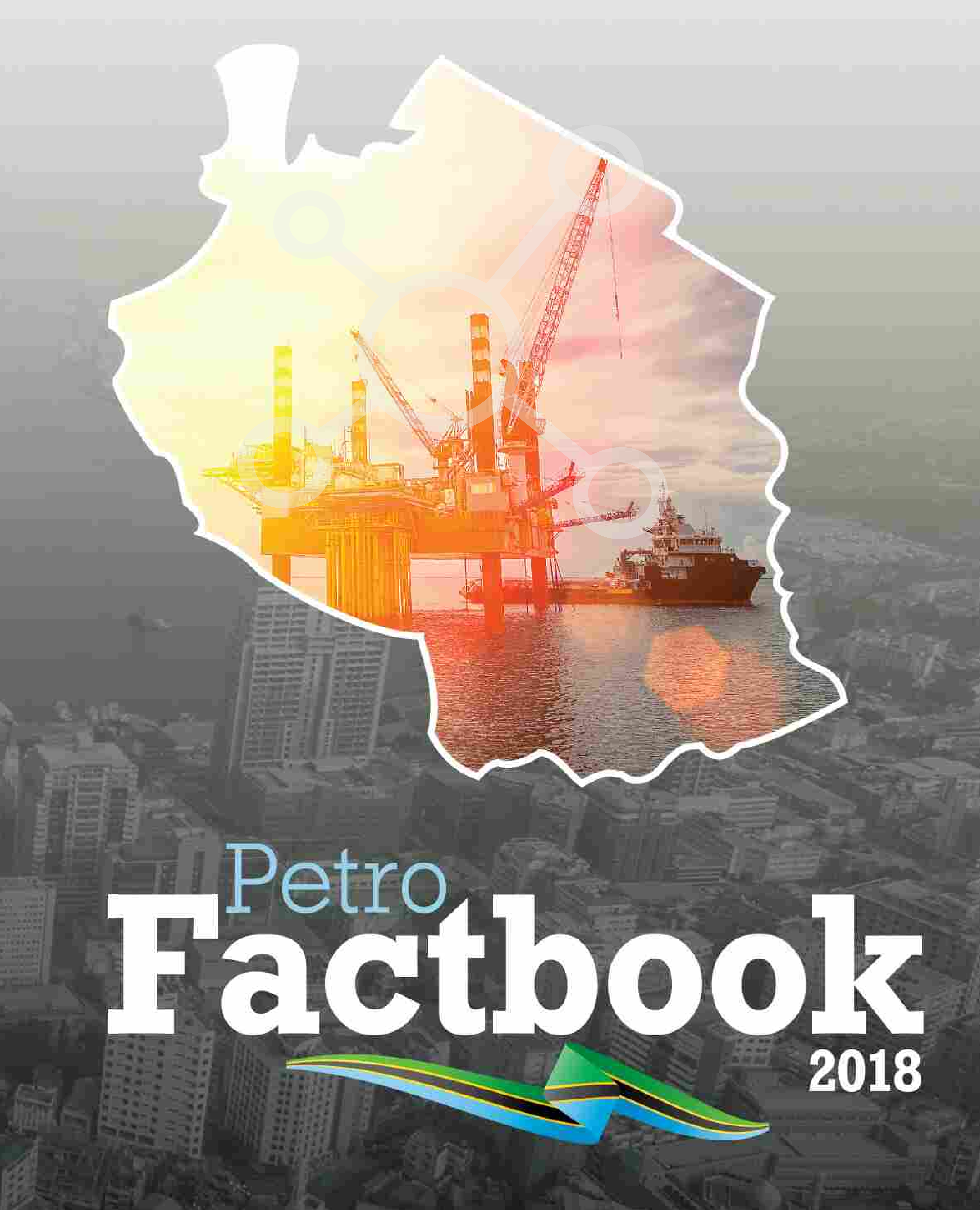

Petro Factbook 2018

REPOA

CMI CHR. MICHELSEN INSTITUTE

NBS

ROYAL NORWEGIAN EMBASSY

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About the Tanzania Petro-factbook

This booklet contains facts about the Tanzania petroleum industry and can be a useful source of information about the gas extraction and other petroleum related activities. The book gives an overall presentation of the Energy sector and petroleum in particular at a glance, operating companies and institutions in the petroleum industry also highlights key legislative frameworks governing the Tanzanian petroleum industry, It further provides glossary of terms used in petroleum sector in general.

Overview of the "Tanzania as a Future Petrostate program"

Following the huge volumes of natural gas that have been discovered offshore in Tanzania. There are prospects that the country will become a major hydrocarbon exporting country over the next decade. Thus, there are high expectations that exploitation of natural resources will substantially increase Tanzania's national income. Lessons from other countries show that, on average, resource-abundant countries have experienced lower economic growth, lower levels of human development, increased inequality and strife in society over the last four decades than their resource-poor counterparts, a phenomenon that has been labelled the 'resource curse' or the 'paradox of the plenty'. Avoiding the resource curse will be a major task for the Tanzanian Government. This will require empirical understanding of key prospects and challenges facing Tanzania as a future petro-state.

Seeing the need, in october 2014, REPOA and Chr. Michelsen Institute (CMI), in close collaboration with the National Bureau of Statistics (NBS), commenced implementation of a research programme titled "Tanzania as a future Petro-state: prospects and challenges". with the aim of enhancing the empirical understanding of key prospects and challenges facing Tanzania as a new Petro-state, and to provide contextualized and evidence-based policy analysis in order to contribute to avoiding a resource curse situation. The programme is funded by the Royal Norwegian Government.

Together with this fact booklet the program has published a handful of articles, briefs and papers as seen on the program's website: www.tanpetstate.org. A Resource hub, a webpage specifically dedicated to supplying datasets on petroleum and other related activities in Tanzania for use in analyses of the natural gas sector and its social and economic effects on Tanzania, as can be seen on: http://data.tanpetstate.org/

Tanzania's history with natural resource production and extraction

Exploration of oil and gas in Tanzania has taken place since 1952, prospecting for oil in the years 1952-1964. Exploration and drilling took place along the coast on Mafia Island, Zanzibar, Pemba and Onshore in the Mandawa Salt Basin, with no significant hydrocarbon finds. In the next phase of exploration non-associated natural gas was discovered in 1974 from Songo Songo, Kilwa district in Lindi Region.

In 1982 another natural gas discovery was realized in Mnazi Bay – Mtwara Mikindani. Most of the drilling occurred in the eighties, following the enactment of the Petroleum Act and spurred on by high oil world market prices in the early 1980s.

In early 2000, rights to explore the coast of Tanzania were granted to several oil and gas companies including Petrobras, Ophir, Statoil, Dominion and British Gas (now Shell). Significant discoveries of gas were made in blocks 1, 2, 3 and 4. In the years 2010 to 2015 a total of 47.08 Tcf has been discovered in the deep sea where in 2012 Statoil and Exxon Mobil alone made the biggest offshore gas reserve discovery of 20 Tcf at Zafarani field off the coast of Indian Ocean. Making a total of 57.25 Tcf inclusive of other discoveries of 10.17 Tcf found onshore; in 2007 Mkuranga (0.2 TCF), 2008 Kiliwani (0.07 TCF), 2012 Ntorya (0.178TCF) and in 2016 Ruvu (2.17 TCF).

Tanzania Energy sector at a glance

Currently about 80% of Natural gas is used for power generation amounting to Mega Watts 884.5 according to 2018 estimates where 50% of power is consumed by national grid. Gas turbines account for about 54% of total installed capacity connected to the national grid. Other uses are for Industrial heating where a total of 37 industries have been connected, cooking for households so far 72 houses have been connected and Compressed Natural gas (CNG) for vehicles with one refilling station now at Ubungo.

