal accounts. This can make it harder for NOCs to adapt to broader global developments through changes in their strategy, investments and to their workforces because they are major employers.

NOCs' exposure to carbon transition risk will vary

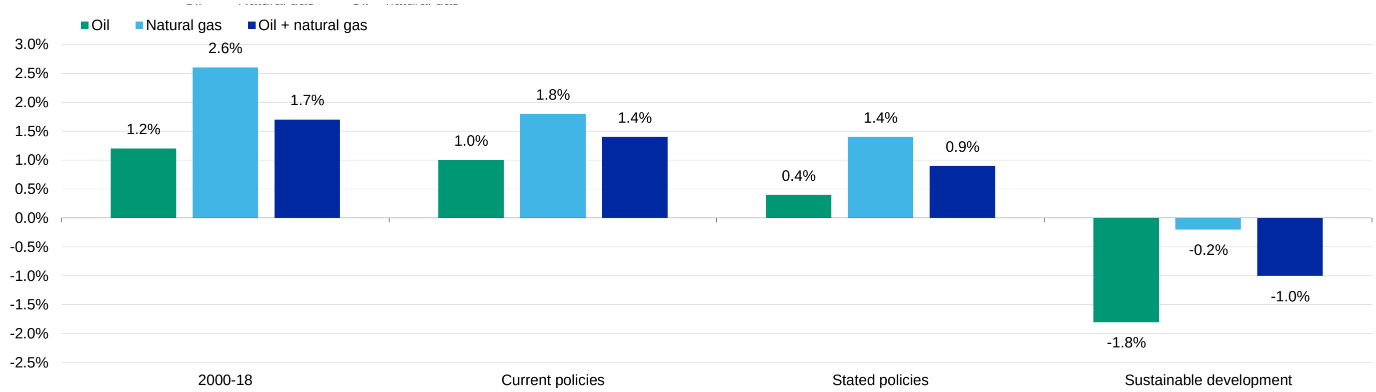
Energy transition raises new business risks for the oil and gas industry because it will affect how demand for its products evolves over the next 10-20 years. While these risks have not been the primary driver of specific rating actions to date, we expect the credit impact of energy transition to grow in importance in the medium term.

Energy transition scenarios involve a long, two-decade timeline, and highly uncertain patterns. Our analysis of credit risks related to future energy transition adopts the two main projection scenarios of the International Energy Agency (IEA), the intergovernmental organization that has published a World Energy Outlook since 1998. IEA's detailed projections include a simulation of three key outcomes, based on current policies, stated policies (STEPS), and sustainable development (SDS). We use STEPS as our baseline scenario (see Exhibit 2). However, we are also assessing the implications for the industry if future demand were to move toward SDS, which envisages more rapid changes across the energy sector and would present greater challenges to oil and gas companies to manage their capital reinvestment decisions and adapt their business models.

Exhibit 2

High uncertainty about future oil and gas demand adds to business risks

Demand growth CAGR to 2040



Source: IEA (2019) World Energy Outlook. All rights reserved

Under STEPS, incorporating both policy intentions and emission-reduction targets, IEA projects oil demand will rise by a 0.4% compound annual growth rate (CAGR) to 2040, assuming compound average annual GDP growth of 3.4%. STEPS, the scenario we use as a baseline, envisions low-carbon sources making up more than half of demand growth, with oil consumption flattening in the 2030s and coal edging out. Emissions would continue rising, but the peak would slow by 2040.

Under SDS, the scenario that assumes the world meets the sustainability goals of the 2015 Paris Agreement, oil demand would shrink by a 1.8% CAGR to 2040. Meeting the two-degree-Celsius goal of the Paris Agreement would require large, rapid changes across the energy sector. But among the IEA assumptions, carbon dioxide (CO_2) emissions would decline notably only under the SDS scenario, remaining mostly flat even under STEPS.

We expect that the NOCs in oil importing countries are less exposed to carbon transition risk than those in oil exporting countries. This is because NOCs in oil importing countries are unlikely to see a large decline in their sales volume, provided they are not inefficient/ high cost producers.

