National Oil Company Database
Methodology Guide
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I. Introduction

The Natural Resource Governance Institute (NRGI) National Oil Company Database is designed to advance public knowledge of state-owned oil companies around the world. National oil companies (NOCs) frequently play a crucial role in petroleum-producing economies and are often tasked with a country's resource development as well as significant responsibilities for generating fiscal revenues. NOCs' control of large portions of the world's petroleum resources over recent decades provides them with huge influence in the global oil and gas industry. As NOCs have become major players on a national and international level, there is greater interest among industry stakeholders, policy makers and civil society to scrutinize these firms and assess their performance. However, most NOC analysts face severe information-gathering challenges in this endeavor, which NRGI aims to help address with the National Oil Company Database.

The database assembles information from public reporting on 71 NOCs, headquartered in 61 countries, from 2011 to 2019.[1] We interpreted this information and incorporated it into the database via a standard methodology and set of definitions designed to increase the comparability of information across countries, companies and years. In addition to the data on NOCs themselves, the database also provides contextual data on the home countries of each NOC, including on oil and gas production, gross domestic product (GDP), government revenue and government spending. The database is the most comprehensive, freely available public dataset of its kind on NOCs.

This paper details the methodology that NRGI employed in order to construct the database. NRGI created the database in the pursuit of three major objectives:

Benchmarking

Despite the major roles that NOCs play in their oil sectors and in the national and global economies, the government and citizen shareholders of most NOCs have traditionally lacked the means to systematically assess how well these companies are performing or managing public assets. NOCs often play a mix of commercial and non-commercial roles, and this can complicate efforts to assess company performance. Many governments also lack strong metrics that can help put company statistics into context. Further, significant variation in reporting practices, accounting standards and data availability makes meaningful performance benchmarking of NOCs an inherently challenging task. For these reasons, and despite a substantial body of literature covering theoretical considerations of NOC performance, there have been few attempts to collect comparative data on NOCs to facilitate systematic benchmarking.[2,3]

Thus, one of the main objectives behind the creation of this database was to fill this gap of a larger, global and current NOC database that allows analysts to go beyond the usual case-by-case analysis. By amassing extensive data across companies and years, we seek to help users see how one NOC's operational and economic data over time compares against its peer companies. Despite ongoing challenges associated with cross-cutting comparison (discussed in detail below), the database is a powerful tool that can support comparative benchmarking.

Increasing international knowledge

The database also seeks to facilitate cross-country research on how NOCs behave and what kinds of government and company policies tend to be associated with various outcomes. The database is a valuable tool for efforts to analyze NOCs on a range of factors, in order to enrich global literature on the governance and economic impacts of these influential

[1] See Appendix for a list of companies in the database.

[2] Valerie Marcel. *Oil Titans* (Brookings Institution Press, 2006); Silvana Tordo, Brandon S. Tracy and Noora Arfaa. *National Oil Companies and Value Creation* (World Bank, 2011); Christian Wolf. "Does Ownership Matter? The Performance and Efficiency of State Oil vs. Private Oil," *Energy Policy* 37 (2009), 2642 – 52; Stacey L. Eller, Peter R. Hartley and Kenneth B. Medlock III. "Empirical Evidence on the Operational Efficiency of National Oil Companies," *Empirical Economics* 40 (2010), 623 – 643; David G. Victor, David R. Hults and Mark Thurber, eds. *Oil and Governance: State-Owned Enterprises and the World Oil Supply* (Cambridge University Press, 2012).

[3] Most datasets underlying existing empirical studies are either (a) outdated, (b) focus on one region or (c) focus on the comparison with private international firms. We purposefully deviate from existing studies that focus primarily on comparing NOCs to their private international counterparts, and intend to provide data that allows inter-NOC comparison.

companies. We aim to help deepen the analysis of NOCs in global public finance literature, given the very large portions of government revenues that flow through them in many producing countries.

Promoting transparency

Many NOCs have traditionally been opaque, with little incentive from their governments to disclose systematic information on their operations, finances or performance. This project seeks to bolster NOC transparency, by illustrating the gaps in disclosure among various NOCs and demonstrating the power of public reporting to inform policy-making and benchmarking. The database seeks to inform international reporting systems and transparency advocacy campaigns, including by pinpointing the kinds of company disclosures – both their content and form – that are most valuable for comparison and analysis.

The paper provides users of the database with an understanding of the decisions made by NRGI in designing the database, the definitions of indicators and peer groups, our approach to mitigating various data challenges and the limitations of the data. NRGI has also published *The National Oil Company Database* (an overview report on the database and its major implications), *Massive and Misunderstood: Data-Driven Insights into National Oil Companies* (an in-depth analysis drawing cross-cutting findings from the data), and *How to Use Guide*, which provides practical tips on using www.nationaloilcompanydata.org.

II. Research process

A. SOURCES

The data on the exploration and production, revenues, expenditures, transfers to the state and performance of specific NOCs is drawn exclusively from official NOC and government sources. The most common sources of information for most companies in the database are company annual reports and financial statements. We supplemented these data with information from other government reports, including filings by ministries of oil, energy and finance and reports published as part of the Extractive Industries Transparency Initiative (EITI). EITI member countries have to publish information on the revenues, payments, ownership interests and quasi-fiscal expenditures of their state-owned enterprises.[4]

In a small number of cases, information on an NOC is available both in company-published annual or financial reports and EITI reports. Our approach to data in these cases depends on the amount of information available in the company's financial reporting. In instances in which the company's own financial reporting is extensive – particularly when the company publishes comprehensive financial information in a consolidated financial statement – we use this reporting, instead of the EITI reports, as our data source. Examples in this group are Norway's Equinor and Azerbaijan's SOCAR. In other instances, however, the information in the company's own reporting is relatively sparse and provides some useful data, but either only covers a small number of years or does not provide a comprehensive picture of the years covered. Since EITI reports and company financial statements tend to be developed according to different accounting principles that would have rendered a combination of data between the two sources difficult, in these cases we maintain two separate data profiles for the company. The companies that fall into this category are Cameroon's Société Nationale des Hydrocarbures (SNH), Cote d'Ivoire's Petroci, Ghana's Ghana National Petroleum Corporation (GNPC), Liberia's NOCAL, Mozambique's Empresa Nacional de Hidrocarbonetos (ENH) and Nigeria's Nigeria National Petroleum Corporation (NNPC).

In addition to the data on the NOCs themselves, the database also includes a number of indicators on "country context," reflecting national data on the oil sector and broader economy (e.g., expressing NOC revenues as a share of total government revenue or government spending). These indicators draw from public datasets generated by the International Monetary Fund (IMF), World Bank, International Centre for Tax and Development, and other sources. See Section V, below for a list of these indicators.

When we launched the database in early 2019, it included data covering the years 2011 to 2017 and included all information that we were able to find from company and government reports published through September 30, 2018. Reports published after that date were not included in the initial published version of the database.[5] As more data is published, we add it to the database. As of the update of December 2020, the database covers the years 2011 – 2019.

B. SELECTION OF INDICATORS

Our decisions about what indicators to collect drew upon several sources. As a starting point for measuring financial and operational performance, we built on existing research on NOC performance, notably from Stevens (on performance), Hartley and Medlock, Tordo (on state ownership levels, project costs and profitability), Victor (on NOC employment and efficiency), Manley et. al. (on NOC utilization of public assets), Megginson and Netter (on financial returns among SOEs)

[4] In one case, Ghana, we use data not from the statutorily-mandated Public Interest and Accountability Committee (PIAC) instead of data from EITI reports. PIAC produces reports that, in the vein of EITI, provide detailed information on the flows of revenues between international oil companies, the NOC and state coffers. We opted to include PIAC reporting because it provides more extensive data than what is included in Ghana's EITI reports.

[5] There is one exception to our cut-off of reports issued after September 30, 2018. On April 1, 2019, Saudi Aramco released an investor prospectus including consolidated financial statements covering the years 2016, 2017 and 2018. Because of the size and influence of Saudi Aramco, and the complete absence of any financial data from the company before the release of the prospectus, we opted to include figures derived from it in the database.

and Wolf (on various efficiency measurements).[6] In addition, we included a set of key performance indicators (KPIs) commonly used by industry experts and investors to assess private-sector upstream oil companies.

Our measurements on the management of oil revenues build on methods identified in previous work by NRGI and reflected in the approach adopted in the EITI, which emphasizes measuring flows of funds between the state and its state-owned enterprises.[7] They also reflect the wider literature on tax mechanisms and equitable taxation in the oil and gas sector.[8] We measured the various fiscal mechanisms (including royalties, income taxes, dividends and others) by which each NOC transfers revenues to the state, but also kept track of the total transfers to the state by each company (and vice-versa, in cases in which the state makes budgetary allocations to the company), which reflect the bottom line of state-NOC relations. We measured revenues, expenditures, transfers to government, cash flows and balance sheet indicators. All financial items are included in both local currency and US dollar terms.

Amidst a wide variety of company accounting standards and definitions we developed a standard set of definitions in order to maximize comparability across NOCs. In many cases this required consulting the detailed notes attached to company and government reports and aggregating or disaggregating company data in order to make it consistent with the database project definition. In addition, some indicators in the database are calculated by combining indicators to generate a total or percentage.

Section V, below, provides a comprehensive list of indicators and their definitions. We grouped indicators into 11 indicator groups:

- Exploration and production
- Revenues
- Transfers to government
- Expenditures
- Cash flows
- Balance sheet
- Operational performance
- Financial performance
- NOC data in context
- Reporting questions
- Country variables

C. DEFINITION AND SELECTION OF NOCS

[6] Paul Stevens. *A Methodology for Assessing the Performance of National Oil Companies* (World Bank, 2008); Peter Hartley and Kenneth B. Medlock III. "A model of the operation and development of a national oil company." *Energy Economics* 30.5 (2008), 2459-2485; Tordo et. al., *National Oil Companies and Value Creation*; Nadeja Victor. *On Measuring the Performance of National Oil Companies – Program on Energy and Sustainable Development Working Paper 64* (Stanford University Program on Energy and Sustainable Development, 2007); David Manley, James Cust and Georgia Cecchinato. *"Stranded Nations?" The Climate Policy Implications for Fossil-Fuel-Rich Developing Countries – Oxcarre Policy Paper 34* (Oxford Centre for the Analysis of Resource Rich Economies, 2016); William L. Megginson and Jeffrey M. Netter. "From State to Market: A Survey of Empirical Studies on Privatization," *Journal of Finance 49* (2001), 403 – 52; Wolf, "Does Ownership Matter?"

[7] See, e.g., Patrick R.P. Heller, Paasha Mahdavi and Johannes Schreuder. *Reforming National Oil Companies: Nine Recommendations* (Natural Resource Governance Institute, 2014); Alexandra Gillies, Marc Guéniat and Lorenz Kummer. *Big Spenders: Swiss Traders, African Oil and the Risks of Opacity* (Natural Resource Governance Institute, 2014); Extractive Industries Transparency Initiative, *The EITI Standard 2016* (EITI International Secretariat, 2016).

[8] See, e.g., Robin Boadway and Michael Keen. "Theoretical Perspectives on Resource Tax Design," in *Taxation of Petroleum and Minerals: Principles, Problems and Practice*, eds. Philip Daniel, Michael Keen and Charles McPherson (Routledge/International Monetary Fund, 2010), 13 – 74; Sebastian Beer and Jan Loeprick. "Taxing Income in the Oil and Gas Sector – Challenges of International and Domestic Profit Shifting," *Energy Economics 61* (2017), 186 – 198.

