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Peru's hydrocarbons sector and natural gas export potential

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\SUMMARY

Peru is a minor natural gas producer. Its proven reserves represent only 0.1% of the world's ones, ranking third in South America after Venezuela and Brazil. In terms of world production and consumption, Peru represents only 0.3% and 0.2%, respectively.

About 96% of Peru's natural gas is extracted and processed from a handful of blocks in the Peruvian jungle. Blocks 56 and 57 are destined for LNG exports, while block 88 has been reserved for the domestic market. The most important export markets of LNG are mainly countries in Europe and Asia. However, due to lack of more exploration and given the declining ratio reserves to production, exports would only be possible until 2047.

Currently, there is insufficient domestic demand for natural gas, which still provides ample room for exports. Meanwhile, successive Peruvian governments have tried unsuccessfully to massify the domestic demand of natural gas.

CHAPTER 1 NATURAL GAS RESOURCES AND USES IN PERU

Peru is a minor player in the production of oil, natural gas and hydrocarbon. As Table 1 shows, Peru is a net importer of both crude oil and its derivative fuels and a net exporter of liquefied natural gas (LNG). According to the latest data, current proven natural gas reserves in Peru are around 9.244 trillion cubic feet (TCF), representing only 0.1% of the worlds' proven reserves,[1] the leaders being Russia (19.1%), Iran (16.1%), Qatar (12.4%), Turkmenistan (9.8%) and the United States (6.5%). Within South America, Peru is the third largest producer of [natural gas] after Venezuela and Brazil.

Table 1
Peru's fuel trade balance - 2021
(Millions US$)

	Exports	Imports	Net balance
Crude oil	290	1,753	-1,463
Refined petroleum products	1,903	4,296	-2,393
Natural gas	1,706	0	1,706

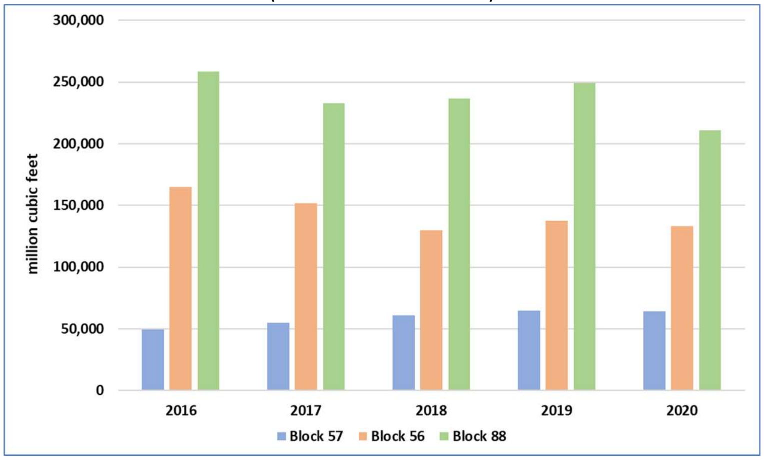
Source: MEF-SUNAT.

Peru's main source of natural gas is located in the country's jungle. About 96% of Peru's natural gas is extracted and processed in the Peruvian jungle by the Consorcio Camisea (CC)[2] in the area known as Camisea (blocks 56, 57 and 88)[3]. This consortium signed a *Gas Supply Agreement* (GSA) with the consortium Peru LNG[4] in 2006 to ensure the supply of gas from blocks 88 and 56, which will expire in 2040 and 2044, respectively[5]. According to this *take or pay* agreement,[6] the CC supplies, on a daily basis, 620 million cubic feet of gas to Peru LNG from block 56 - later was added block 57., This gas is later exported as LNG. In order to do so, at the Las Malvinas plant owned by CC, in the area of the fields, the dry gas is separated from the accompanying liquids and both are conditioned to be transported to the coast through gas pipelines. As there is always gas left over from extraction, it is reinjected into productive fields.