However, we do not expect carbon transition to lead to changes in market structure: monopolies/oligopolies will persist. We also expect that NOCs' access to funding will remain intact given their linkages to their respective governments.

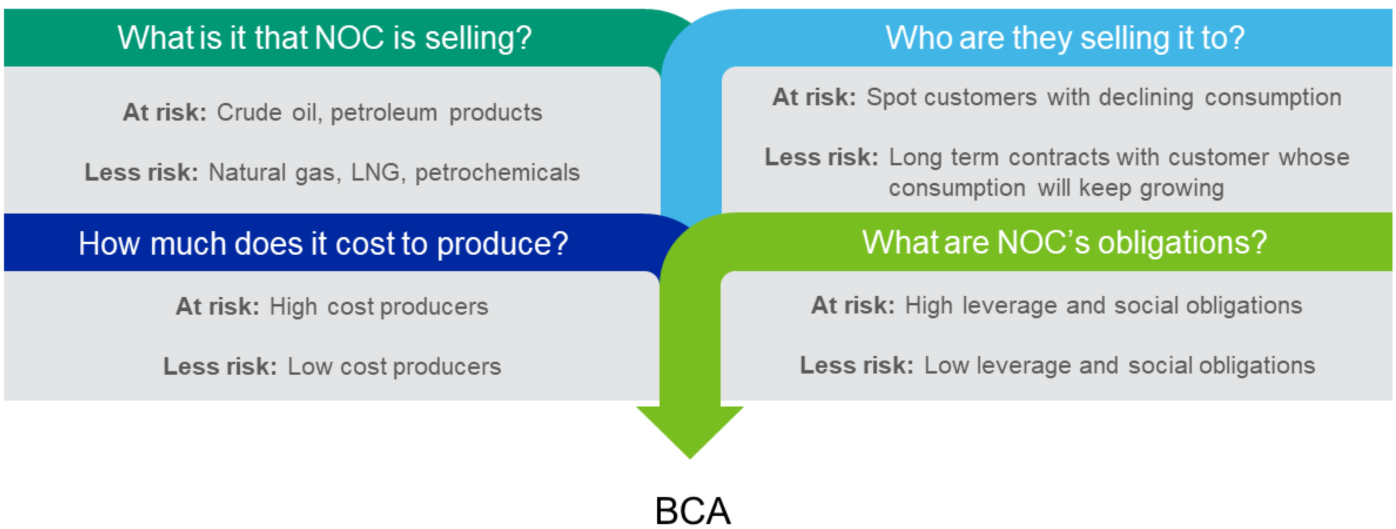
Key credit considerations for NOCs

Hui Ting Sim, Analyst, Corporate Finance Group

As government-related issuers (GRIs), most NOCs' ratings reflect the combination of a baseline credit assessment (BCA), which represents our opinion of the GRI's standalone intrinsic strength, and our assumptions of the likelihood of the government providing extraordinary support if needed. There are four main considerations for how carbon transition risk could affect NOCs' standalone credit strength: what they are selling, who they are selling it to, the cost of production and what the NOCs' obligations are (see Exhibit 3).

Exhibit 3

Impact of carbon transition risk on NOC's BCA will depend on its business position