NOCs have been broadly defined as "*oil companies operating in some part of the petroleum value chain owned and controlled by government.*"[9] In our research, we further specified this definition along two characteristics:

1. **State ownership and control**. The state has a *majority ownership* stake and/or a "golden share" that gives it effective control over decision-making; and (b) the entity is defined by national legislation and/or national practice as an enterprise. Our definition of an NOC is thus in line with the OECD's definition of a state-owned enterprise (SOE).[10] Our definition is deliberately inclusive, incorporating companies that range from 100% state-owned to mixed-ownership and with a range of different tasks and mandates.

2. **(Upstream) oil company**. The company is involved in *upstream activities* related to the exploration, production, processing and regulation of oil and gas. Notably, this does not necessarily mean that an NOC has already taken on an operatorship role. In other words, it has not necessarily developed the capability to serve as the technical lead on development and production from a well or a field. Our sample also includes some NOCs that only have an oversight/regulatory role in the upstream (in several cases this is because the country is not yet producing oil or gas). While our sample includes many companies that conduct both upstream and downstream activities, we did not include companies with a purely downstream mandate. For instances in which NOCs are structured as holding entities with several subsidiaries devoted to activities that go beyond the core oil and gas business, we selected the parent/group level as the unit of analysis. Collecting data only for the group and not for individual subsidiaries has its shortcomings, as different individual subsidiaries play a variety of roles and mandates, which poses a challenge for comparison. We also use the colloquial term of "national oil company" even for companies whose primary business is natural gas rather than liquid petroleum.

The set of 71 NOCs included in the database as of December 2020 launch can be find in the Appendix. The set contains NOCs from three broad categories:

- *The 52 NOCs included in NRGI's 2017 Resource Governance Index (RGI)*.[11] This sample includes many of the biggest NOCs in the world, as well as companies of major regional and national significance.
- *Large NOCs excluded from the RGI because that index only covers one NOC per country.* We included additional NOCs from China, Ecuador, Russia and the United Arab Emirates that are important to their national economies or global oil markets but were not included in the *RGI*.
- *NOCs representing specific sub-groupings valuable for comparative purposes.* A final group of companies is included because they provide points of comparison for particular sub-groupings of NOCs (e.g., Suriname's Staatsolie which has steadily produced oil in small volumes and Liberia's NOCAL which is one of a number of NOCs based in a country that is not yet producing oil).

Our sample of 71 NOCs is not a complete list of all NOCs in the world. It is, however, the most comprehensive grouping in existence for NOC public data dissemination of this kind.

Table 1: Overview of NOCs in database per region

Total NOCs	Asia-Pacific	Eurasia	Latin America/ Caribbean	Middle East/ North Africa	Sub-Saharan Africa	Western Europe
71	16	6	13	17	17	2

The database contains a diversity of NOCs, with significant variance among companies along several lines:

[9] Paul Stevens. *National Oil Companies: Good or Bad? A Literature Survey* (Draft presented at World Bank National Oil Companies Workshop, Washngton, DC, May 27, 2003).
[10] Organization for Economic Cooperation and Development, *Guidelines on Corporate Governance of State-Owned Enterprises – 2015 Edition* (OECD, 2015), 14 – 15.
[11] For a list of these 52 companies, see http://resourcegovernanceindex.org/data/oil-gas/issue?category=1&region=global&subcategory=4.

- **Size.** Companies range from global giants to tiny new companies. NOCs in the sample vary significantly according to the size of their production, assets and revenues, among others.
- **Region***.* Companies in the database are headquartered across the globe.
- **Domestic versus international nature of operations.** Some of the companies in the sample produce oil and gas exclusively or overwhelmingly within their home jurisdiction. Others operate overseas as well, producing oil and managing projects in countries all over the world.
- **Activities.** Some NOCs are "operators" for large shares of their production, meaning that that the NOC either runs the oilfield exclusively or is the lead company responsible for managing the finances and the operations of a project with partners. Other companies take a more passive role in commercial activities, restricting their upstream activities to selling oil that the companies receive via minority equity stakes or assume non-operating roles representing the state in production-sharing contracts.
- **Role in the national economy.** Different NOCs have different primary value drivers. Some are called upon to maximize the short-term fiscal return delivered to the state. Others prioritize long-term commercial success, growth and improvements in efficiency. Others have a broader national mandate to furnish infrastructure, energy or other services to the broader population.
- **Reporting status.** Some of the data in the database derives from reports audited by independent auditors according to international standards. Other data derives from reports that were not subject to independent audits.

Given the variety of companies in the sample, it is important to compare similar sets of companies as much as possible. In order to facilitate these comparisons, the database contains four filters that allows users to separate companies into peer groups. The filter definitions are discussed in detail in Section III.d.

III. Data gathering and interpretation decisions

NRGI standardized its approach to data collection and interpretation. The key decisions that we made included the following:

- **Currency conversion.** The database records data both in the national currency of the home country and in U.S. dollars. In most cases, the original company/government source reports are denominated in local currency units (LCU), so we recorded the data in those units and converted to U.S. dollars using the average annual exchange for the data year, from the World Bank's World Development Indicators. When the company or government reported data in U.S. dollars, we recorded data in dollars and converted back to the LCU.
- **Oil and gas unit conversion.** We recorded production and reserves figures in barrels of oil equivalent (boe) as a common unit, and conversion calculations were conducted if applicable. For converting between barrels of and other units (including, e.g., tons of oil, cubic feet of gas, cubic meters of gas) we used British Petroleum's published conversion figures.[12]
- **Missing data.** Many companies did not publish data necessary to fill in all database fields. When we were unable to find data sufficient to fill in a data point with confidence that it is consistent with our project methodology, we leave the indicator blank. An indicator for a particular company-year completed with a "0" means that there is a verified zero value, not that the data is missing.
- **Source information.** We provide the source information for the indicators, including page numbers where available. Users interested in seeing the source information can click "download full dataset" on www.nationaloilcompanydata.org. The full dataset also includes our internal research notes which explain the derivation of data when it would not be immediately obvious by consulting the source document alone.
- **Data library.** We have compiled a library of source documents, available at https://www.resourcedata.org/organization/noc-library, which houses copies of the NOC reports, government reports and other documents that served as the principal sources for the National Oil Company Database**.**

[12] Available at: www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of world energy-2017-approximate-conversion-factors.pdf.

IV. Data challenges and mitigation approaches

In this section we discuss the most significant data challenges, NRGI's approach to mitigating them and the implications for users of the database.

A. DATA AVAILABILITY

As has been highlighted by the *Resource Governance Index*, NOC reporting is deeply inconsistent across countries. In order to identify information sources for our database, we began with the reference materials developed as part of the *Resource Governance Index* research process, supplemented by additional online research of NOC and government websites, stock exchange filings, EITI country pages and other sources.[13]

The absence of strong public reporting in many countries leaves significant gaps, including for major companies with an important influence on their national economies and global oil and gas markets. In some cases, a company published no data for us to collect. We opted to leave these companies in the database – with blanks for individual data cells – to highlight the significant gaps in reporting and show the data availability variance across the sample.

Though our research process was thorough, it is also possible that we missed some publicly available data on certain NOCs, especially when that data is published in non-obvious places. We encourage users of the database to contact NRGI at nocdata@resourcegovernance.org and inform us of data sources that we may have missed.

B. DATA RELIABILITY

Since the data on NOC activities and finances in the database derives exclusively from official government sources, it replicates any false or misleading information that a government may report. To mitigate some of the data reliability risks, we included proxy indicators to assess the likelihood of data accuracy. Most significantly, we included indicators related to whether the financial statements were audited by an independent auditor, whether that audit was signed without reservations and whether the data was reported in accordance with International Financial Reporting Standards. Other proxies include whether the company trades shares on a financial market (and therefore subjects itself to market listing requirements on reporting) or files reports in accordance with the EITI. Analysts using the database can filter a data query so that it captures only companies whose reports were subject to independent audit.

C. INCONSISTENT TERMINOLOGY AND ACCOUNTING STANDARDS

NOCs report information to serve different audiences and according to different national traditions and accounting principles. NOCs do not necessarily report according to international standards and even when they do follow core accounting principles, there is significant variation in how data points are reported and categorized across the sample. On the occasion that reports consistent with International Financial Reporting Standards (IFRS) or in the format of 20F filings under the U.S. Security and Exchange Commission reports haven been created in addition to other annual financial reporting, we tended to use the IFRS or 20F reports as the principal data source.

In order to maximize consistency of data and comparability between NOCs, the database follows a standard set of definitions on the calculation method for each indicator. To apply these definitions, we examined all available reporting, including detailed notes in reports to enter data consistently with our methodology. Wherever detailed data is available, we employ a bottom-up methodology that sums individual items from financial reporting to derive the figure listed for each indicator. In some cases, this approach means that our stated value for a data point differs from the stated value for a similarly-titled figure within the source report.

[13] The source materials for the *Resource Governance Index* can be found at https://www.resourcedata.org/organization/rgi. As part of the supplementary research for this project, our research team included researchers proficient in English, French, Spanish, Arabic, Russian and Chinese.

This approach is inherently imperfect, especially as some NOCs and governments do not provide detailed notes in their reporting and we only accessed publicly available financial accounts of NOCs. As such, our data is not designed to replace detailed analysis by in-country public officials and experts focused on the specific benchmarks and accounting standards that are most important within their own national systems. Rather, it is designed to maximize the comparative power of the data to facilitate cross-company analysis.

See Section V for a definition of each indicator in the database. Table 2 provides a summary of major decisions on the calculation of challenging types of data, and the implications for interpretation.

Table 2: Definitional challenges and approach

Issue	Definitional challenge	Database approach and implications
NOC production	Most NOCs report on their "production" without distinguishing between oil and gas produced via projects where the NOC was the operator – meaning that it was in charge of technical and financial decisions on the project – and oil and gas that the NOC acquired and/or sold because it was a non-operating minority equity partner or the state's representative in a production sharing contract.	Our oil and gas production figures reflect the published data from the NOC and/or government on total company production. This measurement mixes together oil that an NOC may record/sell based on several different kinds of arrangements. The database has a separate indicator for oil and gas production on which the NOC is the operator, but as of December 2020 this indicator is blank for many NOCs because the company/government does not report this data.
Treatment of non-tax transfers to the state	NOC fiscal contributions to government come in the form of income taxes, dividends and a range of other "non-tax" fiscal instruments (e.g., royalties). In their reporting, NOCs and governments follow different systems and use different terminology on payments from the NOC to the state. Some NOCs categorize non-tax transfers as operating costs.	Because we are interested in distinguishing between transfers to the state and the companies' commercial operations costs, where information is available, we include non-tax transfers in our "transfers to the treasury" section and net them out of our measures of operating costs and net income. Not all companies record the components of operating income in detail, so it is likely that there are some companies whose data for "operational costs" in our database also include these non-tax transfers. We group the types of fiscal transfers from the NOC to government into five common categories and try to fit NOC payments into a category wherever possible. Where no category applied, we record the transfer as "Other transfers to government."
Expenditure reporting	In most cases, NOC reporting on expenditures does not provide a clear picture of how companies are spending their money. Our initial research template sought to divide both capital and operational expenditures into subcategories that could be easily understood by key stakeholders, including upstream-versus-downstream, core-versus-non-core and business-related-versus-quasi-fiscal spending on behalf of government. This effort proved largely fruitless, as many NOCS did not publish sufficiently disaggregated information on their expenditures, and variety in reporting standards among NOCs that did report disaggregate information was too great to allow for consistent recording in the database. Even the basic categorization of expenditure as capital or operational expenditure was subject to differences in definitions across companies.	The published database does not include expenditure information that has been disaggregated into detailed sub-categories, because the differences in company reporting approaches were too great to allow for meaningful comparison. The database breaks expenditures down into operational expenditures and capital expenditures, following a standardized approach.

