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IEEFA.org

Gas in Spain: Oversupplied and Overcompensated

High Premium Paid by Customers for Security and Diversity of Supply

Executive Summary

The profits of Spanish gas transmission system operator (TSO) Enagás (an abbreviation of Empresa Nacional de Gas) are driven not by consumer demand for natural gas or company efficiency, but instead by a regulatory system that guarantees Enagás a fixed rate of return on its gas infrastructure investments, regardless of whether the country actually needs them. Over the years, Enagás has used "security and diversity of supply" as an excuse for building or expanding liquefied natural gas (LNG) regasification terminals, natural gas pipelines and gas storage facilities. However, these investments have led to very low utilisation rates for gas assets as well as some of the highest gas bills in Europe. Gas demand in Spain has declined since 2008, and Spanish consumers are left paying incredibly high rates for unused infrastructure. Enagás' top two shareholders, with 5% each, are the Spanish government and Amancio Ortega, a Spanish billionaire.

In general, IEEFA finds that the regulated returns structure has been complex with a lack of clarity in some areas, making it difficult for a third party to analyse and increasing the risk of overpayment. In the new regulatory framework (2021-2026), some components of Enagás' remuneration have been decreased but others have increased. This raises doubt as to whether profits will really be reduced to better protect consumers during this new regulatory period.

The utilisation rate of installed LNG capacity has averaged just 27% over the last 10 years and dropped as low as 20% in 2015 and 2016.

Enagás plans to invest in new projects driven by the "decarbonisation pathway to net zero greenhouse gas emissions by 2050," on the basis that renewable gases are needed to decarbonise Spain's economy.[1] This situation raises two critical questions: How can regulators guarantee that these new investments won't create more stranded assets in the future, and how can they guarantee customers won't be forced to foot the bill—yet again—for unnecessary gas projects? In IEEFA's view, there is a significant risk that the past mistakes of overbuilding infrastructure will be repeated, and that Spanish gas consumers will be forced to cover the costs.

[1] Biogas, biomethane, green hydrogen, and synthetic natural gas (SNG) are all described by Enagás as renewable gases.

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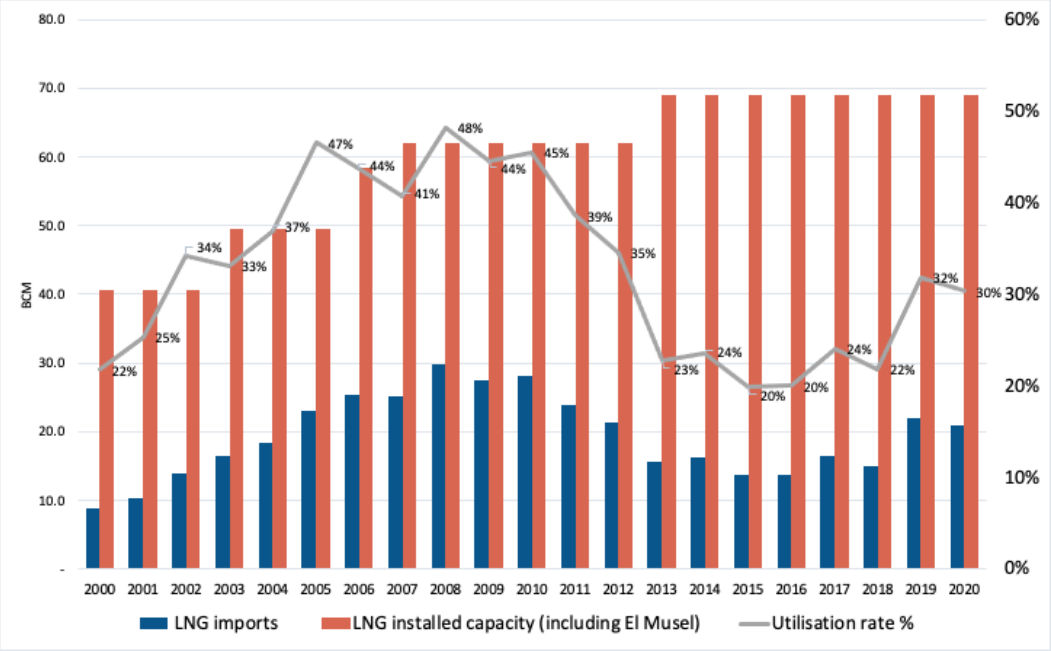
Overcapacity in Gas Infrastructure

LNG Terminals Have Been Consistently Underutilised

In 2015 and 2016, only 20% of Spain's installed LNG capacity was used. Over the last 20 years, the annual utilisation rate has never reached 50%.

