National Oil Companies of the Future

By Valérie MARCEL
Chatham House

Will national oil companies (NOCs) be the champions of the energy transition and invest in clean energy? That is not a commonly asked question. Because NOCs are designed to produce and sell fossil fuels, their potential contribution in the area of renewables, cleaner energy and energy efficiency standards is often underappreciated. This article reviews NOC incentives to invest in the clean energy space and asks whether they are the right vehicles to lead the energy transition in their countries.

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In order to assess their potential role in supporting the energy transition, let us ask first, "Would they want to?" In other words, would renewables and clean energy be a natural strategy for NOCs? The second important corollary question we should ask is, "Could they do so effectively?".

Would they?

We have seen announcements made by the largest European oil companies that they are taking steps to transition away from fossil fuels and invest in renewables. Total's ambition is to have close to "20% low-carbon businesses in 20 years' time". Shell announced this year it is exploring the feasibility of doubling its annual green energy investments to $4bn. However, the share of investments in renewable energy remains very low in relation to total capital expenditure among these companies and the change has not swept up the whole sector. According to a study by CDP, European oil majors spent up to 7% of their capex on low carbon projects, while the sector as a whole is lagging far behind at 1.3% of total 2018 capital expenditure [1]. Looking across 24 international oil companies (IOCs) and NOCs, the study found Equinor, Total, Shell and ENI standing among the oil companies leading the transition, while CNOOC, Rosneft and Marathon Oil lag behind. That said, the share of R&D dedicated to improving energy efficiency or cleaning up the process of extraction of oil and gas shows a stronger commitment in this aspect of the push towards cleaner energy.

While these IOC investment strategies offer signals to NOCs, they are only of limited use to understand those of national oil companies and whether they would expand their footprint in clean energy, renewables and energy efficiency. National oil company shareholders have more complex demands than do private company shareholders. Listed company shareholders are largely concerned with dividends and the future value of the company – which leads to pressure to reduce climate risk. The NOC's shareholder is the state and it is not only interested in maximizing profits (though that is a priority) or in the petroleum sector. Governments are concerned with their country's development agenda, international obligations, a host of domestic policy priorities and their political survival. As a result of government direction, NOC strategies are guided by public policy priorities, as well as their own self-interested business priorities, such as growth and profitability.

The degree to which the NOC is bound by those broader public policy issues will determine how its strategy responds to or anticipates global climate and market trends. A number of factors shape this, as the following outlines.

Degree of internationalization

Internationalized NOCs behave more like IOCs. They are less bound by domestic public policy priorities and their investments will be driven primarily by reserves growth and access to 'low' cost reserves, in locations where they have a relative advantage, with project technical and financial requirements they can meet and a risk level they can manage. This is the case for Petronas. It should be the case for Equinor, though, as we will see, government direction and public expectations encourage it to look beyond petroleum for growth.

(1) CDP, https://www.cdp.net/en/articles/investor/european-oil-majors-spending-up-to-7-on-low-carbon-but-wider-industry-needs-to-step-up

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Solar panels are installed on the roof of a Petronas Tower in the Kula Lumpur business district, Malaysia (2 November 2011).

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It is common for NOCs operating primarily at home to be more embedded in the political system and in tune with public policy expectations regarding the energy sector. They will favor a more vertically integrated business, expanding from upstream, to downstream and midstream investments. This will allow them to meet domestic energy needs as well as international demand for petroleum products and high value petrochemical products. NIOC (Iran), Pemex, Saudi Aramco, and ADNOC are such examples. Where the domestic or government expectations are to invest in clean energy, they are more likely to follow.

High growth of domestic demand for energy

NOCs in countries where domestic demand for petroleum products and/or electricity is growing fast will be concerned with measures to slow that demand by increasing energy efficiency (and/or removing subsidies). They are more likely to invest in developing other energy sources, such as renewables or nuclear, in order to free more oil for export. This is the case for Saudi Aramco, operating in a country with a growing economy and population, and rising needs for air conditioning and desalination, as well as industrial energy use. Much of that electricity is fuel-generated, reducing the volumes available for export (and high rent generation).

NOCs operating in countries without oil and gas production were commonly created with a mandate to meet the country's energy needs through imports of products. The rationale for investing in energy efficiency is clear. That for renewables generation can also be made. Guided by the government's energy policy, the Petroleum Corporation of Jamaica (PCJ) invested in wind farms ten years ago and is now studying the potential for hydro power and biofuels. PCJ installed 62.7 MW of wind energy, which, as the PCJ website notes, "should reduce national oil consumption by more than 37,100 barrels annually and result in yearly savings of approximately J$400 million."