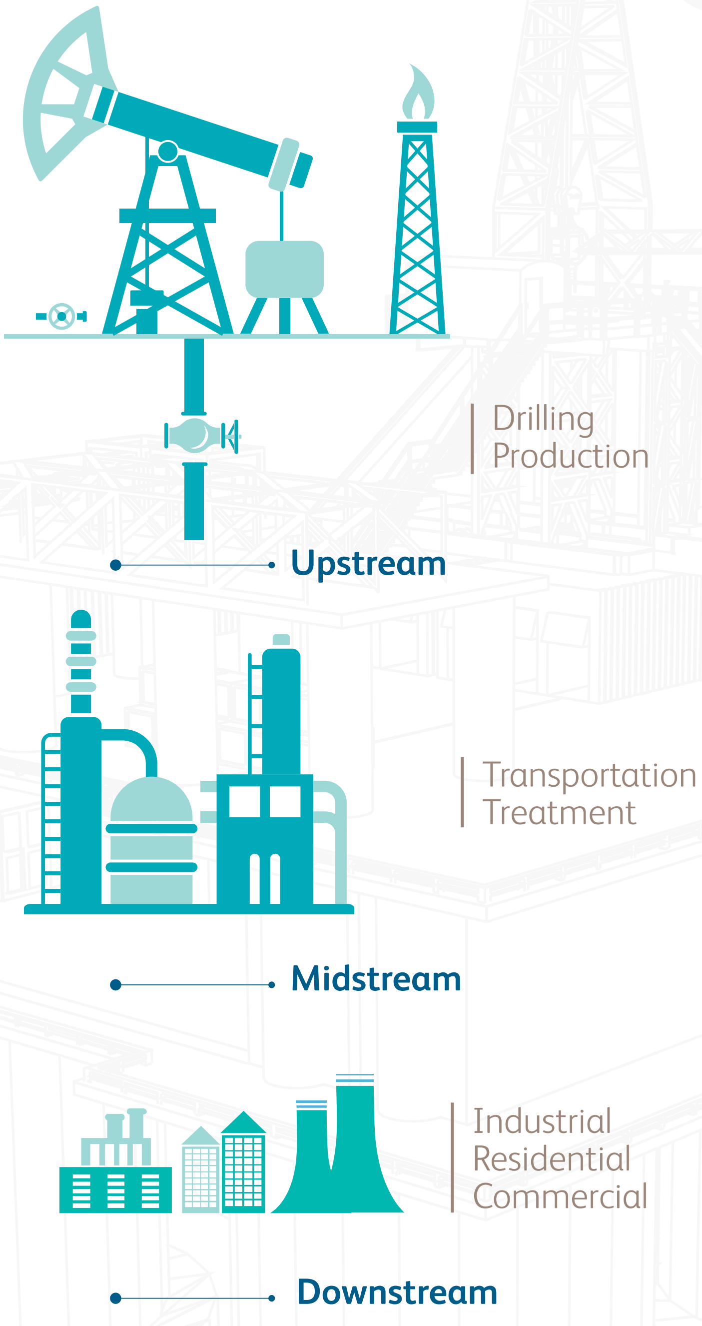
Other projects emanating from gas production include a 542 km Natural Gas Pipeline from Mtwara and Lindi to Dar es Salaam and Gas Processing Plants at Madimba (Mtwara) and Songo Songo (Lindi) which was completed in 2015. Also plans to export natural gas from Tanzania to other markets calls for a Liquefied Natural Gas Project (LNG).

Liquefaction shrinks the volume of the gas to 600 times, allowing for large amounts to be stored or transported over a long distance. The envisioned plant capacity is a standard 5 Million Metric Tonnes per annum (MTPA) LNG train that consumes 833mmScfd of natural gas. The project is yet to start as Host Government Agreement (HGA) negotiations are ongoing. In November 2015, TPDC finalized acquisition of land for the LNG facility planned to be located at Likong'o village in Southern Tanzania town of Lindi in a 2071 hectares of land set aside. Key players in the LNG project include TPDC, Royal Dutch Shell/BG Group; Equinor (Statoil), ExxonMobil and Ophir Energy.

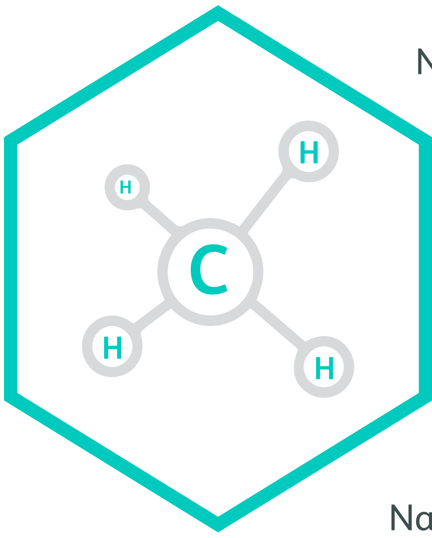
Natural Gas value chain

A natural gas value chain is an integrated process that can be broken down to upstream, mid-stream and downstream. First, the Exploration and Production companies need to explore, drill and extract natural gas from the ground. Then the transmission companies link the gas fields to major consuming areas either via pipelines or LNG. Finally, the Local Distribution Companies deliver the natural gas to respective industries and homes.

In Tanzania the upstream is mainly operated in a joint venture between TPDC, a national oil company that holds the exploration and development license together with International Oil Companies (IOCs) as contractors. The mid-stream and downstream is mainly operated by GASCO, a subsidiary of TPDC and IOCs. A full list of operating companies and institutions can be found in section …..



Gas Processing In Brief



Natural gas used by consumers is composed almost entirely of methane. Raw natural gas found in the coast of Tanzania comes from gas/condensate wells in which there is little or no crude oil, termed 'non-associated gas'.

Gas wells typically produce raw natural gas by itself, while condensate wells produce free natural gas along with a semi-liquid hydrocarbon condensate. Raw natural gas contains water vapor, hydrogen sulfide (H2S), carbon dioxide, helium, nitrogen, and other compounds.

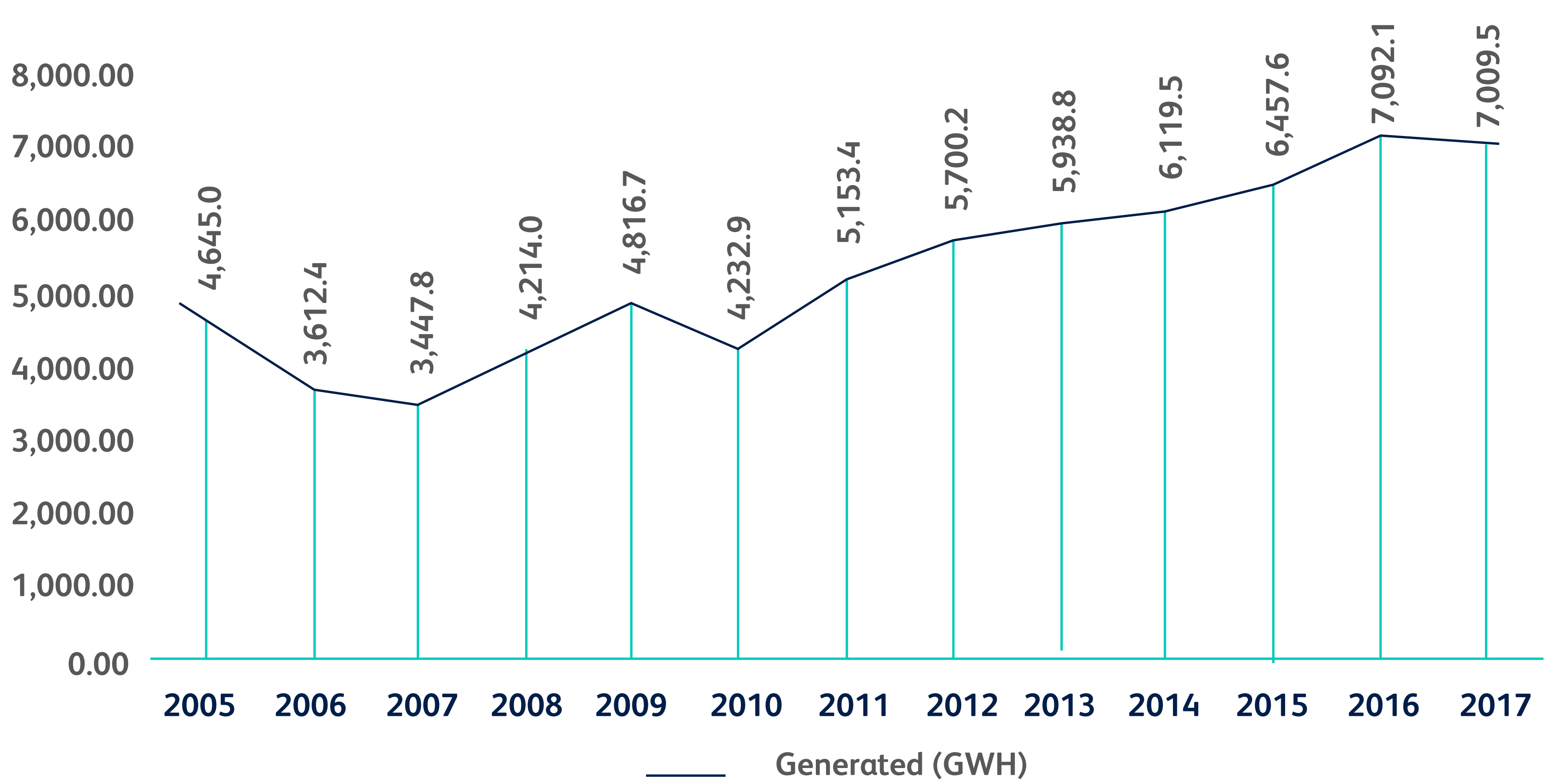
Natural gas processing consists of separating all of the various hydrocarbons and fluids from the pure natural gas, to produce what is known as 'pipeline quality' dry natural gas fit for transportation pipelines. Water collected is then used for other purposes at the plant and other bi products are produced from the condensate.