Source: Moody's Investors Service

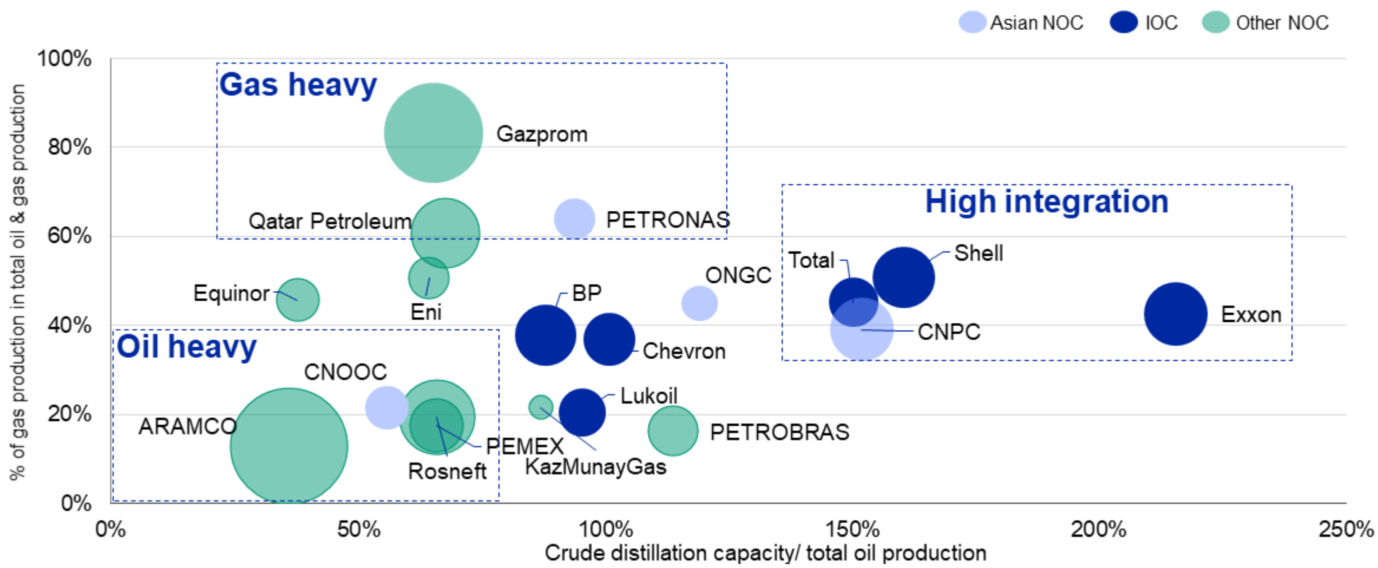
The following attributes, among others, broadly imply less risk:

- low production costs
- a high proportion of natural gas in total production
- a high level of vertical integration (large petrochemical capacities)
- low dependence on oil exports, although long-term off-take agreements or strong market position in geographies where oil consumption will continue to grow (China, India) could protect volumes.
- flexibility to lower dividends and other payments to the government

Exhibit 4 provides an overview of rated NOCs' business models.

Exhibit 4

Rated NOCs business models vary significantly and are generally less integrated than IOCs



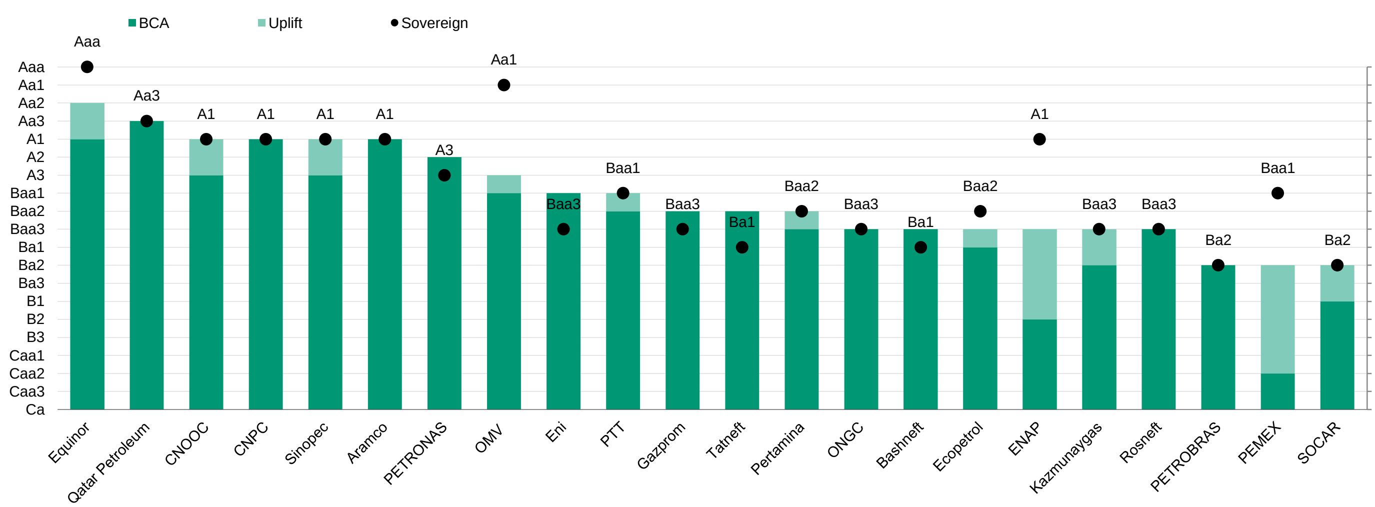
Size of the bubble represents the total daily production; chart is based on 2019 data