Operational efficiency	In order to measure how efficiently NOCs are managing upstream resources, we sought a mechanism for putting various figures on NOC activities and economics into context.	Most of our operational efficiency measurements are constructed on a per-barrel, per-employee or per-reserves basis. These measurements are most meaningful for companies with upstream production at the core of their business. For companies that have broader portfolios encompassing significant downstream or social service provision mandates, or that import and sell oil beyond what they "produce" themselves, these figures can present an incomplete picture. It is thus important to interpret operational efficiency measures in light of the NOC's endowments and mandates, as discussed in Section IV.d, below. It is also important to note that our per-barrel measures of expenditures (both operational and capital) reflect company-wide expenditures. As such, they differ from per-barrel cost measurements by industry analyst groups that build their measurements from projections about individual oil and gas fields, then aggregate upwards to calculate company-wide ratios. Such measures can provide a more precise estimation than ours of specific extraction processes and the costs associated with a company's geological portfolios. Our measurement looks at a company's expenditures as a function of how much oil and gas it produces, and thus provides a blunter (and typically higher) but fairly comprehensive picture of how much the company spent as a function of its upstream petroleum-sector output.

D. DATA INTERPRETATION

NOCs in the database exhibit significant variety in terms of goals, geology and national context. Blanket comparisons between, e.g., a new non-operating NOC and global giants with operations all over the world risk generating irresponsible conclusions. NRGI recommends that users consider several techniques for generating meaningful comparisons. Please see our *How to Use Guide* for a detailed discussion of these suggestions. The techniques include:

i. Filters

Users can employ four filters on www.nationaloilcompanydata.org to create peer groups for comparison. These filters can be used on the "Explore by Indicator" page and are constructed as followed:

Region. Divides NOCs based on the region of the company's headquarters country: Asia-Pacific, Eurasia, Latin America/Caribbean, Middle East/North Africa, Sub-Saharan Africa and Western Europe.

Production level. Divides NOCs based on the average daily production level of oil and gas (in boe equivalent) for the most recent year for which data was available. For companies that reported production data publicly, the group is determined by the production data as captured in the NRGI National Oil Company Database. Where we were not able to find official published data for a company in any year from 2011 to 2019, we categorized companies according to the estimated production as noted in Rystad Energy's UCube (proprietary Upstream database).[14]

The categories for this filter are:

- 0 boe per day (company is not producing oil)
- Between 0 and 100,000 boe per day
- Between 100,000 and 500,000 boe per day

[14] These companies are: EGPC (Egypt), Gabon Oil Company (Gabon), GEPetrol (Equatorial Guinea), NIOC (Iran), NOC Libya (Libya), Nilepet (South Sudan), PetroleumBrunei (Brunei), PetroVietnam (Vietnam), PNOC (Philippines), Qatar Petroleum (Qatar), Sudapet (Sudan), Turkmengaz (Turkmenistan) and YOGC (Yemen).

- More than 500,000 boe per day

Production peer group. This filter further breaks down the database according to the companies' upstream production profile, through a two-level designation. It begins by distinguishing between "internationalized operators" and "domestic producers." An "internationalized operator" is a company that is an operator producing a significant share of oil and gas outside its home country. To "operate" an oil and gas project means that a company is either solely responsible for managing the technical and financial operations for the project or is the lead decision-maker responsible for executing technical and financial operations for the project among a consortium of oil companies.

We based the decision on whether a company is an "internationalized operator" on a review of company reports wherever they were available. Many companies do not provide a systematic breakdown of their operated versus non-operated production or the location of production, so in some cases we needed to interpret narrative statements in order to categorize a company. The simple fact that a company owns equity in oil or gas projects or companies outside its country was not sufficient to categorize a company as an internationalized operator; rather, the operator's role abroad was a necessary determinant. The designation focuses on oil and gas assets that are in production. Some NOCs are the operators of projects in the exploration phase, but where they are not operating any producing assets abroad, we did not categorize them as internationalized operators. The definition of what constitutes a "significant share" of a company's production does not require that a majority of a company's assets come from abroad. Rather, it requires that a more than *de minimis* amount of production is abroad.

Domestic producers, by contrast, produce all or the overwhelming majority of their oil and gas within their home jurisdictions.

The distinction between "internationalized operators" and "domestic producers" is important because NOCs that are engaged in complex technical activities outside their home jurisdictions may have different business drivers and face different conditions than NOCs working exclusively or overwhelmingly at home. Internationalized NOCs are more likely to compete for access to acreage abroad against other oil and gas companies, which may increase incentives for commercial efficiency. In addition, indicators that express NOC production, revenues or transfers to government as a share of their home-country totals should be read differently for internationalized companies – which are operating from a reserve base that extends beyond their borders – than for domestic NOCs, which are exclusively converting their national public assets into production and revenues.

Among domestic operators this filter breaks companies down by their daily production level. This component follows the same rules as those described above for the "production level" filter. It divides domestic NOCs based on the average daily production level of oil and gas (in barrels of oil equivalent) for the most recent year for which data was available. For companies that reported production data publicly, the group is determined by the production data as captured in the NRGI National Oil Company Database. Where we were not able to find officially published data for a company in any year from 2011 to 2019, we categorized companies according to production as noted in Rystad Energy's UCube (proprietary upstream database).[15]

The filter also includes a grouping of "Pre-production NOCs," which are not yet producing oil or gas. This group contains NOCs that are involved in upstream exploration or preparing for production but are not yet producing oil.

To summarize, the five groupings contained in this filter are:

- Internationalized operators
- Large domestic producers
- Medium domestic producers
- Small domestic producers

[15] These companies are: CNOOC (China), EGPC (Egypt), Gabon Oil Company (Gabon), GEPetrol (Equatorial Guinea), IPIC (United Arab Emirates), NIOC (Iran), NOC Libya (Libya), Nilepet (South Sudan), PetroleumBrunei (Brunei), PetroVietnam (Vietnam), PNOC (Philippines), Qatar Petroleum (Qatar), Sinopec Group (China), Sudapet (Sudan), Turkmengaz (Turkmenistan) and YOGC (Yemen).

- Pre-production NOCs

Audited. This filter allows users to sort companies based on whether the report that served as the principle source for the most recent year for which data was available was audited by an independent external auditor, as determined by the methodology described above for the question "Report audited by an independent external auditor?" It allows users to filter data if they are interested only in examining companies whose data was subject to this quality check.

ii. Role-based peer groups and other ad hoc groups

In addition to the filters provided on the database website, users may also wish to create ad hoc peer groups organized around a characteristic that is the subject of inquiry. In conducting an analysis of the upstream performance of an NOC that also has significant downstream responsibilities, for example, a peer group of other similarly-situated companies may be the most relevant.

In many cases, it is also valuable to interpret data based on a role-based typology related to the priority sets of goals that the NOCs are designed to achieve. See *Massive and Misunderstood: Data-Driven Insights into National Oil Companies* for a detailed discussion. Governments endow different NOCs with varying roles and priorities. Thus, in analyzing data across a set of NOCs, it is important to consider what indicators are priorities for different kinds of NOCs. The mixed mandates of many companies mean that it is impossible to conclusively sort all NOCs into a rigid role-based typology but considering where an NOC is situated on a spectrum among the following archetypes can help generate meaningful interpretation.

- **Cash cow.** An NOC in this category prioritizes delivering revenues to the treasury. It exists primarily to help the state monetize its oil resources, ensure that the sector runs well and transfers as large a share of oil revenues as possible to the state. Cash cows tend to be more focused on capturing and transferring today's rents than engaging in risk-taking investment that could either consume those rents without return (if the investments fail) or generate long-term company growth (if the investments succeed).
- **Profit seeker.** An NOC in this category prioritizes commercial success, in the form of profit and the development of commercial skills and efficiency. If successful, a profit seeker NOC will deliver long-term financial returns to the state (and its other shareholders, if present) in the form of dividends and income taxes, but its short-term incentives may include a desire to minimize payments to the state in pursuit of a growth strategy. A profit seeker will likely be interested in increasing its reserves over time. Companies that list some shares on public stock exchanges are more likely to have profit seeker tendencies, since they must appeal to the bottom lines of their non-state investors. Internationalized NOCs may also be more likely to be profit seekers, since their orientation is fundamentally growth-oriented, and they usually need to compete for access to projects outside their home jurisdiction. Listings and international operations can, therefore, serve as rough proxies for this category.
- **State supplement.** An NOC in this category prioritizes delivering public services rather than commercial ones, performing roles similar to those typically played by traditional government ministries. This category includes companies that provide services to citizens in the energy/petroleum sectors – including fuel subsidies, domestic importing and refining and energy. It also includes companies charged with providing other social services, building infrastructure, employing large numbers of citizens and promoting the local private sector. In contrast to cash cows, state supplement NOCs do not prioritize the maximization of fiscal transfers, instead focusing on delivering value to citizens through more direct means.

V. Definitions of indicators

The published database contains 135 indicators, divided into the 11 indicator groups featured in Box 1. This section outlines each indicator in detail, including the definition of the indicator, its calculation method (where relevant) and the source from which the data was drawn. It also includes notes on interpretation of various indicators and certain limitations that users should take into account when using the database.

Box 1: Overview of Indicator Groups

Exploration and production: Reserves and production attributed to the NOC, as well as proxies for their upstream operational activities (seismic exploration, wells, rigs employed).

Revenues: NOC revenues from sales, other business activities and any transfers received by the company from the state. NOC net income.

Transfers to government: Payments by the company to the state, via royalties, income tax, bonus payments, dividends, transfers of sales proceeds and other vehicles.

Expenditures: NOC operational and capital expenditures, with an attempt to break down spending into upstream and downstream, core and non-core, etc.

Cash flows: From operating, investing and financing activities.

Balance sheet: Assets, liabilities and equity.

Operational performance: Efficiency of upstream operations, measured in terms of revenues, costs and profits, on per-reserves, per-barrel and per-employee bases.

Financial performance: Various measurements including return on capital employed, profit margin, and net income after taxes/total assets.

NOC data in context: Puts various measures of revenues, spending and profits into context as a share of GDP, government revenues, spending and other measures.

Reporting questions: Accounting standards used in NOC/government reports, presence or absence of audits and EITI reports.

Country variables: National GDP, general government revenues, government revenues from oil and gas, general government total expenditure and total national oil and gas production. Derived from the IMF, World Bank, ICTD, BP Energy outlook and Rystad Energy.

Indicators covering NOC activities and finance

Indicators in the first six indicator groups comprise indicators come from the reports of NOCs and their governments, covering the companies' activities and finances.

A. EXPLORATION AND PRODUCTION

Reserves and production attributed to the NOC, as well as proxies for their upstream operational activities (seismic exploration, wells, rigs employed) and number of employees. Excludes downstream activities. We used barrel of oil equivalent as the primary unit or measure. When NOC reported in different units, we used approximate conversion factors by BP.[16]

Indicator	Units	Description	Calculation	Sources	Notes on Interpretation
Oil & gas production	Barrels of oil equivalent / day	Denotes the amount of barrel oil equivalent (boe) of hydrocarbons that a NOC produces as an operator, but also that it markets on its own or through partnerships with other oil companies, per day in a given year. Includes production at home and abroad.	Calculated by adding up total hydrocarbon production that is crude oil, condensate, NGLs, natural gas in boe. Sometimes figures need to be converted to boe. Annual production figures need to be divided by 365 for daily prod.	Annual report, EITI report or company/ government website	NOC reports are often inconsistent and group several things into what they deem "production." Production figure does not necessarily mean that the NOC is an operator of the total boe listed, it can also have a non-controlling interest in a producing field, while another company operates the field.
Oil production	Barrels of oil equivalent / day	Denotes the amount of barrel oil equivalent (boe) of all liquid crude that a NOC produces a day in a given year (as an operator or in partnerships with private companies). Includes oil production at home and abroad. Oil refers to all hydrocarbon liquids including crude oil and condensate NGL.	Sometimes figures need to be converted to boe. Annual production figures need to be divided by 365 for daily. Sometimes calculated by subtracting all gas from total hydrocarbon production.	Annual report, EITI report or company/ government website	NOC reports are often inconsistent and group several things into what they deem "production." Production figure does not necessarily mean that the NOC is an operator of the total boe listed, it can also have a non-controlling interest in a producing field, while another company operates the field.