Currently there are four (4) operating Natural gas processing plants in Tanzania: Songo songo Gas processing plant, Mnazi bay, TPDC Songo Songo and TPDC madimba

Fuel Mix and Energy Consumption

The power sector in Tanzania has an energy mix of hydro, biomass and thermal power. As of 2017 the composition stands at hydro 41.54 %, thermal plants (Natural gas power plants 45.0 %), Liquid Fuel 12.69% and Biomass 0.77%. Below is a summary of Electricity Installed capacity and Electricity generated from both National grid and Isolated stations. Thermal power is a combination of several power plants; Gas fired, Heavy Fuel oil, Biomass and Industrial diesel. Gas fired electricity was introduced in 2002 via SONGAS power plant Ubungo, electricity is supplied to the national grid and distributed to end users by TANESCO. Songas' Thermal Power station is the largest gas-fired power station in East Africa with installed capacity 189 MW.

Figure 1 Electricity generation in Tanzania



East Africa Crude Oil Pipeline Project (EACOP)

The government of Uganda and Tanzania signed a Memorandum of Understanding (MoU) in October 2015 for the development and constructions of the pipeline. The signing was facilitated by the Tanzania national oil company and the representative of Lake Albert upstream investor.The Cross-border Pipeline project will cover 1,443 kilometres with 80% distance transiting through Tanzanian land and 20% covering Ugandan land. The pipeline will transport crude oil from Kabaale Uganda to Chongoleani peninsula near Tanga port in Tanzania for export to other markets.

Post Front end Engineering design (FEED) the execution of the project will start with a pipeline company established operating the pipeline that is jointly owned by the shareholders of the project that is the two governments and the private led upstream investors from TOTAL, TULLOW and CNOOC. The first oil is expected to be transported end of year 2020.

Key institutions in the petroleum Industry in Tanzania

The institutional framework include the regulatory authorities in Tanzania that are concerned with management of oil and gas sectors, three state owned companies, two governing bodies, three regulatory authorities and two other Institutions. State Owned Companies

Tanzania Petroleum Development Corporation (TPDC)

Tanzania Petroleum Development Corporation (TPDC) is the national oil company of Tanzania, wholly owned by the government. It was established in 1969 under the Public Corporations Act No. 17 of 1969 and commenced its operations in 1973. The major roles of TPDC include; exploration and production of petroleum, distribution and storage facilities, hold exploration and production rights, contract/hold equity or participate in oil concessions, franchises and licenses, management of parastatals or other legal entities transferred to the corporation, development of an adequate industrial base for the oil industry.

http://tpdc.co.tz/

Tanzania Electric Supply Company Limited (TANESCO)

TANESCO is a parastatal organization under the Ministry of Energy. The company generates, transmits, distributes and sells electricity to Tanzania Mainland and sells bulk power to the Zanzibar Electricity Corporation (ZECO). TANESCO owns most of the electricity generating, transmitting and distributing facilities in Tanzania Mainland. It is responsible for all power generation functions owned both National Grid connected and off - Grid Stations. Other sources of generation are from independent power producers (IPPs) and emergency power producers (EPPs), which feed the National Grid and isolated areas as well as Small power projects (SPPs). Thermal contributes the largest share of TANESCO's Grid power Generation with 57% of total installed capacity while Hydro Plants contributes 43%. TANESCO owns interconnection power grid made up of generation system transmission and distribution system. It has a marketing Business Unit that deals with distribution of electricity, promotion of services and all customer service matters. http://www.tanesco.co.tz/index.php

Gas Supply Company (GASCO)

In 2014 TPDC underwent restructuring that divided the company into an upstream and downstream directorate. With the downstream directorate seeing an establishment of GASCO a commercial company under TPDC which invests in and market Tanzanian gas. The company handles all operations of natural gas pipelines downstream operations that include processing and purifying of raw natural gas, and marketing and distribution of products derived from natural gas; midstream operations that comprise construction of natural gas transportation pipelines.

Key Government Institutions

Bank of Tanzania (BOT)

BOT is the central bank of the United Republic of Tanzania. BOT has been given mandate to be the operational manager of the oil and gas fund; revenue holding account which shall play a role of receiving all revenues from the fund and revenue saving account which shall be receiving revenues from the revenue holding account thereby avoiding wasteful expenditure and saving for the future generation.
https://www.bot.go.tz/

Energy and Water Utilities Regulatory Authority (EWURA)

EWURA is an independent, multi-sectoral regulatory authority established under Section 4 of Chapter 414 of the Laws of Tanzania. Generally, it is responsible for technical and economic regulation of electricity, petroleum, natural gas and water sectors in Tanzania pursuant to Cap 414 and sector legislation. In the petroleum sector, EWURA is responsible for regulating midstream and downstream natural gas activities that include processing, transportation, storage and distribution of natural gas in Mainland Tanzania. The regulated infrastructures include processing plants, transmission and distribution pipelines, and storage facilities. Hence, the goavl of EWURA is to protect the interests of the key stakeholders which includes; consumers, suppliers and the government.
http://www.ewura.go.tz/

Local Government Authorities

The local government authorities are responsible for collecting levy from oil and gas companies with offices in their respective jurisdiction under the mandate of the Local Government Finance Act of 1982 The local levy is up to 0.3% of the turn over net of the VAT and excise duty.

Ministry of Energy

Formerly under the Ministry of Energy and Minerals, in 2017 the ministry was split into two independent ministries which include the Ministry of Energy and the Ministry of Minerals. The petroleum industry which includes oil and gas activities was thereby placed under the Ministry of Energy is a facilitator for the energy sector in the country. The Ministry of Energy is also responsible for supervising all policy matters relating to the oil and gas fund, formulation and monitoring broad investment strategies and operational guidelines for the revenue saving account of the fund.
https://www.nishati.go.tz/

Oil and gas Advisory Bureau-President's Office

It was established under the Office of the President to guide better utilization the natural resources. Oil and gas Advisory Bureau is responsible for advising the cabinet on investment policies, strategies as well as laws and regulations that govern the oil and gas industry in the country.
Petroleum Upstream Regulatory Authority (PURA)

Petroleum Upstream Regulatory Authority (PURA)

PURA was established under the petroleum act of 2015. The major responsibilities of PURA include; regulating and monitoring the upstream activities in Tanzania mainland, identifying of resource base and enhancement of resource value, conduct auditing of cost recovery on exploration, development, production and sale of oil and gas to determine government profit share and royalty.

