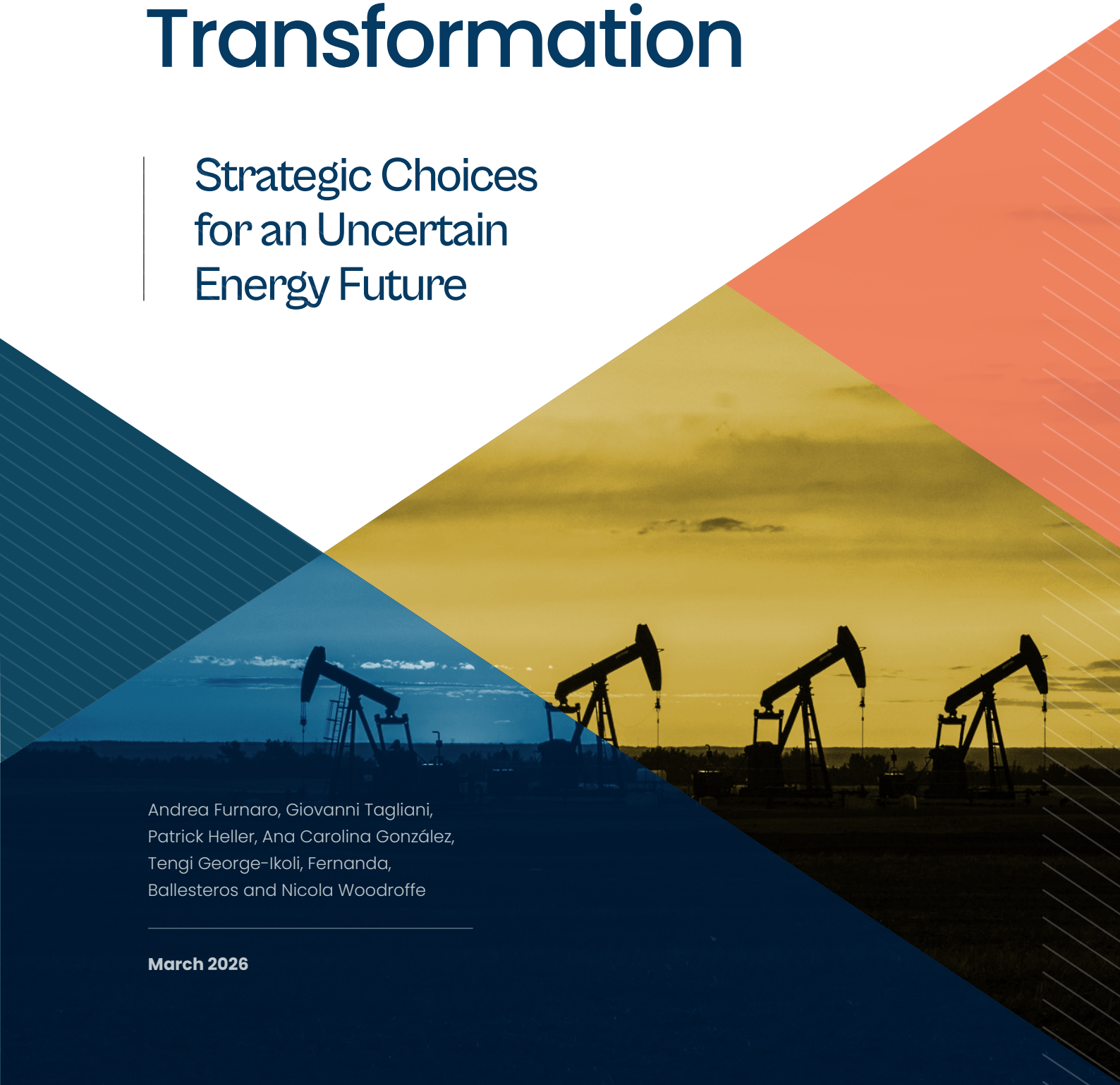
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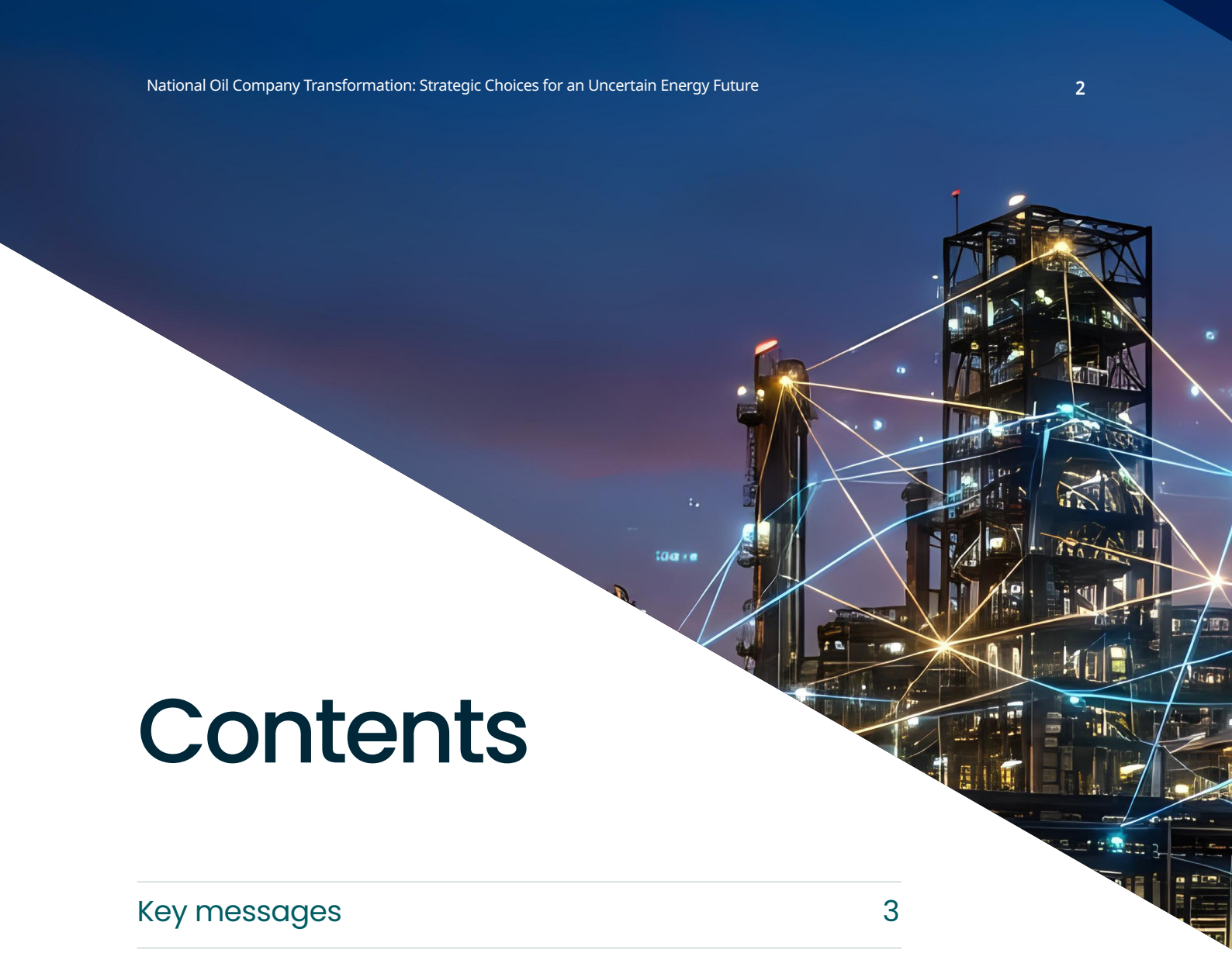
National Oil Company Transformation

Strategic Choices for an Uncertain Energy Future



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March 2026



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Key messages

In this report, National Oil Company (NOC) transformation refers to the proactive choices that governments and NOCs can make in response to energy transition pressures and opportunities.

While many decisions concern changes within the NOC itself, transformation is ultimately a strategic question about how countries navigate the energy transition—balancing economic resilience, energy security and climate goals. Business-as-usual is not a neutral option: amid structural shifts in energy markets, inaction can expose countries to rising fiscal, social and political risks. To inform this debate, this briefing presents a five-step framework that helps governments and NOCs design credible transformation pathways.



Photo by Omar Lucas / NRGI

The five-step framework

1

Setting national-level policy goals. Governments need to define what they want the NOC to deliver amid the energy transition, whether protecting public revenues, supporting energy security, contributing to industrial development or preparing for a gradual exit from fossil fuels. Clear goals provide direction and help align decisions across institutions.

2

Assessing transition risks and new business opportunities. Governments and NOCs must examine how different energy futures could affect revenues and public finances, identifying which oil and gas activities are more vulnerable. Early assessment helps avoid locking public money into projects that may become unviable, while also identifying opportunities to preserve value, strengthen energy security and diversify revenues.

3

Defining the strategic direction and business focus. Governments must decide how much of the NOC's resources should remain within the company versus being deployed toward wider national priorities. For resources retained within the NOC, the key choice is how much continues in oil and gas and how much is directed to new business areas. Any expansion beyond oil and gas should focus on sectors where the NOC has transferable capabilities or can advance national development objectives, while recognizing that other actors may be better placed to lead.

4

Preparing the institutional setup and ensuring strong governance. Governments must clarify the roles and responsibilities of the NOC, private-sector partners, other state-owned enterprises, and fiscal and investment institutions. Well-designed governance helps avoid duplication, political interference and inefficient capital allocation.

5

Ensuring a just transition and responsible exit. NOCs often play wide social and developmental roles, supporting energy security, employment, public services and local economies, so a fair transformation requires measures for workers and affected subnational regions, as well as ensuring projects are properly decommissioned and the environment is restored. These measures must align with the specific transformation pathway pursued, as different routes create distinct effects on workers and subnational regions.

> The five-step framework presented here is intended to support governments, NOC leaders and other stakeholders in defining a credible transformation pathway—one that aligns national priorities with the NOC's capabilities and constraints, and that recognizes that what is feasible, and at what pace, will differ across countries.

Summary

The term "transition risk" originated in finance to describe how decarbonization policies, technological shifts and market changes can erode asset values and cash flows.[1] The term represents more than an investor concern. For countries where the state has an ownership interest in a national oil company (NOC), transition risk translates into economic and social challenges. According to NRGI analysis, roughly USD 400 billion in planned upstream spending by NOCs between 2023 and 2032 may fail to break even under a scenario in which global oil demand declines in line with current government climate pledges.[2] Without strategic planning, such a scenario could exacerbate challenges that these countries already face, deepening hydrocarbon dependency at the very moment when national diversification is most urgent.

Mitigating transition risk requires NOCs first to acknowledge their exposure, assess vulnerabilities and review investment decisions.[3] Building on that foundation, this report outlines a decision framework to help governments, NOC leaders and advocates explore forward-looking transformation strategies. These strategies are not one-size-fits-all: they should reflect national priorities, fiscal and institutional constraints, and each NOC's capabilities and risk profile. They must also consider the broader roles NOCs play in their national economies through employment, domestic supply chains, industrial development, foreign exchange and energy security.

Key differences among NOCs—such as whether they have operational capacity, are partially listed companies with private investors or fully state-owned, or focus on oil versus gas—are essential to consider because they shape the decisions they can make within this framework.

As summarized in the figure below, the framework outlines five steps.

1. **The first step emphasizes setting national-level policy goals.** It should be addressed in advance or in parallel with other steps rather than be deferred until the end. Clear policy goals are essential for aligning institutional roles, financing strategies and long-term development plans. In the context of the energy transition, these goals clarify what governments expect the NOC to deliver—such as protecting public revenues, safeguarding energy security, supporting industrial development, or preparing for a managed and gradual exit from fossil fuels—and provide a reference point for evaluating strategic choices over time.

2. **The second step requires assessing both transition risks and opportunities.** Risks include financial exposure shaped by policy, market and technological shifts. Governments and NOCs must evaluate asset exposure, identifying risks associated with oil and gas expansion plans, while identifying whether existing capabilities can support diversification into new sectors.

3. Based on this assessment, **governments and NOCs should define the strategic direction and explore potential new business areas.** This step also involves identifying sectors and technologies in which the NOC holds genuine comparative advantages. Some countries may prioritize gradual diversification while divesting from the most vulnerable assets. Others may choose to reinvest NOC profits to shift the company's industrial focus toward new sectors. Countries pursuing a full NOC exit from the oil and gas sector could also channel sector profits toward national development goals outside the company.

1 Task Force on Climate-related Financial Disclosures (TCFD), *Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures* (2017), www.fsb-tcfd.org/recommendations.
2 D. Manley, A. Furnaro and P. Heller, *Riskier Bets, Smaller Pockets: How National Oil Companies Are Spending Public Money Amid the Energy Transition* (NRGI, 2023).
3 A. Furnaro and D. Manley, *Facing the Future: What National Oil Companies Say About the Energy Transition* (NRGI, 2023).

4. **Step four focuses on preparing the institutional design needed to support the chosen transformation pathway**, including coordination mechanisms, corporate structures and financing instruments.
5. Whatever pathway they choose, **governments must anticipate and manage the financial, social and environmental implications of declining fossil operations and/or emerging NOC investments.** This includes proactive planning for decommissioning, workforce transition and community impacts through fair and transparent mechanisms.

The overall framework and specific steps are designed as an entry point for more structured dialogue and analysis. While they touch on relevant aspects, they do not provide the technical detail required for full planning or implementation. Instead, the aim is to use the framework and steps to clarify objectives, identify constraints and assess options. For each step, the framework highlights a set of guiding questions for discussion.