Sources: Company filings, Moody's Investors Service

In an energy transition scenario, the sovereign can provide support or act as a drag depending on its ability and willingness to provide support even when oil consumption is declining, the degree of its reliance on the NOC for its revenue and whether it is rated above or below the NOC's rating. Out of the 22 [2] integrated oil and gas companies that are GRIs, five are rated above the sovereign and six are rated at the same level as the sovereign with no uplift form sovereign support. Another six are rated at par with the sovereign with an average uplift of 1.7 notches from sovereign support. Another five are rated below the rating of their respective sovereign with an average uplift of three notches (see Exhibit 5).

Exhibit 5

Sovereign creditworthiness and assumptions of support shape NOCs' ratings to varying degrees



Includes integrated oil & gas companies rated B3 and above. The sovereign rating associated with (1) Tatneft reflects the rating of the Republic of Tatarstan, and for (2) Bashneft it reflects the rating of the Republic of Bashkortostan. Ratings as of 30 September 2020

Source: Moody's Investors Service

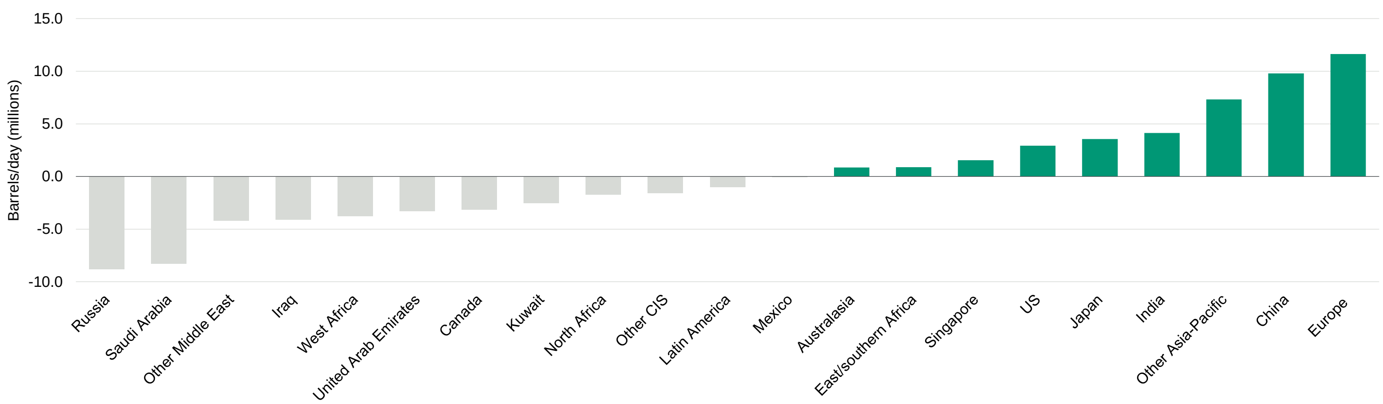
Sovereign strategies will affect the risks NOCs face from the carbon transition

Supply and demand dynamics for hydrocarbons globally and how they will evolve over time at regional and country levels as the world transitions to a lower carbon future will have implications for the strategies sovereigns adopt in response — and by extension their NOCs.