[16] BP's approximate conversation factors are available at: https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of%20world%20energy-2017-approximate-conversion-factors.pdf (Access: 24 August 2018)

Indicator	Units	Description	Calculation	Sources	Notes on Interpretation
Gas production	Barrels of oil equivalent / day	Denotes the amount of barrel oil equivalent (boe) of natural gas that a NOC produces a day in a given year (as an operator or in partnerships with private companies). Includes gas production at home and abroad.	Commonly requires conversion from cubic meters or cubic feet of natural gas (bcm) to barrel oil equivalent (boe). See BP conversion factors.	Annual report, EITI report or company/ government website	NOC reports are often inconsistent and group several things into what they deem "production." Production figure does not necessarily mean that the NOC is an operator of the total boe listed, it can also have a non-controlling interest in a producing field, while another company operates the field.
Reserves	Barrels of oil equivalent	Denotes the amount of oil and gas in barrels of oil equivalent (boe) that has been booked and reported by an NOC in that year. It thus refers to the amount of proven reserves that a NOC reports to be recoverable under reasonable certainty.	Calculated by adding up total proven developed and undeveloped reserves of all hydrocarbon reserves in boe.	Annual report, EITI report or company/ government website	Reserves declarations require significant judgement on the part of the declaring entity and may be subject to manipulation in countries that lack controls over reserves reporting.
NOC operator of any production?	Binary Yes/No	Whether or not (YES/ NO) NOC acts as an operator, as opposed to only managing or selling production/ holding stakes in fields operated by other oil companies in a given year. An NOC is generally an operator if the company is responsible for managing the exploration, development, and production of an oil or gas well or lease.	Where we found evidence that the NOC was operating any production, we answered yes to this question, even in the absence of precise production figures.	Annual report, EITI report or company/ government website	NOCs often do not distinguish between total production and production of which NOC is an operator.
NOC has stake in fields abroad?	Binary Yes/No	Whether or not (YES/NO) an NOC owns an equity stake in fields in other countries in a given year. This indicator demonstrates international presence/ internationalization through the investment portfolio.	N/A	Annual report, EITI report or company/ government website	N/A
NOC operator of fields abroad?	Binary Yes/No	Whether or not (YES/NO) an NOC operates a field in abroad in a given year. This indicator demonstrates international presence and further shows whether NOC behaves like an international oil company.	N/A	Annual report, EITI report or company/ government website	N/A
Production on which NOC is operator	Barrels of oil equivalent / day	Denotes the amount of barrel oil equivalent (boe) oil and gas that an NOC produces a day as an operator of a field in a given year. This indicator acts as a proxy for operational/production capacity of a NOC. In other words, it measures how big the company is in terms of oil and gas production.	Sometimes figures (esp. natural gas) need to be converted to boe. Annual production figures need to be divided by 365.	Annual report, EITI report or company/ government website	NOCs often do not distinguish between total production and production of which NOC is an operator.

Indicator	Units	Description	Calculation	Sources	Notes on Interpretation
Exploration – Seismic (2D)	Km	Denotes the amount of 2D seismic data in square kilometers that was acquired by the NOC in the given year. Measures exploration activities of an NOC.	N/A	Annual report, EITI report or company/ government website	N/A
Exploration – Seismic (3D and 4D)	Square km	Denotes the amount of 3D seismic data in square kilometers that was acquired by the NOC in the given year. Measures exploration activities of an NOC.	N/A	Annual report, EITI report or company/ government website	N/A
Wells drilled	Number of wells	Denotes the number of wells drilled (exploratory, delineation and development) to extract oil and gas by an NOC if in operational mode. Demonstrates whether NOC is engaged in significant drilling. Measures exploration and development activities of an NOC.	N/A	Annual report, EITI report or company/ government website	NOC often do not explicitly disclose whether wells have been drilled by themselves or other companies.
Number of rigs	# of rigs	Number of rigs (offshore/onshore platforms) operated by an NOC at home or abroad. Since a rig is removed after a well is drilled and replaced by a wellhead, rig activity reflects exploration and development of oil and gas wells rather than actual production. Rig count data is often used for private companies to benchmark performance in exploration.	N/A	Annual report, EITI report or company/ government website	N/A
Employees	# of employees	Refers to the total number of staff employed by an NOC.	N/A	Annual report, EITI report or company/ government website	The definition of "employee" is not consistent across NOCs. We use the figures included in official documents for each company.

B. REVENUES

NOC revenues from sales, other business activities and any transfers received by the company from contractors or the state. NOC net income (from core revenues and from all revenues) and net income after taxes. These indicators allow us to measure how much revenue an NOC is generating through its activities, as well as various measures of profitability.

Indicator	Units	Description	Calculation	Sources	Notes on Interpretation
Total Revenue	LCU million; USD million	Denotes all revenues (core, non-core and financial) of a NOC in a given year.	Where the reporting makes available the component revenue streams, this total revenue figure is calculated by the sum of the components. In other cases, where the reporting only makes available a total revenue figure rather than disaggregated components, that is what we record here.	Income/ Profit & Loss (P&L) Statement, EITI reports	In some cases, a company may report some individual component revenue streams (e.g., oil and gas sales), but it is not clear that the reported figure represents the total. In such cases we leave this "total revenue" figure blank.
Oil, gas & product sales	LCU million; USD million	Refers to the 'core revenue' of an upstream NOC in a given year, which is defined as income from oil, gas and product sales. Core revenue excludes financial income and revenues from activities in other parts of the oil and gas value chain i.e. refining, transport and storage or retail or activities in non-oil sectors (i.e. construction or services. Revenues from these activities are defined as non-core.	N/A	Income/ P&L Statement and accompanying notes in consolidated financial statement, EITI reports	Sometimes NOCs do not use well-defined distinctions between core and non-core revenues. The categories can be non-exact and sales data needs to be disaggregated and individual items identified based on our definition.
Domestic oil, gas & product sales	LCU million; USD million	Denotes the revenue from oil, gas and product sales to the domestic market in a given year.	N/A	Income/ P&L Statement and accompanying notes in consolidated financial statement, EITI reports	Data is often not disaggregated in domestic and foreign sales or core and non-core revenues.

Indicator	Units	Description	Calculation	Sources	Notes on Interpretation
External oil, gas & product sales		Denotes the revenue from oil, gas and product sales to the foreign markets in a given year.	N/A	Income/ P&L Statement and accompanying notes in consolidated financial statement, EITI reports	Data is not always disaggregated in domestic and foreign sales or core and non-core revenues.
Revenue – non-core activities	LCU million; USD million	Refers to revenue from any other activities of an NOC besides oil and gas sales (non-core revenue). Based on our definition, this indicator includes financial income and revenues from activities in other parts of the oil/gas value chain i.e. refining or non-oil sectors.	Some reports enumerate their non-core revenues specifically (in an aggregated or disaggregated fashion). Where that is not done, we generate by subtracting total revenues minus revenue from oil gas and product sales.	Income/ P&L Statement and accompanying notes in consolidated financial statement, EITI reports	Sometimes NOCs do not make a clear distinction between core and non-core revenues.
Fiscal payments from contractors	LCU million; USD million	Refers to any payments in the NOC receives from other oil companies in a given year. NOCs sometimes collect revenues from contractors on behalf of the state for bonuses, royalties, taxes, cash transfers for training programs etc.	N/A	Income/ P&L Statement and accompanying notes in consolidated financial statement, EITI reports	Sometimes NOCs do not disaggregate these payments.
Government transfers	LCU million; USD million	Denotes any transfer payments an NOC receives from the government in form of budgetary allocations, subsidies, repayments, capitalization, etc. This seems to be most common for NOCs that are not yet producing oil/gas or are at an early stage of their development.	N/A	Income/ P&L Statement and accompanying notes in consolidated financial statement, EITI reports	NOCs and governments do not always clearly report on transfers from the government to the company that take the form of equity increases or loans.

Indicator	Units	Description	Calculation	Sources	Notes on Interpretation
Net income from core revenues (before transfers to govt.)	LCU million; USD million	This indicator is the result from running the operations, also known as operating profit. Includes only core revenues, since these are our primary revenues of interest and the primary source of revenues to most companies, and thus excludes financial income. See our definition of "operational expenditures," for manner of calculation of that component. For another measure of the results from the year from running the company's operations, see "cash flows from operating activities" in the Cash Flows indicator group.	Calculated by taking revenues from oil, gas and product sales and subtracting operational expenditures.	Taking individual data points from Income/ P&L Statement	A lack of detail and a high degree of inconsistency in NOC reporting on expenditures means that it was difficult to achieve complete consistency in various profit measures calculated using operational expenditure data (including net profits from core revenues, net profits from all revenues, and net income after taxes). Our calculated figure might diverge from a "net operating income" figure reported by the NOC, for two reasons. First, as noted above the inconsistency in NOC practices on expenditure reporting impacts this indicator. Second, wherever sufficiently disaggregated information is available we record non-tax transfers to the treasury as "transfers" rather than as operational expenditures. NOC practice is inconsistent, but some NOCs include these transfers in their measures of operational expenditures. Since we do not record them as part of operational expenditures, these non-tax transfers are not subtracted from core revenues in our calculations of net income. Not all companies disaggregate the components of their "operational expenditure" measurements in detail, so it is likely that there are some companies whose data for "operational costs" in our database also include these non-tax transfers.

Net income from all revenues (before transfers to govt.)	LCU million; USD million	Denotes the total amount of revenues an NOC generates in in a given year from all revenues after covering all its expenses except those of a financial or tax nature.	Calculated by taking total revenues (include core, non-core, and financial income) and deducting total operating expense (excluding tax expenses and other transfers to the government).	Taking individual data points from Income/ P&L Statement	A lack of detail and a high degree of inconsistency in NOC reporting on expenditures and financial revenues means that it was difficult to achieve complete consistency in various profit measures calculated using operational expenditure data (including net profits from core revenues, net profits from all revenues, and net income after taxes). Our calculated figure might diverge from an "EBIT" figure reported by the NOC, for two reasons. First, as noted above the inconsistency in NOC practices on expenditure reporting impacts this indicator. Second, wherever sufficiently disaggregated information is available we record non-tax transfers to the treasury as "transfers" rather than as operational expenditures. NOC practice is inconsistent but some NOCs include these transfers in their measures of operational expenditures. Since we do not record them as part of operational expenditures, these non-tax transfers are not subtracted from core revenues in our calculations of net income. Not all companies disaggregate the components of their "operational expenditure" measurements in detail, so it is likely that there are some companies whose data for "operational costs" in our database also include these non-tax transfers. Third, because many NOCs did not clearly differentiate between financial and operational income, some of our measurements of "total income" include financial income, whereas some NOCs

Indicator	Units	Description	Calculation	Sources	Notes on Interpretation
					do not include financial income when calculating EBIT.
Net income after taxes (NIAT)	LCU million; USD million	NIAT measures how much income the NOC retains after paying income taxes to the state and covering all its expenses. The indicator is basically the sum of all revenues minus expenses (that is costs and income taxes paid to the treasury).	Calculated by taking net income from all revenues and subtracting income taxes	Taking individual data points from Income/ P&L Statement	A lack of detail and a high degree of inconsistency in NOC reporting on expenditures means that it was difficult to achieve complete consistency in various profit measures calculated using operational expenditure data (including net profits from core revenues, net profits from all revenues, and net income after taxes). This measure does not include financial costs (interest). This cannot consistently be regarded as the bottom-line profit for an NOC, since the NOC also makes other non-tax transfers.