Key steps in the discussion on NOC transformation

STEP 1 (concurrent) | Setting national-level policy goals

STEP 2 Assessing transition risks & new business opportunities

STEP 3 Defining the strategic direction & business focus

STEP 4 Preparing the institutional setup and ensuring strong governance

STEP 5 Ensuring a just transition and responsible exit

Key decision-making institutions

The five-step framework is intended to guide how a range of key decision-making institutions can lead and design the NOC transformation process, such as:

- Finance, energy and planning ministries
- Energy, environmental and competition regulators
- State ownership or SOE oversight bodies
- Treasury and budget authorities

NOC board and executive management

Why transformation?

NOCs are increasingly exposed to transition risks. These include policy and legal pressures from climate regulations, technological shifts driven by the rapid deployment of low-carbon energy, market risks linked to declining demand, pressure to reduce operational emissions, reduced investment from private partners, and reputational risks affecting their access to capital and long-term legitimacy.[4]

The future, however, remains uncertain. Forecasts of global oil and gas demand over the coming decades vary widely. In this context, assessing NOC exposure using a range of transition scenarios is essential. NRGI's previous analysis found that, under a scenario that assumes governments meet their existing climate pledges and global oil demand falls accordingly, around 25 percent of planned 2023–2032 upstream investments across NOCs may fail to break even. The study underscored the need for NOCs and their governments to assess NOC exposure and recalibrate investment strategies that may be too risky for an increasingly uncertain future.[5]

NOCs with high operating costs, mounting debt or clear production-decline trends—like Pemex in Mexico or NNPC in Nigeria—are the most heavily exposed and may need to act sooner. However, even NOCs with low-cost reserves that appear less vulnerable in the next decade, such as those in the Persian Gulf, can benefit from early, proactive planning.

The next challenge is to define forward-looking strategies to mitigate risk and position NOCs and their countries to seize emerging opportunities.

This report uses the term "NOC transformation" to describe **the proactive steps that NOCs and their governments can take to respond to transition pressures and opportunities**. While many of these steps focus on changes within the NOC itself, transformation is ultimately a strategic issue of how countries navigate the energy transition and balance economic resilience, energy security and climate goals. This report, therefore, approaches transformation as both a business and a governance challenge.

NOCs and their governments must define a pathway for transformation and start moving in that direction. Amid structural shifts in energy markets, business-as-usual will not serve the public interest. The chosen pathway should align with national priorities, the NOC's capabilities, and its specific conditions and circumstances, which together determine what is feasible and at what pace.

This report outlines key strategic questions to spur discussion among governments, NOC leaders and advocates about transforming their NOCs. The analysis draws on academic research and existing examples, including from NOCs, comparable companies in adjacent sectors and relevant policy innovations.

The framework outlines five steps.

4 ClimateWise, *Transition Risk Framework: Managing the impacts of the low carbon transition on infrastructure investments* (2019), www.tcfdhub.org/wp-content/uploads/2019/07/CISLClimate-Wise-Transition-Risk-Framework-Report.pdf.
5 Furnaro and Manley, *Facing the Future*.

Figure 1. Key steps in the discussion on NOC transformation

STEP 1 (concurrent) | Setting national-level policy goals

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NOC board and executive management

1 Setting national-level policy goals

Setting national-level policy goals establishes the overall direction for NOC transformation. This should not be a one-off exercise carried out before other actions begin but corresponds to a concurrent, iterative process that evolves alongside the other steps.

In contexts with strong political alignment and institutional capacity, clear national goals to promote the NOC transformation can serve as a foundation to guide the strategic decisions outlined in other steps. In other contexts, national policy goals may be less defined at the outset and will take shape progressively, informed by the results of risk and opportunity assessments, the evolving balance between financial protection and industrial ambition, and the feasibility of different institutional arrangements.

These goals differ from semi-permanent statutory and legal mandates, often set at the moment of the NOC's establishment. The state has the right and duty to set clear objectives for the NOC. For NOCs that are not wholly state-owned, the state should still independently set objectives to guide their priorities as a major shareholder. The goal is to establish a strategic direction for the company without micromanaging operational decisions.[6]

The government should decide these objectives autonomously. If the NOC had set its own policy objectives, there would be a conflict of interest: NOC management would be incentivized to set unambitious objectives against which it would then be evaluated.

In terms of process, the government will have to agree upon specific metrics and timeframes together with independent experts.

For example, in Thailand, the State Enterprise Policy Committee (SEPC)—a centralized "superboard"—sets strategic performance targets for more than 50 state-owned enterprises (SOEs). Established in 2014 (and formalized by the 2019 SOE Act), the SEPC works alongside the State Enterprise Policy Office (under the Ministry of Finance) to define objectives, nominate boards and monitor results. SOEs submit five-year development plans and annual performance agreements, which are evaluated based on governance indicators, risk management and efficiency goals—independently verified by SEPC and other agencies.[7]

Well-designed objectives should guide NOC decision-making while allowing flexibility in how goals are achieved. To be effective, these objectives should be concise, limited, explicit, anchored and realistic,[8,9,10] a set of principles that can be captured by the acronym CLEAR:

Concise = simple and easy to evaluate;
Limited = few in number;
Explicit = transparent and clearly defined;
Anchored = constant over time and time-bound;
Realistic = ambitious yet achievable.

6 J. Peña Niño, A. Furnaro, G. Tagliani, D. Manley and O. Pardo, *Gobernar el riesgo: claves para repensar la relación entre Ecopetrol y el Estado frente a la transición energética* (NRGI, 2025), resourcegovernance.org/es/publications/gobernar-riesgo-ecopetrol-estado-transicion.
7 M. Mazzucato, F. Teixeira and G. Tagliani, *A mission-oriented framework for the coordination of State-Owned Enterprises in Brazil* (UCL Institute for Innovation and Public Purpose, 2024), www.ucl.ac.uk/bartlett/public-purpose/wp2024-18.
8 H. Chang and A. Lebdioui, *From fiscal stabilization to economic diversification: A developmental approach to managing resource revenues* (UNU-WIDER, 2020).
9 M. Mazzucato, *Mission economy: A moonshot guide to changing capitalism* (Allen Lane/Penguin Books, 2021).
10 Mazzucato, Teixeira and Tagliani, *A mission-oriented framework for the coordination of State-Owned Enterprises in Brazil*.

How could CLEAR NOC objectives look in practice?

Ideally, transformation-related goals should be durable and consistent across political cycles, providing strategic clarity beyond a single administration. While there is often pressure on incoming governments to revise policy priorities, it is still possible—and increasingly necessary—to establish long-term objectives that are insulated from short-term political shifts.

These objectives could be articulated through different instruments, including national legislation, performance contracts or shareholder directives. Setting objectives at the start of a presidential term allows time for planning and alignment.

While full consensus across administrations is difficult to sustain, the aim is to establish long-term transformation targets that persist across political cycles, enabling consistent monitoring, institutional learning and public accountability.

While the government, with the support of independent experts, should agree the specific numbers and timeframe, Table 1 provides examples of CLEAR objectives for NOC transformation.

Table 1. CLEAR objectives for NOC transformation

High-level state objectives	Illustrative NOC transformation targets
Protecting public revenues and fiscal stability	• Maintain fiscal discipline by reducing debt exposure and ensuring that any state support to the NOC is tied to clear performance and transition benchmarks.
Supporting energy security during the transition	• Improve cost management and transparency by benchmarking production and investment efficiency against international peers over the next three years. • Align new investment decisions with credible transition scenarios.
Contributing to industrial development and economic diversification	• Increase the share of NOC capital expenditure or revenues directed to low-carbon or transition-related activities to a defined percentage within five years.
Social development	• Define and begin implementing a just transition plan that supports workers and communities affected by fossil fuel phasedown, including provisions for reskilling and local economic diversification within an agreed timeframe.

2 Assessing transition risks and new business opportunities

Governments and NOCs should assess the level of transition risk and the scope of opportunities presented by the energy transition, considering existing NOC capabilities.

Assessing transition risks

Components and levels of risk

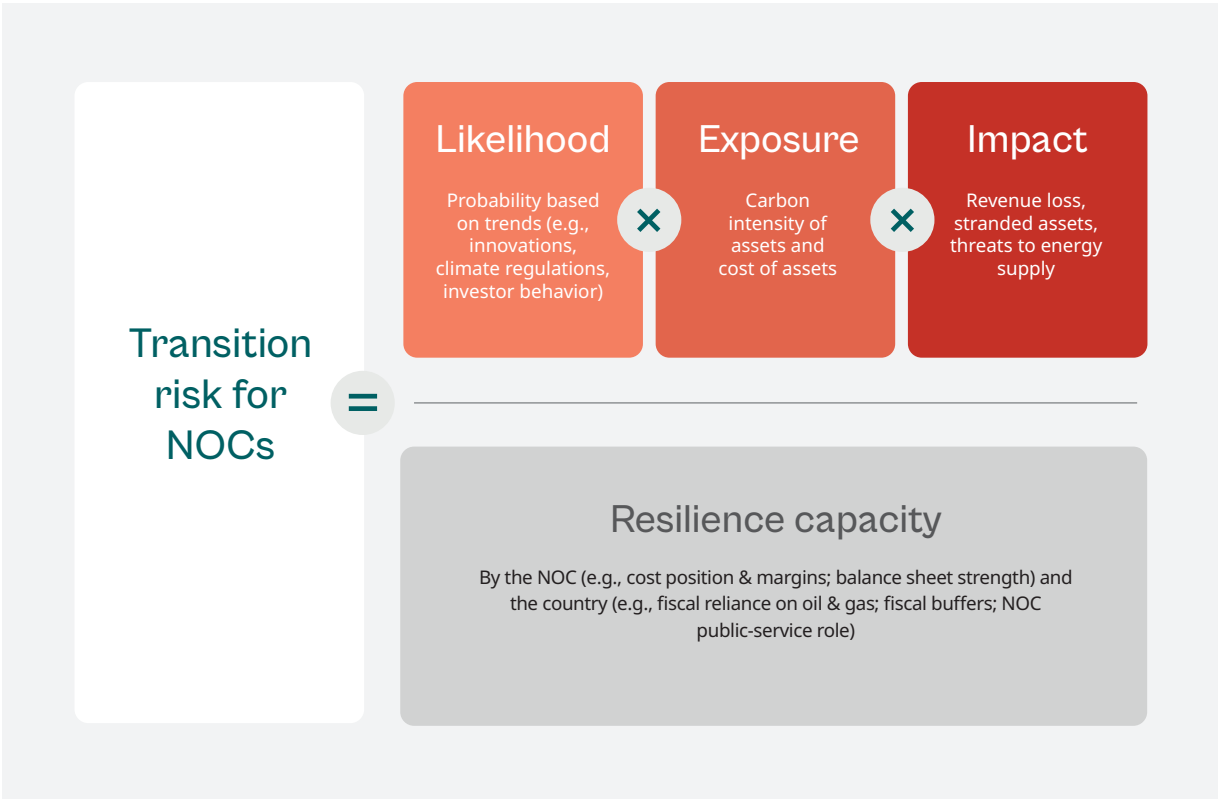
NOCs face diverse risks under the energy transition. These risks may arise from shifting policy and legal regimes, technological changes, evolving market dynamics or reputational damage.

Measuring a NOC's level of transition risk depends on a combination of:

- **Likelihood**: the probability that specific transition risks materialize, based on trends in climate regulation and commitments, innovation and investor behavior.
- **Exposure**: the degree to which an NOC is engaged in activities vulnerable to transition risks, such as heavy reliance on carbon-intensive, costly or otherwise high-risk assets.
- **Impact**: the potential severity of those risks if they materialize, including disruptions to the NOC and the country related to revenue loss, stranded assets or threats to energy supply.
- **Resilience capacity**: the capacity of the NOC and the state to absorb or manage the risk and its impact. At the company level, this includes cost position and cash margins, balance sheet strength and liquidity, access to external finance, contract and portfolio flexibility, and diversification of revenue streams. At the national level, it includes dependence on oil and gas revenues, fiscal buffers including non-oil fiscal revenue streams, strength of public financial management, and the NOC's role in providing public services, including energy supply.[11]

11 On the capacity of national economies to manage a fossil fuel phaseout, see G. Muttitt and S. Kartha, "Equity, climate justice and fossil fuel extraction: principles for a managed phase out," *Climate Policy*, 20(8) (2020): 1024–1042, doi.org/10.1080/14693062.2020.1763900.