Asia-Pacific is currently the largest consumer of crude oil, while the Middle East is the largest producer. However, the picture is more concentrated in terms of exports and imports. The Middle East and Russia combined account for around 75% of net crude oil exports. On the demand side, China alone accounts for about 25% of net crude imports and if Europe and India are added the combined share rises to about 60% of the total (see Exhibit 6).

Exhibit 6

Crude oil and petroleum products: exports and imports
Ordered by net imports in 2018



Source: BP Statistical Review of World Energy, 2019

Against this backdrop, NOCs preparedness to face carbon transition risk varies substantially by country and region. While some NOCs are changing for business reasons or to align with government climate-change imperatives, the ability of others to make the transition to less carbon-intensive models is constrained by fiscal obligations to or the social objectives of their sponsoring governments. In some emerging market countries, the need to direct capital to grow and develop their economies will make it hard for NOCs to reduce dependence on hydrocarbons. In general, NOCs are not that well prepared for the carbon transition and lag behind the IOCs in these efforts.

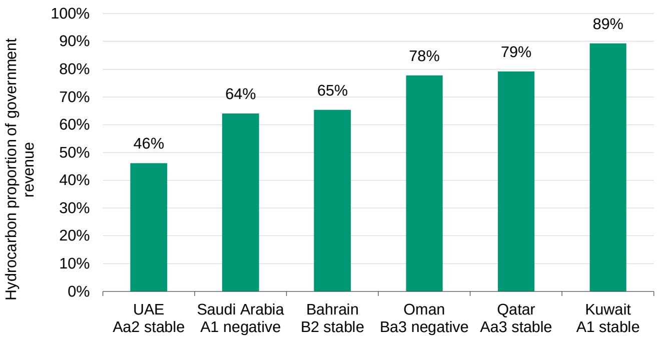
Middle East

Rehan Akbar, Vice President – Senior Credit Officer, Corporate Finance Group

In the Gulf Cooperation Council (GCC) economies, the NOCs are large sources of funding for their sovereign sponsors, so their investment strategies are influenced by their sponsors' fiscal and socioeconomic needs. As Exhibit 7 shows, government revenues for Kuwait (A1 stable) are the most reliant on hydrocarbon revenues (89%), while the United Arab Emirates (UAE, Aa2 stable) is the least (46%).

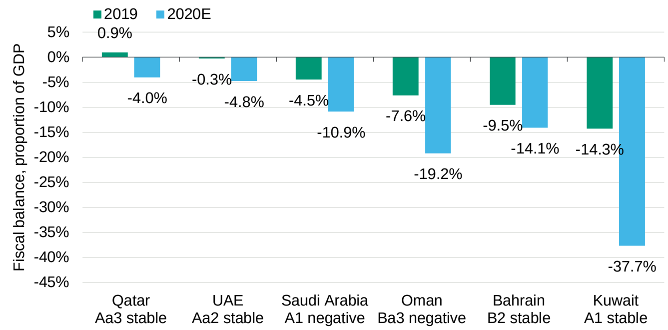
GCC sovereigns have long struggled to diversify their economies and low oil prices are making it more difficult by straining public finances and thereby reducing financial resources that could be used to support diversification (see Exhibit 8). The GCC NOCs generally have strong balance sheets because of their relatively low debt levels and high liquidity/cash buffers. However, sustained lower oil prices are likely to erode those balance sheets with the rising pressure on the NOCs to maximize transfers to their respective sovereigns. This pressure will be most acute in the countries where sovereigns derive the largest share of their fiscal revenues from oil and gas and have the weakest capacity to cut spending or significantly increase non-hydrocarbon revenue, such as through tax increases.

Exhibit 7
GCC governments remain reliant on hydrocarbon revenues



Source: Moody's Investors Service

Exhibit 8
Budget deficits exacerbate challenges to economic diversification



Note: For Kuwait, fiscal balance as proportion of GDP is calculated post transfer to Future Generations Fund.
Source: Moody's Investors Service

We believe GCC sovereigns are unlikely to introduce policies and regulations that undermine the monetization of hydrocarbon resources given the economic reliance on these resources. On the contrary, the general approach being taken is to maximize the value of these resources. GCC NOCs are investing significantly within their area of strength by implementing strategies that may support them in a low carbon world, and in particular there is a strong focus on increasing production of natural gas as well as petrochemicals.