Natural gas production is distributed among domestic consumption, exports and reinjection. When the gas extracted from blocks 56 and 57 arrives to Peru LNG's Pampa Melchorita plant in the coast, LNG is obtained and destined for export. The State has kept Gas from block 88 exclusively for domestic consumption[7]. According to most recent figures, 45% of total production is consumed domestically, 35% is exported and 20% is reinjected to the well from which it was extracted, given the insufficient demand. As seen in Figure 1, block 88 production shows certain stability, while there is a drop in block 56 and an increase in block 57. Regarding consumption and end-use of natural gas, approximately 58% is intended for electricity generation, 26% for industry including mining, 11% for vehicles, and 5% for household consumption.

[1] OSINERGMIN (2022). Statistical Bulletin: Natural Gas Processing, Production and Transportationl. First quarter 2022. One TCF is equivalent to 28316846592 cubic meters.
[2] Comprised by Sonatrach, Hunt Oil Company, Repsol, Tecpetrol, SK Innovation and Pluspetrol.
[3] Blocks 88 and 56 are operated by Pluspetrol Perú Corporation and block 57, by Repsol Exploración Perú. The natural gas production started in 2004 from lot 88, in 2008 from block 56 and in 2014 from block 57.
[4] Shell, Hunt Oil Corporation, Marubeni Corporation, and SK Group comprise the consortium.
[5] OSINERGMIN (2021). Statistical Bulletin: Natural Gas Processing, Production and Transportation, First Quarter 2021, p.11.
[6] LNG Peru is bound to pay for the contracted amount of gas independently if it uses it or not.
[7] Peru LNG Annual Memoire. 2019. Pp.23. https://perulng.com/wp-content/uploads/2020/07/Memoria-Anual-PERU-LNG-2019.pdf

Figure 1
Peru: Natural gas output by block
(Millions of cubic feet)



Source: Osinergmin

Currently, the lack of new projects for exploration and development of natural gas can limit the lifetime of the extraction activity. Table 2 describes the existing gas reserves by block of production. In the Camisea zone, block 58 also contains gas deposits. However, its reserves are considered for the time being as non-viable – i.e. not yet exploitable for commercial use -, because the Gasoducto del Sur pipeline project was left unfinished.

In this regard, the ratio of reserves-to-production has been progressively declining through the years (91.2 in 2009 and 30.4 in 2014), because there are no new proven reserves to meet gas production for domestic consumption and exports, and because reserves from block 58 are still considered 'not viable' as noted above.[8] On the demand side, it is also important to mention that a source from Peru LNG pointed out that the domestic demand for gas could be reduced by the development of renewable energy projects at much more competitive costs.[9]

Table 2
Peru: Gas reserves by main blocks
(Millions of cubic feet)

Block	Proven	Probable	Possible
88	6,479	7,429	7,863
56	1,363	1,633	1,951
57	1,402	1,828	2,204

Source: Osinergmin.

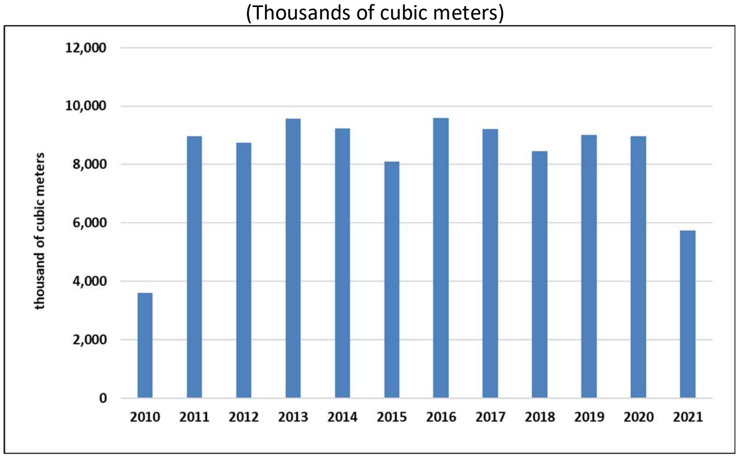
It is worth noting that if gas reserves for export are not increased, they will only last 25 more years. Due to lack of exploration and given the current ratio reserves to production, the energy regulator Osinergmin estimates that exports would only be possible until 2047[10], even though the operation contract expires in 2044.