Figure 2. Components shaping the level of transition risk for NOCs[12]



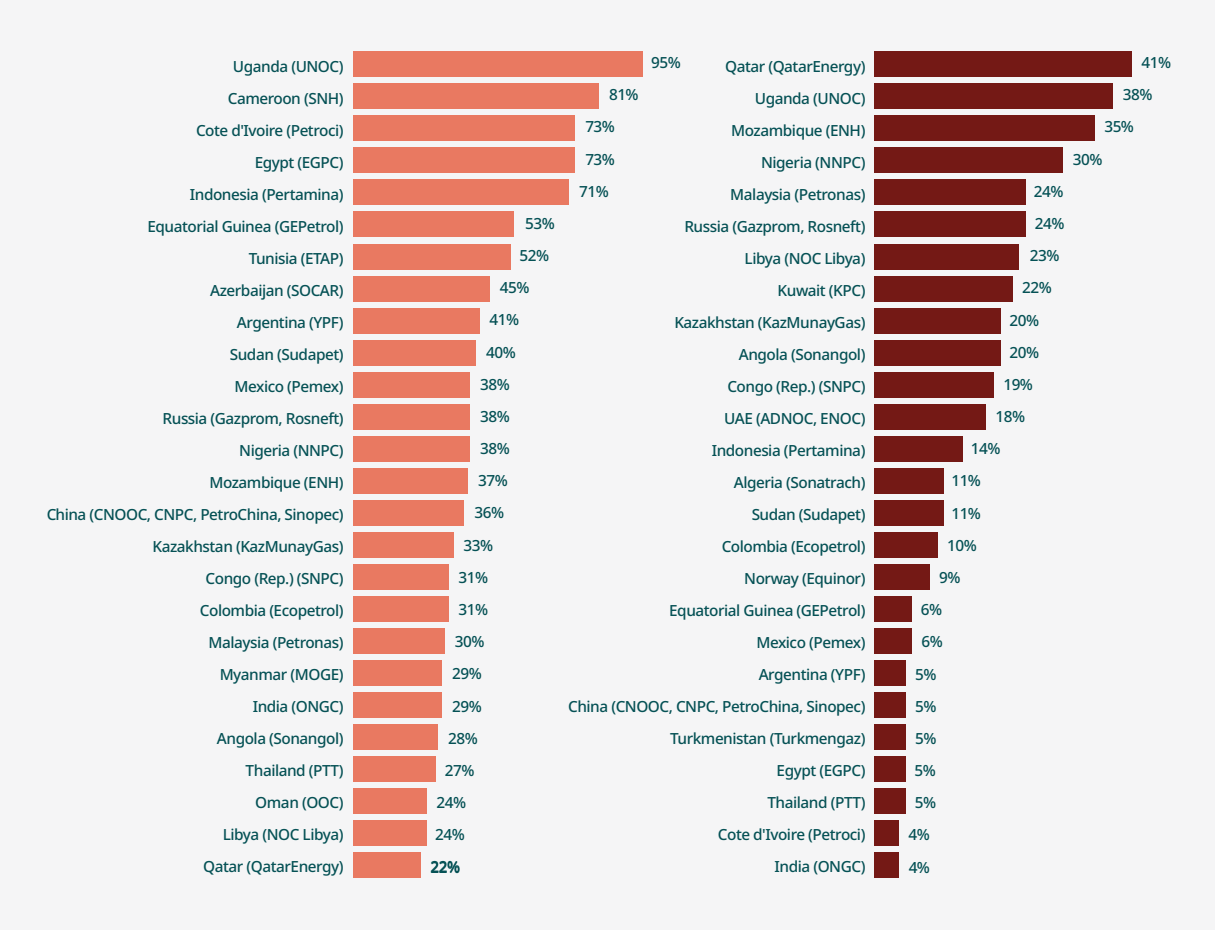
A meaningful assessment of transition risk requires a forward-looking approach grounded in scenario analysis. In a simplified approach, in 2023 NRGI estimated NOCs' market exposure and potential losses from new investments over the next decade. We compared the planned upstream oil and gas capital expenditures of NOCs against three transition scenarios. Investments that would not break even under the International Energy Agency's (IEA's) Announced Pledges Scenario (APS) were classified as "at risk."[13] The results (see Figure 3) reveal sharp differences in risk levels across NOCs.[14]

- **Higher risk**. UNOC (Uganda), SNH (Cameroon), Petroci (Côte d'Ivoire), EGPC (Egypt), Pertamina (Indonesia), GEPetrol (Equatorial Guinea) and ETAP (Tunisia) are especially vulnerable.
- Under the APS, more than half of their investment pipelines would not break even. For UNOC and SNH, this figure rises to 80 percent. In some countries, the scale of risky investments is equivalent to more than 30 percent of annual government expenditure (e.g., Mozambique, Nigeria, Qatar and Uganda). This raises serious concerns about macroeconomic stability if projects underperform.
- **Lower risk**. NOCs such as Equinor (Norway), Petrobras (Brazil) and Aramco (Saudi Arabia) appear less vulnerable, either because of more competitive, lower-cost asset portfolios, less fiscal dependence on NOC revenues, or greater financial flexibility to withstand shifts in global demand. In these cases, most investments break even under the APS.

12 Furnaro and Manley, *Facing the Future*; TFCD, *Final Report*.
13 A scenario in which governments meet their current climate pledges, though these still fall short of Paris goals, and global oil demand declines to 55 million barrels per day by 2050.
14 In some jurisdictions, these risks include a trend of NOCs acquiring risky assets—whether for energy security, resource development or other objectives—as international oil companies divest from them. N. Woodroffe, *Responsible Change: How Governments Can Address Environmental, Social and Governance Challenges When Petroleum Assets Change Hands* (NRGI, 2024), resourcegovernance.org/publications/responsible-change-how-governments-can-address-environmental-social-and-governance.

2

Figure 3. NOCs with the highest percentage of upstream investments (2023–2032) that would not break even under APS (left) and as a percentage of annual government expenditure (right)[15]



Focusing only on upstream transition risk can obscure vulnerabilities elsewhere in the NOC's value chain. For example, Pemex's financial distress stems largely from inefficient downstream operations, particularly its aging refineries, rather than from upstream investments. Transition pressures can amplify these weaknesses, even when upstream projects remain viable.[16] Building resilience, therefore, requires scenario planning that looks across the entire value chain.

In parallel with assessing stranded asset risks, NOCs should take concrete steps to reduce operational emissions, as an essential early measure to limit both financial and reputational exposure.[17] Reducing operational emissions risk, whether through divestment from the most carbon-intensive assets or through abatement programs, can complement efforts to avoid risky investments.[18] This is not, on its own, a pathway to transformation, but rather a foundational element that must accompany broader strategic shifts to reduce transition risk and reorient the NOC's long-term role.

15 Manley, Furnaro and Heller, *Riskier Bets, Smaller Pockets*.
16 F. Ballesteros and A. Furnaro, *Pemex and the Energy Transition: Timely Responses to Growing Threats* (NRGI, 2024), resourcegovernance.org/sites/default/files/2024-11/Pemex_and_the_Energy_Transition_Timely_Responses.pdf.
17 P. Mahdavi, "Collaborative Levers for Methane Abatement in National Oil Companies," Environmental Defense Fund, 2024, blogs.edf.org/wp-content/blogs.dir/90/files/2024/12/Collaborative-Levers-for-Financial-Engagement-at-NOCs-1.pdf.
18 Experience from countries such as Nigeria and Senegal show that credible methane reduction in gas projects is not only a technical challenge but also a test of governance—requiring transparent, proactive systems for monitoring, reporting and verification, clear institutional mandates and public oversight. See NRGI, *Strengthening Methane Emissions Reduction in Nigeria's Oil and Gas Sector* (2024), resourcegovernance.org/sites/default/files/2024-09/strengthening-methane-emissions-reduction-in-nigeria%E2%80%99s-oil-and-gas-sector-6552.pdf; P.D. Diène and Aida Diop, *Reducing Methane Emissions in Senegal's Hydrocarbons Sector: A Call for Proactive and Transparent Action* (NRGI, 2024), resourcegovernance.org/sites/default/files/2024-08/reducing-methane-emissions-in-senegal%E2%80%99s-hydrocarbons-sector%3A-a-call-for-proactive-and-transparent-action-6583.pdf.

Different levels of transition risk can inform how governments and NOCs approach strategic choices:

- **Implications of higher risk**. When exposure to transition risk is high, governments may need to reassess investment plans to safeguard public value. This could involve limiting new commitments to high-cost oil and gas projects and/or exploring options to redirect capital toward more resilient or diversified activities, whether within or beyond the NOC.
- **Implications of lower risk**. Lower exposure provides greater flexibility. NOCs in this position may find it feasible to maintain selective investment in projects that remain viable under even faster transition scenarios while gradually reallocating resources toward efficiency improvements, emissions reduction or new business ventures.

Transition risk and energy security

If an NOC's oil and gas investment falls—either by design (policy choices) or by necessity (market and finance constraints)—supply shortfalls may follow. Yet most transition risk analyses overlook the resulting energy security challenges for producing countries. This is especially relevant for NOCs, often responsible for maintaining a stable and affordable energy supply.[19]

This energy security role can take several forms, each carrying different implications for NOC strategy and exposure to transition risk – Table 2.

Table 2. NOCs' energy security role

Role	Description
Energy service provider	NOCs maintain domestic fuel or power supply, often operating refineries, retail networks or generation assets (e.g., Pertamina).[20]
Subsidy delivery vehicle	NOCs supply fuels or gas at below-market prices, absorbing the cost difference on behalf of the state, often implicitly (e.g., Petronas (Malaysia)).[21]
Importer of last resort	NOCs step in to import fuels or gas when local production or private traders cannot meet demand (e.g., NNPC).[22]
Energy security buffer	NOCs hold strategic fuel stocks or maintain backup power capacity to ensure reliability during crises (e.g., KPC (Kuwait)).[23]

These obligations can force NOCs to sustain domestic production even when projects are not commercially viable. Meeting such mandates can also strain their finances, leaving little room to invest in diversification, and can delay national efforts to strengthen long-term energy security through cleaner and more affordable systems.

Other NOCs operate on a more commercial basis but still act as *de facto* guarantors of supply stability (e.g., Equinor).[24] While publicly listed NOCs are formally expected to treat upstream investment decisions as commercial, they often remain strategically important for national energy security.

19 Chang and Lebdioui, *From fiscal stabilization to economic diversification*.
20 World Bank, *Indonesia Energy Transition in the Transport Sector: Subsidy Reform Options* (2024). documents1.worldbank.org/curated/en/099748505212431959/pdf/IDU1e31e5e531f16114baa1b62c1b3201c9c2e68.pdf.
21 Y. Li, X. Shi and B. Su, "Economic, Social and Environmental Impacts of Fuel Subsidies: A Revisit of Malaysia," *Energy Policy* 110 (November 2017): 51.
22 Nigeria, *Petroleum Industry Act 2021*, ngfcp.nuprc.gov.ng/wp-content/uploads/2022/09/Petroleum-Industry-Act-2021-pdf-searchable.pdf.
23 Kuwait Petroleum Corporation, *Strategy 2040*, www.kpc.com.kw/Strategy2040.
24 IEA, *Norway 2022: Energy Policy Review* (2022), iea.blob.core.windows.net/assets/de28c6a6-8240-41d9-9082-a5dd65d9f3eb/NORWAY2022.pdf.

2

This can create tension between market discipline and government policy goals.

For most NOCs, energy security will remain a central factor shaping whether and how governments pursue transformation. These concerns are real and politically salient. At the same time, pursuing energy security through continued investment in large oil and gas projects can introduce new forms of energy security exposure that should be considered as part of a comprehensive assessment of transition risk. Significant energy producing countries such as China and the UAE are turning to renewables to improve energy security and affordability.[25,26] Thus, the energy security component of the transition risk analysis should assess whether current and planned investments genuinely enhance long-term supply resilience.

Transition risk and gas

Some NOCs are almost entirely oil-focused (e.g., Basra Oil Company (Iraq), BAPCO (Bahrain), Aramco). In contrast, others primarily produce gas (e.g., PTTEP (Thailand), Petronas, QatarEnergy, Sonatrach (Algeria)), and many produce a mix of fuels. Beyond current production, NOCs differ in their fuel focus based on resource endowments and strategic intent. The latter is increasingly significant, as gas is often positioned as a "bridge fuel" to support energy access, industrial development and export earnings, or as a relatively clean "transition fuel" to facilitate the shift toward renewable energy systems.[27]

A key question is whether a pivot to a more gas-heavy mix in the NOC's investment and project portfolio will help manage NOC financial risk and national energy security.

A pivot to gas is not without risk. While the IEA forecasts global natural gas demand growth of about 9 percent through 2030 in its base case (the report does not assess trends beyond 2030),[28] it also notes that keeping gas demand growing past 2030 would require unusually low prices and slower clean-energy progress than its central case projects.[29] At the same time, a record liquefied natural gas (LNG) supply surge is expected between 2025 and 2030.[30] If demand lags this supply build-out, prices can come under pressure, and volatility could rise through the late 2020s and 2030s.[31]

Gas pipelines, processing plants and LNG terminals require massive capital outlays and are designed to operate for decades. Investors likewise often demand long-term supply and sales contracts spanning decades before committing capital to such projects. If global gas demand peaks earlier than expected, or if penalties are imposed on the emissions intensity of gas products, these long-lived assets risk becoming stranded or significantly devalued over their operating lifetimes.

These dynamics highlight the need to temper expectations about the role of gas in transforming NOCs. In practice, this means stress-testing gas strategies and managing the risks that can define the credibility of gas portfolios (see Table 3). Many of these are standard risks faced by gas projects, but they can be amplified by the uncertainties of the energy transition.

25 China's *14th Five-Year Plan: Modern Energy System Planning* (2021–2025) links renewables with "improving national energy security": see Climate Change Laws summary translation of the plan (2021), climate-laws.org/document/14th-five-year-plan-on-modern-energy-system-planning_79df.
26 The United Arab Emirates' *Energy Strategy 2050* (2024) aims to deliver "clean, secure, affordable energy," explicitly tying renewables to security: u.ae/en/about-the-uae/strategies-initiatives-and-awards/strategies-plans-and-visions/environment-and-energy/uae-energy-strategy-2050.
27 Furnaro and Manley, *Facing the Future*.
28 IEA, *Gas 2025: Analysis and Forecast to 2030* (2025), www.iea.org/reports/gas-2025.
29 IEA, *World Energy Outlook 2024*, www.iea.org/reports/world-energy-outlook-2024.
30 IEA, "Global LNG Capacity Tracker," www.iea.org/data-and-statistics/data-tools/global-lng-capacity-tracker, accessed September 2025.
31 IEA, *Gas Market Report, Q3 2025*, iea.blob.core.windows.net/assets/119378b2-8d56-49c7-9907-9ee7a516fddd/GasMarketReport-Q32025.pdf.