C. TRANSFERS TO GOVERNMENT

These indicators allow us to measure the size and nature of NOC fiscal contributions to government. They include any payments made (tax and non-tax transfers) by the NOC to the state and thus revenue collected by the government/ Ministry of Finance from the NOC. NOCs follow many different systems governing how much they must pay. The type and size of transfers depend on a NOC's national mission and the fiscal/ taxation regime of a country. We standardized these into five common categories and tried to fit NOC payments into a category wherever possible. Where no category applied, we recorded the transfer as "other." NOCs do not always explicitly report on non-tax transfers such as royalties or dividends, which are often sub-summed in operating costs.

Indicator	Units	Description	Source/ Calculations	Notes on Interpretation
Total transfers to government	LCU million, USD million	Total transfers by the NOC to the state in a given year.	Where the component transfers are available, this figure is the sum of all transfers. In some cases, the NOC only publishes a total transfer figure, in which case that is what we record for this indicator.	N/A

Indicator	Units	Description	Source/ Calculations	Notes on Interpretation
Royalties	LCU million, USD million	Denotes the payment made by the NOC (as a producing company using the resource asset) to the government (as the owner of rights to the resource) in a given year. In other words, a royalty is a payment for the right to use the resource for production. A royalty is often based on a percentage of gross production from the property, free and clear of most or all costs relating to production. They are either ad valorem levies (based on the percentage of value of output) or specific per unit volume levies (based on a fixed amount). [17]	Income statement under taxes/ cash flow statement and corresponding notes, EITI reports	NOCs can be tasked with collecting royalties from other oil companies and then transferring them to the state, which is captured by the "fiscal payments from contractors" indicator in the "Revenues" indicator group. Sometimes it is difficult to determine whether an NOC paid or received the royalty reported. We engaged in our best effort to only her include royalty payments made by an NOC to the government. Some NOCs include royalties as part of their operational expenditures. Where the NOC disaggregates this information in its reporting, we record the royalty here (and do not include it as part of our measure of operational expenditures). But in some cases it is likely NOCs lump their royalty payments into operational expenditures without providing disaggregated information.
Income Tax	LCU million, USD million	Denotes the current income tax expense paid by a NOC to the government (federal or state level). Income tax is a profit-based instrument levied on a NOC (as opposed to any production- based tax). In some cases, the NOCs are subject to the general corporate income tax rate prevailing for all businesses in a country; in other cases, there is a special tax rate higher than for other sectors.	Income statement or cash flow statement, EITI reports	When NOC is an internationalized operator, this figure includes income tax payments both to the home government and to governments abroad. Ideally, we would have captured income tax paid to the home government only, but the strong majority of internationalized operators did not disaggregate in this manner, so in order to be consistent we recorded income tax payment across jurisdictions/activities. Some NOCs recorded income tax liability only on their income statement and not on the cash flow statement. In some of these cases, the figure recorded may reflect an income tax liability generated rather than the explicit amount transferred during the year.
Bonus Payments	LCU million, USD million	A one-time payment is made by the NOC to the state upon the finalization of a contract, the launch of activities on a project, or the achievement of certain goals laid out in the law or contracts.	Income statement under taxes (sometimes opex) or cash flow statement and corresponding notes, EITI Reports	Bonus payments are frequently used as incentives for private oil companies and are not as common for NOCs.

[17]Natural Resource Governance Institute (NRGI), Oil, Gas and Mining Fiscal Terms: https://resourcegovernance.org/analysis-tools/publications/oil-gas-and-mining-fiscal-terms

Indicator	Units	Description	Source/ Calculations	Notes on Interpretation
Dividends	LCU million, USD million	Denotes amount of dividend payments to the state as a (majority) shareholder of a NOC out of the company's earnings or reserves in a given year. Size of dividend transferred to treasury depends on the share government ownership interest.	Income statement/ cash flow statement, EITI reports Can be calculated from the number of shares the government own times the share's price for a given financial period.	NOCs sometimes do no report dividend payment, which could mean that they either did not pay dividends or that dividends were subsumed under other line items on the financial report. Sometimes there is a disparity between the figure a NOC reports as dividend declared versus dividend paid in a particular year. We only reported on dividends paid, where the information was available.
Proceeds of state profit/equity petroleum	LCU million, USD million	Some NOCs automatically transfer proceeds from the oil it sells – whether it accesses that oil as a result of production-sharing contracts or the state's or NOC's equity holdings – directly to the state treasury or a fund, sometimes after deducting a service or transaction fee.	Income statement or cash flow statement, EITI reports	This fiscal tool is most common in countries that employ production-sharing contracts and in which the NOC has no or only a small operational role. Some NOCs include this transfer as part of their operational expenditures. Where the NOC disaggregates this information in its reporting, we record the transfer here (and do not include it as part of our measure of operational expenditures). But in some cases it is likely NOCs lump these payments into operational expenditures without providing disaggregated information.
Other transfers to government	LCU million, USD million	Any additional transfers made to government in a given year that have not been captured above i.e. rentals, fees, special petroleum taxes or export duties etc.	Financial statement (cash flow; operational expenses and notes); EITI reports	Some NOCs include non-tax transfers as part of their operational expenditures. Where the NOC disaggregates this information in its reporting, we record the transfers here (and do not include it as part of our measure of operational expenditures). But in some cases it is likely NOCs lump these payments into operational expenditures without providing disaggregated information.

D. EXPENDITURES

These indicators allow us to record how much NOCs are spending and investing. NOC operational and capital expenditures. Indicators are ordinal variables that measure amount in USD/ LCU spend by a NOC. Due to poor disaggregation of NOC expenditure data and explicit assumptions we had to made to standardize measurement, these indicators are subject to greater inconsistency than indicators in other indicator groups.

Indicator	Units	Description	Calculation	Sources	Notes on Interpretation
Capital expenditures	LCU million, USD million	Denotes the amount in cash spent by a NOC on the purchase or upgrade of a fixed (physical) assets in a given year. In other words, the investments a NOC makes through acquisition or leasing of property, assets or equipment (wells, plants etc.), or costs relating to upgrading and maintenance of exiting assets to extend their life. Essentially, the indicator denotes any acquisition cost that is capitalized. Exploration activities, such as costs of drilling exploratory wells are only included when NOC explicitly capitalizes these costs. This indicator measures the investments a NOC makes into the future growth of the company.	Calculated by summing up individual investment items that are interpreted as investments into fixed assets. Where the company explicitly reports its "capital expenditures," we use this figure, so long as it appears to be limited to acquisition costs that are capitalized. When the company does not explicitly report on its "capital expenditures" or appears to do so in a manner that is inconsistent with the description to the lest, we calculate capital expenditures from cash flow statement: Purchases of fixed assets minus proceeds of sales from fixed assets.	Company financial statements. In most cases, found in cash flow statement under cash flows from investing activities. In other cases, companies will list "capital expenditures" in a narrative section of the report.	A lack of detail and a high degree of inconsistency in NOC reporting on expenditures means that it was difficult to achieve complete consistency in our measurements of capital and operational expenditures. It is sometimes difficult to interpret whether a cost has been capitalized, and to distinguish between operational and capital expenditures.

Indicator	Units	Description	Calculation	Sources	Notes on Interpretation
Operational expenditures	LCU million, USD million	Denotes the amount spent by a NOC relating to reoccurring costs from day-to day operations, thus expenses accruing from sales of oil, gas and products in a given year. Includes: - general, operating, selling, administrative, marketing costs - employee and facility expenses (i.e. rent) - exploration expenses if not capitalized - depreciation, impairment and amortization (under the assumption it relates to a company's operations) - costs relating to purchase of oil, gas and products - financial costs Does not include any tax or non-tax transfers to the state.	Calculated by summing up individual cost items from the income statement that are not capital expenditures, tax or non-tax transfers.	Income/ P&L statement and accompanying notes	A lack of detail and a high degree of inconsistency in NOC reporting on expenditures means that it was difficult to achieve complete consistency in our measurements of capital and operational expenditures. It is sometimes difficult to interpret, and to distinguish between operational and capital expenditures. Wherever sufficiently disaggregated information is available we record non-tax transfers to the treasury as "transfers" rather than as operational expenditures. NOC practice is inconsistent, but some NOCs include these transfers in their measures of operational expenditures. Not all companies disaggregate the components of their "operational expenditure" measurements in detail, so it is likely that there are some companies whose data for "operational costs" in our database also include these non-tax transfers.

E. CASH FLOWS

Cash flows from operating, investing and financing activities.

Indicator	Units	Description	Calculation	Sources	Notes on Interpretation
Cash flows from operating activities	LCU million, USD million	Denotes the net total amount of cash flows provided by operating activities.	N/A	Consolidated cash flow statement	N/A. Generally, we took the figure directly from the cash flow statement.
Cash flows from investing activities	LCU million, USD million	Denotes the net total amount of cash flows used in investing activities.	N/A	Consolidated cash flow statement	N/A. Generally, we took the figure directly from the cash flow statement.
Cash flows from financing activities	LCU million, USD million	Denotes the net total amount of cash flows provided by (used in) financing.	N/A	Consolidated cash flow statement	N/A. Generally, we took the figure directly from the cash flow statement.

F. BALANCE SHEET

These indicators allow us to measure the size of NOC asset bases as well as their liabilities, in the short and long term. Include assets, liability and equity.

Indicator	Units	Description	Calculation	Sources	Notes on Interpretation
Total assets	LCU million, USD million	Denotes the total value of assets an NOC holds in a given year. Total assets refer to the resources that have been put into the company in a given year.	Sum of current and non-current (fixed) assets.	Consolidated balance sheet	N/A. Generally, we took the figure directly from the balance sheet.
Total current Assets	LCU million, USD million	Denotes the value of current an NOC holds that can be liquidated into cash within a year.	N/A	Consolidated balance sheet	N/A. Generally, we took the figure directly from the balance sheet.
Total long-term/ fixed assets	LCU million, USD million	Denotes the value of fixed assets an NOC holds that cannot be liquidated into cash within a year.	N/A	Consolidated balance sheet	N/A. Generally, we took the figure directly from the balance sheet.
Cash and cash equivalents	LCU million, USD million	Reports the total value of an NOC's assets that are cash or can be converted into cash immediately in a given financial year. Measures the liquidity of an NOC.	N/A	Consolidated balance sheet	N/A. Generally, we took the figure directly from the balance sheet.
Total liabilities	LCU million, USD million	Denotes the total value of accounts payable, debt and other liabilities within a year. Measures the total amount of debts of an NOC.	Sum of current liabilities and fixed liabilities	Consolidated balance sheet	N/A. Generally, we took the figure directly from the balance sheet.
Total current liabilities	LCU million, USD million	Denotes the value of amounts due to be paid to creditors within a year.	N/A	Consolidated balance sheet	N/A. Generally, we took the figure directly from the balance sheet.
Total long-term/ fixed liabilities	LCU million, USD million	Denotes the value of liabilities due to be paid to creditors after more than a year.	N/A	Consolidated balance sheet	N/A. Generally, we took the figure directly from the balance sheet.
Equity	LCU million, USD million	Denotes the total value of common stocks, capital surplus, retained earnings, treasury stock and other equity an NOC holds in a given year.	N/A	Consolidated balance sheet	N/A. Generally, we took the figure directly from the balance sheet.

