

SUMMARY

Risky Bet

National Oil Companies in the Energy Transition

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February 2021

KEY MESSAGES

- If national oil companies follow their current course, they will invest more than \$400 billion in costly oil and gas projects that will only break even if humanity exceeds its emissions targets and allows the global temperature to rise more than 2°C.
- Either the world does what's necessary to limit global warming, or national oil companies can profit from these investments. Both are not possible.
- State oil companies' investments could pay off, or they could pave the way for economic crises across the emerging and developing world, and necessitate future bailouts that cost the public. Some oil-dependent governments in Africa, Latin America and Eurasia are making particularly risky bets with public money.
- Many national oil companies have incentives to continue spending big on new oil and gas projects. As a result, company officials might not, on their own, change course to account for the energy transition away from fossil fuels toward green energy, nor make investment decisions that serve the interests of citizens.
- Governments—through finance and planning ministries, presidential offices and public accountability bodies—must act to promote a more sustainable economic path. Governments should:
 - Understand the extent of national oil companies' exposure to a decline in oil and gas prices
 - Revisit rules on cash flows into and out of state-owned companies
 - Require or incentivize lower-risk investment decisions
 - Benchmark and measure national oil company performance, improve corporate governance, and report consistently to citizens

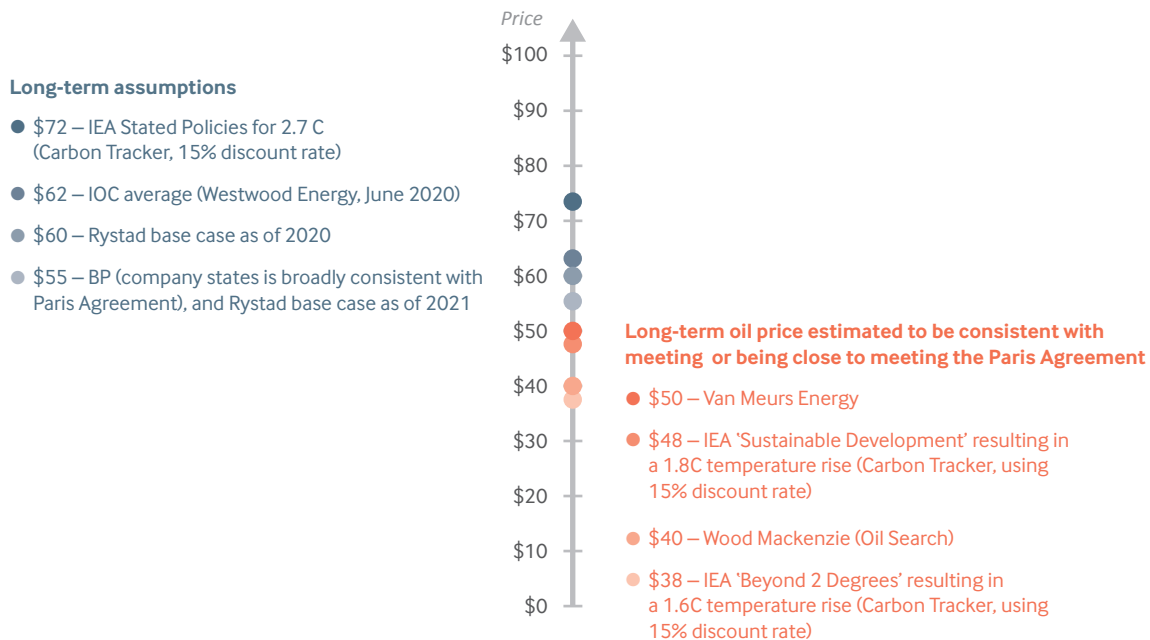
Summary

National oil companies (NOCs) are key to the fight against global warming. NOCs—in which the government is the sole or the dominant shareholder—produce half of the world’s oil and gas, and invest 40 percent of the capital in the global oil and gas industry. If the rest of the industry begins to invest less, NOCs may fill the gap that private companies leave, thereby thwarting international efforts to curtail supply.

NOCs are important for fighting poverty. Two-hundred and eighty million people live below the poverty line in countries with NOCs, and NOCs play a major role in the economic stability of many of these states. Furthermore, people in poverty are the most vulnerable to the worsening climate.