Figure 1: Spanish LNG Imports and Installed Capacity*, 2000 to 2020



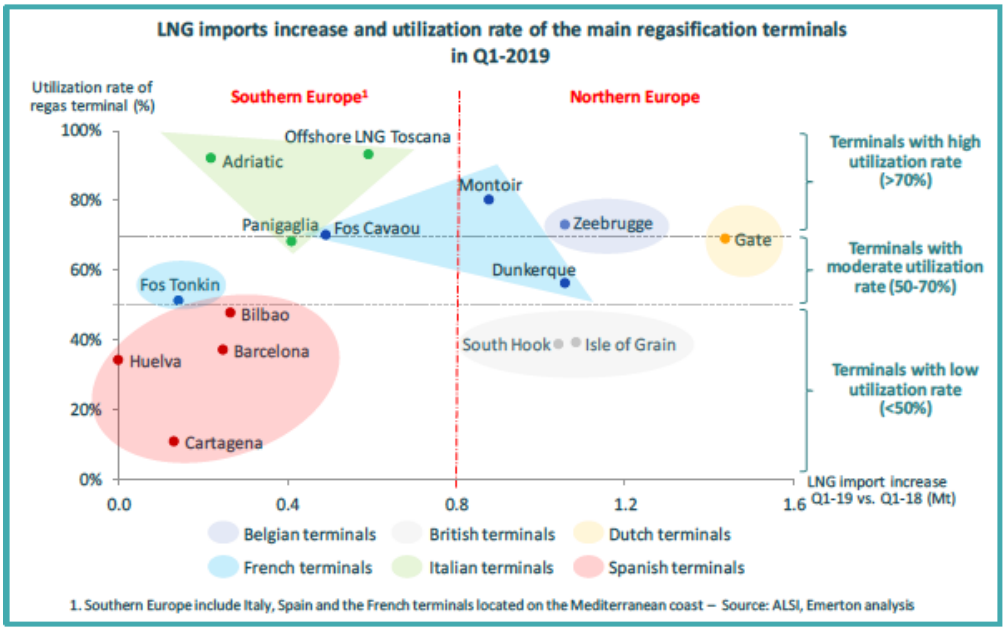
Source: BP Statistical Reviews, Enagás, IEEFA calculations.
**Installed capacity includes El Musel terminal, which has been mothballed since its construction in 2013.*

The annual utilisation rate of LNG terminals in Spain is low compared to other European terminals (see Figure 2).

There are 28 LNG import terminals in Europe. Seven are in Spain, which has six operational LNG terminals and one that is mothballed. The operating LNG terminals account for almost one-third of Europe's LNG import capacity,[2] but have some of the lowest utilisation rates in Europe.

[2] Global LNG Hub. LNG in Europe 2020. December 2020.

Figure 2: LNG Imports Increase and Utilisation Rate of the Main Regasification Terminals[3]

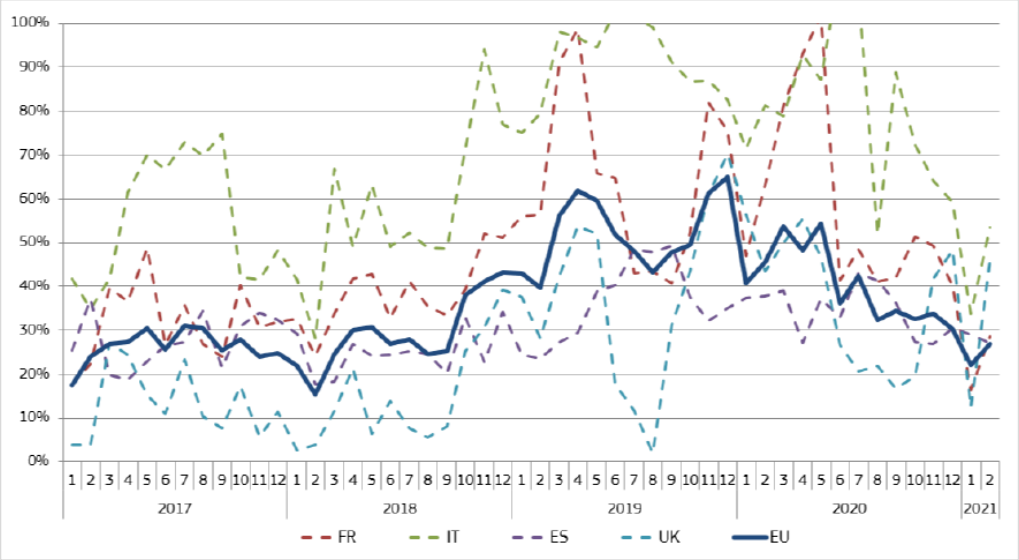


Source: ALSI, Emerton analysis.

In December 2020, the EU average monthly LNG utilisation rate fell to 30%, its lowest since 2018. Utilisation rates were higher than average in Italy and France, and lower in the United Kingdom. While Spain's utilisation rates were lower than the EU average in October and November, it pulled equal with the continent in December.[4]

[3] Emerton. Energy Market Insights. May 2019.
[4] European Commission. Quarterly Report on European Gas Markets. 2021.

Figure 3: Average Monthly Regasification Terminal Utilisation Rates in the EU and in Some Significant LNG Importer Countries



Source: Commission calculations for LNG imports based on tanker movements reported by Refinitiv. Regasification capacities are based on data from International Group of Liquefied Natural Gas Importers (GIINGL) and Gas Infrastructures Europe (GIE).

Background: Enagás and Its LNG Terminals

Enagás S.A. is a Spanish company and European gas transmission system operator (TSO) that owns and operates the nation's gas transmission grid.

Enagás was founded in 1972 by the Spanish government with the aim of creating a nationwide network of gas pipelines. After privatisation in 1994, Gas Natural acquired a controlling stake in the company. Since Enagás demerged in 2002, Gas Natural gradually decreased its stake to 5%, the maximum allowed for any shareholder by the government after 30 December 2006. As of 2006, the state-owned holding company Sociedad Estatal de Participaciones Industriales (SEPI) owns 5% of Enagás. Enagás' top two shareholders, with 5% each, are the Spanish government and Amancio Ortega, a Spanish billionaire.

Enagás is among the biggest owner of LNG terminals in the world.[5] Enagás owns the LNG import terminals of Barcelona, Huelva and Cartagena, 70% of Bilbao and 72.5% of Sagunto. The company operates the five terminals.

Another LNG terminal, Mugardos (El Ferrol), is operated by Reganosa. Its owners are: Grupo Tojeiro (50.4%), Gobierno Galicia (24.6%), First State Regasificador (15%), and Sonatrach (10%). Mugardos LNG Terminal is planning an expansion of 3.6 billion cubic metres (BCM) by 2023 and two LNG terminals are under construction, one in Tenerife and the other one in Gran Canaria.

[5] Enagás. Transportista de gas natural. 2021.