Table 3. Risks of gas projects and implications for NOCs

Type of risk	Implications for NOCs
Price volatility risk. Unlike oil, there is no unified global price for gas. Regional basis differentials between North America, Europe and Asia can persist for years, and infrastructure constraints, such as pipeline or regasification bottlenecks, further amplify volatility. In recent years, global and regional LNG prices have also swung more sharply and more frequently than oil prices, with fluctuations driven by a wide range of factors including weather, storage levels, shipping costs and geopolitical tensions.[32]	Exposure to transition risk therefore varies by market. For exporters, heavy dependence on a single destination (for example, Europe) can heighten competition and price risk if supply outpaces demand or if importers accelerate decarbonization. For producers focused on domestic markets, risks stem from price regulation and political pressures that can lead to abrupt changes in tariffs or subsidies, affecting both revenue stability and investment returns.[33]
Contract risk. Contract structures determine how much of the market volatility in the gas sector, especially LNG, affects revenues. Long-term LNG contracts can offer stability but may lock NOCs into rigid pricing formulas or delivery obligations that become unfavorable under changing market conditions. By contrast, greater exposure to spot sales increases flexibility but also heightens short-term volatility.	Evaluating the mix of long-term versus spot exposure, and how these align with projected market shifts, should form part of an NOC's transition-risk assessment.
Supply risk. Ensuring reliable feed gas is often a recurring challenge, as shortages, unplanned outages or weak midstream infrastructure can sharply reduce export volumes and revenues.[34] The same factors can also disrupt domestic gas supply, with consequences for power generation, industry and households. In such cases, NOCs may be forced to pay for expensive replacement cargoes or renegotiate delivery contracts. The difficulties faced by Nigeria LNG in recent years illustrate how fragile supply chains can undermine even established exporters.[35]	These vulnerabilities underline the need to evaluate not only market and price exposure but also the physical and institutional resilience of supply systems. Assessing how infrastructure performance, maintenance capacity and domestic allocation policies affect reliability should therefore be a central part of any NOC's transition-risk assessment.
Offtake risk. Gas producers face credit and payment risks linked to the reliability of their buyers. While defaults under long-term LNG contracts are uncommon due to take-or-pay and penalty clauses, domestic gas sales often involve utilities, aggregators and industrial customers with weak financial positions or histories of delayed payments. In several producer countries, these entities rely on government subsidies or bailouts, creating persistent liquidity constraints and exposure to arrears.	For NOCs, limited fungibility makes it difficult to redirect unsold gas to alternative buyers—unlike oil, which is easily remarketed. Poor credit discipline and unrealistic government demand projections can lead to excess supply, underutilized midstream assets and revenue shortfalls, particularly where domestic gas demand forecasts are based on politically driven or speculative industrial expansion plans.

32 IEA, "What Drives Natural Gas Price Volatility in Europe and Beyond?" Commentary, 10 October 2023, www.iea.org/commentaries/what-drives-natural-gas-price-volatility-in-europe-and-beyond.
33 IEA, *Gas Market Report, Q3 2025*.
34 Oxford Institute for Energy Studies. *A Brave New World? LNG Contracts in the Context of Market Turbulence and an Uncertain Future (2023)*, www.oxfordenergy.org/wpcms/wp-content/uploads/2023/12/LNG-Contracts-in-the-Context-of-Market-Turbulence-and-an-Uncertain-Future-NG-187.pdf.
35 Reuters, "Nigeria LNG Inks Long-Term Contracts to Secure Gas Supply," 23 August 2025, www.reuters.com/business/energy/nigeria-lng-inks-long-term-contracts-secure-gas-supply-2025-08-23.

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Associated gas risk. In many oil-led systems, a large share of gas is produced together with oil. When gas gathering and processing capacity lags oil output, producers are forced to flare or vent—wasting fuel, generating emissions and damaging credibility. Because gas supply in these systems depends on oil policy and market cycles, "gas-for-energy security" strategies become vulnerable to the same risks that affect oil investments.	This underscores the need to assess how dependent future gas production is on oil production trends, and whether planned investments in gas infrastructure are aligned with realistic oil-sector trajectories under different transition scenarios.
Renewables competitiveness. Rapidly falling solar and onshore wind costs are reshaping the economics of domestic power generation; in many markets, new renewables already undercut new gas-fired capacity.[36] For LNG producers, this also raises demand uncertainty: rapid solar (and, to a lesser extent, wind) growth in key Asian importers like India, Pakistan and Vietnam has begun to cap or displace gas demand in the power mix, leading several analyses to question earlier assumptions that Asia would be the reliable engine of LNG growth.[37,38]	This highlights the need to assess future cost competitiveness and system planning assumptions when evaluating NOC gas project investments, testing whether they will remain viable in markets where renewables continue to scale and capture demand growth.[39]

Assessing opportunities in new businesses

In addition to assessing risk levels, governments and NOCs must evaluate strategic opportunities considering internal NOC capabilities and external conditions. While Step 3 focuses on a more detailed discussion of sectoral and technological choices, this initial step emphasizes a broader reflection on whether and to what extent the NOC can realistically expand beyond fossil fuel operations.

For many NOCs, the rationale for transformation can align with national development objectives: anchoring the country's industrial upgrading by moving into higher-value-added activities. New green industries are emerging, and early movers can gain advantages. Delaying action could mean losing ground as these sectors mature and entry barriers rise.[40]

NOCs are often among the most capable companies nationally, especially in many low- and middle-income countries. They usually attract highly skilled personnel, concentrate engineering and project management expertise, and may serve as a hub for partnerships with international firms. Even when a company's commercial or financial performance is under pressure, its internal talent base and infrastructure footprint may provide a foundation for future transformation, if strategically redeployed. A relevant example—though from a high-income country with strong institutional and financial capacity—is Denmark's Ørsted (formerly DONG), which successfully leveraged its offshore engineering and project management expertise to become a global leader in offshore wind.[41]

36 International Renewable Energy Agency (IRENA), *Renewable Power Generation Costs in 2024* (2025), www.irena.org/Publications/2025/Jun/Renewable-Power-Generation-Costs-in-2024.
37 IEA, "India," in *World Energy Investment 2025* (clean power's surge; 83% of 2024 power-sector investment to clean energy), www.iea.org/reports/world-energy-investment-2025/india.
38 Institute for Energy Economics and Financial Analysis (IEEFA), *Global LNG Outlook 2024–2028* (2024), ieefa.org/resources/global-lng-outlook-2024-2028.
39 A. Sayne, *Framework for Countries Evaluating Gas-to-Power Pathways—Goal 1: Navigating the Energy Transition and Climate Crisis* (NRGI, 2022), resourcegovernance.org/publications/framework-countries-evaluating-gas-power-pathways-goal-1-navigating-energy-transition.
40 R. Lema, X. Fu and R. Rabellotti, "Green windows of opportunity: Latecomer development in the age of transformation toward sustainability," *Industrial and Corporate Change*, 29(5) (2020): 1193–1209, doi.org/10.1093/icc/dtaa044.
41 G. Tagliani, A. Furnaro, D. Manley and C. Romero, *DONG to Ørsted: Seven insights to transform national oil companies* (NRGI, 2025).

In Nigeria, despite chronic financial pressures, NNPC continues to maintain a large and skilled workforce compared to other national players. As of early 2025, NNPC employed 5,566 staff, with deep sectoral expertise including 74 petroleum engineers, 48 well-engineering specialists, 142 geoscientists, 301 IT professionals, 466 general engineers, and 605 finance and audit staff. This pool of talent creates a strategic asset that could catalyze industrial development in different sectors.[42]

There is no automatic case for NOCs to expand into new business areas. While history offers many examples of NOCs investing in new sectors that failed to deliver lasting or robust returns, there are also notable cases where diversification has succeeded—often when capabilities, governance and market conditions were well aligned.[43] These mixed outcomes highlight that NOCs often struggle to translate capabilities built around managing public petroleum resources—and associated rents—into success in sectors that require agility and innovation, but success is not impossible. Diversification efforts can divert attention and capital from core operations if poorly designed, and in the worst cases, they have become vehicles for patronage.[44] The challenge is therefore not whether NOCs should diversify, but under what conditions diversification is likely to deliver public value.

Governments and their NOCs should assess both exposure to risk and scale of opportunity, influencing which transformation pathways are realistic.

- **Implications of higher opportunity**. Where NOCs possess strong internal capabilities, access to finance or competitive advantages, early engagement in industrial transformation may offer benefits—such as capturing market share or building experience in emerging sectors. The discussion should consider whether current revenues and capacity can support such moves, and how these investments align with national priorities and risk tolerance.
- **Implications of lower opportunity**. Where NOCs face financial, organizational or technical constraints, incremental approaches may be appropriate. Debates may focus on whether to prioritize efficiency gains and capacity building. In such cases, transformation resources may be better deployed elsewhere in the state or national economy, at least in the short to medium term.

42 Equity Petroleum, *NNPC Organisational Structure and Key Talent Indicators* (2024), www.equitypetroleum.com/insights/1010.

43 Historical experience shows that diversification by NOCs into unrelated, non-core sectors has often generated governance, financial and corruption risks rather than durable returns. Well-documented cases include Sonangol (Angola), whose expansion into telecommunications, banking, real estate and tourism became associated with opaque ownership structures and corruption scandals. By contrast, PTT (Thailand) is frequently cited as a comparatively diversified NOC group: it has expanded beyond core hydrocarbons through a major retail/non-oil platform and invested in biochemicals/bioplastics. See International Consortium of Investigative Journalists (ICIJ), *Luanda Leaks: How Africa's Richest Woman Exploited Family Ties, Shell Companies and Inside Deals to Build an Empire* (2016); G. Tagliani, "Crossing the River by Feeling the Stones: A Sustainable Technological Transition Strategy for National Oil Companies" (2025).

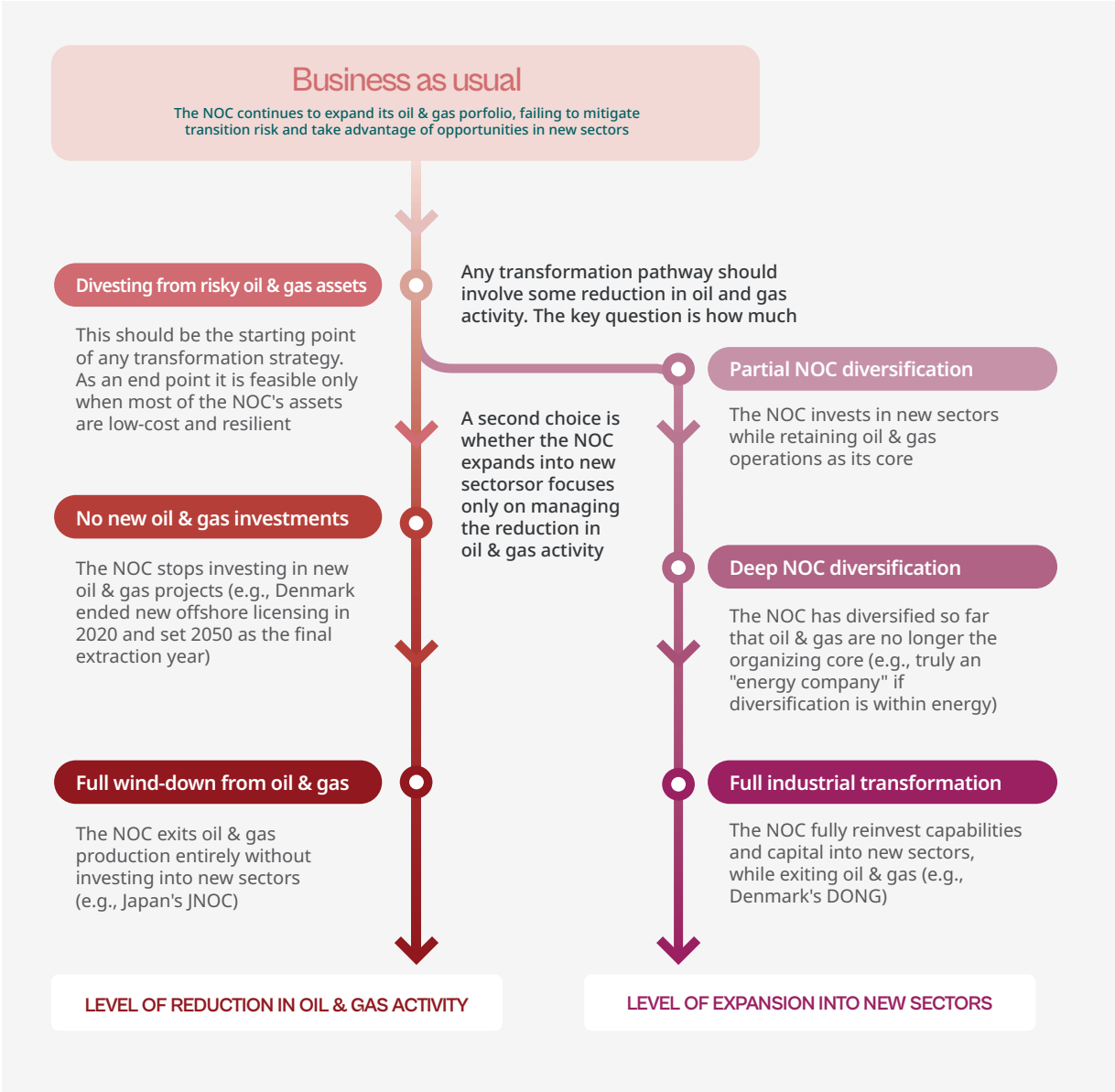
44 ICIJ, *Luanda Leaks*.

3 Defining the strategic direction and business focus

NOCs face different possible transformation trajectories depending on how they respond to transition risks through changes in their core activities and investment strategies. Figure 4 maps possible end points for NOC transformation along two core dimensions: the extent of reduction in oil and gas activity and the degree of expansion into new sectors.

It shows that business as usual—continued oil and gas expansion without diversification—fails to address transition risks and sits outside any meaningful transformation pathway. Any credible transformation pathway involves some reduction in oil and gas activity, ranging from divesting the riskiest assets, to halting new investments, to a full wind-down of fossil operations.