A fast energy transition poses a threat to NOCs. The global economy is transitioning from using fossil fuels to renewable energy. The faster this transition, the more it threatens NOCs and governments relying on oil revenues—unless they prepare well. Figure 1 below shows the spread of long-term oil prices assumed by several major oil companies, international organizations and private analysts. A fast transition will likely mean lower long-term oil prices (those in orange), potentially surprising some companies who have planned on higher prices. No one knows exactly how this transition will play out, but governments must manage the risk of a terminal decline in oil and gas prices.

Figure 1. Oil price assumptions¹



¹ The definition of long-term, and the methods for estimating the price consistent with meeting the Paris Agreement vary across organizations. Therefore, this diagram is only illustrative of the difference in prices between different possible futures. Price assumptions from BP and most other oil companies are for 2020 to 2050. Sources: Carbon Tracker, *Breaking the Habit: Methodology* (2019) 5, carbontracker.org/reports/breaking-the-habit; Pedro van Meurs, *World Petroleum Industry Perspectives* (2020), 14, [app. vanmeursenergy.com/documents/free/80001008.pdf](https://vanmeursenergy.com/documents/free/80001008.pdf); and Westwood Energy, from Keith Myers, email, 21 September 2020.

NOCs gamble with public resources.

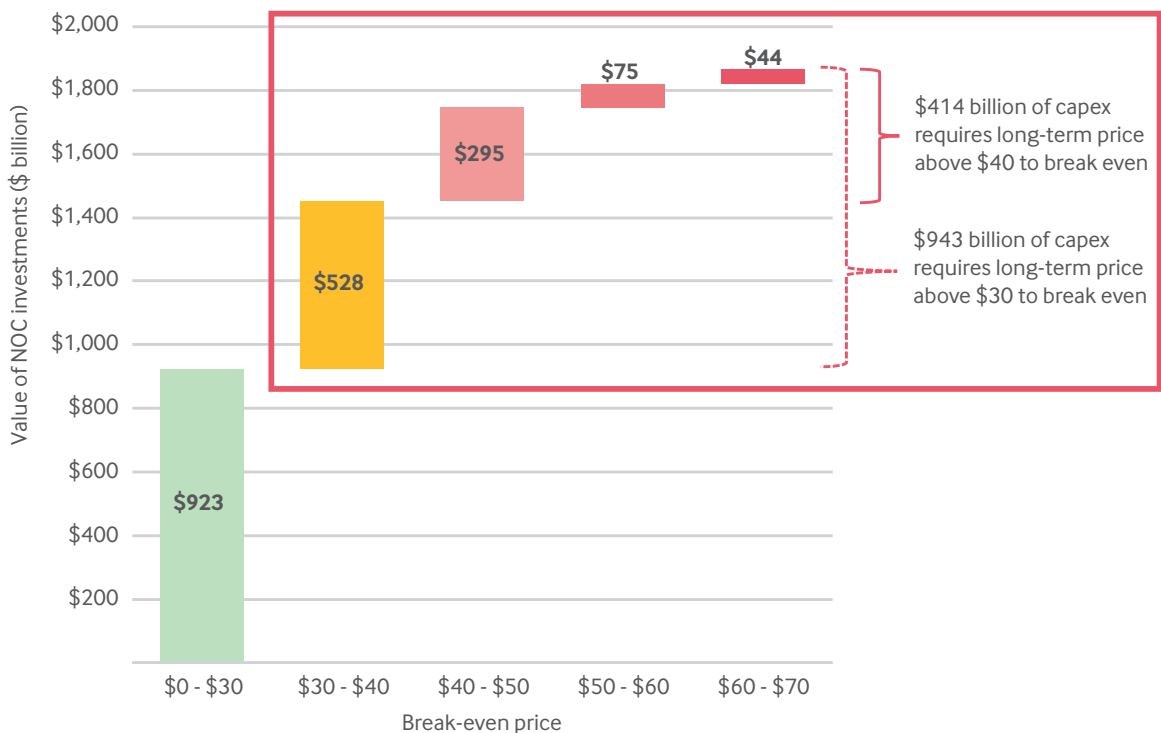
Governments should undertake the difficult task of directing their NOCs to manage the risk of a global decline in oil price. For every four dollars the average NOC earns from oil and gas, it only transfers about one dollar to its government.² NOCs spend the rest themselves, often with little accountability to higher authorities and their citizen shareholders. Citizens should be aware of—and question—what bets their NOC is placing with their money.