In countries where domestic growth in energy demand is not a matter of concern, the NOC will not need to substitute domestic demand for oil with gas or with renewables. This is the case for countries with small populations, such as Kuwait, and where demand growth is controlled by public policy measures, such Malaysia. These NOCs may seek out industry collaborations to improve the image of oil/gas internationally however.

Government energy and climate policies

Strong policy direction based on environmental goals will give NOCs an opportunity to transform their mandate into an energy company. While some NOCs have a mandate

narrowly defined around the petroleum value chain, some have a broader energy mandate, which opens the door to this transition. Petroleum Corporation of Jamaica's mandate is to provide innovative, sustainable solutions to Jamaica's energy supply challenges (PCJ website). The company has emphasized renewable energy solutions. In 2018, the Mexican government announced a target of 50% clean energy by 2050, which could lead to a broadened mandate for Pemex.

In some cases where government climate policy tends to be reactive and laissez-faire, the NOC has taken the initiative on climate. NOCs with greater state agency responsibilities (those which are concessionaires or regulators, for instance) and with high technical capabilities will be strong actors in the national petroleum sector. Those NOCs are more likely to take the initiative on new energy policy/strategy paths. They are also more inclined to anticipate how long-term energy demand and climate policies can affect their business outlook (specifically markets for their future production). Saudi Aramco, Petrobras, Petronas, Sonatrach and Equinor are NOCs with such a long-term strategic outlook.

NOC exposure to carbon risk

NOCs with large reserves should have a long-term outlook and awareness of their exposure to climate risk. They would be concerned with maintaining long-term demand for oil and gas and the impact that climate policies can have on demand. The risk of stranded oil assets should encourage them to take measures to anticipate a carbon constrained world (especially if they are commercially and technically competent) – for instance, by investing in processes and technologies that reduce the carbon footprint of their oil production or by cooperating with other companies to present a greener industry to the world. The risk of stranded assets would also encourage them to invest in refining and petrochemicals [(2)].They would also upgrade their refineries so their products meet evolving environmental standards.

NOCs with a small reserve base will be more likely to produce reserves at a faster rate. They will have less time to develop a vertically integrated business (less likely to invest in refining). These NOCs may be more interested in investing in other energy sources, such as renewables or oil/gas abroad, in order to ensure future growth, though they may have less resources to dedicate to the effort.

Review of NOC clean energy investments

The above discussion outlined the factors that should make NOCs more interested in becoming National Energy Companies (NECs) or, at least, in investing in clean energy. We will now briefly review the current level of interest among NOCs.

The overall trend for NOC investments has generally been, like IOCs, more focused on petroleum, with a refocusing on gas as the transition fuel and on low carbon technologies that reduce emissions (and other harmful pollutants). There is a natural strategic incentive to implement technologies or interventions that reduce emissions, clean up the extraction of fossil fuels or increase energy efficiency. Efficiency remains an issue in the industry, with companies losing on average 3.3% of their natural gas production through flaring, venting and methane leakages – worth almost US$5bn at the current gas price (CDP). And, more broadly, the negative image of the oil sector, which is associated with pollution, is a threat to demand.

Many NOCs are willing to sign up to initiatives addressing these concerns. The Oil and Gas Climate Initiative (OGCI) which includes 5 NOCs (Saudi Aramco, Pemex, Petrobras, Equinor, CNPC) among the 13 active companies, aims to act in this direction. CNPC has indeed invested in research and development to clean up oil production through carbon sequestration and cleaner energy substitution (natural gas, coal bed methane, shale gas, biomass). Saudi Aramco has similarly been focused on energy efficiency and carbon capture. Its R&D focus has been on sustaining low carbon intensity crude oil, growing non-fuel applications for crude oil, and advancing sustainable transport. Saudi Aramco also has clear targets to increase energy efficiency in its operations and eliminate unnecessary flaring, as does Sonatrach – which ties executive pay to achieving targets [(3)]. Like Sonatrach too, Aramco has experimented in solar energy, with a plant that generates electricity for its facilities.

But the policy background changed in 2018 when Minister of Energy Khalid Falih announced that renewables, which now represent a negligible amount of the Kingdom's energy use, will be able to provide 10 percent of its power generation by the end of 2023. The government set up *a new unit* to drive this investment and drew much of the staff from Aramco (*New York Times*, 5 February 2018). The lack of progress on the renewables front may lead the minister to take a step further and direct Saudi Aramco to take a greater role in renewable generation.