Barcelona has the biggest regasification capacity in Spain and has only reached a utilisation rate of 33% in the last six years. Excluding the mothballed El Musel terminal also owned by Enagás, Cartagena has had the lowest utilisation rate of 7%.

Table 1: LNG Regasification Terminals in Spain

LNG Import Terminals	2015	2016	2017	2018	2019	2020
Import Capacities (BCM/yr)	**68.9**	**68.9**	**68.9**	**68.9**	**68.9**	**68.9**
Barcelona	17.1	17.1	17.1	17.1	17.1	17.1
Huelva	11.8	11.8	11.8	11.8	11.8	11.8
Cartagena	11.8	11.8	11.8	11.8	11.8	11.8
Bilbao	8.8	8.8	8.8	8.8	8.8	8.8
Sagunto	8.8	8.8	8.8	8.8	8.8	8.8
Mugardos, El Ferrol	3.6	3.6	3.6	3.6	3.6	3.6
El Musel (mothballed)	7.0	7.0	7.0	7.0	7.0	7.0
Import Volumes (BCM/yr)	**13.7**	**13.8**	**16.6**	**15.0**	**21.9**	**20.9**
Barcelona	3.4	3.2	5.5	5.5	5.7	4.2
Huelva	3.0	3.6	4.5	4.2	5.1	4.5
Cartagena	1.3	1.0	0.8	1.0	1.8	3.1
Bilbao	2.1	1.6	2.7	2.9	6.0	5.3
Sagunto	2.5	3.1	1.9	0.2	2.2	1.8
Mugardos, El Ferrol	1.5	1.2	1.0	1.2	1.3	2.0
El Musel (mothballed)	0.0	0.0	0.0	0.0	0.0	0.0
Utilisation Rates (%)	**20%**	**20%**	**24%**	**22%**	**32%**	**30%**
Barcelona	20%	19%	32%	32%	33%	25%
Huelva	25%	30%	38%	36%	43%	38%
Cartagena	11%	8%	7%	8%	15%	26%
Bilbao	23%	18%	31%	33%	68%	60%
Sagunto	28%	35%	22%	2%	25%	21%
Mugardos, El Ferrol	41%	34%	29%	32%	35%	55%
El Musel (mothballed)	0%	0%	0%	0%	0%	0%

Source: BP Statistical Reviews, CORES, IEEFA calculations.

The El Musel LNG Terminal located in Gijon (Asturias) on the northern coast was completed in 2013 but immediately mothballed. Under Spain's Royal Decree 13/2012, El Musel will remain in "hibernation" until gas demand rises.[6] As of December 2018, the carrying amount of this investment totalled €378.9 million. While the El Musel regasification plant has not been in operation, Enagás has the right to receive compensation to ensure the recovery of the costs associated with the delays, as well as a fee for the operation and maintenance costs (O&M) necessary to maintain the plant so that it is ready to be brought into service if required.[7] During the 2015-2020 regulatory period, Enagás Transporte, S.A.U. received €19.4 million annually for El Musel financial remuneration and €4.2 million for operation and maintenance costs, totalling €23.6 million. Similar amounts are expected in the new regulatory period.

[6] King and Spalding. An Overview of LNG Import Terminals in Europe. 2018.
[7] Enagás Financiaciones, S.A.U. Guaranteed Euro Medium Term Note Programme Guaranteed by Enagás S.A. May 28, 2021.

In Spain, shippers collect a part of the LNG terminals' allowed revenues through a compensation mechanism, with capacity charges billed directly to domestic consumers. The amounts recovered from consumers connected to local networks do not depend on the use of LNG terminals, but on costs associated with security of supply and costs associated with having the El Musel LNG terminal mothballed.[8]

After eight years of hibernation, there are plans to reactivate El Musel. LNG9, a Singapore-based company, is developing a 1600-megawatt (MW) combined-cycle gas turbine plant nearby. Assisted by the Enagás regasification facility of El Musel, LNG9 also proposes to build a manufacturing facility to produce hydrogen from natural gas with carbon capture.[9]

Approximately 98% of current hydrogen production is from the reformation of methane or the gasification of coal or similar materials of fossil-fuel origin; only about 1% of hydrogen production from fossil fuels includes carbon capture and storage (CCS).[10]

Enagás Main Activities

Spain's gas network consists of Enagás, a regulated monopoly and the nation's only large TSO, as well as one small TSO and 12 transport companies.[11]

Enagás' main activities are:

I. Infrastructure:

   a) Gas transport: Offers gas transmission through pipelines network;

   b) Regasification: Transforms liquefied natural gas (LNG) into gas form and stores it in cryogenic tanks; and

   c) Storage: Operates underground natural gas storage facilities.

II. Technical Management: Coordination of the access, storage, transportation and distribution process, maintaining gas infrastructure and ensuring the continuity and security of gas supply.

III. Unregulated Activities: Includes deregulated operations and transactions.

The company has a presence in Greece, Albania, Italy, the United States, Mexico, Chile and Peru, and a 16% share of the Trans-Adriatic Pipeline (TAP) European Project.[12]