NOCs’ big bets will only pay off if the climate fight is lost. While some NOC bets may pay off, the energy transition makes them riskier. The amounts are staggering: NOC investment may exceed USD 1.9 trillion over the next decade. Much of this investment is probably low-risk. However, NOCs could invest more than \$400 billion of public money on high-cost projects. Figure 2 illustrates

the share of projected upcoming NOC capital expenditure that will only break even if the long-term oil price exceeds \$40 per barrel. This is within the range of prices analysts have projected are consistent with achieving the 2016 Paris Agreement goal of limiting global temperature rise to well below 2°C. These projections also assume that wide spread carbon-capture and storage technologies are deployed, which is far from certain. These projects will only yield returns if the world exceeds its carbon emission targets. NOCs in developing and emerging countries might collectively invest more than \$365 billion in such high-cost projects—expenditures that could instead help alleviate poverty.

The next generation of investments is key. Figure 3, below, shows the range of break-even prices for oil and gas projects in which NOCs

Figure 2. Value of upcoming national oil company capital expenditure disaggregated by break-even price range³



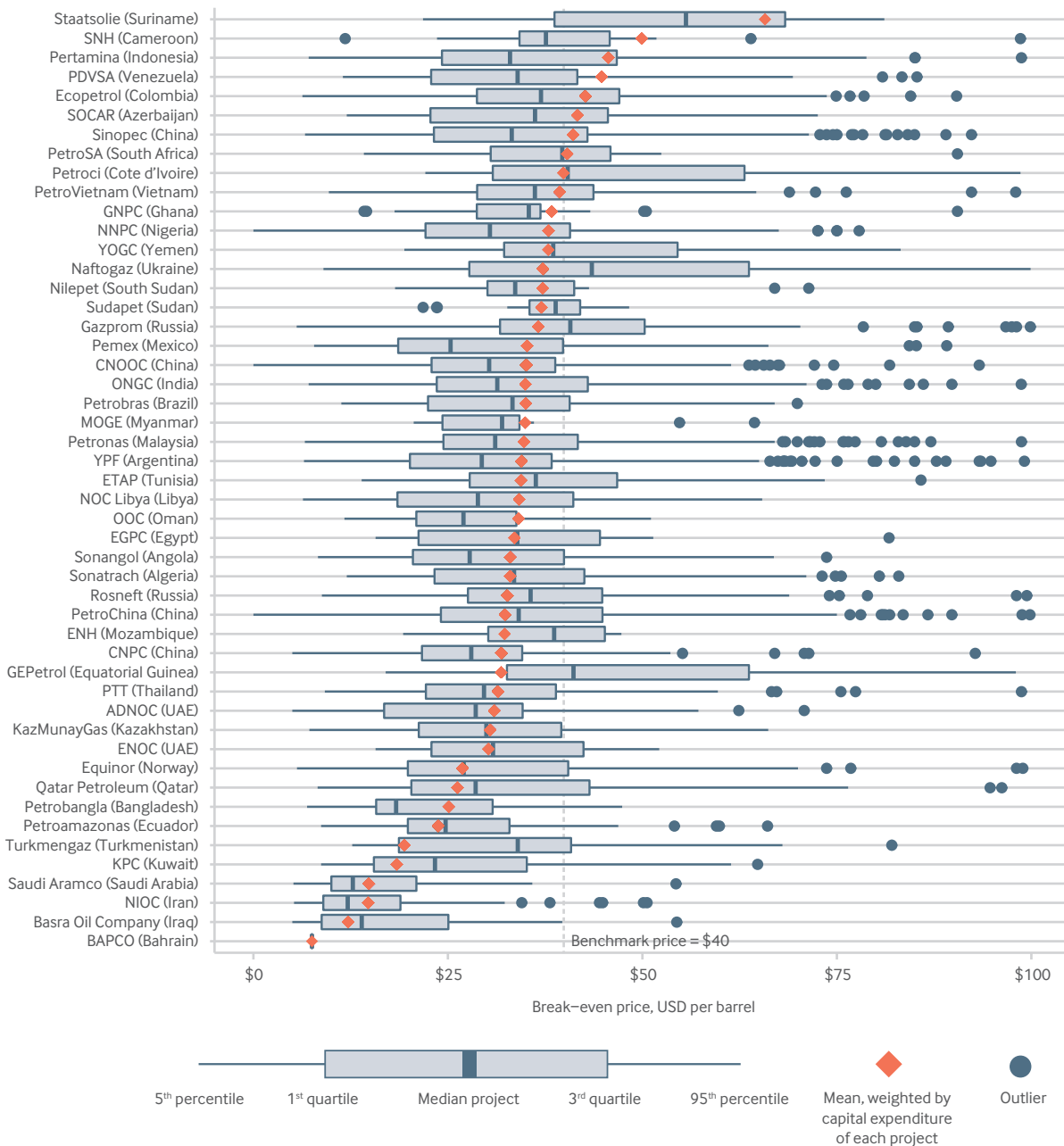
2 Natural Resource Governance Institute, *National Oil Company Database*, May 2020. In 2018, the median NOC in the sample transferred 22 percent of its gross revenues to government (via taxes, dividends and other fiscal mechanisms). Of the 36 NOCs in the sample with available data, 20 of them transferred less than 25 percent of their gross revenues to government.