Other NOCs which have invested more significantly in renewables thus far include Equinor, Petrobras and Sonatrach, as well as emerging NOCs such as Petroleum Corporation of Jamaica. Bolstering Equinor's potential in this space, the CDP ranked 24 oil companies on business readiness for a low carbon transition. Equinor came first, Gazprom eight, Petrobras 16th, Petrochina 20th, Rosneft 23rd and CNOOC last at 24th. Indeed, Equinor plans to spend $12bn in renewables by 2030. Petrobras has invested in biofuels for years and is now ramping up investments in wind and solar. While Sonatrach's current spend on solar represents only 2% of total investment, it plans significant investments in solar energy to meet demand at its facilities, domestic consumers and for export. It plans to have 80% of its own electricity needs covered by solar by

(2) Though, as Christof Ruhl has argued, plastics will also come under threat under environmental grounds and should not be considered a safe bet in the energy transition. "The war on plastic will dent oil demand more than anticipated", *Financial Times*, 17 February 2019, Available at: https://www.ft.com/content/281addec-2ed9-11e9-80d2-7b637a9e-1ba1 (last accessed 22 February 2019).

(3) MARCEL V., PAINTER D. & HELLER P. (forthcoming), "Enhancing the Performance of African NOCs", AfDB.

2030. In that time frame it will expand solar generation to 1.3 gigawatt and eventually 4 gigawatts (current domestic demand is 14 gigawatts, which is expected to grow to 22 in 2030). Just between 2018 and 2019, the change in capital expenditure on new energies by Sonatrach is 3,506% (Marcel *et al.*, forthcoming).

While the spend on renewables is small in relation to total capital expenditure, Sonatrach's and Equinor's future energy investments do point to a significantly different forward strategy, one that develops a more diversified portfolio and reduces exposure to climate risk.

Should they?

There is no doubt NOCs will be creating value for the country by reducing flaring or increasing energy efficiency in their operations. But greater efforts are required to meet Nationally Determined Contributions (NDCs) under the Paris Agreement. And domestically, development priorities increasingly include access to clean and safe energy and the promotion of clean environment and air. NOCs could support these goals by generating cleaner energy for domestic consumption (or export), such as renewables.

The issue to consider is whether they would be the best vehicles to carry forward a renewables push. Governments should make an assessment of NOC capabilities, suitability, and the national industrial environment before letting them commit their financial resources to generating renewable energy.

First, can the NOC do so effectively? It should have good project management capabilities and skills and experience that could be transferrable to the renewable sector. The NOC's track record in delivering multiple projects efficiently will provide some indications. Those NOCs that have proven historically unable to deliver a complex project without cost overruns will likely be operating renewable projects like ineffective SOE-power utilities and add limited value.

Some skills are transferable from the petroleum sector to renewables, others are not. Renewables involve multiple small-scale projects (more akin to manufacturing). They are also short cycle projects, in contrast to the oil and gas sector. They require a greater focus on costs because profit margins are in the single digits, unlike the rent generated by oil. Of use to the renewables sector would be NOC capital, engineering skills, project management skills, and experience with community engagement.

Second, governments should consider the domestic industrial landscape. They could compare the NOC's track record of delivering projects to those of existing power utilities. It could, after all, be beneficial for the utility and the NOC to compete, to drive investments in the sector. To determine what role an NOC could effectively play in this area and how any competition between the NOC and existing power utilities might play out, a conversation would be warranted with the power utilities, the finance ministry, climate planners and national planners. It is worth noting that, thus far, success in the renewable power space has been built on good relationships with regulated power distribution companies and regulators [(4)].

Governments should also evaluate the potential role of the domestic private sector in clean energy. A state company dominated approach can stifle the growth of a competitive market (as happened with the solar project in Saudi Arabia). An alternative approach would be for the NOC to play a strong role in research and development and in leading the first investments to grow home-grown experience and reduce risk for future investors.

Conclusion

There are clearly risks involved in encouraging NOCs to become National Energy Companies (NECs). A careful assessment is required of their ability to successfully engage in this new industrial activity and of the knock-on effect their entry into the sector would have on other domestic industrial actors. However, we should also consider the potential support it could give a national energy transformation. Since an NOC may perceive the global energy transition a threat to its long-term business, giving it a stake in the transition by allowing it to invest in renewables and energy efficiency may support the country's transition to cleaner fuels. This would also allow the NOC to diversify its portfolio of assets and increase its resilience in the face of the energy transition.

(4) EY, 2019: https://www.ey.com/en_gl/oil-gas/how-can-big-oil-transition-to-power-the-future