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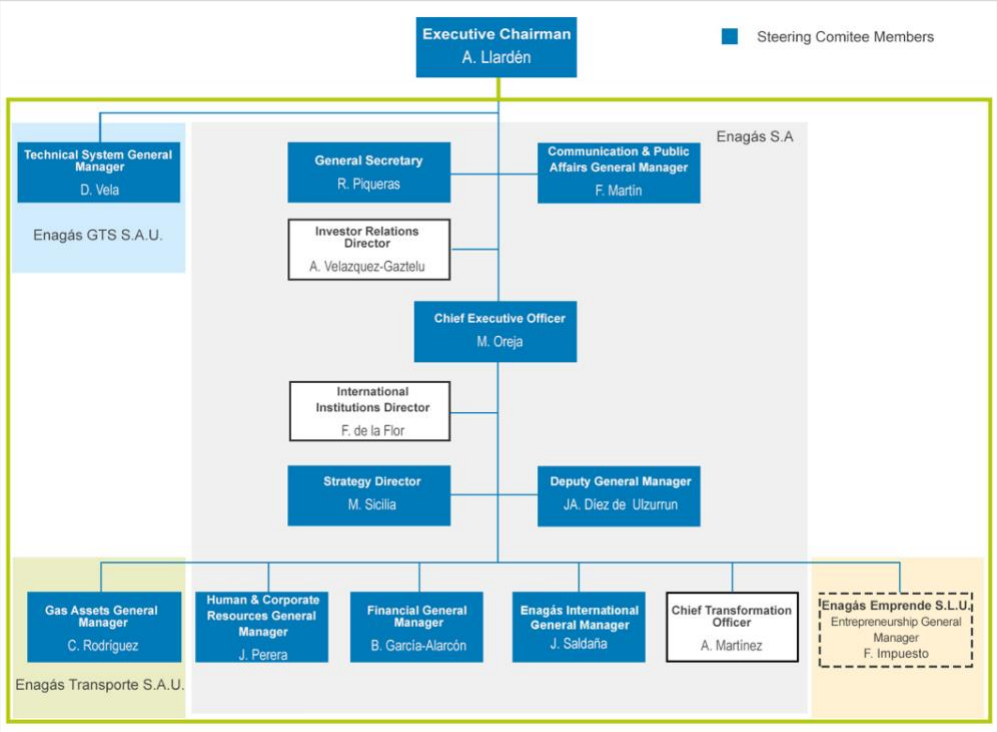
[8] Agency for the Cooperation of Energy Regulators. The internal gas market in Europe: The role of transmission tariffs. April 6, 2020.
[9] El Comercio. Un grupo de Singpur plantea construer un ciclo cominado en El Musel. July 10, 2021.
[10] Global CCS Institute. Blue Hydrogen. April 2021.
[11] Council of European Energy Regulators. Report on Regulatory Frameworks for European Energy Networks 2019. January 28, 2020.
[12] Trans Adriatic Pipeline. TAP's shareholders. 2021.

Enagás' annual income comes from regulated and non-regulated activities. Enagás' income from regulated activity depends fundamentally on the use of its assets and on the repayment that the state provides for these activities and for being the technical manager of the system. **Over the last six years, 92% of Enagás' revenue has come from regulated activities.**

The company derives about 95% of its revenue from its Enagás Transporte S.A.U. subsidiary. This unit receives revenue from transporting and distributing natural gas through its own network of pipelines, the operation of regasification facilities that transform natural gas from a liquid to a gas, and the maintenance of its natural gas storage facilities.[13]

Figure 4: Enagás Organisation



Source: Enagás.

The legally designated technical manager of the system is Enagás GTS, a company belonging to the Enagás S.A. group (to which Enagás Transporte also belongs). Enagás Transporte del Norte, S.A.U. owns 450 kilometers of high-pressure gas pipelines in the Basque region and the international Irún connection.[14]

[13] Pitchbook. Enagás Overview. 2021.
[14] Enagás. Enagás completes acquisition of 90% of Naturgas Engergía Transporte from EDP. February 15, 2013.

Enagás' remuneration for performing its obligations as system technical manager is determined annually through an order by the Ministry for the Ecological Transition and the Demographic Challenge.

International Pipelines

Average Utilisation Rate of 61%

The Spanish market's gas consumption relies on imports from its international pipeline connections with Africa, France and Portugal, as well as its LNG terminals.[15]

There are two gas pipelines from North Africa, both bringing Algerian gas. The Maghreb-Europe Gas Pipeline (MEG) brings 12.5 billion cubic meters per annum (bcma) of gas from the Hassi R'Mel field in northern Algeria, via Morocco to land at Tarifa in southwestern Spain. One quarter of the Algerian gas is shipped into Portugal. The Medgaz pipeline brings 8 bcma of gas from the same field to land at the southeastern tip of Spain at Almería.[16]

Spain has two interconnections with France: Virtual Interconnection Point (VIP) Pirineos (Larrau and Irún pipelines). It also has two interconnections with Portugal: VIP Ibérico (Badajoz and Tuy bi-directional pipelines). The capacities at the VIP Ibérico are 4.6 bcma from Spain to Portugal and 2.6 bcma in the other direction. The two existing pipeline connections with France are situated on the western side of the border, at Biriatou (FR)-Irún (ES), which is bi-directional and at Col de Larrau, which is mainly used for importing into Spain. The two physical pipelines were merged in 2014 into one single virtual point known as VIP Pirineos.

Figure 5: Gas System Owned by Enagás[17]

Source: Enagás.

[15] Enagás Financiaciones, S.A.U. (incorporated with limited liability in the Kingdom of Spain). €4,000,000,000 Guaranteed Euro Medium Term Note Programme Guaranteed by Enagás, S.A., May 21, 2021

[16] Oxford Institute for Energy Studies. A Hub for Europe: The Iberian Promise? March 2019.

[17] Enagás. Mapa de infraestructuras de Enagás en España. 2021.