[8] China National Petroleum Company (CNPC) is developing Block 58. Depending on the results, both proven reserves and the number of years natural gas will last can increase.
[9] Conversation with Jaime Risco, Peru LNG commercial manager.
[10] OSINERGMIN (2021). Statistical Bulletin: Natural Gas Processing, Production and Transportation, First Quarter 2021, p.11.

Exports

Since 2010, the consortium Peru LNG exports LNG through both the spot market and under long-term contracts. Currently, Shell International Trading Middle East (SITME) is the *off-taker,* the company responsible for selling the LNG and deciding to which specific markets the gas is exported to Peru LNG produces in the liquefaction terminal located south of Lima at Pampa Melchorita, which has a production capacity of 4.4 million metric tons per year, and storage capacity of 260,000 m^3.[11] The LNG is sold on a FOB basis by SITME on the spot at a contractual sale price, indexed to natural gas prices at the shipment destination, as well by long-term contracts. Exports are made through maritime transport from the port of Pisco, and solely based on business decisions, i.e. without any interference by the state (see Figure 2).

Figure 2
Peru: Natural gas exports 2010-2021
(Thousands of cubic meters)



Source: BCRP

LNG exports have currently diverse destinations within Europe and Asia. As mentioned before, production of blocks 56 and 57 is destined for export without limitation. Because gas reserves appeared to vastly exceed domestic demand, exportation initiatives were included in the project but not without heated debate in the country.[12] Initially, exports were destined to Mexico and to a lesser extent to Spain; however, since 2016 Peru has progressively diversified its export markets. Thus, during 2019 exports went mainly to South Korea (34%), Japan (20%), China (18%), Spain (9%) and other destinations in Europe and Asia (19%).[13] Within the European Union, the main importers are France, the Netherlands and Spain. It is important to note that in the last two years, the United Kingdom has become a major importer and that gas demand from European countries has surged since the first quarter of 2021, particularly linked to the war in Ukraine.[14]

[11] It is the only liquification plant in South America.
[12] Among others refer to Jaime Quijandria (2010) *Exportar o no Exportar Gas: Un falso Dilema*. Available at: esan.edu.pe/conexcion-esan/exporter-o-no-gas-un-falso-dilema. Also, Humberto Campodonico, *El Gran Fraude de la Exportación de Gas*. Available at desco.org.pe/recursos/site/files/CONTENIDO/1220/15_Campodonico_PHj18.pdf.
[13] LNG Peru Annual Report 2020.
[14] Data on number of shipments and volume in m^3 by country can be found in the Trimestral Boletin Estadistico de OSINERGMIN, and in the web page of PeruPetro.

Table 3
Export destinations of Peruvian gas
(As percentage of total)

Countries	2020	2021	First quarter 2022
Europe	**7**	**44**	**38.8**
United Kingdom		31	38.8
Other*	7	13	
Asia	**91**	**49**	**61.1**
South Korea	45	28	24.7
China	28	5	6.5
Japan	18	16	19
Taiwan			10.9
Americas	**2**	**5**	
México	2		
Canada		5	

* Mainly France, Netherlands and Spain.
Source: Peru LNG and OSINERGMIN.

CHAPTER

2 MAIN REGULATORY FRAMEWORK FOR THE EXPLOTATION OF NATURAL GAS IN PERU

It has been several decades since specific legislation for the development and oversight of the natural gas industry began. This section briefly describes the general mandates of the new hydrocarbons law on the exploitation of natural gas, and other laws and regulations on the promotion of investments in exploitation, processing, transportation and distribution plants, massification of the use of natural gas, as well as the creation of public regulatory and supervisory institutions.