3 Authors’ calculation using Rystad Energy UCube.

might invest over the next decade. Even with oil prices much below \$40, most of the projects owned by Middle Eastern NOCs, such as Saudi Aramco, are likely to break even. However, this is not the case for all companies, and many NOCs have a significant number of upcoming projects that exceed this threshold. For Suriname’s Staatsolie,

Colombia’s Ecopetrol, Venezuela’s PDVSA and Indonesia’s Pertamina, among others, future investment decisions will be difficult. To continue developing their production base, these companies would need to continue investing, but high-cost spending comes with substantial risk of economic failure.

Figure 3. Range of (post-tax) break-even prices of the next generation of national oil company projects⁴



⁴ Authors’ calculation using Rystad Energy UCube. Includes those projects that in the Rystad Energy base case scenario, the NOC invests capital over the period 2021 to 2030. Mean is weighted by the proportion of capital expenditure of each project as a proportion of the total capital expenditure for the NOC, measured over the period 2021 to 2030.

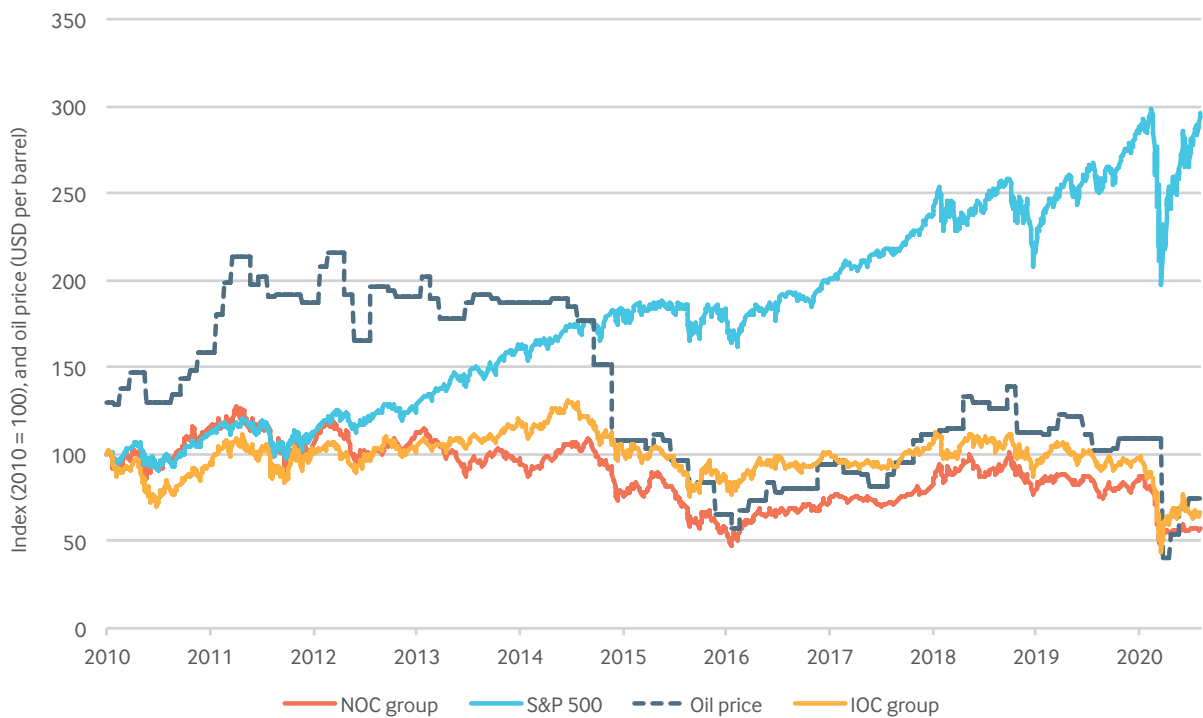
NOC shares have performed poorly in the past. Because of oil market uncertainty, it is impossible to predict whether NOCs’ investments will yield profits. However, their past financial performance has been poor—and that was without having to contend with a major energy transition. The S&P 500 index (representing the 500 largest listed companies in the U.S.) has tripled in value over the last ten years. In contrast, over the same period, the group of NOCs listed on exchanges around the world has lost a fifth of its value. Today’s low share prices suggest that investors also see a troubled future ahead for both NOCs and international oil companies.