In addition to its six international connections, Enagás also has 19 compressor stations across the country, along with transmission centres, regulation and metering stations and network connection points ensuring proper primary gas distribution around the country.[18]

A third interconnection is planned between Portugal and Spain, connecting Celorico da Beira to Zamora. The first stage of the interconnection will provide 70 gigawatt-hours/day (GWh/d) to both countries and is scheduled to begin operation in 2024.[19]

Table 2: International Pipeline Capacities and Volumes in Spain

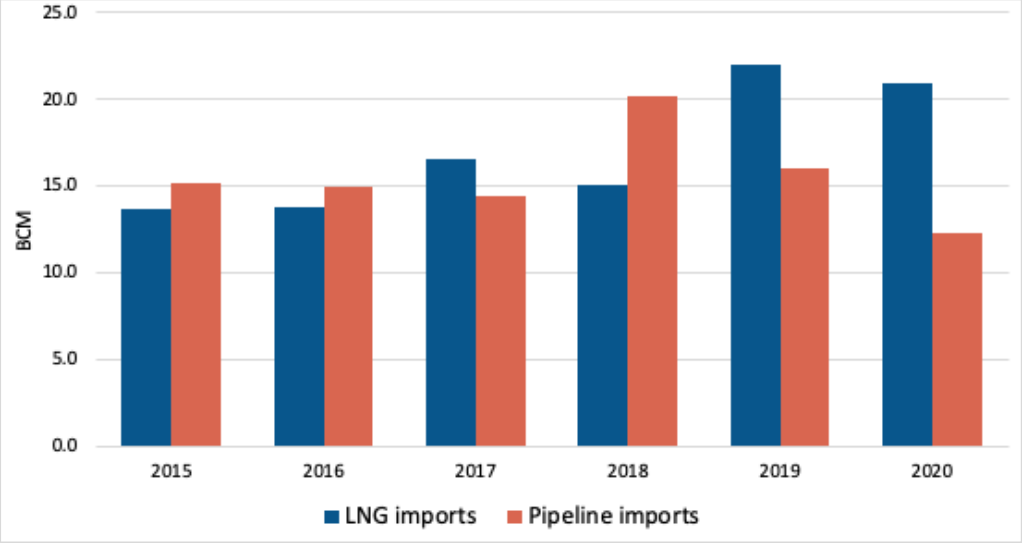
International Pipelines	2015	2016	2017	2018	2019	2020
Import Capacities (BCM)	**25.5**	**25.5**	**25.5**	**25.5**	**25.5**	**25.5**
Medgaz Pipeline (from Algeria via Almeria)	8.0	8.0	8.0	8.0	8.0	8.0
Maghreg-Europe Pipeline (from Algeria via Morocco)	9.4	9.4	9.4	9.4	9.4	9.4
VIP Pirineos (France to Spain)	5.5	5.5	5.5	5.5	5.5	5.5
VIP Ibérico (Portugal to Spain)	2.6	2.6	2.6	2.6	2.6	2.6
Import Volumes (BCM)	**15.2**	**15.0**	**14.4**	**20.2**	**16.0**	**12.3**
Medgaz Pipeline (from Algeria via Almeria)	5.4	5.4	5.2	7.1	6.2	5.4
Maghreg-Europe Pipeline (from Algeria via Morocco)	7.1	7.0	6.1	9.4	5.2	3.7
VIP Pirineos (France to Spain)	2.6	2.7	3.1	3.6	4.4	3.0
VIP Ibérico (Portugal to Spain)	0.0	0.0	0.0	0.0	0.2	0.2
Utilisation Rates (%)	59.7%	58.8%	56.5%	79.2%	62.7%	48.2%
Medgaz Pipeline (from Algeria via Almeria)	68.1%	67.2%	65.5%	89.2%	77.4%	67.5%
Maghreg-Europe Pipeline (from Algeria via Morocco)	75.8%	74.0%	64.5%	100.4%	55.3%	39.2%
VIP Pirineos (France to Spain)	48.0%	48.5%	56.2%	65.8%	80.7%	55.4%
VIP Ibérico (Portugal to Spain)	0.0%	0.0%	0.0%	0.4%	6.7%	6.4%

Source: BP Statistical Reviews, CORES, Enagás, IEEFA calculations.

These pipelines have a total capacity of 25.5 bcm, which when added to 68.9 bcm of LNG total installed capacity, gives Spain a total of 94.4 bcm of gas import capacity. **The average utilisation rate of all import capacity (LNG and pipelines) has been 34%, ranging between 30% and 40% annually.**

[18] Enagás. Red de transporte Gasoductos. 2014.
[19] REN. Project description. August 2018.

Figure 6: LNG and Pipeline Imports in Spain Over Last Six Years



Source: BP Statistical Reviews, CORES, Enagás, IEEFA calculations.

Midcat/STEP Gas Pipeline: Another Infrastructure Not Needed

The Midi-Catalonia project MidCat (originally the STEP, or South Transit East Pyrenees) is a planned pipeline running from Catalonia in northern Spain to southeastern France. Begun in 2011, its goal was to double the capacity of gas transportation from Spain to France and increase the EU's energy security. French energy regulator CRE and its Spanish counterpart CNMC rejected a project by France and Spain's grid operators to build a gas pipeline across the Pyrenees.[20] French grid operator Teréga and Spanish operator Enagás submitted a project to boost capacity by 180 GWh in the France-to-Spain direction and by 230 GWh in the Spain-to- France direction.[21] But the project has faced opposition from French energy regulator CRE, which said Midcat would push up consumer prices without improving security. Industry experts have questioned the need for another interconnector, arguing that cross-Pyrenees pipelines are already under-utilised, even during periods of high demand. The South Transit Eastern Pyrenees (STEP) is the first phase of Midcat.[22]

Underground Storage Facilities

Spain has four operating underground gas storages (UGS) sites. Three are depleted gas fields: Gaviota (offshore, Basque country), Serrablo (Huesca) and Marismas (Huelva). Yela (Guadalajara) is a saline aquifer. Marismas is owned by a subsidiary of Gas Natural Fenosa, and the other three by Enagás Transporte.[23] Their working gas capacities are: Gaviota, 2.7 bcm; Serrablo, 1.1 bcm; Marismas, 0.6 bcm and Yela,

[20] Reuters. Regulators reject France-Spain gas interconnection project. January 22, 2019.
[21] Snam, GIC, EDF and CAA now hold respectively 40.5%, 31.5%, 18.0% and 10.0% of Teréga stock.
[22] European Commission. Cost benefit analysis of STEP, as first phase of MIDCAT: April 2018.
[23] International Energy Agency. Energy Policies of IEA Countries: Spain. 2015.