Figure 4. Examples of possible end points for the NOC transformation process



A second strategic choice concerns whether the NOC focuses solely on managing decline or simultaneously expands into new activities. This yields a spectrum of outcomes, from partial diversification—where oil and gas remain the core business—to deep diversification, where fossil fuels are no longer the organizing center, and to full industrial transformation, in which the NOC exits oil and gas entirely while fully redeploying capital and capabilities into new sectors. Together, the axes highlight that transformation is not a binary choice but a set of strategic trade-offs between risk reduction and industrial ambition.

Expansion into new sectors

A long-term industrial transformation means the NOC gradually shifts its core business away from oil and gas and toward other sectors with a lower exposure to transition risk. This can take a range of forms in the short and medium term, from partial NOC diversification to a more ambitious repositioning of the NOC around low-carbon or non-energy sectors.

The closest example of a full industrial transformation is DONG, which converted to the renewable energy giant Ørsted. While Denmark has not entirely abandoned oil and gas production, the NOC has transformed its business from fossil fuels to wind energy.[45,46]

A parallel in the private sector is Italy's ERG. Founded as Edoardo Raffinerie Garrone in 1938, ERG was one of Italy's largest oil refiners and fuel distributors. In 2008, the company started a deliberate transformation, divesting its refining and fuel retail assets, culminating in the full divestment of its refinery business by 2013, and investing nearly EUR 3.9 billion into renewable energy, predominantly wind.

By 2023, ERG had exited all fossil operations entirely and rebuilt as a leading European wind and solar operator, with over 3.8 GW installed capacity.[47]

Several NOCs have begun investing in new sectors. In an analysis of 21 NOCs that NRGI conducted in 2023, more than half reported some level of investment or planning related to low-carbon or diversified sectors.[48] Moreover, according to the IEA's *World Energy Investment 2025* report, while many international oil companies have recently scaled back their investments in low-emissions energy technologies (25 percent less in 2024 than in 2023), increased spending by large independents and NOCs is offsetting some of this decline.[49]

NOCs may need to prioritize fiscal stabilization and be cautious about launching ambitious industrial transformation plans, particularly if they lack the technical or financial capabilities to compete in new sectors.

45 Tagliani et al., *DONG to Ørsted*.
46 A. Voldsgaard and M. Rüdiger, "Innovative Enterprise, Industrial Ecosystems and Sustainable Transition: The Case of Transforming DONG Energy to Ørsted," pp. 1–52 in M. Lackner, B. Sajjadi and W.Y. Chen (eds), *Handbook of Climate Change Mitigation and Adaptation* (Springer, 2022), doi.org/10.1007/978-1-4614-6431-0_160-1.
47 *Energy Intelligence*, "Italy's ERG Proves You Can Trade Oil for Renewables—and Win," 13 March 2024, www.energyintel.com/0000017b-a7cf-de4c-a17b-e7cf85f80000.
48 Furnaro and Manley, *Facing the Future*.
49 IEA, *World Energy Investment 2025*.

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Figure 5. Expansion into new sectors: examples

Less ambitious → **More ambitious**

Partial NOC diversification	Deep NOC diversification	Full industrial transformation
The NOC adds investments in new sectors while retaining oil and gas operations as its core. This destination, if accompanied by divestment from risky oil & gas assets, can manage risk without redefining the company. Example: Although no NOC has yet fully reached this stage, Petrobras offers a partial illustration. According to its 2024–2028 *Strategic Plan*, Petrobras aims to allocate up to USD 11.5 billion to low-carbon initiatives—including biorefining, wind, solar, carbon capture, usage and storage (CCUS) and hydrogen—marking a gradual but significant shift toward diversification.[50]	An NOC that has diversified so far that fossil fuels are no longer the organizing core. Example: There is no fully realized example yet of a fully diversified NOC. When diversification is within the energy sector, Equinor comes closest: renewables/low-carbon capex rose from 3% (2019) to 14% (2022), with a stated goal of 50% by 2030. Fossil operations still expand, so this is only a partial correspondence—but it signals the kind of reweighting implied by this destination.[51]	The NOC exits oil and gas production entirely, reinvesting capabilities and capital into new sectors. Example: Between 2009 and 2017, DONG Energy divested upstream oil and gas assets, ceased coal usage and reinvested proceeds into offshore wind development. In 2017, DONG was renamed Ørsted to reflect its new identity as a renewables-focused company. This case stands as a rare example of an NOC's full industrial transformation.[52]

50 Petrobras, *Strategic Plan 2024–2028+* (2023), www.investidorpetrobras.com.br/en/press-releases/strategic-plan-2024-2028.
51 World Benchmarking Alliance, "Equinor," Oil and Gas Benchmark (2023), www.worldbenchmarkingalliance.org/publication/oil-and-gas/companies/equinor-4.
52 Tagliani et al., *DONG to Ørsted*.

Reduction in oil and gas activity

Reduction in oil and gas activity can be pursued either as a stand-alone destination—shrinking the oil and gas portfolio—or in parallel with investment in new areas, as mapped in Figure 4. Governments may face a strategic trade-off between reinvesting NOC profits internally, to support the company's transformation, and allocating those profits elsewhere to promote broader policy goals.

In practice, divestment would result in a smaller NOC, ideally focused on the lowest-risk assets, reducing exposure to stranded-asset risk, and freeing resources for fiscal stabilization, just transition or diversification outside the company.

In some contexts, redirecting a larger share of NOC profits (beyond regular taxes and royalties) toward national development goals can help governments advance key priorities while reducing exposure to risky fossil reinvestments. When fiscal conditions allow and the NOC remains profitable, redirected revenues can support broader industrial transformation by funding investments in infrastructure, innovation and workforce development beyond the company itself. Governments can achieve this through several fiscal or ownership mechanisms, for example, adjusting dividend policies, revising NOC-specific tax incentives or assigning targeted public obligations, provided these measures are transparent and consistent with long-term fiscal and corporate planning. However, if NOC revenues are expected to drive these development goals, they must be both stable and substantial—a condition that cannot be assumed, particularly amid the uncertainties of the energy transition.

In countries where NOCs face financial strain, available profits may need to cover existing and emerging liabilities, including those linked to winding down operations, such as decommissioning costs and support for affected workers and regions. In cases like Mexico, where Pemex has long faced high debt levels, financial underperformance and operational inefficiencies, governments must carefully weigh the trade-offs between using remaining profits to stabilize the company versus redirecting them to other policy goals.

The case of Japan's former national oil company (JNOC) is instructive. With declining domestic reserves, high costs and limited comparative advantage, Japan chose to wind down the NOC in 2005, reallocating its resources to other public institutions capable of managing its industrial strategy and energy security policy (see Box 1).

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Box 1. The managed decline of JNOC

Established in 1967 as the Japan National Oil Corporation (JNOC), the entity held extensive offshore and overseas exploration mandates, given Japan's limited domestic resources. However, by the late 1990s, JNOC had become a sizable financial burden—accumulating cumulative losses exceeding JPY 800 billion (USD 7 billion) by 2003. In 2002–2004, as part of Prime Minister Koizumi's administrative reforms, the Japanese government dissolved JNOC and restructured its functions. A newly incorporated administrative agency, Japan Oil, Gas and Metals National Corporation (JOGMEC), took over strategic roles—such as stockpiling and technology support—without direct upstream investment mandates. Upstream activities were transferred to newly established or privatized companies. Closure allowed the government to avoid further financial losses and consolidated resource focus toward strategic stockpiling and supporting downstream private-sector actors.[53]

In recent years, JOGMEC has significantly expanded its mandate to align with Japan's goal of achieving carbon neutrality by 2050. No longer focused solely on ensuring fossil fuel supply security, JOGMEC now plays a central role in facilitating Japan's energy transition by investing in and supporting clean energy projects. It conducts geological and environmental surveys to accelerate offshore wind development and has recently entered into partnerships to support wind certification and site assessments.[54]

JOGMEC also provides equity investments and debt guarantees for low-carbon infrastructure, including hydrogen and ammonia production, carbon capture and storage, and geothermal energy. Domestically and internationally, JOGMEC is actively supporting new LNG projects, but with increasing attention to emissions performance and clean supply chain standards. It is a founding partner of the CLEAN initiative—a coalition of Asian LNG importers committed to transparency and benchmarking methane emissions in fossil fuel supply chains. Through these activities, JOGMEC has evolved into a hybrid public institution that blends energy security with green industrial policy.[55]

However, Japan's experience reflects distinct structural conditions—a high-income economy with limited domestic reserves and strong industrial R&D capacity. These factors made it more feasible to pivot from state-led extraction to technology development, rather than preserving a conventional upstream role.

53 S. Yamaguchi, "Japan's Overseas Oil Development and a Role of Technology," GraSPP Discussion Paper (University of Tokyo, 2008), www.pp.u-tokyo.ac.jp/wp-content/uploads/2016/03/GraSPP-DP-E-08-002-SEPP-DP-E-08-002.pdf.
54 Japan Organization for Metals and Energy Security (JOGMEC), "JOGMEC Signs MOC with Bureau Veritas for Offshore Wind Development," 5 June 2024, www.jogmec.go.jp/english/news/release/news_10_00068.html.
55 JOGMEC, "News Release[s] related to the Carbon Neutral," www.jogmec.go.jp/english/carbonneutral/carbonneutral_15_00002.html.

Levels of ambition for reinvesting NOC profits outside the NOC can vary. A modest approach might involve a gradual decline in oil and gas investments alongside incremental increases in the share of profits redirected to the state. At the other end, some governments may pursue a full "harvest mode," where the NOC focuses on maximizing near-term returns from existing assets while sharply reducing new fossil investments.[56] To a certain extent, this approach mirrors the case of Shell, which has prioritized dividends and share buybacks over reinvestment.[57] If the shares of NOC profits redirected to the state are increased, this should avoid undermining the company's operational viability.

Allowing the NOC to operate on a commercially sustainable basis while providing a return to the state should remain a good practice.[58] Yet this balance becomes more difficult as the global energy transition exposes more NOC investments to risk. However, where forward-looking assessments suggest that continued expansion could erode long-term value and where NOC profits could generate greater public benefit if reinvested elsewhere, it may be appropriate for governments to adopt a strategy that gradually channels capital away from the NOC and toward future-oriented economic priorities.

Figure 6. Reduction in oil and gas activity: examples

Less ambitious → **More ambitious**

Divesting from risky oil & gas assets	No new oil and gas investments	Full wind-down from oil and gas
This should be the starting point of any transformation strategy. Seeing this as the destination is feasible only where a large portion of the NOC's assets are low-cost and resilient. When fiscal conditions allow, governments could allocate a larger share of NOC profits to national development priorities. Example: According to Petrobras's reports, the company evaluates all projects assuming a Brent crude oil price of USD 55 per barrel and tests resilience under a long-term price of USD 35 per barrel.[59] While this approach signals growing attention to transition risks, how far such strategies translate into redirecting profits toward broader low-carbon or developmental goals remains less clear.	The NOC stops investing in new oil and gas projects, focusing instead on maximizing cash flow from existing operations. Rather than reinvesting earnings in fossil expansion, these funds are redirected toward emerging sectors within the NOC or broader national development priorities. Example: Although there are no clear precedents, Denmark's policy offers a close analog. In 2020, the Danish government ended new offshore oil and gas licensing and set 2050 as the final extraction year. The state's remaining stakes are managed through Nordsøfonden, which now also holds a mandatory share in all CO_2-storage licenses, linking the fossil phaseout to the buildup of low-carbon industries.	The NOC exits oil and gas production entirely. If the NOC is dissolved, its public functions and capabilities are transferred to other state bodies. Example: A close precedent is Japan's closure of JNOC in 2005—driven not by energy transition goals, but by chronic financial losses and strategic inefficiencies. Upstream assets were transferred to newly created or privatized companies, while technology development, resource stockpiling and, later, clean energy initiatives were consolidated under the newly established JOGMEC in 2004 (see Box 1).

56 On the term "harvest mode," see K. Kûhne, *Harvest Mode* (LINGO, 2024), www.leave-it-in-the-ground.org/wp-content/uploads/2024/11/Harvest-Mode.pdf.
57 M. Moore, "Shell seeks to close valuation gap with US rivals," *Financial Times*, 27 March 2025, www.ft.com/content/55e484f0-49cc-410a-88d9-4332c26498fb.
58 H. Fortin and J. Billy, "Getting a fair slice of the pie: Three options for the State to collect its share of SOE profits," World Bank, 5 June 2024, blogs.worldbank.org/en/governance/getting-a-fair-slice-of-the-pie--three-options-for-the-state-to-.
59 Petrobras, *Form 20-F, 2022*, www.sec.gov/ixviewer/ix.html?doc=/Archives/edgar/data/1119639/000129281423001253/pbrform20f_2022.htm.

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Choosing sectors

Once governments and NOCs have defined the direction and depth of transformation, and prioritized an internal transformation of the NOC, they must decide which sectors or technologies to focus on. Exploring sectoral and technological options requires assessing where the NOC holds a genuine comparative advantage—whether through technical expertise, infrastructure or partnerships—and where other public or private actors may be better placed to lead. In some industries, directing transformation resources toward the NOC may align with national development goals; in others, it could divert scarce capital from more capable institutions.

To guide this assessment, options can be grouped according to the NOC's core operational base. This helps clarify which productive and technological capabilities are transferable.

- **Options stemming from upstream-related capabilities**: those linked to oil and gas exploration and production, including subsurface engineering, offshore operations and project management.
- **Options stemming from downstream-related capabilities**: those centered on refining, petrochemicals, logistics and the transformation of raw materials into marketable products.

Another relevant way of organizing these options is by differentiating between energy- and non-energy-related sectors.