Governments could make better bets. Money spent by NOCs could otherwise be spent diversifying economies. For example, in Venezuela and Nigeria, the interest rates that governments pay on their debt is higher than the expected yield from investing in their NOCs. Both governments may be better off paying down high-interest debt, rather than investing at historical levels in their NOCs. Alternatively, finance ministries could redirect some of the money

destined for NOC spending on high-cost projects to education, health and public infrastructure.

Some governments can’t afford to gamble. Betting public money on high-cost projects is riskier for the governments that are most dependent on their NOCs because they have less income from other sectors to make up for potential losses. Oil-dependent governments should not bet more public money than they can afford to lose. The table on the next page shows that some NOCs could invest amounts representing large shares of their government general expenditure in high-cost projects that will only break even if the world exceeds its carbon budget. This spending creates opportunity costs in the form of foregone public spending in other domains, even for companies near the bottom of the table. For example, projected capital expenditure in high-cost projects for Angola’s Sonangol (9 percent of general government expenditure), Ukraine’s Naftogaz (8 percent) and Chad’s SHT (6 percent)—among others—is equal to or greater than average annual public spending on health in these countries

Figure 4. Share price indices of listed national and international oil companies compared with the S&P 500 index⁵



5 Yahoo finance, via quantmod R package, and authors’ calculations. Data collected in October 2020. IOC group index comprises of BP, Exxon, Chevron and Total.

NOC capital expenditure that would fail to break even as a proportion of annual general government expenditure, if NOCs invest on assumption that price will be \$70, and actual price is \$40 a barrel (top 25 NOCs)⁶

Country	Value at risk as % of government expenditure
Mozambique (ENH)	179%
Azerbaijan (SOCAR)	157%
Oman (OOC)	61%
Nigeria (NNPC)	53%
Congo (Rep.) (SNPC)	42%
Turkmenistan (Turkmengaz)	41%
Algeria (Sonatrach)	36%
Qatar (Qatar Petroleum)	31%
UAE (ADNOC, ENOC)	30%
Malaysia (Petronas)	29%
Russia (Gazprom, Rosneft)	27%
Colombia (Ecopetrol)	21%
Ghana (GNPC)	18%
India (ONGC)	16%
Brunei (PetroleumBrunei)	14%
Norway (Equinor)	12%
Vietnam (PetroVietnam)	10%
Kazakhstan (KazMunayGas)	10%
Angola (Sonangol)	9%
Ukraine (Naftogaz)	8%
China (CNPC, CNOOC, Sinopec)	7%
Mexico (Pemex)	7%
Chad (SHT)	6%
Sudan (Sudapet)	6%
Tunisia (ETAP)	5%

■ This figure exceeds average annual public spending on health.

6 Rystad Energy UCube and authors' calculations. General government expenditure data from International Monetary Fund, "General government total expenditure," *World Economic Outlook*, last updated October 2020, www.imf.org/en/Publications/WEO/weo-database/2020/October/download-entire-database. We take the average government expenditure from 2014 to 2018. The IMF database does not have expenditure data for Libya and Yemen. We show the results from assuming NOCs invest assuming a price of \$70, but actual long-term price is \$40. Development capital expenditure on projects expected to start between 2020 and 2030 under Rystad Energy's baseline price scenario.