Tanzania Extractive Industry Transparency Initiative (TEITI)

Tanzania became a member of Extractive Industry Transparency Initiative (EITI) on February 2009 with representatives from the government, companies and civil society organizations. The main objective of TEITI is to manage the implementation of EITI in the country. TEITI ensures that disclosure and reconciliation of payments and revenues from oil and gas companies to the government are conducted in transparent and accountable manner. http://www.teiti.or.tz/

Tanzania Revenue Authority (TRA)

TRA is a government agency established in 1996 with the general goal of assessing, collecting and administering tax revenues. In the petroleum industry, TRA has been given mandate by section 6 of the Oil and Gas Revenue Management Act of 2015 to assess, collect and account taxes and levies derived from oil and gas revenues which include corporate income tax, skills development levy, Value Added Tax (VAT) and import duty.
https://www.tra.go.tz/

The Legislative Framework for Natural Gas Sector in Tanzania

There are several policies and laws which govern the natural gas sector in Tanzania as follows:-

The National Energy Policy, 2015

The policy is a result of merging several policies such as: The Petroleum Policy, the Local Content Policy, the Subsidy Policy, the Natural Gas Policy, the Renewable Energy Policy, the Bio-energy Policy and the Revised 2003 National Energy Policy to simplify its administrations. A Draft National Energy Policy 2015 Implementation Strategy has been developed. and expected to be in use at…….

The National Investment Policy 1996

This policy aims to ensure promotion, attraction and facilitation of foreign investments in Tanzania through the Tanzania Investment Centre which was initiated in 1996. Some of the key activities regarding the policy includes; Heightening of the transparent legal framework that enables the advancement and guard of all investments and deregulation of the investment consent process.

The Oil and Gas Revenue Management Act (OGRMA) of 2015

The OGRMA sets out the legal framework in relation to the managing the oil and gas revenues derived from exploitation, development, and production of oil and gas accomplishments

The Tanzania Extractive Industries (Transparency and Accountability) Act (TEIA) of 2015

The TEIA asserts the government's effort to warrant that there are transparency and accountability in the extractive industry.

Health and environment protection related policies and laws

The exploitation, extraction and transportation of oil and gas resources are pertinent to the Environmental Management Act (EMA) 2004, Occupational Health and Safety Act (OHSA) 2003, Insurance Act 2009, and Fire and Rescue Force Act 2007.

The Petroleum (Local Content) Regulations 2017

Provides the ways of how effectively the government can meet the aim of maximizing the country's benefits from potential and current gas projects.

The Petroleum Act of 2015

The Act delivers the legal framework under which the petroleum and gas will be used for sustainable development.

Natural gas pricing regulations of 2016

The natural pricing gas regulations rule pricing of the natural gas for the domestic market and cross-border markets.

Natural wealth and Resources contracts (Review and re-negotiation of Unconscionable Terms Act 2017

The Act stands where necessary, requires all agreement(s) on natural wealth and natural resources to be tabled for review by the National Assembly for purposes of ensuring that any unconscionable terms therein are rectified.

The written laws (miscellaneous amendments) act, 2017

Amends written laws specified in various Parts of this Act affecting the Petroleum Act, THE INCOME TAX ACT, tax administration Act, Value added tax and other various laws

The natural wealth and resources (Permanent sovereignty) Act 2017

The Act stands to provide for ownership and control over natural wealth and resources and provide protection of permanent sovereignty over natural wealth and resources.

Exploration and Production Companies

Alfren Tanzania;

Alfren is an independent oil and gas company which entered Tanzania in 2011 after purchasing 74% working interest in the Tanga Block and later wholly owned by the Petrodel Resource that now retains 26 % interest in the company.
http://wiki.openoil.net/Afren_in_Tanzania

Dodsal Hydrocarbons and Power (Tanzania) Pvt. Ltd;

Dodsal Hydrocarbons and Power (Tanzania) Pvt. Ltd is a wholly owned subsidiary of Dodsal Resources. The company came into operation in Tanzania after signing the Production Sharing Agreement (PSA) with the Government of Tanzania in 2007. The company acquired possession of an on-shore Oil and Gas exploration for Ruvu block with an area of more than 15,000 sq. km towards the eastern part of Tanzania.
https://dodsal.com/mining/projects.shtml

Dominion Oil and Gas Limited;

Dominion Oil and Gas Limited entered Tanzania in 2016. It is 100% subsidiary of Dominian Petroleum Limited. However, Dominian Oil and Gas Limited holds four licenses and three PSAs in onshore Tanzania which include; Mandawa, Kisangire, and Selous Deep sea.
http://wiki.openoil.net/Dominion_Petroleum_in_Tanzania

Equinor;

Formerly known as Statoil. It is a Norwegian national oil company which commenced its operation in Tanzania in 2007. Equinor came into operations after signing a PSA for offshore Block 2 of water depth between 400-3000 meters with TPDC whereby it operates with 65% working interest, partnered with US major ExxonMobil with 35% working interest. Statoil is working in progress towards the construction of an onshore LNG plant in joint venture https://www.equinor.com/en/where-we-are/tanzania.html

ExxonMobil Exploration and Production Tanzania Limited (EMEPTL);

EMEPTL came into operation in Tanzania in 2010. It is a fully owned subsidiary of US major ExxonMobil; in which it holds 35% working interest in Block 2 Deep water prospect offshore southern Tanzania partnered with Statoil with 65% working interest. Recently, EMEPTL and its partner have completed four natural gas discoveries with estimated reserves of 17-20 TCF found in water depth of 2500 meters. https://corporate.exxonmobil.com/en/company/worldwide-operations/locations/tanzania

Heritage Rukwa Tanzania Limited;

Heritage Rukwa Tanzania Limited is an oil and gas company which entered Tanzania in 2008 and successfully completed 3D seismic acquisition in offshore Tanzania. It has been licensed for exploration in the entire Rukwa Rift basin which has been split into two separate areas which include; Rukwa North Basin and Rukwa South Basin. http://www.heritageoilltd.com/our-operations.aspx

Jacka Resources Limited;

Jacka Resources Limited is an Australia-based oil and gas exploration company which entered Tanzania in 2011 after signing a PSA with TPDC for Ruhuhu Block, an onshore area located in southwest Tanzania and covers an area of approximately 10,343 square kilometers.
http://www.jackaresources.com.au/documents/Jacka%20Resources%20-20Proactive%20Investors.pdf

Maurel & Promo;

Maurel & Prom is a French exploration company established in Tanzania in July 2004. The company holds Bigwa-Rufiji-Mafia permit with 60% working interest. In 2009, it strengthened its position with the acquisition from Artumas of the Mnazi Bay permit, in which its operated interest is 48.06%. Maurel & Prom has today opened the first two wells of the Mnazi Bay gas field that will deliver the Madimba processing centre (operated by GASCO), the entry point of the gas pipeline linking Mtwara to Dar es Salaam. The Mnazi Bay permit is governed by a production sharing contract dating from May 2004. The development licence was granted on October 2006 for a 25-year term, renewable once for a further period of 20 years. https://www.maureletprom.fr/en/documents/download/193/tanzanie-debut-de-l-approvisionnement-en-gaz-du-ce

Motherland homes;

Commenced its operations in January 2012 after signing a PSA with TPDC for Malagarasi Basin.