- **Energy-related sectors** generally build on upstream capabilities, such as offshore drilling, mining or subsurface engineering. For example, Denmark's DONG leveraged its offshore drilling experience to develop offshore wind projects, while Pertamina is expanding into geothermal energy, drawing on its subsurface expertise and drilling infrastructure.[60]
- **Non-energy-related sectors** tend to emerge from downstream strengths in refining and petrochemicals. Thailand's, for instance, used its experience in biofuels and petrochemicals to move into advanced biochemistry and bioplastics, progressively developing a portfolio that extends beyond traditional energy industries.[61]

Governments and their NOCs should assess the NOC's potential comparative advantages and the extent to which these sectors align with national development goals, market opportunities and existing institutional capabilities.

Table 4. Examples of sectoral choices

	Energy-related sectors	Non-energy-related sectors
Stemming from upstream-related capabilities	Offshore wind; geothermal; hydrogen from gas; direct lithium extraction	Applications of subsurface expertise in materials extraction or advanced mining processes
Stemming from downstream-related capabilities	Hydrogen from refining byproducts; biofuels from petrochemical platforms	Advanced biochemistry and bioplastics; specialty chemicals; other advanced materials

60 Pertamina Geothermal Energy, www.pge.pertamina.com/en, accessed July 2025.
61 Tagliani, "Crossing the River by Feeling the Stones."

Energy-related sectors

Energy-related sectors—such as wind, solar, geothermal power, electricity transmission, alternative fuels, and energy storage, including hydrogen—are among the most common diversification targets for NOCs. The integration of offshore wind with upstream oil and gas systems already shows broad industry application.[62] Opportunities in renewables manufacturing, however, remain limited due to competition from established global players, particularly in wind and solar.

Hydrogen has attracted investment from several NOCs, including ADNOC (Abu Dhabi) and Equinor.[63,64] It can build on upstream expertise in natural gas extraction as well as downstream capabilities in industrial chemical processing, where hydrogen is often a byproduct. Although the hydrogen sector offers more competitive space it also faces significant technological and cost challenges.[65] In the case of lithium—a critical input for the global energy transition—direct lithium extraction relies on subsurface and fluid-handling skills akin to those used in upstream oil and gas. Reflecting this convergence, NOCs such as ADNOC, Aramco and Equinor have begun investing in lithium-related ventures.[66,67]

Non-energy-related sectors

Non-energy-related sectors have received less attention in the policy literature, yet they offer relevant opportunities for NOCs with strong downstream capabilities. Some companies have leveraged expertise developed in refining and petrochemicals to expand into second-generation biofuels and advanced biochemistry. Examples include NOCs in China and Thailand, which have applied existing industrial and chemical know-how to develop bio-based products and materials.[68,69] Petrochemicals are another non-energy-related sector that has been relevant in discussions about NOC diversification. Investment in chemical production can deliver sufficient returns, but only if the capacity of new assets is based on a realistic assessment of future demand for petrochemical feedstocks.[70] Petrochemicals can also help develop technological capabilities in chemistry, which NOCs could later repurpose in different sectors (such as advanced biochemistry).

Unrelated NOC diversification

Focusing on sectors that build on the NOC's existing skills, infrastructure or supply chains usually offers a more balanced mix of opportunity and risk. However, when governments aim to create new industries or generate employment, NOCs may also venture into less familiar sectors. While such moves can open new sources of value, they also carry significant governance and fiscal risks.

Experience shows that when NOCs expand far beyond their core functions, they often face unclear mandates, weak oversight and heightened fiscal exposure.[71] These ventures can strain public resources and divert attention from the company's main role in managing national energy assets.

Governments and NOC leaders must ensure that any unrelated diversification is strategic, transparent and time-bound, supported by clear public objectives, financial safeguards and accountability mechanisms. Even when new sectors appear promising, a grounded understanding of the NOC's existing capabilities remains essential to set realistic goals and plan investments.

62 US Department of Energy, "A Renewable Future for the Oil and Gas Industry," 17 October 2017, www.energy.gov/eere/wind/articles/renewable-future-oil-and-gas-industry.
63 S. Valle, "Exxon, Abu Dhabi's ADNOC Partner on Delayed Texas Hydrogen Project," Reuters, 9 May 2024, www.reuters.com/markets/commodities/exxon-abu-dhabis-adnoc-partner-delayed-texas-hydrogen-project-2024-09-04.
64 Equinor, "Hydrogen," www.equinor.com/energy/hydrogen, accessed July 2025.
65 K. Zhang, L. He, L. Jiang, S. Jiang, R. Yu, H.C. Lau, C. Xie and Z. Chen, "The role of hydrogen in the energy transition of the oil and gas industry," *Energy Reviews* 3(4) (2024): 100090.
66 C. Denina, S. Mcfarlane and M. El Dahan, "Gulf Oil Giants Saudi Aramco, ADNOC Set Sights on Lithium," Reuters, 8 March 2024, www.reuters.com/markets/commodities/gulf-oil-giants-saudi-aramco-adnoc-set-sights-lithium-2024-03-08.
67 Equinor, "Equinor to Form Strategic Partnership with Standard Lithium," 8 May 2024, www.equinor.com/news/20240508-partnership-standard-lithium.
68 Tagliani, "Crossing the River by Feeling the Stones."
69 S. Wianwiwat and J. Asafu-Adjaye, "Is there a role for biofuels in promoting energy self- sufficiency and security? A CGE analysis of biofuel policy in Thailand," *Energy Policy*, 55 (2013): 543–555, doi.org/10.1016/j.enpol.2012.12.054.
70 S. Ashrafkhanov, H. Benham and M. Coffin, *Petrochemical Imbalance* (Carbon Tracker, 2024).
71 P. Heller, P. Mahdavi and J. Schreuder, *Reforming National Oil Companies: Nine Recommendations* (NRGI, 2014), resourcegovernance.org/sites/default/files/documents/nrgi_9recs_eng_v3.pdf.

4 Preparing the institutional setup and ensuring strong governance

This step focuses on institutional arrangements to support the chosen transformation pathway. These arrangements—related to coordination mechanisms, corporate structures and financing instruments—can determine how strategies can be effectively implemented.

For NOCs expanding into the electricity sector

Coordination and competition between NOCs and SPCs

When exploring entry into the electricity sector, NOCs should consider whether their country already has a state-owned power company (SPC). Among 69 NOCs reviewed for this analysis, 64 operate in countries with an SPC. Only a few exceptions exist—such as Petroci (Côte d'Ivoire), PCJ (Jamaica), Nilepet (South Sudan), KPC (Kuwait) and Basra Oil Company (Iraq)—where electricity is managed directly by the government or by a ministry. This overlap or separation of roles has important implications for how NOCs can participate in renewable energy production.

While complementarities between NOCs and SPCs can exist, their parallel roles in the electricity sector may create duplication and inefficiencies. Splitting capital investments, for example, can limit economies of scale or generate competition that erodes government revenues.

A possible approach is establishing a state holding company (SHC) to oversee both entities, promote coordination and strategically manage shared investments.[72]

Many countries use SHC structures to manage their SOEs, including NOCs. This model typically takes two forms: in some cases, the NOC itself functions as an SHC, overseeing a network of subsidiaries; in others, the NOC is placed under a broader SHC that holds multiple SOEs across different sectors.

When designed per Organisation for Economic Co-operation and Development (OECD) standards, SHCs are usually owned by government shareholders who set strategic direction for the parent company while limiting interference in the day-to-day operations of subsidiaries. To promote professional management and limit political interference, these arrangements rely on clear governance rules—such as strong board oversight, clearly defined shareholder–SHC relations, transparent appointments and audits, and clear mechanisms to set and review public objectives.[73,74]

Some countries organize most of their SOEs under a centralized SHC, such as China's State-owned Assets Supervision and Administration Commission of the State Council (SASAC), which holds controlling stakes in major firms, including Sinopec and CNOOC. In other countries, NOCs have been structured as SHCs overseeing diverse business lines (e.g., Petrobras, Pemex, PTT, Aramco, ADNOC and Petronas). The degree of legal and operational autonomy from the government varies significantly across cases.

When professionally managed, an SHC can strengthen industrial policy coordination. A well-known example is Singapore's Temasek. While the government defines its overall strategic direction, oversight mechanisms

72 S. Holland, *The State as Entrepreneur: New Dimensions for Public Enterprise: The IRI State Shareholding Formula* (Weidenfeld & Nicolson, 1972), books.google.co.uk/books?id=qZ01AQAAIAAJ.
73 *OECD Guidelines on Corporate Governance of State-Owned Enterprises* (2015 edition), doi.org/10.1787/9789264244160-en.
74 *OECD Guidelines on Corporate Governance of State-Owned Enterprises* (2024 edition), doi.org/10.1787/18a24f43-en.

protect operational independence. The President of Singapore holds veto power over key appointments, including the board and chief executive officer. Most board members are independent, and the roles of chairman and CEO are separated, with the chairman serving as a non-executive director. Temasek retains full discretion over investment decisions and upholds rigorous governance practices, including regular public reporting and independent external audits.[75]

Unbundling mandates

Another important consideration for institutional design is whether national regulations permit NOCs to operate in the electricity sector. While some countries (such as China) allow NOCs to expand into power generation, others adopt unbundling mandates. In these cases, regulations separate oil and gas production (NOC roles) from electricity generation (SPC roles) to prevent monopolies, forcing NOCs to focus on upstream oil and gas extraction. These mandates aim to prevent vertical monopolies, ensure independent access to infrastructure and foster competition.

A similar unbundling principle often applies within the electricity sector, separating generation from transmission activities. In Colombia, Ecopetrol's 2021 acquisition of a controlling stake in the transmission firm ISA, previously owned by a government ministry, restricted its ability to expand into electricity generation. To comply with sectoral regulations and avoid conflicts of interest, Ecopetrol liquidated its subsidiary Ecopetrol Energía, which provided electricity commercialization services. This example illustrates how unbundling mandates can shape the scope of diversification into power-sector activities and the corporate structures these strategies can take.[76]

Collection and reinvestment of NOC profits amid the transition

A central institutional question in the transformation process is how governments should collect and reinvest NOC profits—especially when the goal is to channel revenues toward broader national priorities rather than back into the company. The choice of mechanism determines not only how resource income supports long-term development, but also how insulated these funds are from political pressures and market volatility.

Historically, most instruments for managing NOC profits, such as sovereign wealth funds, development banks or special budgetary funds, were designed to address fiscal stabilization and intergenerational equity in resource-rich economies. While these tools remain useful, the energy transition introduces new objectives (e.g., cushioning fiscal adjustments as fossil revenues decline, financing industrial diversification, and supporting social and environmental aspects of the transition).

Table 5 compares the main traditional mechanisms for managing and reinvesting NOC revenues, highlighting their strengths and limitations in the context of the energy transition. The suitability of each approach depends on factors such as fiscal space, institutional capacity and the country's broader development strategy.

75 W.J.N. Ng, "Comparative Corporate Governance: Why Singapore's Temasek Model Is Not Replicable in China," *NYUJ Int'l L. & Pol. 51* (2018): 211.
76 Ecopetrol, "Ecopetrol Autoriza Proceder con Trámites de Liquidación de Dos Sociedades Subordinadas," 26 February 2020.

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Table 5. Main traditional mechanisms for managing and reinvesting NOC revenues

Tool and traditional purpose	Strengths and weaknesses for strategies to reinvest profits outside the NOC		More suitable when
	Strengths	Weaknesses	
Sovereign wealth fund Long-term savings, stabilization or intergenerational equity through diversified asset portfolios	• Can protect the economy against fiscal shocks if transition risk materializes • Strong governance models in some contexts	• Fund uses are often disconnected from domestic reinvestment needs • Tendency to prioritize financial returns over industrial transformation	The country has large, sustained surpluses and aims to preserve wealth rather than actively reinvest domestically (e.g., Gulf producers)
Development bank/ investment authority Independent public institution for long-term investment in industrial or transformation objectives	• Can direct capital toward strategic sectors that support economic transformation and energy transition goals • Can leverage additional finance and expertise	• Requires high capacity and clear mandate • Risks duplicating budget functions	The country has moderate-to-high institutional capacity and coherent sectoral planning frameworks
Special fund (within budget) Allocates resource revenues to priority areas through ringfenced accounts integrated into the national budget	• Can enhance fiscal coherence and transparency • Builds on existing budget institutions, avoiding fragmentation	• Vulnerable to short-term political pressures • Limited insulation from general revenue needs	Revenues are modest or declining, or when institutional capacity for standalone vehicles is limited
Budget allocations (within ordinary budgetary processes) Allocate resource revenues to priority areas using ordinary budget processes, monitored by government, legislatures and citizens	• Full integration into fiscal planning and national development priorities • Enhance transparency and democratic accountability if public finance mechanism systems are robust	• Pro-cyclical and easily reallocated • Difficult to guarantee steady funding for long-term programs • Line ministries and agencies may lack capacity to plan, procure and implement investment projects efficiently • Allocations can be influenced by electoral cycles or lobbying	Revenues are modest or declining, or when the aim is to support broad social or infrastructure investment rather than targeted industrial policies; work best where public finance institutions are credible

No matter the route taken, governance and oversight of these investment decisions and their execution remain essential. Creating separate vehicles for investment should not undermine the development of sound public finance management systems. Ideally, any new fund or institution should complement, not compete with, national planning and budgeting.