The general regulation for the development of natural gas sector is contained in the Political Constitution of Peru and the Organic Law of Hydrocarbons. The Political Constitution of Peru and the Organic Law of Hydrocarbons (Law 26221, 1993 hereinafter "OLH") comprise the legal framework that regulates the exploitation, transport, distribution, and sale of hydrocarbons. Former's article 66 establishes that natural resources, renewable and non-renewable, are patrimony of the Nation; that the State is sovereign in their use, and that by the OLH, the conditions for their use and their granting to private individuals will be established through concessions, which provides to its holder a right.

Specifically, the OLH establishes that the rules for transport, wholesale and retail distribution, and marketing of products derived from hydrocarbons shall include mechanisms to satisfy the supply of the internal market. On natural gas distribution, the OLH establishes that the distribution of natural gas through the pipeline network is a public service, and thus it must be provided by the state through granting concessions to private companies by the Ministry of Energy and Mines (MINEM) to either national or foreign bidders that demonstrate technical and financial capacity to build, operate and maintain pipelines for the transportation of hydrocarbons according to a concession contract for transport.

Additionally, the Law for the Promotion of the Development of the Natural Gas Industry (Law 27133, 1999) sets specific conditions for the development of the natural gas industry. This specific law was drafted in order to foster competition and to diversify energy sources. For example, it included specific requirements for the exploitation of proven reserves, concessions rules for gas transport and distribution through pipelines networks, and laid down guarantees for investment projects for main networks, among others. In particular, in order to authorize the production of natural gas deposit, this law requires the following:

- To guarantee the supply of natural gas to the national market.[15]
- To fix a maximum price in wellhead for natural gas and specify the procedures for the application of prices and conditions of sales.
- The royalty or retribution paid to the state will be estimated considering the base of verified production of natural gas and the sale prices paid in the national or exportation markets as it may apply, considering volumes measured in cubic feet and heat values measured in British Thermal Units (BTUs). The gas that is not sold will be used in the facilities of the concessionary, contained in natural reservoirs, reinjected to the well or burned, in accordance with the OLH.

[15] Regarding this matter, according to article 2° of Supreme Decree 040-99-EM, the supply of natural gas to the national market is considered guaranteed when the demonstrated reserves (deposits) of the producer can meet the future demand according to the estimations of demand of natural gas, and the levels of reserves published by the MINEM in the "Reference Plan of Hydrocarbons".

The regulation also establishes a series of benefits for Natural Gas Plants. The Law for the Promotion of Investment in Natural Gas Processing Plants (Law 28176, 2004) and its regulation, approved by Supreme Decree N° 031-2004-EM, provided some benefits to natural gas processing plants. Specifically, allowed the State to grant through law-contracts the following incentives for investments:

- Guarantee of tax stability with respect to income tax and excise taxes.
- Temporary importation of any good destined to their activities with suspension of import taxes for a period of two years, extendable for periods of one year, up to two times.
- Guarantee through the central bank of both the stability of the exchange rate regime at the date of signing of the tax stability, and free disposal and free convertibility of foreign exchange.
- The law also sets rules for depreciation of investments made by the natural gas plants before starting operations as well as rules for the deduction of expenses made on services provided to the investors of the plants at initial stages.
- Free availability of the products obtained in the Natural Gas Processing Plant and the possibility for exporting them free of all taxes and duties.
- Special depreciation regimen for investments.