2 bcm.[24] Enagás' remuneration from underground storage facilities accounts for 6% to 9% of total regulatory returns.

The Castor Project, Spain's largest gas storage plant, offers another example of gas infrastructure that has not been put into operation. Built into an old oilfield 22 kilometers off the Castellón coast, the Castor Project was justified by Spain's alleged need for more gas storage due to energy security concerns—a claim subsequently dispelled. But after starting pre-operation activities in 2013, the multi-billion euro project was shut down after it caused more than 1,000 earthquakes reaching as high as 4.2 on the Richter scale.[25] The project was transferred to Enagás and put into hibernation in November 2014.[26]

Enagás Transporte S.A.U. has been appointed to manage the maintenance of the facility during the hibernation period. Escal UGS, owner of the Castor project concession, received from Enagás Transporte a compensation for the net recognized value of the facility. To finance the compensation, the gas system issued credit rights (30 years' maturity) to Enagás Transporte. The rights were securitized to several banks and can be further assigned to third parties. The credit right's holder has been receiving an annuity from the gas system's settlements since 2016 to recover principal and interest.

Enagás Transporte S.A.U. has been receiving annual remuneration for provisional costs of maintenance and operation of Castor Underground Storage facility as indicated in the Article 3.2. of the Decree Law 13/2014. Total annual payments have been:

- 2015, € 17.3 million;
- 2016 and 2017, € 15.7 million;
- 2018 and 2019, € 8.7 million;
- 2020, data is missing from the state bulletins

Enagás Income

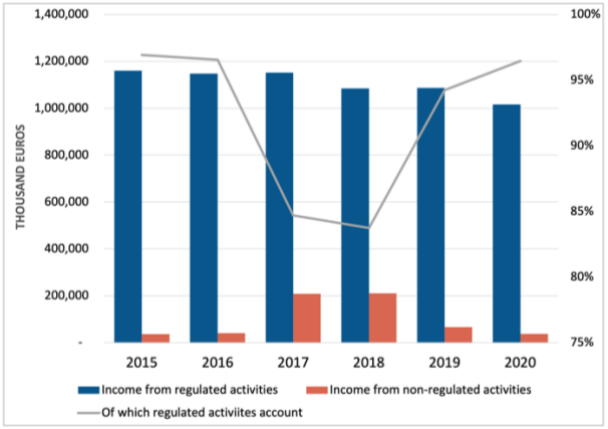
92% of Enagás Income Comes From Regulated Activities

The company's regulated returns are calculated by adding the costs of investment; supply, operation and maintenance; and management of the gas network. These values can be found in the Official State Bulletin (Boletín Oficial del Estado).

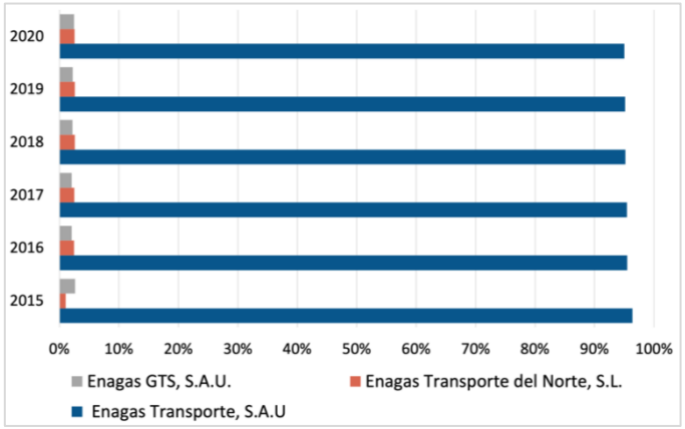
[24] S&P Global Platts. Hydrogen: Beyond the Hype. 2021.
[25] Corporate Europe. Who Owns All The Pipelines? September 2019.
[26] European Investment Bank. Conclusions Report. March 7, 2018.

Figure 7: Enagás Revenue

Total Revenue



Revenue From Regulated Activities



Source: Enagás' financial statements.

Enagás receives remuneration through its subsidiaries, including Enagás Transporte S.A.U., Enagás Transporte del Norte, S.A.U., Enagás GTS, and also through its percentage of ownership in the Sagunto and Bilbao regasification plants.

Table 3: Enagás Regulatory Returns per Subsidiary (€'000s)[27]

Total RCS	2015	2016	2017	2018	2019	2020
Enagás Transporte S.A.	237,854	236,071	247,097	248,930	236,846	246,942
Enagás Transporte del Norte S.A.U.	7,094	6,985	7,318	7,251	6,905	6,999
Enagás GTS	11,561	23,966	23,966	23,966	23,893	23,893
Planta Regasificadora de Sagunto, S.A. (72.5% Enagás)	10,312	10,762	11,249	12,410	11,596	15,199
Bahia de Bizcaia Gas, S.L., Bilbao (70% Enagás)	7,336	8,898	9,300	10,275	9,599	12,619
Total RD	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Enagás Transporte S.A.	722,685	723,422	745,875	720,265	704,949	637,228
Enagás Transporte del Norte S.A.U.	21,085	20,853	20,529	20,232	19,915	19,517
Enagás GTS	N/A	N/A	N/A	N/A	N/A	N/A
Planta Regasificadora de Sagunto, S.A. (72.5% Enagás)	78,994	77,000	61,258	58,075	54,524	53,497
Bahia de Bizcaia Gas, S.L., Bilbao (70% Enagás)	38,661	40,358	41,394	39,031	38,550	37,927
Total OPEX	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Enagás Transporte S.A.	42,782	48,652	48,652	32,934	45,698	4,165
Enagás Transporte del Norte S.A.U.	N/A	N/A	N/A	N/A	N/A	N/A
Enagás GTS	N/A	N/A	N/A	N/A	N/A	N/A
Planta Regasificadora de Sagunto, S.A. (72.5% Enagás)	N/A	N/A	N/A	N/A	N/A	N/A
Bahia de Bizcaia Gas, S.L., Bilbao (70% Enagás)	N/A	N/A	N/A	N/A	N/A	N/A

Source: BOEs, Official State Bulletins.
Note: Sagunto and Bilbao values correspond to the total remuneration allowed per year. Enagás has a participation on them in relation to the percentage of ownership.