Ensuring accountability and strong corporate governance

Amid the broader set of decisions that governments and NOCs must make on their pathways to transformation, core principles of NOC governance remain critical to ensure that decisions are made and executed in the public interest. The experience of NOCs over the past several decades has highlighted several governance priorities:

1. First, clearly define the NOC's commercial and non-commercial roles to prevent conflicts of interest and ensure coherence between its mandate and national energy strategy.
2. Second, establish a transparent and balanced revenue-retention model that enables the NOC to meet operational needs while maintaining fiscal discipline and preventing the company from becoming a "state within the state."
3. Third, limit political interference and empower professional, independent boards, with appointments based on merit and technical expertise.
4. Fourth, strengthen transparency and oversight, including through regular publication of audited financial statements and clear reporting on transfers between the NOC and the state.
5. Finally, invest in staff integrity and capacity, ensuring that management systems, promotion pathways and conflict-of-interest safeguards promote competence and accountability.[77]

Together, these principles form the foundation for effective, accountable transformation, independently of the specific pathway chosen.

77 Heller, Mahdavi and Schreuder, *Reforming National Oil Companies*.

5 Ensuring a just transition and responsible exit

Because of the central role they play in economies and energy systems—at the national level and at the local level in communities where the oil and gas sector has been dominant—NOCs need to devote strong attention to ensuring that their own transformations and the broader transitions to which they are contributing is executed equitably.

Just transition planning

The NOC transformation should not impose disproportionate social and economic costs on workers, communities and vulnerable groups. For fossil-dependent countries, particularly those where NOCs are major employers or anchor institutions, planning a just transformation is a matter of fairness as well as political and economic stability.

In Mexico, according to local private associations, in certain regions up to 90 percent of their GDP is linked to the oil sector and Pemex.[78] In Colombia and Venezuela, Ecopetrol and PDVSA respectively have played a role in financing and implementing local social programs.[79,80]

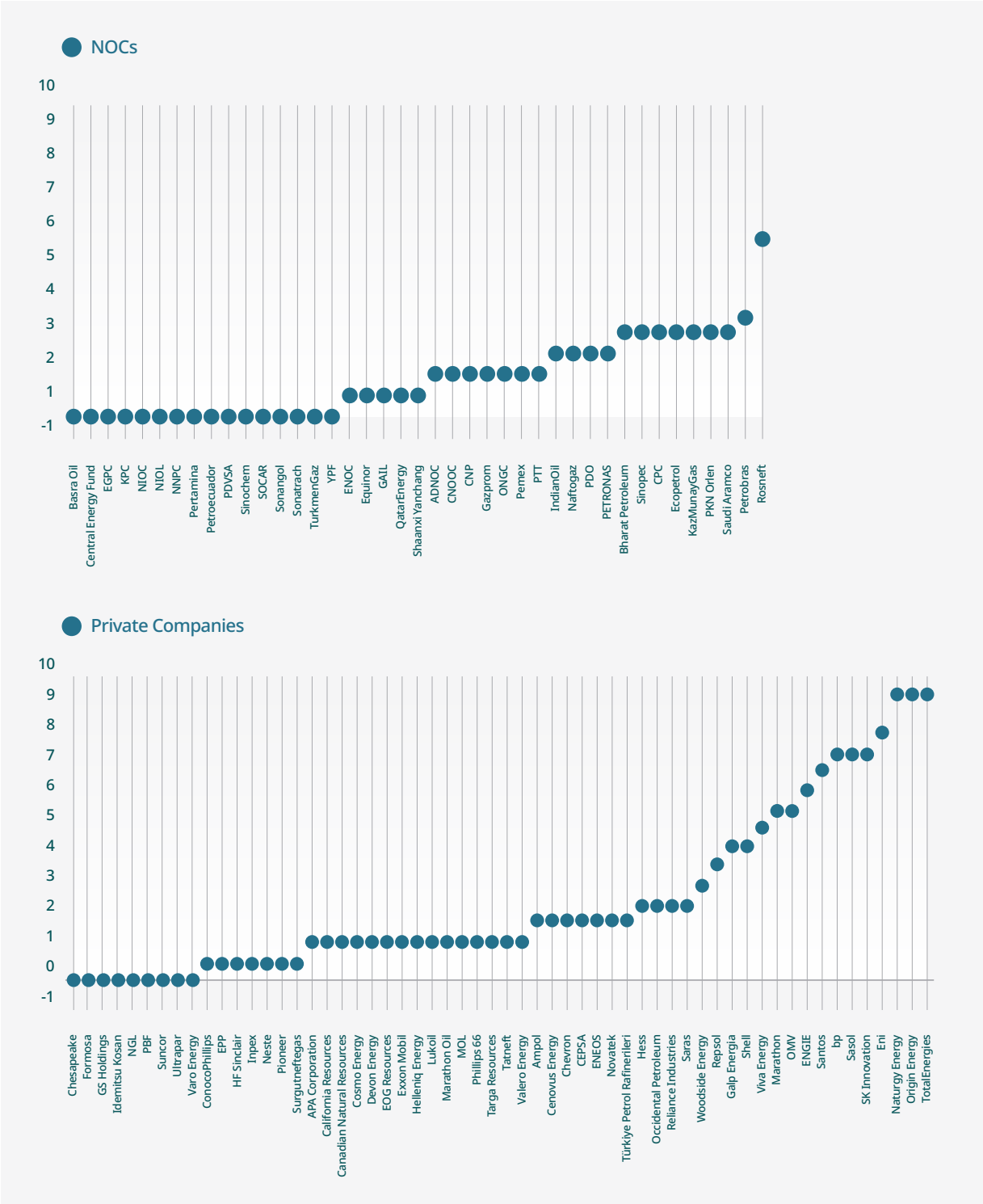
This role is increasingly at risk. In both Colombia and Mexico, oil production decline is affecting subnational revenues and employment.[81] At the same time, many producing regions face large historical environmental liabilities from NOCs, which undermine economic diversification and harm community health, as illustrated by Peru, where over 1,000 polluted sites have been identified and state responses have been widely criticized.[82]

Figure 7 shows how major oil and gas companies perform on the World Benchmarking Alliance's (WBA's) 2023 just transition assessment. The score, measured on a 20-point scale, reflects how well each company integrates just transition principles into its business practices, including commitments to social dialogue, worker protection, reskilling, community impacts and responsible lobbying. It shows that NOCs tend to lag behind private companies in addressing these social aspects, with many scoring zero and very few exceeding even the 2-point mark. While private firms generally perform better, no company in the sector scores above 10, indicating a systemic weakness.

Yet, for NOCs, social expectations about their role in local development and in any possible transition plans tend to be more significant than for private firms. NOCs, which have often emerged from processes of decolonization and nationalization, are widely seen as symbols of national development, sovereignty and modernization, and in producing regions they have often played an outsize role in the relative absence of the state. Deeply rooted social expectations influence resistance to or acceptance of change, meaning that just transitions must address social assumptions as much as economic indicators.

78 *Proceso*, "Impago de Pemex a proveedores arrastra la economía de Tabasco y Campeche," 4 September 2025, www.proceso.com.mx/nacional/2025/9/4/impago-de-pemex-proveedores-arrastra-economia-de-tabasco-campeche-358148.html.
79 Ecopetrol, "Proyectos Obras por Impuestos Ecopetrol 2023–2024" (2024), files.ecopetrol.com.co/web/esp/proyectos-obras-por-impuestos-ecopetrol2023-2024.pdf.
80 Transparencia Venezuela, "Proyecto 17784," transparenciave.org/project/17784, accessed January 2026
81 A.C. González-Espinosa and R. Bailey, *A Just Energy Transition in Six Oil-Producing Regions: Bringing Local Priorities to Global Climate Action—Colombia, Ghana, Mexico, Nigeria, Peru and Tunisia* (NRGI, 2025), resourcegovernance.org/sites/default/files/2025-11/Just-Energy-Transition-in-Six-Oil-Producing-Regions.pdf.
82 J. Hurtado,"Petroperú operará Lote 192 sin que se haya remediado sitios contaminados," *Ojo Público*, 12 March 2023, ojo-publico.com/ambiente/territorio-amazonas/petroperu-operara-lote-192-sin-que-se-haya-remediado-sitios-contaminados.

Figure 7. Company performance on just transition: WBA 2023 benchmark scores[83]



While most NOCs still lack formal just transition plans, some have begun to integrate elements of social justice, worker retraining and low-carbon investment into their broader energy transition strategies.

83 World Benchmarking Alliance, *Climate and Energy Benchmark in the Oil and Gas Sector: Methodology Report 2023*, assets.worldbenchmarkingalliance.org/app/uploads/2023/11/WBA-Oil-Gas-Methodology-2023.pdf.

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Key dimensions of NOCs' contribution to just transition

NOCs can play a key role in a just transition by i) recognizing the rights of affected communities and addressing needs related to protection, compensation and due diligence; ii) grounding the transition in open and democratic processes through multi-stakeholder dialogue, with meaningful participation of marginalized groups such as women, youth and Indigenous peoples; and iii) translating these commitments

into tangible outcomes in terms of sustainable development and well-being at both national and subnational levels. This could include improved access to energy, decent employment opportunities and a fair distribution of benefits.[84] These three general principles are widely attached to the definition of just transition, and NOCs should use them to guide their strategies and plans. More specifically and as a possible way to materialize these principles, there are at least five strategies through which NOCs can contribute to a just transition – Table 6.

84 A,C. González-Espinosa, D. Borja and J. Peña-Niño, *People-Powered Energy Transitions in Resource-Rich Countries* (NRGI, 2025).

Table 6. Five potential just transition strategies for NOCs

Just transition strategy	Example
1. Labor transition, reskilling and social protection measures Transformation strategies must incorporate proactive labor transition planning. This includes mapping workforce profiles, setting timelines for phased downsizing, and designing training and reskilling programs that equip workers for emerging sectors, with deliberate inclusion of women and youth. This also requires the definition of social protection measures. Severance, pension portability and unemployment support must be guaranteed to workers affected by restructuring. In some cases, income-replacement schemes or job guarantees in public infrastructure or green economy programs can cushion short- to medium-term impacts. In partnership with national and local authorities, NOCs should consider the needs of vulnerable communities associated with indirect jobs or the informal economy linked to the industry.	In 2025, Petronas launched its Energy Transition Academy (P-ETA) to upskill employees and partners for low-carbon energy.[85] P-ETA offers training in hydrogen, carbon capture, renewables and other clean tech to prepare Malaysia's oil workforce for green jobs.[86] Although not directly part of the NOC transformation process, when Petronas announced a strategic workforce reduction in 2025, it also introduced a "transition programme" offering severance packages, career coaching, emotional support and retraining opportunities for affected staff.[87]
2. Subnational economic diversification When NOCs dominate employment or revenue generation in specific regions, long-term planning, public–private partnerships and targeted investment are needed to create new economic anchors. An important contribution to a just transition is for NOCs to clearly communicate their timelines and exit plans, while using their strong ties with local governments and communities to support local planning processes. They can also leverage their mandatory and voluntary social investments to channel resources toward alternative sectors that can replace the economic weight of oil and gas activities, coordinate with public banks or transition funds to finance local projects, participate in identifying options to repurpose existing infrastructure, and contribute to more transparent and effective decision-making on the use of oil and gas royalties.	In May 2025, Petrobras published new social metrics to guide its just energy transition efforts. One concrete initiative is Autonomia e Renda, a BRL 350 million program (2024–2027) designed to train 20,000 vulnerable Brazilians—particularly women, minorities and people with disabilities—living near Petrobras facilities for jobs in the energy and related sectors. Over 1,000 participants have already begun training, and the company encourages its contractors to hire program graduates.[88] In 2023, Ecopetrol announced social investment in more than 1,000 initiatives in different municipalities with a focus on education, diversification of local economies and access to energy, as part of its support for transition plans.[89]

85 Petronas, "Petronas Energy Transition Academy Launches to Support Just and Responsible Energy Transition," February 2025, www.petronas.com/media/news-releases/petronas-energy-transition-academy-launches-support-just-and-responsible-transition
86 Petronas, "Petronas Implements Workforce Transition Program as Part of Strategic Review," January 2025, www.petronas.com/media/news-releases/petronas-implements-workforce-transition-program-strategic-review.
87 Petronas, "Petronas Prioritises Employees' Welfare Amid Strategic Workforce Rightsizing," 19 March 2021, www.petronas.com/media/media-releases/petronas-prioritises-employees-welfare-amid-strategic-workforce-rightsizing.
88 Petrobras, "Programa Autonomia e Renda Petrobras: Uma oportunidade mais que significativa para milhares de pessoas que buscam uma formação profissional, e melhor ainda, gratuita," petrobras.com.br/quem-somos/autonomia-e-renda, accessed September 2025.
89 *La República*, "Ecopetrol hará inversión social de $767.000 millones para apoyar transición energética," 23 October 2023, www.larepublica.co/economia/ecopetrol-hara-inversion-social-de-767-000-millones-para-apoyar-transicion-energetica-3689449.