Performance metrics and NOC data in context

Common metrics and ratios allow comparisons among companies and across a company's own time horizon. There are various approaches to industry benchmarking and a wide variety of performance metrics for the oil and gas industry and SOEs. However, there has not previously been a consistent for measuring overall performance for National Oil Companies, who have more diverse and mixed goals than their private counterparts.

Based on the data collected from the NOCs and their governments – along with country-level data described below – we use several metrics to benchmark the performance of NOCs across three indicator groups:

- ***Operational performance***
- ***Financial performance***
- ***NOC data in context***

Notably, NOCs have certain other non-commercial goals besides fiscal transfers, such as contribution to national development, employment and local content. Our database does not measure this "National Mission Performance," which Ash (2011) and Wolf (2009) have identified as a key component in their NOC value creation index. The main reason behind our decision was limited data availability and inconsistent accounting on underlying data.

G. OPERATIONAL PERFORMANCE

Efficiency and productivity of upstream operations, measured in terms of revenues, costs and profits, on per-reserves, per-barrel and per-employee bases. Our measurements are most meaningful for companies for which upstream production sits at their core business. These indicators are calculated by formula based on data collected elsewhere in the database.

Indicator	Units	Description	Calculation	Notes on Interpretation
O&G production / Total reserves	%	Denotes the share that NOC oil and gas production for the year represents of the total proven oil and gas reserves the NOC has booked. A high ratio means that a NOC has either relatively few reserves still in the ground or high production levels. As oil and gas is produced, reserves are depleted. This ratio thus gives an indication about depletion of NOC reserves at current production levels. In other words, the higher the ratio the more likely the NOC would run out of its reserves at current proven reserves and production levels.	The amount of natural gas and oil production in boe/d divided by the amount of reserves in boe	Often used to measure the value of a (private) oil company. This ratio says less about the value of a NOC because the amount of oil and gas (boe/d) can be produced by the NOC (if operator) or another oil company in partnership with the NOC.

Indicator	Units	Description	Calculation	Notes on Interpretation
Reserves/ Production ratio	Years	Denotes the number of years of production at current levels that would be supported by existing reserves. Measured as (P/R), the inverse of the preceding indicator. A high ratio means that a NOC has either relatively large reserves still in the ground or low production levels. As oil and gas is produced, reserves are depleted. The reserves-to-production ratio thus gives an indication about depletion of NOC reserves at current production levels. In other words, the higher the ratio the longer the NOC would be able to produce at current proven reserves and production levels.	The amount of reserves in boe divided by the amount of annual oil and natural gas production (boe/day times 365)	Often used to measure the value of a (private) oil company. This ratio says less about the value of a NOC because the amount of oil and gas (boe/d) can be produced by the NOC (if operator) or another oil company in partnership with the NOC.
Total revenue / barrel of reserves	LCU/boe, USD/boe	Refers to the amount of total revenue an NOC generates for each barrel of proven reserve a NOCs has booked. Measures the income a NOC receives for each barrel it holds, in other words how efficiently a NOC produces revenue.[18]	Total revenue in LCU or USD is divided by the amount of reserves in boe.	The quality of the crude oil or natural gas is an important determinant of this indicator, as are production costs (especially where the NOC is in partnership with private companies and its share of production is wholly or partially determined by profitability). Thus, this indicator is an important measurement, but reflects a broader set of factors than just the NOC's performance. Another source of variance here is that there are some companies (e.g., Indonesia's Pertamina) that sell the oil they produce via their own production and also purchase additional oil or oil products for resale. Where such companies do not disaggregate their sales revenues, the numerator of this equation (revenue) reflects a larger base of sources than is reflected in the denominator (the company's production).

[18] Eller, Stacy L., Peter R. Hartley, and Kenneth B. Medlock. "Empirical evidence on the operational efficiency of National Oil Companies." *Empirical Economics* 40.3 (2011): 623-643.

Indicator	Units	Description	Calculation	Notes on Interpretation
O&G revenue / barrel of production	LCU/boe, USD/boe	Refers to the amount of revenue from oil and gas, product sales, a NOC generates for each barrel of oil it produces. A proxy for efficiency of a company's upstream operations. The quality of the crude oil or natural gas is an important determinant of this indicator, as are production costs (especially where the NOC is in partnership with private companies and its share of production is wholly or partially determined by profitability). Thus, this indicator is an important measurement, but reflects a broader set of factors than just the NOC's performance.	Revenue from oil, gas and product sales in LCU or USD is divided by the total production in boe/d	The quality of the crude oil or natural gas is an important determinant of this indicator, as are production costs (especially where the NOC is in partnership with private companies and its share of production is wholly or partially determined by profitability). Thus, this indicator is an important measurement, but reflects a broader set of factors than just the NOC's performance. Another source of variance here is that there are some companies (e.g., Indonesia's Pertamina, Norway's Equinor) that sell the oil they produce via their own production and also purchase additional oil or oil products for resale. Where such companies do not disaggregate their sales revenues, the numerator of this equation (revenue from sales) reflects a larger base of sources than is reflected in the denominator (the company's production).
Total revenue / barrel of production	LCU/boe, USD/boe	Refers to the amount of total revenue a NOC generates for each barrel of oil it produces. A proxy for efficiency of an NOC.	Total revenues in USD/LCU is divided by total production in boe/d	The quality of the crude oil or natural gas is an important determinant of this indicator, as are production costs (especially where the NOC is in partnership with private companies and its share of production is wholly or partially determined by profitability) and any requirements that the NOC sell quantities of oil on the national market at a discount. Thus, this indicator is an important measurement, but reflects a broader set of factors than just the NOC's performance. In addition, because different companies engage in varied ranges of activities beyond exploration and production, there can be a significant variance in these figures deriving from these other activities.

Indicator	Units	Description	Calculation	Notes on Interpretation
Opex (company-wide) per barrel	LCU/boe, USD/ boe	Denotes the unit costs of production. In other words, the operational costs a NOC encounters when producing a barrel of oil. How much it costs a NOC to produce a barrel of oil is not only determined by a NOC efficiency, but also resource characteristics (i.e. technologically more challenging unconventional oil and gas resources are most cost- intensive).	Operational expenditures in USD/LCU is divided by total annual production in boe.	A lack of detail and a high degree of inconsistency in NOC reporting on expenditures means that it was difficult to achieve complete consistency in various performance measures calculated using operational expenditure data. This metric includes opex on all segments of an NOC's activities. Thus, for NOCs which have much broader mandates than just upstream production, one would expect a higher figure than for companies more narrowly focused on the upstream. Because this figure covers company-wide opex, it differs from opex-per-barrel measurements of industry analyst groups that build their cost measurements from projections about individual oil and gas fields, then aggregate upwards to calculate company-wide ratios. Such measures can provide a finer-grained estimation than ours of specific extraction processes and the costs associated with a company's geological portfolios. Our measurement looks at a company's expenditures as a function of how much oil and gas they produce, and thus provides a blunter (and typically higher) but fairly comprehensive picture of how much the company spent as a function of its upstream petroleum-sector output. Our definition of operational costs does not include financial costs, thus the figure does not reflect all costs a NOC spends on producing a barrel of oil. The geology of the country's upstream assets also has an impact. Where oil is being produced offshore or in a challenging onshore environment, the opex per barrel will be higher due to the challenges and additional activities associated with operating in those environments.

Indicator	Units	Description	Calculation	Notes on Interpretation
Capex (company-wide) per barrel	LCU/boe, USD/ boe	Refers to the amount invested for producing a barrel of oil. Essentially benchmarks the degree to which a company is investing into the future growth of a company.	Capital expenditures in USD/LCU is divided by total annual production in boe.	A lack of detail and a high degree of inconsistency in NOC reporting on expenditures means that it was difficult to achieve complete consistency in various performance measures calculated using capital expenditure data. This metric includes capex on all segments of an NOC's activities. Thus, for NOCs which have much broader mandates than just upstream production, one would expect a higher figure than for companies more narrowly focused on the upstream. Because this figure covers company-wide capex, it differs from capex-per-barrel measurements of industry analyst groups that build their cost measurements from projections about individual oil and gas fields, then aggregate upwards to calculate company-wide ratios. Such measures can provide a finer-grained estimation than ours of specific extraction processes and the costs associated with a company's geological portfolios. Our measurement looks at a company's expenditures as a function of how much oil and gas they produce, and thus provides a blunter (and typically higher) but fairly comprehensive picture of how much the company spent as a function of its upstream petroleum-sector output. The geology of the country's upstream assets also has an impact. Where oil is being produced offshore or in a challenging onshore environment, greater investment per barrel may be necessary in order to develop necessary installations.
Opex / total revenue	%	Refers to the relative share of revenue that will be absorbed by operational expenditures.	Operational expenditures divided by total revenues.	A lack of detail and a high degree of inconsistency in NOC reporting on expenditures means that it was difficult to achieve complete consistency in various performance measures calculated using operational expenditure data. This metric includes opex on all segments of an NOC's activities. Thus, for NOCs which have much broader mandates than just upstream production, one would expect a higher figure than for companies more narrowly focused on the upstream

Indicator	Units	Description	Calculation	Notes on Interpretation
Capex / total revenue	%	Refers to the relative share of revenue that will be absorbed by capital expenditures.	Capital expenditures divided by total revenue.	A lack of detail and a high degree of inconsistency in NOC reporting on expenditures means that it was difficult to achieve complete consistency in various performance measures calculated using capital expenditure data. This metric includes capex on all segments of an NOC's activities. Thus, for NOCs which have much broader mandates than just upstream production, one would expect a higher figure than for companies more narrowly focused on the upstream.
Non-core activities / total revenue	%	Denotes the share of revenues from non-core activities in total revenue of a NOC. Based on our definition, non-core revenue includes financial income and revenues from activities in other parts of the oil/gas value chain, e.g., refining or non-oil sectors. The lower the ratio, the more concentrated a NOC is on generating income from oil and gas upstream operations.	Calculated as revenue from non-core activities is divided by a NOC's total revenue.	It can sometimes be difficult to differentiate between core and non-core activities. (See descriptions in "Revenues" indicator group).
Reserves per employee	boe/ employees	Refers to the amount of oil and gas reserves in boe a NOC holds per employee. A proxy to measure the labor productivity of a NOC.	Total amount of reserves in boe divided by total number of employees.	Reserves do not reflect the actual output of a NOC. In cases where a NOC acts merely as a bookkeeper of reserves, this ratio does not reflect real productivity of the NOC. NOCs with a broader "state supplement" mandate may have a larger base of employees than NOCs with a narrower upstream mandate. This should influence the interpretation of an NOC's data on this indicator.
Production per employee	boe/ employee	Refers to the amount of oil and gas in boe a NOC produces per employee. Measures the productivity of a NOC. High productivity can mean a small labor force, or a large production. Factors impacting the size of the labor force for a NOC are outsourcing practices versus in-house staff, national employment objectives, corporate response to oil price shocks etc. Oil and gas production as the core output of an NOC can be domestic or foreign.	The amount of natural gas and oil production in boe/d divided by the total number of employees.	NOCs with a broader "state supplement" mandate may have a larger base of employees than NOCs with a narrower upstream mandate. This should influence the interpretation of an NOC's data on this indicator.