Qatar Petroleum (Aa3 stable) is significantly increasing its liquefied natural gas (LNG) production and is targeting 126 million metric tons per annum (mtpa) of LNG production by 2027, up from the current 77 mtpa. Qatar's exposure primarily to natural gas reduces its vulnerability to carbon transition risk. Unlike Qatar Petroleum, which is export-focused, Saudi Arabian Oil Company's (Saudi Aramco, A1 negative) investments in natural gas cater for growing domestic energy needs. In February 2020, the company announced that it received regulatory approval for the development of the Jafurah unconventional gas field, one of the world's largest shale gas fields and the largest non-associated gas field in Saudi Arabia. Saudi Aramco has heavily invested in petrochemical assets over the years as a means to diversify and secure a market for a portion of its upstream oil and gas production, with the acquisition this year of a 70% stake in Saudi Basic Industries Corporation (A1 negative) for $69.1 billion being transformational for its downstream business. In recent years Abu Dhabi National Oil Company (ADNOC) has also been executing on a strategy to increase investment in natural gas production and higher-value products such as petrochemicals. A part of the company's strategy is to deepen its market access in emerging markets by building strategic partnerships in countries such as China and India, where energy demand growth will remain robust over the coming decades.

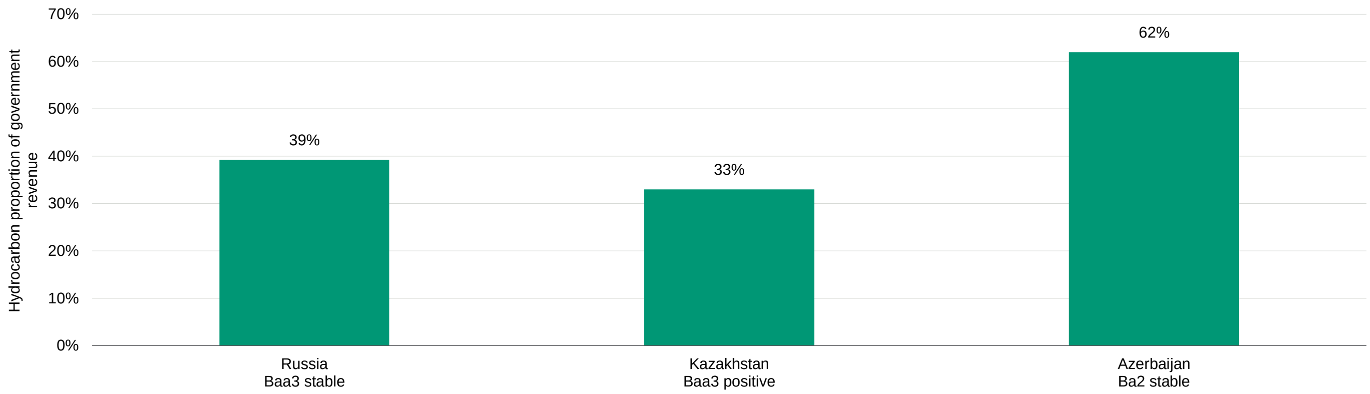
CIS

Artem Frolov, Vice President – Senior Credit Officer

In the CIS, the reliance of government budgets on revenue from the oil and gas sector is significant in the main three markets (see Exhibit 9). Although ownership levels and market structures vary, the NOCs in these three countries are core strategic holdings of their governments and derive benefits from that status.

Exhibit 9

State budgets remain dependent on hydrocarbon revenues



Sources: Russia's Ministry of Finance and Moody's Investors Service estimates

Although all three countries recognize carbon transition risk, there are as yet no clear strategies to specifically address it. In Russia (Baa3 stable), the government is implementing broader policies around sustainability. Russia's Gazprom, PJSC's (Baa2 stable) production mix is already predominantly natural gas, which is significantly less carbon-intensive than oil. Gazprom is also working to create entirely carbon-free technologies for producing hydrogen from natural gas in a bid to address carbon transition risk and also capture market share in Europe, where it is already the largest natural gas supplier.