The Supreme Decree N° 081-2007-EM provides the legal framework of transport of natural gas. Through this 2007 amendment, the MINEM modified the legal framework for the transport of hydrocarbons through pipelines, establishing conditions and duration of concessions, setting obligations of the concessionaires and conditions for the transport service itself. The main features of this regulation are:

- It established the obligation to allow open and non-discriminatory access to the gas transport service provision, albeit with some exceptions.
- The concession will be granted for a fixed term period of 20 to 60 years, including the extension period. It may be extended successively for additional terms not exceeding 10 years, unless the concession contract states otherwise. The concession is granted by public bidding or tender or at the request of a party.
- The Supervisory Body of Private Investment in Energy and Mines (OSINERGMIN) sets transportation rates, in accordance with the regulation for transportation of hydrocarbons by pipelines. This does not include the transport and distribution of compressed natural gas (CNG) and liquefied natural gas (LNG) through 'virtual pipelines' (by trucks) for residential, industrial, commercial, or vehicular purposes, which are priced according to market supply and demand.

In addition, through the Supreme Decree 040-2008-EM, MINEM updated the existing regulation on the distribution of natural gas through pipeline networks[16], precising the procedures for granting concessions, setting rates, safety standards and rules on environmental protection, and specifying the functions of the competent regulatory authority and its control capacity.

MINEM, OSINERGMIN and the Environmental Assessment and Supervisory Body (OEFA) are the authorities involved in granting concessions and supervision of the exploration and production of natural gas. MINEM is in charge of the design the sectorial public policy and

[16] The original regulation on distribution of gas was established by Supreme Decree N° 042-99-EM. Through Supreme Decree 040-2008-EM, MINEM approved It's Texto Único Ordenado (TUO, Unique Ordered Text) to organize and update this regulation

awarding concessions. OSINERGMIN is the public agency in charge of regulating the applicable rates for the transportation and distribution of natural gas through pipelines and supervising the obligations of the concessionaires according to their contracts, and the conditions of quality and safety of the facilities and operation of the industry. The OEFA, is the public agency, dependent on the Ministry of the Environment, responsible for the evaluation, supervision and enforcement of environmental regulations, with the aim of contributing to an adequate balance between economic activities and the protection of the environment. Finally, PERUPETRO S.A., a state-owned company subject to private law, represents the Peruvian state in the technical evaluation of companies interested in seeking licenses and services contracts for exploration and production activities of natural gas, examining whether they fulfil the requirements of the law. Both licenses and services contracts must be approved by a Supreme Decree issued by the Peruvian Ministry of Economy and Finance (MEF) and by MINEM.[17]

The government of President Pedro Castillo and the different political parties in Congress have been trying to promote the massification of natural gas. In particular, on July 13th 2022, a bill proposed by the Executive was approved by Congress, although it has not yet officially published.[18] This law seeks to promote projects by the MINEM for the provision of natural gas distribution through pipeline networks by means of special orders to the state-owned companies of the Energy Sector. This scheme for the massification of gas, is aimed to guarantee the security of the fuel supply, based on an overcharge on the service of natural gas transport by pipes (Compensation Mechanism for the Decentralized Access of Natural Gas), applicable to all clients of the companies that carries out this service in Peru. The overcharge would be administered by OSINEGMIN.

However, several industry associations, such as the National Society of Mining, Petroleum and Energy SNMPE, have expressed their concerns about this Compensation Mechanism, since it considers that adds price overcharges to those that are already paying for past investments, and could act as a disincentive for the consumption of natural gas. In addition, many representatives of the private sector manifested that this kind of State projects promotion should be carried out once the channels established in the regulatory framework have been exhausted.[19]

[17] Ernst & Young. Peru's oil and gas investment guide 2019/2020. P. 144.
It is important to note that a license contract does not imply a transfer or a lease of property over the area of exploration or production. In that sense, under the license contract the investor pays a royalty to the State and acquires authorization to explore and exploit gas deposits, while under services contract the government pays a remuneration to the contractor.

[18] Currently there are other projects presented by different parties within the Congress related to the massification of natural gas, such as the following: Bill 00523/2021-CR creates the National Authority for the Massification of Natural Gas; Bill 1453-2021-CR promotes the massification of gas in the country; Bill 01939/2021-CR proposes precisions in the current regulations for the massification of natural gas through a distribution system by pipeline network; Bill 01829/2021-CR declares of public necessity and national interest the execution of the integrated gas transport system project in the south of the country (SIT GAS), taking the original route of the southern Peruvian gas pipeline project; and, Bill 00817/2021-CR declares of national interest and public necessity the construction of natural gas supply and distribution networks throughout the national territory.