Ndovu resources (Aminex);

Ndovu resources is a wholly owned subsidiary of Aminex operating in Tanzania since 2001. Ndovu Resources operates 3 licenses in the country namely; Kiliwani North Development license (65% WI), Ruvuma Exploration License (75% WI), and Nyuni Exploration License (70% WI). Four exploration wells have been drilled, two of which encountered commercial quantities of natural gas. Kiliwani North-1 tested gas at 40 million cubic feet/day and its being developed for commercial production. However, Aminex partnered with Solo Oil started production at the Kiliwani north onshore gas field in 2016. http://aminex-plc.com/

Ophir energy;

Ophir Energy is an independent upstream oil and gas exploration company which came into operation in Tanzania in 2005 after signing a PSA for block 1 with 100 percent working interest and later signed for blocks 3 and 4 in 2006. Drilling began in 2010 and since then 16 wells have been drilled . Of the 16 wells drilled, 11 have been successful exploration wells and five have been appraisals. It has so far discovered around 15TCF total gross resource. https://www.ophir-energy.com/our-assets/tanzania/

Orca exploration Group;

Orca Exploration is an international public company which deals with hydrocarbon exploration, development and supply of natural gas in Tanzania. The company entered Tanzania in 2004 when it signed a Production Sharing Agreement (PSA) with the Tanzania Petroleum Development Corporation (TDPC) for operating 879 Bcf of Songo Songo natural gas field. http://www.orcaexploration.com/

Pan African Energy Tanzania (PAET);

PAET commenced its operation in Tanzania in 1991. PAET owns and operates the Orca Group's natural gas exploration, development and supply business in Tanzania and holds the rights to explore, develop market, produce and sell natural gas from Songo Songo Block in partnership with TPDC. It also has contracts to supply natural gas for power generation at the Ubungo Power Plant and for industrial uses as well as CNG for domestic use. http://panafricanenergy.com/

Petrobas Tanzania limited;

Petrobas Tanzania Limited came into operation in Tanzania since 2013. The company is the operator of Block 5 and 6 in deep water Tanzania partnered with Royal Dutch Shell.

Petrodel Resources Limited;

Petrodel Resources Limited is an oil and gas company concerned with the exploration and production of oil resources. It entered Tanzania in 2006 when it was awarded exploration license for the Tanga block after winning a public tender from TPDC.

Royal Dutch Shell;

Formerly known as BG Group came into operations in Tanzania in 2010. Currently, it is the operator of offshore Blocks 1and 4 in which it holds 60% working interest. Royal Dutch Shell was also the operator of offshore block 3 until October 2014 where it withdrew due to insufficient resources to carry on with the exploration investment. The company is in progress of towards developing a joint liquefied natural gas (LNG) plant in collaboration with the Block 2 partners. https://www.shell.co.tz/

Solo oil plc

Solo oil PLC Is an oil and gas company which entered Tanzania in 2013. It is partnered with Aminex. It possesses a PSA agreement for Ruvuma basin composed of two licenses which include Lindi and Mtwara and covers an area of over 6000 sq. km which is partially offshore and largely onshore. http://www.solooil.co.uk/our-portfolio.aspx

Songas Limited;

Songas Limited came into operations in Tanzania in July 2004. The company generates electricity using gas from Songo Songo Islands gas fields off the coast of Southern Tanzania. Songas Limited conducts gas processing, transportation and power generation from Songo Songo Gas pipeline. http://www.songas.com/

Swala Energy;

Swala is Australian Oil and Gas Exploration Company established in Tanzania in 2011 to undertake exploration of hydrocarbon although no oil has been discovered to date in Tanzania. Swala holds a particular working interest along the East African rift valley system with exploration license for the Kilosa Kilombero basin and Pangani Basin. http://swalaoilandgas.com/

Wentworth resources;

Wentworth Resources is an independent upstream and midstream oil and gas company. Wentworth resources came into operation in Tanzania in 2004 after signing a PSA for Mnazi Bay Concession with 80% working interest partnered with Anadarko and the Mozambique national oil company. Later in 2005, Wentworth Resources bid for and won concession in three Ruvuma Basin Blocks of southern Tanzania. The Company and its concession partners are exploring over 3,250 square kilometers of onshore and near shore acreage and own two producing natural gas fields in Tanzania which commenced delivering gas to a new government owned and operated transnational gas pipeline in August 2015. https://www.wentworthresources.com/tanzania.php

Glossary of Terms used in Petroleum sector

Some of the mostly used terms in the sector and their meanings:

Absorptive capacity;

The ability of the government or the economy to transform (i.e., “absorb”) additional money (e.g., revenues, investments) into tangible goods and services without causing inflation or wasteful spending. It depends on availability of skilled workers and suppliers in the economy, as well as government competency.

Accountability:

The acknowledgement and assumption of responsibility by public, private and voluntary sector officials for their actions and the existence of redress mechanisms when duties and commitments are not met.

Associated gas:

The natural gas that can be found in contact and/or dissolved in the crude oil of the reservoir bed. This can be classified as free gas or dissolved gas.

Allocation of rights:

The process and approach through which companies are granted the right to extract. Openness and competition in the allocation of rights can have a positive impact on the quality of the outcome.

Asset allocation:

The distribution of investment across different asset classes in an investment portfolio. Asset classes, namely: cash, fixed income assets (e.g., bonds), equities (e.g., corporate stocks) and alternative assets (e.g., real estate; derivatives) have different risk-return and liquidity profiles which a portfolio seeks to balance according to the investor’s risk appetite.

Back-loaded revenues:

Revenues that are collected toward the end of the project cycle (i.e., once production has started and some costs have been recouped by the investor), such as profit taxes.

Barrel of oil equivalent (boe):

It is the gas volume (or other energy resource) expressed in barrels of crude oil at 60oF, and which are equivalent to the same amount of energy (energetic equivalence) obtained from the crude oil. This term is frequently used to compare natural gas in units of crude oil volume in order to provide a common measure for different gas energy qualities.

Benchmark price;

A reference price for a commodity based on an aggregation of trading activity over a given period as published by strategic global or regional commodity exchanges or other reputable industry sources.

Beneficial owner;

A beneficial owner is a natural person who, directly or indirectly, exercises substantial control over a legal entity or has a substantial economic interest in, or receives substantial economic benefit from, such legal entity.

Bonus;

A lump sum payment required by governments at a specified point in the extractive project timeline, such as at contract signature (i.e., “signature bonus”) or at the start of production or given production thresholds (i.e., a “production bonus”).

Cadaster (cadastre);

A registry (at national or subnational level) that records property details such as ownership, location and access rights. Mining cadasters record information regarding mineral rights such as licenses or concessions. In some countries the term mining cadaster refers not just to the registry, but also the public institution managing the registry and mining rights generally.

Capital expenditure (capex);

Refers to money invested in a fixed asset (e.g., building or machinery) that will create future benefits extending beyond the tax year. Its counterpart is operating expenditure or running cost. Also known as “capex” in accounting practice.

Capital inflow;

The movement of money into a country for the purchase of local capital assets, such as buildings, land, machines, government bonds, stocks or companies.

Cash transfer;

In the extractives context, governments may choose to designate a portion of windfall revenues to directly distribute to their citizens in order to give them a direct stake in the sector, alleviate poverty and/or to build a tax base. Also known as direct distribution.

Commercial discovery;
A discovery of extractives that is 90 percent or more likely to be profitable for the company.