Russia's PJSC Oil Company Rosneft (Baa3 stable) expects that hydrocarbons will still be the main fuel until at least 2040, although the share of oil will decline in favor of gas, nuclear energy and renewables. The company is increasing the proportion of natural gas in its production, intends to spend around 7% of its annual capital spending on green investments in 2020-22 (aimed at reducing the flaring of associated petroleum gas, improving pipeline integrity, water and waste management and increasing land remediation), and benefits from low all-in production costs of less than $10 per barrel of oil equivalent (boe) which will support its profitability under a wide range of stress oil price scenarios. Rosneft is developing a long-term carbon management plan which will define its carbon-related risks and identify opportunities with regards to future energy demand.

Kazakhstan (Baa3 positive) and Azerbaijan (Ba2 stable) are focused mainly on reducing their environmental footprints as reflected in efforts by their NOCs (KazMunayGas NC JSC (Baa3 positive) and State Oil Company of the Azerbaijan Republic (SOCAR, Ba2 stable) to cut their energy consumption and emissions. However, we think these governments are highly unlikely to limit the potential of developing hydrocarbon resources. While there is an overall plan to develop renewable sources of energy, it is as yet at an early stage.

Latin America (LatAm)

Nymia Almeida, Senior Vice President, Corporate Finance Group

Most governments in Latin America rely on their NOCs for fiscal revenues or public policies as well as for energy security. Although these governments have signed on to the Paris Agreement that aims to keep global temperature rises well below 2°C, they have yet to come up with concrete measures mainly because they lack the capital to go that far or fast.

Against this backdrop, Latin American NOCs for the most part are not well prepared for a lower-emissions marketplace. NOCs are discussing carbon transition risks and are listing some actions, but many, such as Mexico's Petroleos Mexicanos (PEMEX, Ba2 negative) are grappling with shorter-term issues like weak liquidity that preclude them from making any substantial investments in lower-carbon energy sources. Brazil's Petroleo Brasileiro S.A. — PETROBRAS (Petrobras, Ba2 stable) has made more headway than most, but its investments in alternative energy sources are still low compared with the IOCs. None of the NOCs in Latin America currently have a clear view of what their businesses will look like in 10 to 15 years' time. They may think about this more in the future as the risks begin to crystallize, but in the meantime they have implicit or explicit support from their sovereign sponsors which gives them a layer of credit support.

China

Kai Hu, Senior Vice President, Corporate Finance Group

China (A1 stable) is an active sponsor of the Paris Agreement and aims to cut GDP per capita carbon dioxide (CO_2) emissions by 60%-65% by end of 2030 from the 2005 level, mainly by reducing the proportion of coal in the energy mix and increasing the proportion of renewable energy and natural gas. China's NOCs — China National Petroleum Corporation (CNPC, A1 stable), China Petroleum and Chemical Corporation (Sinopec Corp, A1 stable) and China National Offshore Oil Corporation (CNOOC Group, A1 stable) – will be instrumental in achieving these aims which are embedded in their strategies.

The NOCs are of very high strategic importance to the Chinese government. This is mainly from the perspective of safeguarding the country's energy security rather than their contribution to fiscal revenue because China's economy is widely diversified yet highly dependent on energy imports. The Chinese government has directed the NOCs to increase oil and gas exploration and production as the country's import dependence rose to 70% for oil and 45% for natural gas at the end of 2018. Oil consumption will grow by the low single-digits while GDP growth is slower. The increase in natural gas consumption will be faster in comparison at around 10% a year for the next five years, supported by the switch from coal.

All the NOCs have high ratings and the Chinese government also has strong capacity to support them if needed.

India

Sweta Patodia, Analyst, Corporate Finance Group

India (Baa3 negative) is the world's third-largest consumer of oil (about 5% of global consumption) and is heavily dependent on imports to meet these needs.