Indicator	Units	Description	Calculation	Notes on Interpretation
O&G revenue per employee	USD million / employee	Measures how much money each employee generates for a NOC's core-business (sales from oil and gas). Ideally, a NOC wants the highest revenue per employee possible, because it indicates higher productivity and effective use of the firm's resources. If a NOC is overstaffed or has too many employees in the overhead (non-production related) parts, this is reflected by the indicator.	Oil, Gas and Product Sales in USD/LCU divided by total number of Employees	The quality of the crude oil or natural gas is an important determinant of this indicator. NOCs with a broader "state supplement" mandate may have a larger base of employees than NOCs with a narrower upstream mandate. This should influence the interpretation of an NOC's data on this indicator.
Total revenue per employee	USD million / employee	Indicates how efficiently a NOC produces revenue. It basically measures the average financial productivity of a NOC.	Total revenues in USD/LCU is divided by total number of Employees	The quality of the crude oil or natural gas is an important determinant of this indicator. NOCs with a broader "state supplement" mandate may have a larger base of employees than NOCs with a narrower upstream mandate. This should influence the interpretation of an NOC's data on this indicator.
Net income per employee	USD Million / employee	Measures how much profit (before taxes) each employee generates for a NOC's. Theoretically, the higher the net income per employee the better.	Calculated by taking a NOC's net operating from core revenues divided by the number of employees.	See description of "net income from core revenues," in "Revenues" indicator group, above, for challenges associated with interpretation of that indicator and others that derive from it. NOCs with a broader "state supplement" mandate may have a larger base of employees than NOCs with a narrower upstream mandate. This should influence the interpretation of an NOC's data on this indicator.

H. FINANCIAL PERFORMANCE

Various financial ratios to benchmark NOC's financial performance including return on capital employed, profit margin, and net income after taxes/total assets. These indicators are calculated by formula based on data collected elsewhere in the database. Due to poor disaggregation of NOC data on expenditures and profits, and explicit assumptions we had to made to standardize measurement, several of these indicators are subject to greater inconsistency than indicators in other groups.

Indicator	Units	Description	Calculation	Notes on Interpretation
Return on capital employed (before transfers to govt.)	%	Measures the degree to which a NOC is able to turn capital employed into profits within a given year. Capital employed is the total amount of capital that a company has utilized in order to generate profits. ROCE is common proxy for profitability for capital-intensive industries such as oil and gas. For NOCs, ROCE measures what an NOC has been able to do with public assets invested in the company. A low figure could mean either low net income (numerator) or large assets (denominator). In other words, the higher the ratio the greater the ability of an NOC to turn its capital employed into profits.	Calculated by taking net income from all revenues in LCU/USD and dividing total capital employed (= (Total Assets - Current liabilities in LCU/USD.	A limitation of ROCE is that it measures return against the book value of assets in the business. As these are depreciated the ROCE will increase even though cash flow has remained the same. Thus, older businesses with depreciated assets will tend to have higher ROCE than newer, possibly better businesses. See description of "net income from all revenues," in "Revenues" indicator group, above, for challenges associated with interpretation of that indicator and others that derive from it.
Net income/total revenue (before transfers to govt.)	%	Shows the net profit margin: net income as proportion of total revenues in LCU/USD in a given year. Measures how much profit a company makes per unit (USD) sales, after paying for operational expenses, but before paying interest or tax.	Calculated by dividing net income from core revenues by total revenues.	See description of "net income from core revenues," in "Revenues" indicator group, above, for challenges associated with interpretation of that indicator and others that derive from it.
After-tax profit margin **(Net income after taxes/revenues)**	%	After-tax profit margin denotes the after-tax income as proportion of total revenues in LCU/USD in a given year. An after-tax profit demonstrates how well a NOC controls its costs. A high after-tax profit margin generally indicates that a NOC runs efficiently, providing more value, in the form of profits, to shareholders.	Calculated by taking NIAT (= net income from all revenues - Income Taxes) divided by total revenue	See description of "net income after taxes," in "Revenues" indicator group, above, for challenges associated with interpretation of that indicator and others that derive from it.
After-tax return on assets (ROA)	%	Denotes the amount of after-tax income earned by a company from its assets. ROA measures a NOC's ability to turn investments into earnings or in other words how effectively a NOC is using its assets to generate earnings.	Calculated by taking NIAT (= net income from all revenues - Income Taxes) divided by total assets	Usually the metric is based on average assets, and not total assets. See description of "net income after taxes," in "Revenues" indicator group, above, for challenges associated with interpretation of that indicator and others that derive from it.

Indicator	Units	Description	Calculation	Notes on Interpretation
After-tax return on equity (ROE)	%	Denotes the amount of net income after taxes returned as a percentage of shareholders' equity. ROE measures a NOC's profitability by revealing how much profit a company generates (after tax) with the money shareholders have invested.	Calculated by taking NIAT (= net income from all revenues - Income Taxes) divided by equity	See description of "net income after taxes," in "Revenues" indicator group, above, for challenges associated with interpretation of that indicator and others that derive from it.
Cash ratio	%	Denotes the ratio of a company's total cash and cash equivalents (CCE) to its current liabilities. Demonstrates a NOC's ability to repay its short-term debt and to cover its liabilities by the amount of cash the NOC is holding onto. A high cash ratio means that the company retains most of its revenues after covering costs and transfers.	Cash and cash equivalents divided by Current liabilities	N/A

I. NOC DATA IN CONTEXT

Puts various measures of revenues, spending, profits and balance sheet data into context as a share of GDP, government revenues, spending and other measures and NOC value addition to the Nation. These indicators enable us to view NOC-specific information in the larger context of the national economy. These indicators are calculated by formula based on data collected elsewhere in the database.

Indicator	Units	Description	Calculation	Notes on Interpretation
NOC oil and gas production / national oil and gas production	%	Denotes the share of NOC's production in a country's total production. Basically, demonstrates the market share of the NOC in a country's oil and gas industry**.**	Total natural gas and oil production in boe/d divided by total production of country.	NOC reports are often inconsistent and group several things into what they deem "production." Production figure does not necessarily mean that the NOC is an operator of the total boe listed, it can also have a non-controlling interest in a producing field, while another company operates the field.
NOC oil and gas reserves / national oil and gas reserves	%	Denotes the share of NOC's reserves in a country's total production. Basically, demonstrates the market share of the NOC in a country's oil and gas industry**.**	Total NOC reserves in boe divided by total reserves of the country.	N/A

Indicator	Units	Description	Calculation	Notes on Interpretation
Total NOC revenues / general government revenues	%	Denotes the share of NOC revenues of total government revenue in %. This indicator is a proxy for NOC dependency by the state. It demonstrates how important the NOC is for fiscal state of the country. The higher the ratio, the more dependent the government is on the NOC.	Total NOC revenue in USD/LCU divided by government revenue total in USD/LCU.	NOC revenues are not necessarily transferred to the state/ accessible to the state. The data on general government revenue (denominator) comes from the IMF's World Economic Outlook database, which provides ambiguous guidance about whether to include NOC revenues under general government revenues. It recommends including state owned companies only when they are not run as commercial entities. In practice, the line is a blurry one, and the IMF has been criticized for inconsistent treatment across countries.
Total NOC revenues / GDP	%	Denotes the share of NOC's revenue in USD/LCU in a country's GDP. Basically, demonstrates the economic importance of the NOC in a country's economy and can be treated as a proxy for value addition to the economy**.**	Total NOC revenue in USD/LCU divided by Gross Domestic Product in USD/LCU.	
NOC transfers to treasury / total NOC revenues	%	Measures how much of its total income an NOC transfers to the state. Indicator for measuring how much an NOC is able to retain to cover its costs and investment. A high ratio means that an NOC is highly taxed and transfers a large part of its revenues to government and thus retains less for its own investment and costs.	Total NOC transfers to the treasury in USD/LCU divided by total NOC revenue in USD/LCU	The indicator has its limitation in cases, where the NOC receives government transfers in form of subsidies etc. and this is accounted in total NOC revenue. This figure reflects how much an NOC transfers as a percentage of its gross revenues, not profits. As such, it only partially reflects the tax burden on NOCs.

Indicator	Units	Description	Calculation	Notes on Interpretation
NOC transfers to treasury / general government revenues	%	Denotes the share of NOC transfers to the treasury of total government revenue. This indicator measures the state's fiscal dependency on the NOC and demonstrates how important the NOC is for fiscal state of the country. The higher the ratio, the more dependent the government is on the NOC.	Total NOC transfers to the treasury in USD/LCU divided by total government revenue in USD/LCU	The data on general government revenue (denominator) comes from the IMF's World Economic Outlook database, which provides ambiguous guidance about whether to include NOC revenues under general government revenues. It recommends including state owned companies only when they are not run as commercial entities. In practice, the line is a blurry one, and the IMF has been criticized for inconsistent treatment across countries.
NOC transfers to treasury / general government expenditures	%	Denotes the share of NOC transfers to the treasury of total government expenditure.	Total NOC transfers to the treasury in USD/LCU divided by total government expenditure in USD/LCU	N/A
NOC net income / general government revenues	%	Denotes the share of NOC's net income from all revenues as percentage of government revenues.	NOC net income from all revenues in USD/LCU divided by total government expenditure in USD/LCU	See description of "net income from all revenues," in "Revenues" indicator group, above, for challenges associated with interpretation of that indicator and others that derive from it.
NOC transfers to govt. / NOC net income	%	Denotes the share of NOC's transfers as percentage of its net income.	Total NOC transfers to the treasury in USD/LCU divided by NOC net income from all revenues in USD/LCU	See description of "net income from all revenues," in "Revenues" indicator group, above, for challenges associated with interpretation of that indicator and others that derive from it.
Transfers to government per barrel	USD	Measures much money an NOC transfers to the state for each barrel it produces.	Total NOC transfers to the treasury in USD/LCU divided by total NOC natural gas and oil production in boe/d	Transfers per barrel are determined both by the fiscal policies in place in the country (which determine what shares the NOC is required to transfer), the quality/value of oil and gas and the costs of extraction (which determine how much money is available for distribution between the company and the state).
NOC total assets / national wealth	%	Denotes the share of NOC's assets in a country's total wealth.	Total NOC assets in USD divided by total wealth of the country in.	N/A

Indicator	Units	Description	Calculation	Notes on Interpretation
NOC debt / national debt	%	Denotes the share of NOC's debt in a country's total debt.	Total NOC assets in USD divided by total wealth of the country in.	N/A

Background information

The two indicator groups in this category provide information relevant to interpreting the information gathered from NOCs and their governments and understanding the country context in which the NOCs are operating.

J. REPORTING QUESTIONS

This group refers to the accounting standards used in NOC reporting, the presence or absence of an independent audit process as well as potential reservations raised by independent auditors. Indicators are binary variables (YES/NO). These indicators allow us to benchmark the overall transparency of NOCs and provide proxies for the quality, accuracy and reliability of disclosures.

Indicator	Units	Description	Sources	Notes on Interpretation
Report presented according to international financial reporting standards (IFRS)?	Binary Yes/No	Whether or not an NOC reports and presents its consolidated financial statements in accordance with International Financial Reporting Standards (IFRS) in a given year. IFRS are standards issued by the IFRS Foundation and the International Accounting Standards Board (IASB) that aim to set internationally recognized accounting specifications and policies. An auditor often provides an opinion on whether the financial statements are presented in conformity with International Financial Reporting Standards as issued by the International Accounting Standards Board. The NOC may report according to IFRS standards, national accounting standards, other specified standards or no standards.	The auditor's report attached to the consolidated financial statement (usually in the beginning)- if available- makes a reference to conformity to different types of accounting standards.	The statement of an independent external auditor is the most valuable source for confirming that a report is presented in compliance with IFRS. In some cases, however, it is an NOC's internal auditor that states that reporting is in compliance with IFRS. We accept such statements as sufficient to satisfy this indicator. Thus, it should be read in conjunction with the question that follows, on whether the report is accompanied by a statement from an independent external auditor.