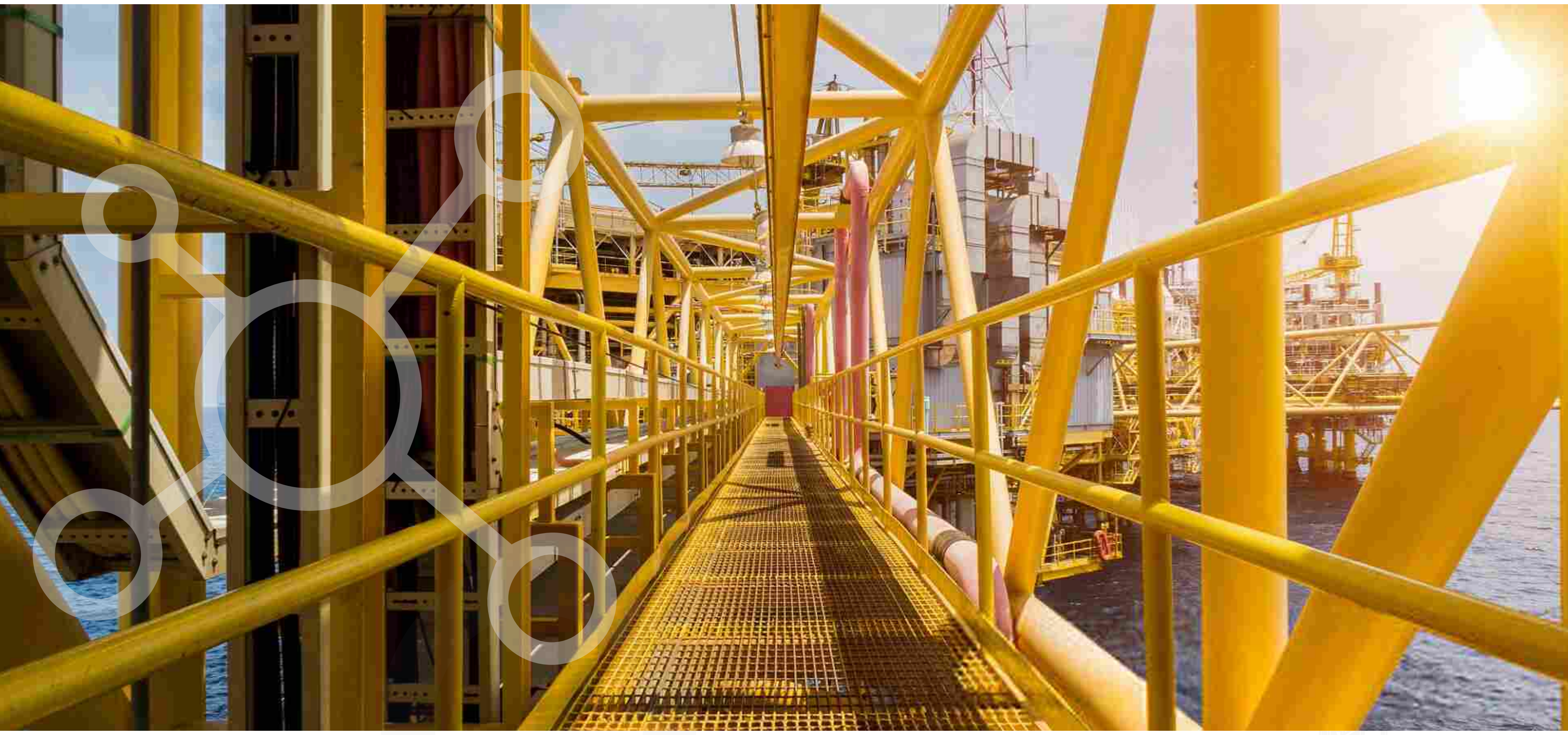
Concession area:
Designated geographic areas over which resource exploration and/or extraction rights are granted. Also known as blocks or license areas.

Contingent resources:
Resources that are discovered, but are not yet recoverable commercially.

Corporate social responsibility (CSR);
A voluntary self-regulation pertaining to how a company manages its impact on the community and society at large. It can range from building village health clinics to publishing information of public interest.

Cost oil:
In a production sharing contract, the amount of oil that the company recovers before calculating the production share between the state and company. It is determined by the operating and capital expenditure of the project.

Cost recovery:
The process of recouping costs of producing a commodity, usually established in the fiscal regime.



Counter-cyclical fiscal policy:
A policy that increases budget spending when resource revenues are low and imposes limitations on spending when revenues are booming. Resource rich countries can use this approach to mitigate the volatile impact of commodity boom and bust cycles on their budgets.

Creaming curve;
A typical pattern of discoveries or for an oil area (often a plotted line on a diagram) that starts with no finds, quickly rises after the initial discoveries and then levels off during the maturing phases, when remaining prospects will be smaller and have a lower discovery probability.

Decision chain;
A model of the interrelated policies made by a government in managing resource extraction from exploration and licensing to investing revenues. It is used as a conceptual framework to the Natural Resource Charter, the Extractive Industries (EI) Source Book and other references for understanding natural resource governance.

Dry gas:
Condensable-hydrocarbon-free natural gas (basically methane).

Dutch disease;
The phenomenon by which, in resource-rich countries, increases in oil, gas and mineral exports to foreign markets can generate large capital inflow, resulting in real exchange rate appreciation and inflation. This can hurt certain parts of the economy such as manufacturing and make exports less competitive.

Earmarking:
Designating a revenue stream or portion of the budget for a particular spending purpose.

Economic diversification:
The process of producing goods and services in different sectors (e.g., agriculture, manufacturing, services, natural resources) so that no single sector dominates the economy.

Economic efficiency:
A state that is reached when resources are optimally used and distributed in the economy, minimizing waste and maximizing potential gains.

Enclave development:
The development of extraction related infrastructure in a manner that exclusively suits the needs of one company and does not take into account other uses by the neighboring community, host government or other companies operating in the country.

Exhaustibility:
The finite or non-renewable nature of a resource; its ability to be depleted or used up.

Expropriation:
The act by which the government takes over the ownership of an asset (such as an oil project) against the contract terms governing the asset. This is often done through a process called "eminent domain."

Extra-budgetary fund:
The government account or institution that collects specific revenue streams or earmarks spending.

Extractive resource:
A non-renewable natural resource found in or under the ground; specifically, oil, gas and minerals.

First come, first served:
A method of license allocation in which the first individual or company that applies for mineral rights will be given priority to the license or lease.

Fiscal decentralization:
The transfer of fiscal authority from central government to subnational governments.

Fiscal deconcentration:
The delegation of certain fiscal authorities to the subnational level while maintaining accountability to the central government.

Fiscal instruments:
Policy tools that enable governments to generate revenues from a sector; in the extractive sector, these will typically include bonuses, taxes, royalties, dividends, etc.

Fiscal policy:
A set of decisions a government makes on revenue (e.g., taxation, savings, borrowing) and expenditure (e.g., budget spending, debt payments) to influence economic outcomes (e.g., employment, household spending, prices).

Fiscal regime:
The set of terms and instruments (e.g., taxes, royalties, dividends) that determine together how the revenues from extractive projects are shared between the state and companies.

Fiscal rule:
A multi-year constraint on overall government finances defined by a numerical target; for example, limiting public expenditure growth to three percent per year.

Fiscal stability/stabilization;
The policy of mitigating the impact of volatile resource revenues on the government budget by, e.g. saving windfall revenues in a fund, paying down public debt when revenues are high, drawing down on public savings or borrowing when revenues are low, thereby smoothing year-to-year spending. See also counter-cyclical fiscal policy.

Fiscal sterilization:
Mitigating the negative effects of large revenue inflows on the economy (e.g., exchange rate appreciation, inflation) by investing revenues in foreign assets; often used to help mitigate the negative effects of "Dutch disease."

Fiscal surplus:
The amount by which government revenues exceed expenditures.

Fiscal sustainability:
The ability of the government to maintain its current spending and tax policy over the long term without threatening solvency or risking default; it is especially important in regions dependent on finite resource revenues.

Formation gas:
Associated or non-associated formation gas. Gas that comes from reservoir beds.

Formula pricing
A method of linking the price of a commodity to a benchmark price in a sales contract (e.g., "Brent minus USD 7.15").

Free, prior and informed consent (FPIC):
The principle that communities (often indigenous communities) have the right to give or withhold their consent to proposed projects that might affect the lands they own, occupy, or otherwise use. It also often encompasses a process of consultation necessary for obtaining valid consent

Front-loaded revenues:
Revenues that are received toward the beginning of the project such as bonuses.

Fuel subsidies:
An economic benefit provided by the government to reduce the price of fuel. Subsidies can either be provided directly to consumers or to producers and can be explicit (e.g., a set price at the pump) or implicit (e.g., selling oil cheaply to refineries).