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3. Environmental justice and site remediation Related to the responsible exit principles presented below, legacy pollution and degraded sites can pose long-term risks to community health and land use. It is essential to both address outstanding legacy pollution and ensure that currently operating projects have adequate financing available for decommissioning in advance. Decommissioning planning and execution should be coordinated with environmental justice principles, ensuring cleanup and land restoration to enable new forms of economic activity in such locations.	A relevant example is PetroSA's (South Africa) aging Mossel Bay refinery, which depends on depleting gas fields and is now being considered for redevelopment as a green hydrogen and powerfuels hub. Experts note that repurposing and decommissioning the site for clean energy use could address environmental remediation needs while supporting local economic revitalization.[90]
4. Transparency and community engagement NOCs that decide to buy, sell or retire operations require purposeful engagement with political actors, trade unions and civil society to explain why these decisions serve national interests and development goals. This includes transparent communication about timing, labor impacts and the balance of public costs and benefits. Communities that depend on NOC operations should be directly involved in shaping transition plans. As NRGI's *People-Powered Energy Transitions* report emphasizes, participation and recognition are central to procedural justice in resource-dependent economies. Meaningful engagement through consultation mechanisms, free, prior, and informed consent, or participatory planning helps ensure that transitions reflect local priorities and strengthen legitimacy. When communities co-design the future of local economies, they are more likely to support diversification and to participate in more equitable outcomes.[91]	This need is even greater when the NOC itself faces closure. The case of Jamaica's attempted closure of the Petroleum Corporation of Jamaica (PCJ) illustrates the risks of failing to do so: the government's sudden announcement in 2019, without prior consultation or clear transition planning, triggered a public backlash, political opposition and confusion about the fate of key subsidiaries like Petrojam.[92] As a result, the closure process stalled, and PCJ remains legally active years later, highlighting how inadequate stakeholder engagement can undermine legitimacy and delay institutional reforms.
5. Institutional coordination Just transition planning requires coordinated action across multiple institutions. NOCs need to ensure they link with local authorities and with ministries of energy, labor, environment and finance to align economic, social and environmental goals. Establishing inter-ministerial task forces or permanent multi-stakeholder platforms can help overcome fragmented governance and ensure that transitions are not driven by one sector/actor alone. Public investment banks, green funds and development agencies can play a catalytic role by financing local transition projects and integrating social objectives into investment criteria.	A corporate–state coordination example is Colombia, where Ecopetrol has formalized joint transition-oriented innovation programming with the Ministry of Science MinCiencias) and the Ministry of Mines and Energy (MinEnergía), including co-structured competitive calls and multi-year funding for technology solutions aligned with decarbonization and the energy transition. More recently, Ecopetrol repositioned its flagship R&D complex as the Instituto Colombiano del Petróleo y Energías de la Transición, signaling an institutional bridge between national energy policy priorities and applied technological capability-building.

90 T. Creamer, "Green Hydrogen and Powerfuels Could Revive Ailing PetroSA, Unlock Green Steel," *Engineering News*, 9 February 2021, www.engineeringnews.co.za/article/green-hydrogen-and-powerfuels-could-revive-ailing-petrosa-unlock-green-steel-2021-02-09.

91 González-Espinosa, Borja and Peña-Niño, *People-Powered Energy Transitions in Resource-Rich Countries*.

92 *Jamaica Observer,* "PCJ to Be Wound Up by March 31," 30 January 2020, www.jamaicaobserver.com/2020/01/30/pcj-to-be-wound-up-by-march-31.

Responsible exit

The idea of "responsible exit" refers to ensuring that any reduction in oil and gas activity, whether through divestment or end-of-life wind-down of assets, protects public value and avoids transferring environmental, financial or social liabilities to the state or to vulnerable communities.

- **When NOCs sell fossil fuel assets**. In these cases, the risk is that environmental and decommissioning obligations are transferred to buyers that lack the financial or technical capacity to manage them.
- **When NOCs acquire assets that IOCs sell**. There is an increasing trend for NOCs to acquire assets from private international oil and gas companies, which can expose countries to new liabilities and transition risks if the acquired assets are high-cost, high-carbon or near end of life.
- **When NOCs decide to wind down an asset**. Decommissioning occurs when the project is no longer generating revenues. Without advance planning, there is a risk that the asset owner will have insufficient funds for a proper decommissioning process at the end of the project life.[93] These risks are heightened where the regulatory framework on financial security for decommissioning costs is not robust.[94]

NOC acquisition, divestment and wind-down strategies require consideration of the costs of environmental and social liabilities associated with the projects, including legacy pollution, community development programs, and the costs of eventually decommissioning these projects—for example, sealing wells, dismantling infrastructure and removing contaminants.

NRGI and Carbon Tracker have outlined several "Responsible Exit Principles" that, although designed for oil and gas companies in general, offer a useful foundation for NOCs that are divesting from fossil assets or acquiring those divested by others.[95]

These principles help frame the instruments and safeguards that need to be in place for a successful and equitable process. They also provide considerations for legal reform where existing laws and regulations do not adequately address these safeguards:

- **Decommissioning obligations in asset transfers**. Ensure that NOC asset sales or acquisitions include legally binding clauses in the sale and purchase agreement to ensure decommissioning obligations are valued, disclosed, fully funded upfront and fulfilled at the end of the project life—for example, via establishment of a fully funded decommissioning fund before transfer in the form of a dedicated escrow account or trust fund (where such a fund does not already exist or has insufficient funding to cover full estimated decommissioning costs).
- **Counterparty and buyer capacity assessment**. Before any divestment, NOCs should rigorously verify that acquiring firms have the financial capacity and operational standards to manage both production and decommissioning and should disclose the results of this due diligence, preventing lower-standard operators from inheriting critical assets.
- **Transparency**. NOCs should make adequate disclosures on their acquisition or divestment to ensure the public understands how asset transfers fit into their broader transition or transformation plans. They should ensure transparency with respect to particular asset transfers including how decommissioning funding, pending environmental obligations and outstanding community development obligations have been addressed in the sale and purchase agreement to avoid negative impacts on affected communities.
- **Engagement**. NOCs should ensure that they, and their counterparty to the asset transfer, engage with relevant stakeholders—for example, local government, workers and affected communities—before the transfer to minimize negative impacts on these stakeholders after transfer.

93 For example, based on a long-term assessment, BNP Paribas estimates that oil, gas and mining companies have a 30% probability of experiencing shortfalls of available free cash flows to meet decommissioning payments: BNP Paribas Asset Management, *The USD 586 Billion Clean-Up Bill: How Decommissioning Liabilities Threaten Corporate Balance Sheets* (2025).

94 See Woodroffe, *Responsible Change*, pp. 34–36.

95 NRGI, *Responsible Exit Principles for Oil and Gas Companies* (2023), resourcegovernance.org/publications/responsible-exit-principles-oil-and-gas-companies.

Guiding questions

Rather than prescribing a single model for NOC transformation, this report aims to help governments, NOC leaders and advocates identify and navigate key tensions—between short-term fiscal stability and long-term diversification, between political oversight and operational autonomy, and between industrial ambition and social responsibility.

Transforming NOCs is not a purely technical exercise but a political and social process that demands dialogue, adaptation and realism. Across the five steps, several common themes emerge. First, effective transformation begins with a realistic appraisal of exposure to transition risks and the genuine scope for new opportunities. Second, it requires a clear vision of how to balance financial prudence with industrial transformation—deciding when to reinvest within the company and when to reallocate resources to the broader economy. Third, institutions matter: the quality of governance, coordination and public accountability will determine whether transformation pathways can be sustained. Fourth, legitimacy is central. Energy transitions that neglect workers, citizens and communities risk losing both political and social foundations.

Below, we present guiding questions that emerge from the five steps outlined in this briefing.

1 Setting national-level policy goals

Defining the NOC's long-term role within national development and transition strategies is a technical and political task. Setting clear, durable goals provides direction amid uncertainty, clarifying how the NOC should evolve, what public value it is expected to deliver and how success will be measured. Effective goal setting should be an iterative and inclusive process that connects political vision with institutional practice. It requires balancing two imperatives: giving the NOC a clear mandate that aligns with national development, climate and industrial strategies, while avoiding micromanaging its operations. Embedding transformation objectives in policy frameworks, performance contracts and ownership directives can help maintain continuity across political cycles, ensuring that the NOC's evolution remains guided by long-term national interests rather than short-term political pressures.

Guiding questions:

- What are the government's objectives for the NOC in an energy transition context, including around protecting public revenues, supporting energy security, contributing to industrial development or preparing for a gradual exit from fossil fuels?
- What institutional body is best placed to coordinate goal setting and monitor the NOC's transformation performance?
- How can the state balance its strategic direction over the NOC's transformation with appropriate managerial autonomy and minimal political interference?
- How can transformation goals be protected from short-term political shifts while remaining transparent and democratically accountable?

2 Assessing transition risks and new business opportunities

Understanding risk is less about predicting the future than about preparing for multiple possible futures. For governments and NOCs, this should be a process of stress-testing strategies—examining how different demand, price and policy scenarios could affect revenues, investments and national finances. At the same time, assessing opportunity is about recognizing where the NOC's existing capabilities, infrastructure and partnerships may retain or create value in the future. Mapping these advantages helps distinguish between activities that should be preserved and those that may need to be phased out. Taken together, risk and opportunity assessments form the foundation for all subsequent decisions.

Guiding questions:

Assessing transition risk

- How exposed are the NOC and the national economy to declining oil and gas demand under various energy transition scenarios?
- How do transition risks differ between oil and gas portfolios, and how do these risks materialize at the level of individual projects and investment decisions?
- What downside level is tolerable for the NOC and the state's finances?
- Has the NOC taken all viable measures to reduce operational emissions, and how do remaining emissions affect its exposure to regulatory, market and financing risks?
- What energy-security roles does the NOC play, and how may these shape investment choices?

Assessing new business opportunities

- Does the NOC have the managerial and financial capacity to run legacy operations while developing new businesses?
- Is there a time-sensitive opportunity to realistically establish an early-mover advantage in emerging industries or technologies?
- Are there state-led policies—such as industrial, energy, climate, fiscal or financing policies—that could facilitate or constrain the NOC's transformation pathway, including the development of new business areas?

3 Defining the strategic direction and business focus

Determining how far and fast an NOC should transform should be a central aspect of the debate. Viewing it as a dynamic process—rather than a fixed destination—can allow governments and NOCs to situate where they stand today, anticipate turning points and adjust course as conditions evolve. Different pathways imply a distinct balance between financial stability and long-term structural change. A central challenge lies in how to allocate limited capital, when to reinvest within the NOC, and when to redirect resources to broader national goals.

Selecting the right sectors for diversification is a strategic decision that requires linking ambition to feasibility. Identifying activities where the NOC can credibly compete or contribute to national goals requires a sober assessment of where the company can redeploy its existing strengths and where other public or private actors may be better suited to lead. Experience shows that building on existing capabilities often provides a balanced path between risk and opportunity. Yet transformation also depends on coordination across the wider state and industrial landscape. Ensuring that the NOC's evolving role complements, rather than substitutes for, other national institutions can help maximize collective impact while preventing inefficiency or duplication.

Guiding questions:

- What is the appropriate balance between divesting from oil and gas assets and investing in new sectors to ensure a sustainable transformation process?
- Would investing inside or outside the NOC deliver higher returns for national development?
- What proportion of NOC profits (beyond existing tax and royalty obligations) can be redirected toward national development goals without undermining the NOC's operational efficiency?
- Which NOC capabilities from upstream and downstream activities are transferable to other industrial sectors?
- In which sectors or technologies does the NOC hold genuine comparative advantages?
- In which prospective sectors might other state-owned enterprises or private actors be better placed to lead, and how can the NOC complement rather than duplicate their roles?
- What are the risks of the NOC moving beyond oil and gas into less familiar sectors, and what measures could reduce the risks of strategic and institutional overstretch?

4 Preparing the institutional setup and ensuring strong governance

The right institutional arrangements often determine whether transformation strategies stay on paper or become reality. As the NOC's role changes, its governance structures, reporting lines and coordination mechanisms must adapt accordingly. Decision-makers need to consider how to adjust these institutions over time to maintain coherence between public ownership, strategic direction and operational efficiency. Experience shows that transformation efforts are more likely to succeed when mandates are clear, oversight is consistent, and decision-making is insulated from short-term political pressures. Transparent accounting, clear profit-allocation

rules and balanced managerial autonomy are essential foundations for public trust and effective implementation.

Guiding questions:

- How should institutional roles, mandates and coordination mechanisms be designed when NOCs and other state-owned enterprises (such as power companies) operate in overlapping sectors, to reduce duplication and align objectives?
- How do existing regulatory and ownership frameworks—including unbundling requirements—shape the NOC's diversification options, and under what conditions should these frameworks be revised to support strategic goals without undermining competition or accountability?
- What ownership and governance structures (e.g., stand-alone NOC versus inclusion within a state holding company) are best suited to the chosen transformation pathway, and why?
- How should governance, oversight and incentive structures be adapted to maintain operational efficiency as the NOC diversifies or manages decline?
- What institutional arrangements should governments use to collect, allocate and oversee NOC profits in order to balance fiscal stability, accountability and transformation objectives?

5 Ensuring a just transition and responsible exit

Managing the transformation of NOCs—whether this involves diversification, restructuring or a gradual wind-down—requires more than technical or financial adjustments. It calls for foresight and legitimacy in addressing the financial, environmental and social dimensions of change. When governance, transparency or stakeholder engagement are overlooked, transformation processes risk losing public trust and facing institutional setbacks.

Embedding principles of justice and accountability throughout the process can help ensure stability and credibility as the NOC's role evolves.

Guiding questions:

- How can governments and NOCs ensure that any asset transfer, acquisition or retirement is managed responsibly and transparently, ensuring that all parties meet their decommissioning, environmental and social obligations?
- What mechanisms can promote early and meaningful engagement with workers, trade unions, communities and other stakeholders affected by the transformation process?
- What programs are needed to retrain and reskill workers whose jobs are affected by the chosen transformation pathway?
- What policies could help diversify local economies and address governance or institutional gaps that may emerge as the NOC's role changes?
- When a wind-down of operations is pursued, how can governments communicate the rationale in a way that builds public legitimacy?

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Acknowledgements

The authors thank Amir Shafaie, Aaron Sayne, Sam Bhutia, Gabriela Flores and Alex Malmqvist of NRGI, and other colleagues in NRGI's fundraising, finance, and human resources teams. We also thank David Tennant-Eyles and Miles Litvinoff for their support in editing and designing this report, and Valérie Marcel (Chatham House) and Nicolas Lippolis (Centre for Energy, Finance and Development) for their comments on drafts of this paper.

About NRGI

The Natural Resource Governance Institute is an independent, non-profit organization that supports informed, inclusive decision-making about natural resources and the energy transition. We partner with reformers in government and civil society to design and implement just policies based on evidence and the priorities of citizens in resource-rich developing countries.
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