[27] Includes reported retrospective amendments in remuneration for preceding years.

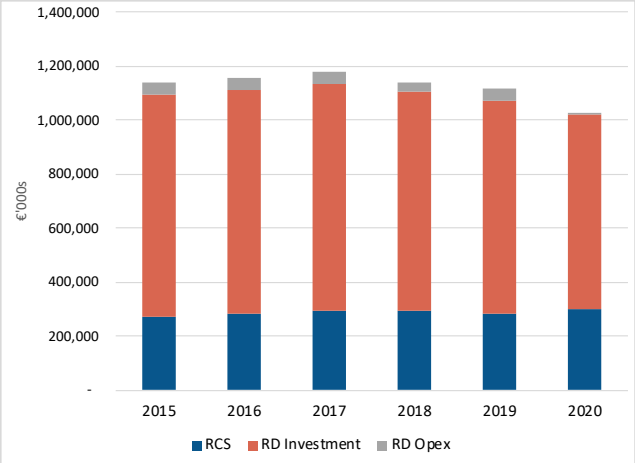
Throughout the six years of the last regulatory period, return on investment costs (RD) has been Enagás' largest source of revenue, contributing 71% of total regulated revenue, followed by renumeration to continuity of supply (RCS) with 25%, and return for operation and maintenance with 4%. RD has made up 67% of Enagás total revenue (regulated and non-regulated).

The returns may have been depressed for 2020 because of missing underground storage revenue figures in the state bulletins.

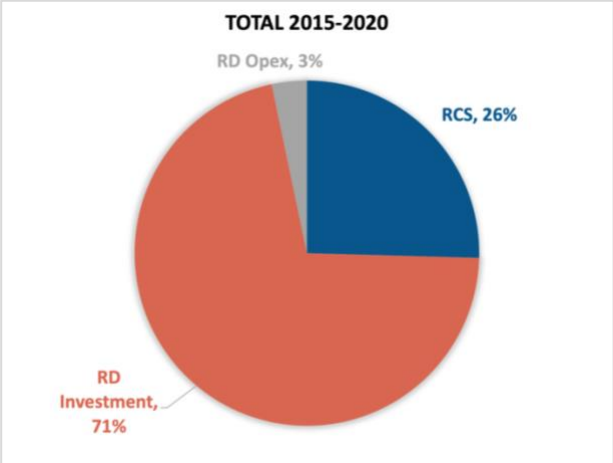
Return on Investment Costs (RD) is Enagas' *cash cow*, generating 67% of the company's revenue over the last 6 years.

Figure 8: Enagás Regulated Returns

Regulated Returns by Component



Regulated Returns Average Values



Source: BOEs, Official State Bulletins.

Since RD is responsible for almost three-quarters of Enagás regulatory returns, it is crucial to understand its components.

From the RD calculations, it might be assumed that the financial remuneration of 5.09% of net investment is the main value, but this is not the case. Costs of exploitation (COPEX) are a very significant part of Enagás' remuneration for investment. In both 2019 and 2020, it was greater than the financial remuneration (see Table 4).

Table 4: Enagás Returns for Investment, 2019 and 2020

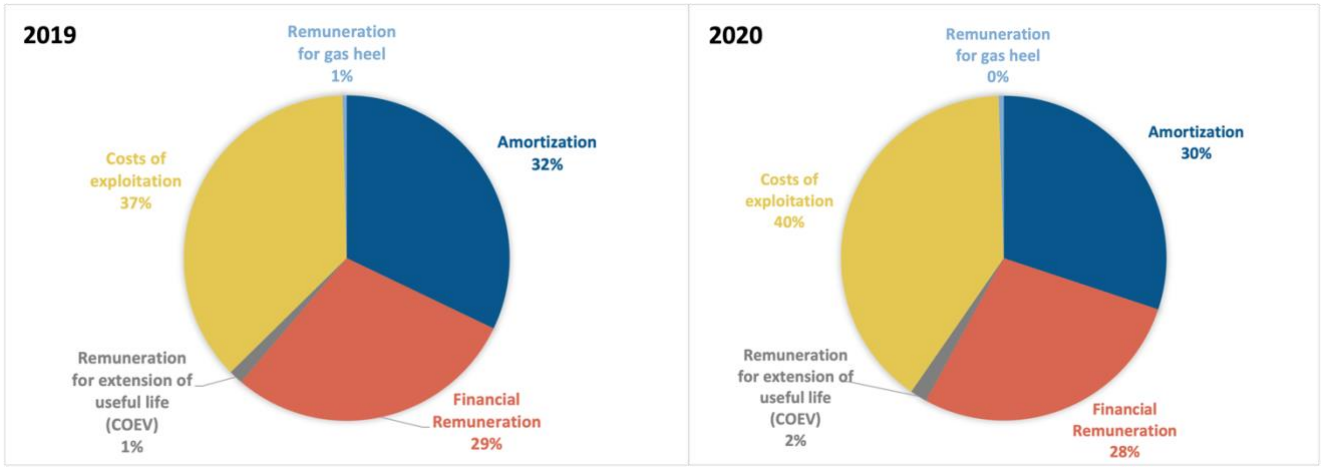
Total Enagás (Including Sagunto/Bilbao) 2019, €'000s	Net Investment	I - Financial Remuneration (5.09% of Net Investment)	II - Amortization	III - Remuneration for Extension of Useful Life (COEV)	IV - Costs of Exploitation (COPEX)	Remuneration for Availability of Investment (= I + II + III + IV)	V - Remuneration for Gas Heel	Total RD
Transport	3,023,770	153,910	149,807	932	180,768	485,416	1,780	**487,196**
Regasification	1,173,481	59,730	76,160	10,017	113,258	259,165	1,526	**260,691**
Storage	354,050	18,021	29,536	-	-	47,557	-	**47,557**
Total	**4,551,300**	**231,661**	**255,502**	**10,949**	**294,026**	**792,139**	**3,306**	**795,445**