Other measures of oil and gas dependency provide different results. Figure 5 below shows the average oil break-even price across each NOC's portfolio, and the home countries' ratios of fuel exports to total exports. Countries toward the top right have the highest costs and are the most dependent. They are most exposed to a terminal decline in prices. Angola and Nigeria stand out: big NOC bets would be large in comparison to their economies. Azerbaijan's SOCAR and Algeria's Sonatrach currently have lower costs, but the countries' exports are heavily dependent on oil and gas.

Governments risk throwing good money after bad. Some of the money NOCs are gambling with comes from banks and corporate lenders. But this doesn't shield the public from risk. If NOCs sink deep into debt, they are likely to ask their governments to bail them out. Similarly, governments may be tempted to rescue their NOCs by reducing their taxes. Either practice simply shifts the problem onto the state and encourages NOC risk-taking.

In figure 6 below, we have plotted NOCs according to their costs (shown as the estimated average break-even price across the company's portfolio) and their debt as a proportion of general government revenue. Those NOCs toward the top right should concern their governments the most: their debts are high relative to government revenues and their projects face the greatest risks from future

price declines. Mexico's government has already bailed out Pemex, which is still one of the most indebted NOCs in the world. NOCs with high debt combined with high costs per barrel are more likely to need bailouts in the future, especially if prices fall. Angola's Sonangol and Suriname's Staatsolie appear to be most exposed. Colombia's Ecopetrol, Kazakhstan's KazMunayGas, Azerbaijan's SOCAR also have a combination of reasonably high costs and high debt compared with their government revenues. These NOCs have time to strengthen their balance sheets, but must act soon.

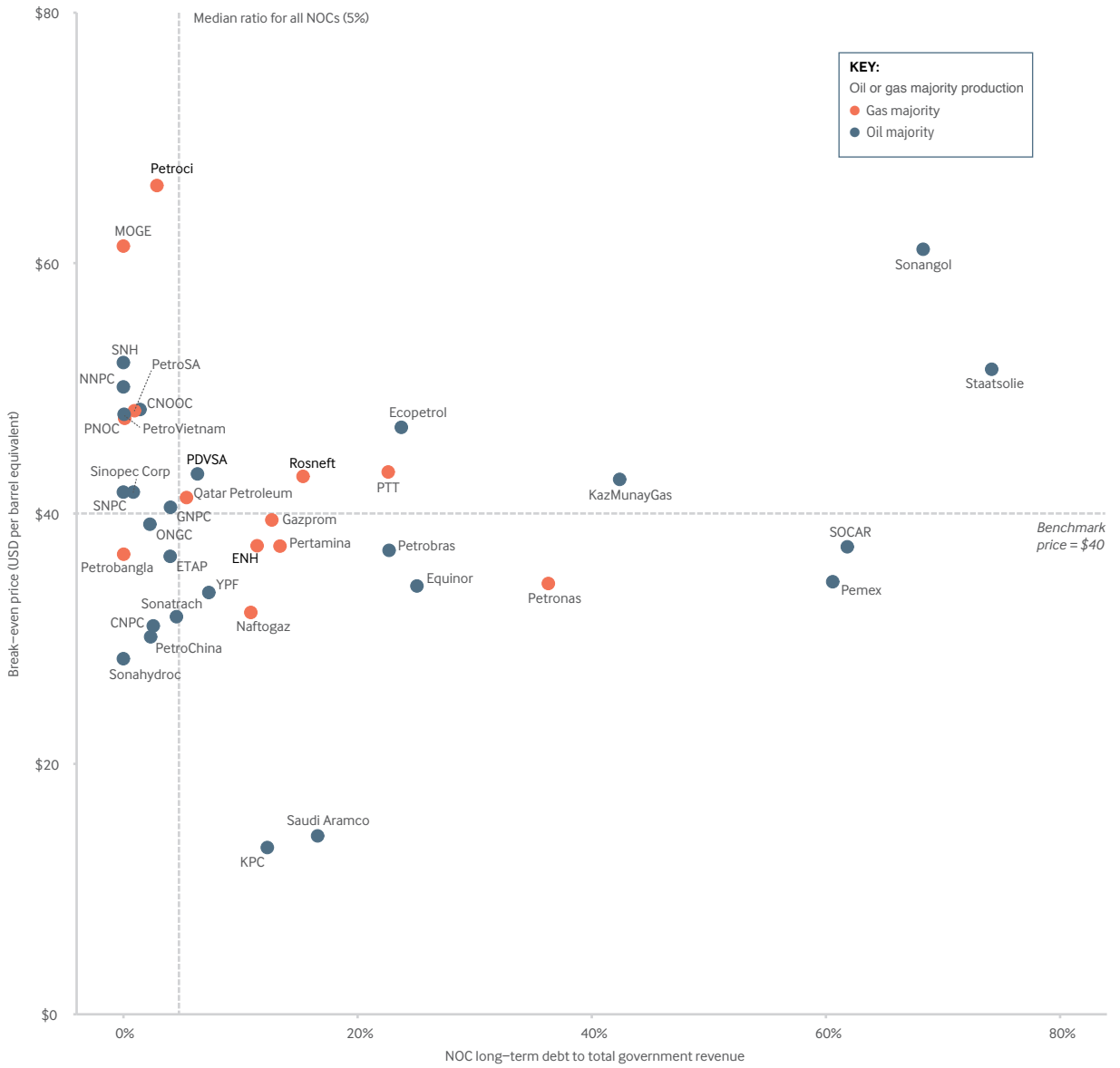
Many NOCs have few incentives to change. Most NOCs—by design, omission or neglect—are unlikely to manage the risk of the energy transition themselves. Their many responsibilities imposed by governments make it difficult to rein in spending. Spending on certain projects might be in the company's interest—including the desire to expand or maintain large operations—but not the country's interest. Last, the well-documented opacity and weak accountability of many NOCs exacerbate these problems. Leaving NOCs or petroleum ministries to respond to the energy transition risk on their own is therefore unlikely to produce good results. The perspectives of finance and planning ministries, presidential offices and public accountability bodies are thus critical components of efforts to examine whether NOC investment plans align with broader economic strategy.