Indicator	Units	Description	Sources	Notes on Interpretation
Report audited by independent external auditor?	Binary Yes/No	Whether or not the independent, external auditor has issued an unqualified opinion that the NOC's financial statements are presented fairly, in all material respects for the given period as part of the auditor's report. A NOC's published consolidated financial statements are audited by an external auditor as an independent entity outside of the government in a given year. Some NOCs only publish reports of internal auditors. We used the presence of a report of an Independent Registered Public Accounting Firm (that is an independent, non-governmental auditor) as evidence.	Availability/ attachment of an independent, external auditor's report	"Independence" means different things in different contexts, and the total independence of an external auditor is not always given.
Auditor opinion issued with qualification?	Binary Yes/No	Whether or not the independent, external auditor has issued a qualified opinion, adverse opinion or a disclaimer with the NOC's financial statement in the auditor's report in that year. The auditor's report is only an opinion on whether the information presented is correct and free from material misstatements. A qualified opinion means that the financial statements are presented fairly in all material respects, except for specific and defined cases and/or that the financial statements conform to the stated standards, except for specific and defined areas. An adverse opinion means that the financial statements are not presented fairly and/or are not in compliance with the stated standards. A disclaimer of opinion means that the auditor does not render an opinion, generally due to a limit in scope (access to financial information) or a violation of accounting principles.	Independent, external auditor's report.	The existence of a reservation is based on our interpretation of any included auditor statements. Sometimes auditor's reports are difficult to interpret.
Country released EITI report for this year?	Binary Yes/No	Whether or not NOC's home country has published an Extractive Industries Transparency Initiative (EITI) report for this year. The Extractive Industries Transparency Initiative (EITI) is a global standard initiative promoting clear reporting and good governance of oil, gas and mineral resources. In order to publish an EITI report, the country must be a member of EITI.	EITI country website	N/A
Any shares publicly traded?	Binary Yes/No	This indicator refers to the ownership structure of the NOC, thus whether or not any shares of the NOC are publicly traded on a stock exchange in that year. An NOC may be 100% owned by the government or only partially.	Company's website or annual report regarding corporate ownership and control.	Some NOCs have subsidiaries that may be listed. We explicitly do not report on subsidiaries, except in the cases of three Chinese NOCs – CNOOC Limited, PetroChina, and Sinopec Group – where we record data on a listed subsidiary in addition to the parent company.

K. COUNTRY VARIABLES

This indicator group contains information on the national economy, derived largely from public international databases. The data in this group helps situate NOCs into the context of their home countries' economies and public sectors. Further, this data was needed to quantify the weight of the NOCs' revenues and expenses as a proportion of the economy and public sector. (See NOC Data in Context indicator group).

Indicator	Units	Description and Interpretation	Sources
Exchange rate	USD/ Local Currency Units (LCU)	Official exchange rate (LCU per US$, period average)	*World Development Indicators*, World Bank, downloaded December 2020
Gross Domestic Product (GDP)	USD million	Gross domestic product (GDP) is a monetary measure of the economic strength performance of a country.	*World Economic Indicators*, International Monetary Fund, downloaded December 2020 Presented in national currency, we convert to USD using exchange rate.
General government revenue	USD million	Revenue consists of taxes, social contributions, grants receivable, and other revenue. Revenue increases government's net worth, which is the difference between its assets and liabilities.	*World Economic Indicators*, International Monetary Fund, downloaded December 2020 Presented in national currency, we convert to USD using exchange rate
General government expenditure	USD million	Total expenditure consists of total expense and the net acquisition of nonfinancial assets.	*World Economic Indicator*s, International Monetary Fund, downloaded December 2020 Presented in national currency, we convert to USD using exchange rate
Oil production of home country	Barrels of oil / day (boe/day)	The total volume of crude oil produced in a given period of time.	*BP Energy Outlook 2020* and *Rystad Energy UCube* (proprietary upstream database)
Gas production of home country	Barrels of oil equivalent / day (boe/day)	The total volume of natural gas produces in a given period of time, converted to a boe (barrel of oil equivalent).	*BP Energy Outlook 2020* and *Rystad Energy UCube* (proprietary upstream database)
Oil and gas production of home country	Barrels of oil equivalent / day (boe/day)	The total volume of crude oil and natural gas produced in a given period of time. The gas volume is converted to a boe (barrel oil equivalent) and added to the crude oil produced (barrels of oil)	*BP Energy Outlook 2020* and *Rystad Energy UCube* (proprietary upstream database)

Indicator	Units	Description and Interpretation	Sources
Government resource revenue	USD million	The ICTD GRD systematically distinguishes between resource and non-resource tax revenue, thus providing a clear and consistent picture of non-resource tax collection across countries – while providing detailed data on resource revenue wherever possible. This is achieved primarily, though not exclusively, by relying on more disaggregated data from IMF Article IV reports.	*GRD - Government Revenue Dataset*, ICTD and UNU Wider, September 2018 https://www.wider.unu.edu/project/government-revenue-dataset
Resource revenue share of general government revenue	Percentage share	This is a calculation of a governments total resource revenue (from ICTD UNU Wider) divided by a governments' general government revenue (from IMF).	*GRD - Government Revenue Dataset, ICTD and UNU Wider*, September 2018 *World Economic Indicators*, International Monetary Fund, downloaded December 2020
Total wealth	USD million	Total wealth is calculated by summing up each component of wealth. Total wealth = Natural capital + Produced capital + Human capital + Net foreign asset For more details please reference: Building the World Bank's Wealth Accounts: Methods and Data	Wealth Accounting, World Bank, *The Changing Wealth of Nations, 30 January 2018,* www.worldbank.org/en/news/infographic/2018/01/30/the-changing-wealth-of-nations.
Natural capital, subsoil assets: oil and gas	USD million	The value of a nation's stock of petroleum and natural gas is calculated as the present value of expected rents that could be obtained over the lifetime of the resource. Calculating the present value of future rents requires data for annual production, prices, production costs, and reserves. From existing reserves and current rates of production, the time to exhaustion of the resource is assumed. For more details please reference: Building the World Bank's Wealth Accounts: Methods and Data	Wealth Accounting, World Bank, *The Changing Wealth of Nations*, 30 January 2018, www.worldbank.org/en/news/infographic/2018/01/30/the-changing-wealth-of-nations.
Government gross debt	USD million	Gross debt consists of all liabilities that require payment or payments of interested and/or principal by the debtor to the creditor at a date or dates in the future. This includes debt liabilities in the form of SDRs, currency and deposits, debt securities, loans, insurance, pensions and standardized guarantee schemes, and other accounts payable.	*World Economic Outlook*, International Monetary Fund, downloaded December 2020

Indicator	Units	Description and Interpretation	Sources
Oil reserves	Barrels of oil equivalent (boe)	Quantities of oil anticipated to be commercially recoverable under defined conditions. Reserves must satisfy four criteria: they must be discovered, recoverable, commercial and remaining as of the evaluation date based on the development project applied.	*BP Energy Outlook 2020*
Gas reserves	Barrels of oil equivalent (boe)	Quantities of gas anticipated to be commercially recoverable under defined conditions. Reserves must satisfy four criteria: they must be discovered, recoverable, commercial and remaining as of the evaluation date based on the development project applied.	*BP Energy Outlook 2020*
Oil and gas reserves	Barrels of oil equivalent (boe)	Quantities of oil and gas which has been converted to oil equivalent based on the calorific value of the gas produced.	*BP Energy Outlook 2020*

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Appendix: NOCs in the database, 2020

Company (short name)	Company (full name)	Home country
ADNOC	Abu Dhabi National Oil Company	United Arab Emirates
BAPCO	Bahrain Petroleum Company	Bahrain
Basra Oil Company	Basra Oil Company	Iraq
CNOOC	China National Offshore Oil Corporation	China
CNOOC Limited	China National Offshore Oil Corporation Limited	China
CNPC	China National Petroleum Corporation	China
CUPET	Cuba Petróleo Union	Cuba
Ecopetrol	Ecopetrol	Colombia
EGPC	Egyptian General Petroleum Corporation	Egypt
ENH	Empresa Nacional de Hidrocarbonetos	Mozambique
ENOC	Emirates National Oil Company	United Arab Emirates
Equinor	Equinor	Norway
ETAP	Entreprise Tunisienne d'Activités Pétrolières	Tunisia
Gabon Oil Company	Gabon Oil Company	Gabon
Gazprom	Gazprom	Russia
GEPetrol	GEPetrol	Equatorial Guinea
GNPC	Ghana National Petroleum Corporation	Ghana
IPIC	International Petroleum Investment Company	United Arab Emirates
KazMunayGas	KazMunayGas	Kazakhstan
KPC	Kuwait Petroleum Corporation	Kuwait
MOGE	Myanma Oil and Gas Enterprise	Myanmar
Naftogaz	Naftogaz	Ukraine
NAMCOR	National Petroleum Corporation of Namibia	Namibia
National Oil Kenya	National Oil Corporation of Kenya	Kenya
Nilepet	Nile Petroleum Corporation	South Sudan
NIOC	National Iranian Oil Company	Iran
NNPC	Nigerian National Petroleum Corporation	Nigeria
NOC Libya	National Oil Corporation of Libya	Libya
NOCAL	National Oil Company of Liberia	Liberia
ONGC	Oil and Natural Gas Corporation	India

Company (short name)	Company (full name)	Home country
OOC	Oman Oil Company	Oman
Orsted	Orsted	Denmark
PCJ	Petroleum Corporation of Jamaica	Jamaica
PDVSA	Petróleos de Venezuela, S.A.	Venezuela
Pemex	Petróleos Mexicanos	Mexico
Pertamina	PT Pertamina (Persero)	Indonesia
Perupetro	Perupetro	Peru
Petroamazonas	Petroamazonas	Ecuador
Petrobangla	Petrobangla	Bangladesh
Petrobras	Petróleo Brasileiro	Brazil
PetroChina	PetroChina	China
Petroci	Société Nationale d'Opérations Pétrolières de la Côte d'Ivoire	Côte d'Ivoire
Petroecuador	Petroecuador	Ecuador
PetroleumBrunei	PetroleumBrunei	Brunei
Petronas	Petroliam Nasional Berhad	Malaysia
PetroSA	PetroSA	South Africa
Petrotrin	Petroleum Company of Trinidad and Tobago	Trinidad and Tobago
PetroVietnam	PetroVietnam	Vietnam
PNOC	Philippine National Oil Company	Philippines
PTT	PTT Public Company Limited	Thailand
Qatar Petroleum	Qatar Petroleum	Qatar
Rosneft	Rosneft	Russia
Saudi Aramco	Saudi Aramco	Saudi Arabia
SHT	Société des Hydrocarbures du Tchad	Chad
Sinopec Corp	China Petroleum and Chemical Corporation	China
Sinopec Group	China Petroleum and Chemical Corporation – Group	China
SNH	Société Nationale des Hydrocarbures	Cameroon
SNPC	Société Nationale des Pétroles du Congo	Congo (Rep.)
SOCAR	State Oil Company of Azerbaijan Republic	Azerbaijan
Sonahydroc	Société Nationale des Hydrocarbures	Dem. Rep. of Congo
Sonangol	Sonangol Group	Angola

Company (short name)	Company (full name)	Home country
Sonatrach	Sonatrach	Algeria
Staatsolie	Staatsolie	Suriname
Sudapet	Sudan National Petroleum Corporation	Sudan
TAQA	Abu Dhabi National Energy Company	United Arab Emirates
Timor GAP	Timor GAP	Timor-Leste
TPDC	Tanzania Petroleum Development Corporation	Tanzania
Turkmengaz	Turkmengaz	Turkmenistan
YOGC	Yemen Oil and Gas Corporation	Yemen
YPF	Yacimientos Petrolíferos Fiscales	Argentina
YPFB	Yacimientos Petrolíferos Fiscales Bolivianos	Bolivia