[19] Opinion of the Energy and Mining Commission of the Congress of the Republic of Peru on the Draft Law 00679/2021-PE. Pp. 22 -23.

CHAPTER 3 POSSIBILITIES AND MAIN OBSTACLES FOR THE EXPORTATION OF NATURAL GAS IN PERU

A fundamental issue for the Peruvian state has been to achieve an adequate balance between satisfying domestic needs and maintaining the viability of the gas industry in the country. In this context, natural gas exports were included in the design of the Camisea project to make it profitable in the absence of sufficient domestic demand. The hydrocarbons legislation assigned great importance to natural gas in the balance of the country's energy supply sources (fossil, hydroelectric and renewable), as it is a relatively cheaper and cleaner source, which could contribute to alleviate the lack of access to electricity that affects a significant part of the low-income population and reduce its cost for industrial and residential consumers. However, the creation of scale in this market led at the time to include the export of natural gas in the design of the Camisea project. Although the OHL established almost 30 years ago that the distribution of natural gas through a network of pipelines was a public service, to date this has not been achieved, failing the state in achieving mass use of gas for the domestic market.

At present, there are no major new electricity projects for gas-fired generators. The thermoelectric generation of electricity is the main consumer of natural gas in the country, with more than 50% of the total consumption, not having short-term perspectives to increase this demand. The main reasons are the following:

a) an increase in demand from the electricity generation sector is not expected;
b) the current trend in the electricity sector is to use more clean and relatively less expensive renewable energy sources such as solar and wind;
c) residential consumption is limited; and
d) the increase in demand is linked to the progress that can be achieved in the massification of the use of natural gas –however, even if such massification is finally achieved, it is considered that supply will exceed demand for a long period.

Given the insufficient domestic demand for natural gas, exports will continue to be necessary to maintain the viability and profitability of the gas industry, but with limits. The supply of natural gas deposits from blocks 56 and 57 can be expected to be exported until reserves are depleted around 2047[20]. To increase exports beyond that date would require significant investments in exploration and possibly plant capacity expansion.

In addition to the medium-term supply rigidities of exports, there are possible political and social difficulties regarding the future expansion of exports. Even when there is ample space for export of LNG in the short run, currently, there is concern in certain segments of Peruvian society regarding extractive activities and their effects on the environment in general, and increasing demands for the use of natural gas for internal massification. In this regard, in addition to the expectations of the populations of southern Peru that still lack access to electricity, some energy analysts have recently updated their criticisms of the prioritization of natural gas exports over its internal massification in the original design of the project[21], which could be contributing to generate a climate of public opinion that is not conducive to actively promote new export initiatives.

[20] OSINERGMIN Statistical Bulletin, First Quarter 2021, p.11
[21] For example, interviews in radio tv broadcast RPP to Peruvian ex Energy and Mines minister Jorge Herrera Descalzi, 27.10.2021 (since minute 03:30): https://www.youtube.com/watch?v=o-p3l-uC9c0, and hydrocarbons consultant Aurelio Ochoa, 01.10.2021 (since minute 09:13) https://www.youtube.com/watch?v=DQs9YYxVBWM.

Despite government declarations to prioritize the massification of gas use for domestic consumption, it is still not clear how this objective will be achieved. On the one hand, the current government has created a Multisectoral Commission for the Massification of Gas and, on the other, Congress has just approved a new law (not yet in force) to promote gas massification whose specific contribution to that goal is not clear at the moment. The development of gas massification requires an important volume of investment, including gas pipelines and urban connections. Nevertheless, the great lack of management capacity of the current administration and the criticisms regarding any new export initiative are not facilitating factors.