Figure 5. Comparison of estimated break-even prices of NOCs' current global portfolio and country share of fuel exports to total exports⁷



7 Rystad Energy UCube, World Bank, "Fuel exports (% of merchandise exports)," *World Development Indicators*, data.worldbank.org/indicator/TX.VAL.FUEL.ZS.UN; NRG1, *The National Oil Company Database*, last updated May 2020, www.nationaloilcompanydata.org; and authors' calculations. Breakeven prices for NOCs in their entirety in 2020. This is a production-weighted average of the underlying projects owned by each NOC. Assuming NOCs invest according to Rystad Energy's baseline scenario. Threshold for fuel export dependency is 25 percent, based on the IMF's definition of a country that is "resource-dependent." In cases in which there are multiple NOCs at home in a country, points denote an average of each NOCs' breakeven price. As a benchmark to determine dependency, we follow the IMF. They define an economy that is dependent on oil and gas as any economy whose exports from oil and gas constitute at least 25 percent of total exports. This includes oil and gas exports that may not be from an NOC, but the measure broadly indicates how dependent the economy in general is on the oil and gas industry.

Figure 6. Comparison of estimated break-even prices of NOCs' current global portfolio, and NOCs' long-term debt as a proportion of general government revenue⁸



⁸ NRGi NOC database, Rystad UCube, and authors' calculations. Break-even prices are the average for the NOC's global portfolio. Debt and government revenue values are averages from the years 2014 to 2018.