Gas of injection:
Gas (nitrogen, carbon dioxide, dry gas, etc.) which is injected to the reservoir bed to keep the pressure, it is used as the secondary recovery system.

Gasification:
Process through which gaseous fuel is produced from solid or liquid fuels.

Gold plating:
When companies spend more than necessary on production costs, often to reduce tax liability or production sharing burden.

Governance:
The form of political regime or the manner by which authority is exercised in the management of a country's social or economic resources for the public good. Can also refer to the capacity of governments to design, formulate, and implement policies and discharge functions.

Greenfield exploration:
In oil, gas and mineral exploration, it indicates activities in a new field where deposits are not already known to exist.

Hedging:
In extractives, the practice of insuring against the risk of price volatility using an options or futures contract to secure the value of production in advance.

Heaviness (of oil);
Crude oil is classified as light, medium, or heavy according to its measured American Petroleum Institute (API) gravity or density as compared to water. Any liquid petroleum with an API gravity less than 20 percent is heavy.

In-kind payment;
Payments made to a government in the form of goods instead of cash. In extractives, it is a payment using the commodity itself as currency in lieu of a share of financial revenues.

Integrated companies:
Companies that are involved in not only upstream activities but in midstream transportation and downstream value-added activities such as refinement, trading and retail.

Intergenerational equity:
The principle that future generations ought to have the means to achieve a quality of life equal to or better than the current generation, for instance from the returns on resource extraction.

Licensing round:
A period in which the government offers and allocates licenses.

Lift Gas:
Gas injected to the well production piping through special valves to decrease the hydraulic column density in the piping.

Liquefied petroleum gas (LGP):
Gas resulting from the mixture of propane and butane. It is obtained during the separation of liquids from the gas or during the separation of refinery liquids. Lighter fraction of crude oil for domestic use and carbureting.

Local content:
Non-tax benefits to the national economy and communities through the use or development, by extractive sector operators, of domestic labor, suppliers, goods and services, capital and infrastructure.

London Metals Exchange (LME):
Center for industrial metals trading and price-risk management. LME prices are often used as global commodity benchmarks.

Mandatory disclosure requirements:
Requirements for companies operating within a certain jurisdiction or listed on certain stock exchanges to disclose information on payments made to government entities in the countries where extraction takes place.

Materiality:
The quality of being deemed relevant for reporting purposes. In the EITI process, multi-stakeholder groups (MSGs) come to an agreement about the level of materiality for payments and other information to be disclosed.

Model contract:
A document outlining generic terms for possible extraction agreements within a country. The level of detail and deference given to a model contract varies from country to country.

Monetary policy:
The actions of a central bank, currency board or other regulatory committee that determine the size and rate of growth of the money supply, which in turn affects interest rates.

Multi-stakeholder group (MSG);
Group that includes representatives from government, civil society and extractive corporations. In the EITI context, the MSG has the responsibility and authority to govern the EITI process.

Natural gas:
It is a mixture of light paraffinic hydrocarbons with methane as its main component with small amounts of ethane and propane; with variable proportions of non-organic, nitrogen, carbon dioxide and sulfhydric acid. The natural gas can be associated with crude oil or it can be found independently in non-associated gas or dry gas wells.

Natural gas liquids: (NGL):
Liquids obtained in gas/liquid dividers of field facilities; in the handling, transportation and compression of natural gas; and at gas processing plants by means of dividers. They are mainly constituted by ethane and heavier hydrocarbons, they are classified in sour condensates due to their content of sulfhydric acid and mercaptans, sweet condensates because they do not contain sulfur compounds, and stripped condensates when all light gases and CO2 have been extracted.

Natural resource funds (NRFs);
Sovereign wealth funds that are financed primarily from oil, gas or mineral revenues.

Natural resource revenues;
Money received by the government from the extraction or sale of natural resources.

Non-associated gas:
Natural gas found in reserves that do not contain crude oil.

Non-fiscal benefits;
Benefits a government or community might get from an extraction project that are not related to collection of monetary rents. This can include jobs, infrastructure and other contributions to the local economy.

Off-budget spending;
Government spending that is not managed through the normal budget process and therefore, may not be subject to the same high standards such as parliamentary oversight, or procurement and audit requirements.

OPEC: Organization of Petroleum Exporting Countries;
International organization in charge of coordinating petroleum-related policies prepared by its members. The OPEC, which was founded in 1960, is constituted by 12 countries: Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, and Venezuela. The headquarters of the OPEC are located in Vienna (Austria). Its supreme authority is the Conference, composed by highly representatives of the government members, who met at least twice a year to define the political guidelines to continue with respect to petroleum exports. The Committee of Governors applies the resolutions of the Conference and administers the organization.

Operating expenditure (opex):
Ongoing expenses that a business incurs for performing its normal business operations (e.g., wages, maintenance and repair of machinery, utilities and rent). Also referred to as "opex" in accounting practice.

Petro-aggression;
A theory extending "resource curse" arguments into the realm of foreign policy and implying that oil changes incentives for states to make war and conduct international relations.

Production sharing:
The allocation of the physical production of oil and gas between the private investor and the state often by formula.

Production sharing contract/Agreement (PSC/PSA);
An agreement in which the oil and/or gas recovered is shared between the government and a private company, after deduction of investment and production costs (in lieu of, or in addition to, cash payments of taxes). It is also called production sharing agreement (PSA).

Profit oil:
In a production sharing contract, the amount of oil that remains after costs are deducted. (See cost oil.) This is split among project investors, including where applicable government entities.

Project life cycle:
The successive stages of an extraction project; usually moving from exploration, development, and production to closure. It can last between five and 200 years depending on the size and geology of the project.

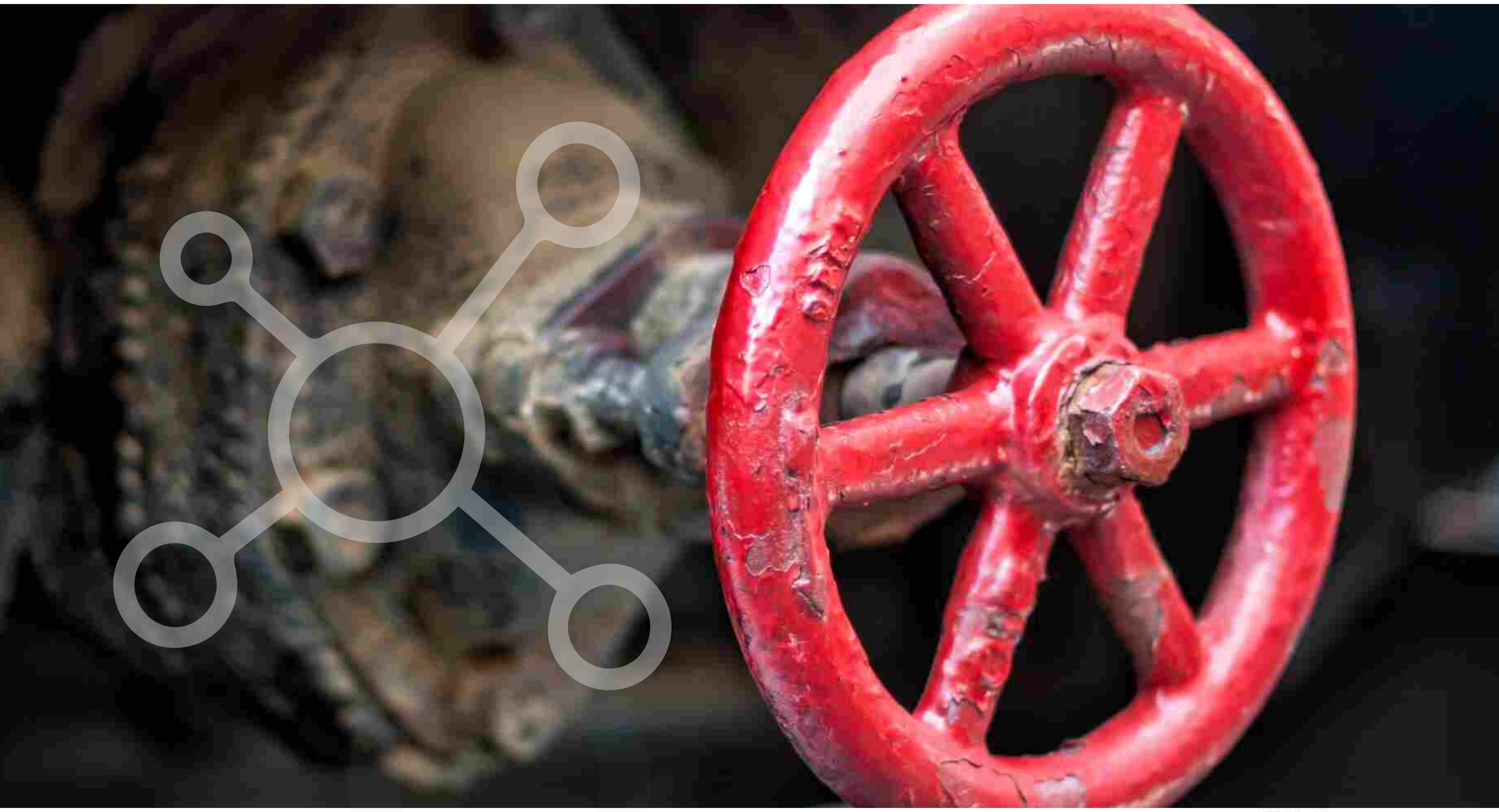
Public disclosure:
Act of making information or data widely available, for example through the media, a public forum or on a website.