India's energy strategy aims to reduce its hydrocarbon imports through the increased use of renewables and improving energy efficiency. However, India's consumption of fossil fuels, under its stated policies, will continue to increase (including for coal) and so will its imports of oil and gas until at least 2040.

While the sales volumes of Indian NOCs remain protected given India's dependence on imports, the sales price for oil and natural gas in the country is linked to international markets.

India's NOCs are key players in the country's oil and gas sector. They dominate the upstream and marketing segments, where in the latter an indirect tax collected by these companies accounts for more than 20% of the government's revenue. Retail selling prices in India for transportation fuel are high because of these indirect taxes, which somewhat serves as a substitute for carbon tax in other countries.

The Indian government has also been extracting large shareholder payouts from its NOCs leaving little cash surplus for them to meaningfully invest in low carbon alternatives. While there has been a significant increase in investment in renewables in India, this has been done by government-owned and privately owned utility companies rather than the NOCs.

Given that the country expects its consumption of oil and gas to continue to increase, the government is unlikely to authorize a meaningful change in the business model of its NOCs away from their original mandates.

If the prices of oil and gas decline, following an accelerated or disorderly carbon transition, to such an extent that makes capital structures of these companies unsustainable, we expect the NOCs to rely on support from the government.

Appendix

Exhibit 10

List of rated national oil companies (NOCs)
As of 30 September 2020

Country	Sovereign rating	Sovereign outlook	Name of NOC	NOC rating	NOC outlook
Austria	Aa1	Stable	OMV AG	A3	Negative
Azerbaijan	Ba2	Stable	State Oil Company of the Azerbaijan Republic	Ba2	Stable
Brazil	Ba2	Stable	Petroleo Brasileiro S.A. - PETROBRAS	Ba2	Stable
Chile	A1	Negative	Empresa Nacional del Petroleo	Baa3	Negative
China	A1	Stable	China National Petroleum Corporation	A1	Stable
			China Petrochemical Corporation	A1	Stable
			China Petroleum and Chemical Corporation	A1	Stable
Colombia	Baa2	Stable	Ecopetrol S.A.	Baa3	Stable
India	Baa3	Negative	Oil and Natural Gas Corporation Ltd.	Baa3	Negative
Indonesia	Baa2	Stable	Pertamina (Persero) (P.T.)	Baa2	Stable
Italy	Baa3	Stable	Eni S.p.A.	Baa1	Stable
Kazakhstan	Baa3	Positive	KazMunayGas NC JSC	Baa3	Positive
Malaysia	A3	Stable	Petroliam Nasional Berhad	A2	Stable
Mexico	Baa1	Negative	Petroleos Mexicanos	Ba2	Negative
Norway	Aaa	Stable	Equinor ASA	Aa2	Negative
Qatar	Aa3	Stable	Qatar Petroleum	Aa3	Stable
Russia	Baa3	Stable	Bashneft PJSOC	Baa3	Stable
			Gazprom, PJSC	Baa2	Stable
			PJSC Oil Company Rosneft	Baa3	Stable
			Tatneft PJSC	Baa2	Stable
Saudi Arabia	A1	Negative	Saudi Arabian Oil Company	A1	Negative
Thailand	Baa1	Stable	PTT Public Company Limited	Baa1	Stable

Reflects integrated oil & gas companies rated B3 and above. Tatneft is located within Russia and its rating is linked to the Republic of Tatarstan. Bashneft is located within Russia and its rating is linked to the Republic of Bashkortostan.
Source: Moody's Investors Service

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Endnotes

1 Saudi Arabian Oil Company (Saudi Aramco, A1 negative), Qatar Petroleum (Aa3 stable), PJSC Oil Company Rosneft (Rosneft, Baa3 stable), Gazprom, PJSC (Baa2 stable), Petroleo Brasileiro S.A. - PETROBRAS (Petrobas, Ba2 stable) and Petroleos Mexicanos (PEMEX, Ba2 negative)

2 Rated B3 or above

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