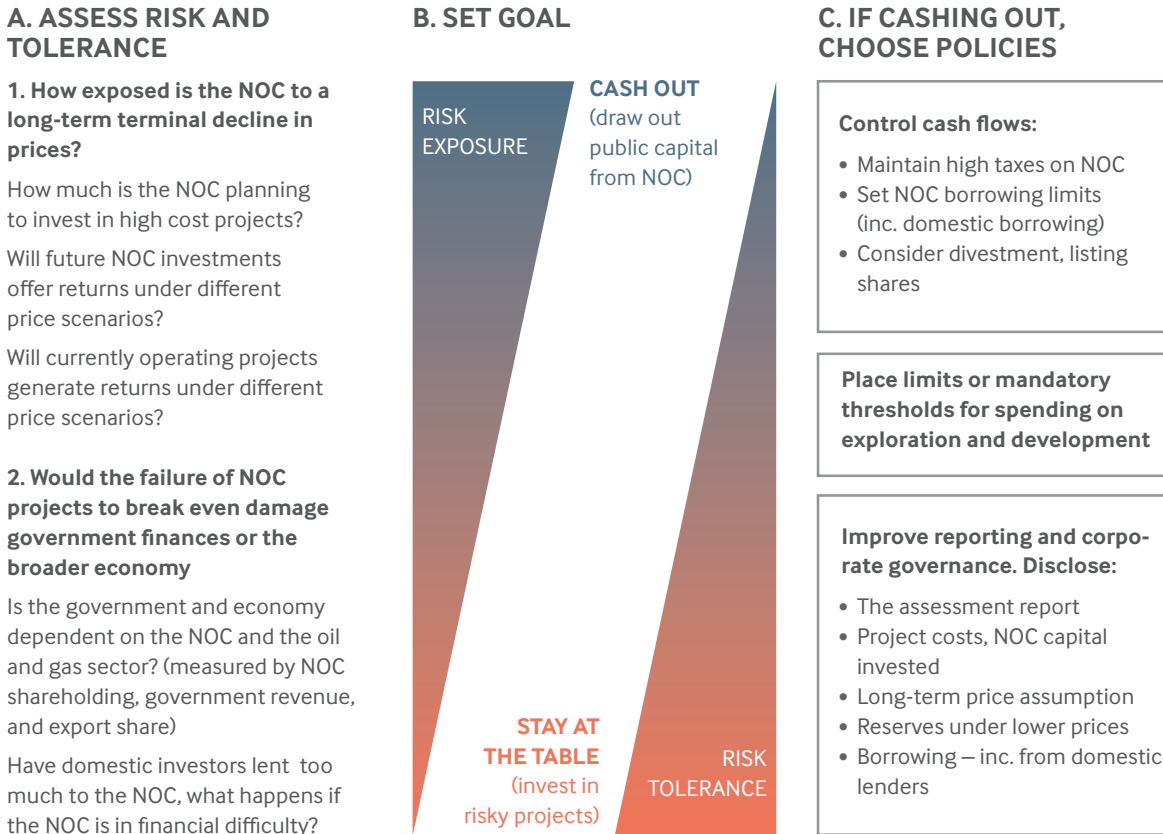
A way forward

Governments must decide to “remain at the table” or “cash out.” NOCs are not identical to international oil companies; they are called upon to deliver value by delivering steady revenue flows that pay for governments to function, providing public employment and social services, and performing a range of other roles. As the energy transition affects the future of oil and gas, the room for maneuver of many NOCs will shrink, and the opportunity costs of investing in expensive projects will rise. The status quo approach of spending today to build to an oil-dominated future looks increasingly risky. Governments and the public can manage the energy transition risk by determining or influencing how

NOCs bet public money on oil and gas projects. Figure 7 illustrates the steps governments can take. The first is to assess the country’s exposure to the risk posed by the energy transition, along the lines suggested in this report. Then governments can decide whether they should remain at the table and continue gambling, or cash out by divesting public money from the extractive sector.

Governments can make a more conservative bet. Few NOCs are well positioned to stay at the table and be the “last one standing” as the sector declines. Governments that instead want to reorient their economies must choose between more directly

Figure 7. Assessing and responding to national oil company energy transition risk



steering NOC investments or incentivizing them to manage risks more conservatively. What is feasible varies heavily by country, but elements of the latter approach could include:

- resisting calls to give tax breaks to struggling NOCs
- increasing required fiscal transfers from NOCs to the treasury
- limiting NOC borrowing, particularly from domestic lenders
- mandating that NOCs use carried interest arrangements, instead of paying for their project interests in cash
- selling some NOC assets—or shares of the NOC itself—to private investors

NOCs that don't already do so should develop price scenarios and break-even price thresholds consistent with what the government expects

the long-term price to be, and should reduce or eliminate investment in projects with costs higher than these thresholds. Finally, governments should continue making NOCs more transparent so that citizens can better see where their money is going.

NOCs in many countries will continue to play a valuable role in the management of the sector, including as their countries pursue a more sustainable path. The revenues that they collect are important sources of public expenditure that the government can use to invest in economic diversification, and they can coordinate with other companies to reduce methane emissions and ensure that ongoing projects are managed efficiently. However, in their efforts to manage energy transition, governments need to devote increasing scrutiny to NOCs' roles as big spenders of public money, and seek to reduce risky spending on high-cost projects that could imperil economic sustainability.

Correction notice: In a previous version of this report, we stated we used a ten year government expenditure figure to calculate the Value at Risk as a % of Government Expenditure, shown in the table on page 4. This is incorrect. We used a one year government expenditure figure.

ABOUT THE AUTHORS

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