Quasi-fiscal expenditures:
Expenditures by a government entity outside of the ministry or government entity's main purpose. For example, national oil company spending on schools instead of their core business, usually acting on behalf of government.

Resource rent:
Revenues that accrue from a natural resource extraction project above and beyond the total costs and economic returns.

Reserves:
The subset of total resources that is commercially viable to extract.

Reservoir Rock:
Highly permeable sedimentary rock (limestone, sand or shale) through which petroleum may migrate, and given their structural and stratigraphic characteristics it forms a trap that is surrounded by a seal layer that will avoid that the hydrocarbons escape.



Resource curse;
The paradox that countries with an abundance of natural resources, specifically nonrenewable resources like minerals and fuels, tend to have less economic growth and worse development outcomes than countries with fewer natural resources.

Resource-dependent:
Generally, when more than 25 percent of a country's GDP, fiscal revenue or exports come from oil, gas or mining.

Resource governance:
The manner in which power is exercised and policies are made in the management of a country's oil, gas and mineral resources for development.

Resource rent tax;
A fiscal instrument designed to capture part or all of the economic rent from natural resource extraction. It can take the form of a variable profit tax, a production share based on the ratio between total cumulated revenues and total cumulated costs, or a tax triggered by a given internal rate of return of a project. Common variants include windfall profits tax or super profits tax.

Resource revenue transfers;
Revenues from extractive projects which are collected by the national government and shared with subnational authorities.

Revenue distribution;
How a government allocates natural resource revenues to different levels of government, institutions, or directly to citizens.

Ring-fencing;
The separate taxation of activities on a project-by-project basis which enables the government to collect tax revenue on a project each year that it earns a profit. Without such requirements companies can offset the tax obligations of more profitable projects with the sizable losses incurred by a project still in its early stages.

Risk/return profile:
The relationship between the potential profits from an extraction project against the potential risks

Royalties:
Payment due to the resource owner based on either ad valorem, a percentage of the value of the resource extracted (e.g., four percent on the sale value of gold extracted) or on a per unit of extraction basis (e.g. four percent on each ounce of gold produced).

Savings fund:
A type of sovereign wealth fund that saves revenues for the long term.

Shell companies:
A legal entity that serves as a vehicle for business transactions without itself having any significant operations.

Social license to operate;
Concept expressing the ongoing acceptance of the project by the surrounding community.

Sour gas:
Natural gas that contains hydrocarbons, Sulphuric acid and carbon dioxide (these last two elements in concentrations greater than 50 ppm).

Source Rock:
Sedimentary rock formed by very fine grain and with an abundant content of organic carbon which is deposited under reducing and low-energy conditions

Sovereign wealth fund (SWF);
State-owned entity with macroeconomic objectives that invests at least partly in foreign financial assets.

Spot price;
The rate quoted for immediate settlement on a contract to purchase or sell a commodity. It is based on the value of an asset on the “spot date”, which is normally two business days after the trade date.

Stabilization clauses:
Terms of contracts that determine how the contract interacts with other laws in the country. They often limit the potential for changes in laws to influence the terms of the contract for a period of time or in a particular area (e.g., changes in the fiscal regime).

Stabilization fund:
A type of sovereign wealth fund created to mitigate the impact of volatility by collecting deposits when prices are high and supplementing the budget when prices are low.

State equity participation:
A state's ownership stake in mineral or oil and gas ventures, either as the sole commercial entity or in partnership with private companies. The government's stake can be in the form of paid equity (where the state pays a market rate for its shares and may have to meet cash calls for project development expenses); carried equity (where the private-sector partner finances part of project costs upfront and the government pays for its equity via foregone revenues); or free equity (where the government pays nothing for its equity, but makes trade-offs elsewhere in the fiscal package).

State-owned company (SOC)/state-owned enterprise (SOE):
A company that is either wholly or partially owned by the government which is created to undertake commercial activities on its behalf. Also known as a state-owned company (SOC), or national oil company (NOC) in the oil sector.

Strategic impact assessment (SIA):
A methodology for a government to evaluate the overall benefits and costs for the country of licensing areas. This is sometimes known as strategic environmental assessment (SEA).

Subnational authority
Official authority or representative of government at a level lower than national (e.g., state, provincial, district).

Surface rental payments:
Payments to the central, or sometimes subnational, government in exchange for the company's use of land to carry out exploration or extraction. These payments are typically based on a fixed or per-acre fee, proportional to the surface area of a mining/ hydrocarbon title.

Sweet gas:
It is the natural gas that contains hydrocarbons and low amounts of sulfhydric acid and carbon dioxide.

Sweetness (of oil):
A measure of the amount of sulfur in oil (less sulfur is sweeter and more valuable).

Tailings:
Material, (e.g. unrecoverable and uneconomic metals, minerals, chemicals, organics and process water) left over after the extraction of ore.

Thin capitalization:
Refers to the state in which a company is financed through a relatively high level of debt compared to equity which is often done to reduce tax liability.

Transfer pricing:
The process for setting the price of a transaction between two entities that are part of a group of related companies. The manipulation of these closed transactions ("transfer mispricing") to avoid taxation can result in significant losses to government revenue in resource producing countries.

Volatility:
In the extractive context, this refers to the frequent tendency of oil, gas and mineral prices to fluctuate unpredictably and dramatically. The Natural Resource Governance Institute, an independent, non-profit organization, helps people to realize the benefits of their countries' oil, gas and mineral wealth through applied research, and innovative approaches to capacity development, technical advice and advocacy.

Wet gas:
It is the natural gas that contains more than 3 gal/Mpc of liquid hydrocarbons

Wildcatting;
An American term for speculative drilling in areas not known as likely to have resources.

"The Tanzania Petrostate Programme is a joint programme of three institutions: REPOA and the NBS in Tanzania, and CMI in Norway with support from the Royal Norwegian Embassy in Dar es Salaam. The Petrostate Programme runs a website at http://www.tanpetstate.org/ where the participating institutions and researchers are presented and the aims of the programme, research results and publications are posted. The programme is also gradually building up a Resource Hub (http://data.tanpetstate.org/) where researchers and other users can download important statistics and information pertaining to the Petro sector and its effect on the Tanzanian economy and society. The database covers 20 categories including production and sales of petroleum products, environmental issues, poverty, public budgets."z