Total Enagás (Including Sagunto/Bilbao) 2020, €'000s	Net Investment	I - Financial Remuneration (5.09% of Net Investment)	II - Amortization	III - Remuneration for Extension of Useful Life (COEV)	IV - Costs of Exploitation (COPEX)	Remuneration for Availability of Investment (= I + II + III + IV)	V - Remuneration for Gas Heel	Total RD
Transport	2,874,201	146,297	146,514	1,446	176,344	470,601	1,988	**472,589**
Regasification	1,097,321	55,854	72,159	10,758	113,258	252,029	1,625	**253,654**
Storage	n/a	n/a	n/a	n/a	n/a	-	n/a	**n/a**
Total	**3,971,522**	**202,150**	**218,674**	**12,204**	**289,602**	**722,630**	**3,613**	**726,243**

Source: BOEs, Official State Bulletins.

Furthermore, the additional remuneration from RCS increases the implicit return on gas transmission assets,[28] which makes it difficult to compare the 5.09% rate of return with other gas TSOs in Europe.

Figure 9: Enagás Returns for Investment 2019 and 2020



Source: BOEs, Official State Bulletins and IEEFA calculations.

In 2019, COPEX accounted for 37% of all Enagás remuneration for investment, while financial remuneration accounted for 29%, and amortization 32%. In 2020, COPEX accounted for 40% of all Enagás' remuneration for investment, while the financial remuneration accounted for 28% and amortization, 30%.

[28] Council of European Energy Regulators. Report on Regulatory Frameworks for European Energy Networks 2019. January 28, 2020.

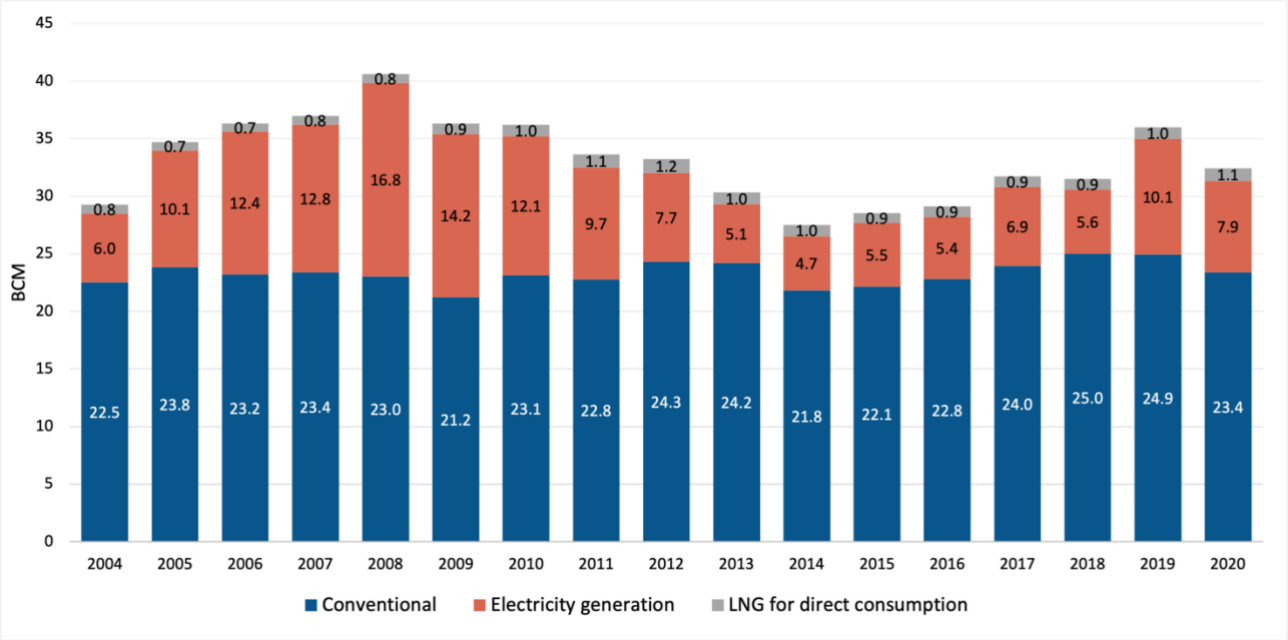
Why has COPEX become such a significant value in RD? And how it is going to be treated in a new regulatory framework (2021-26)? Because COPEX largely consists of costs incurred in updating the equipment for facilities in service, **the more infrastructure in service, the higher COPEX.**

Spain's Gas Demand and Tariffs

One of the Highest Natural Gas Prices for Household Consumers in Europe

Since 2008, gas demand in Spain has been declining. Gas demand in 2020 (32.4 bcm) was 20% less than 2008 demand (40.6 bcm), mainly due to a reduction in natural gas for power generation from 16.8 bcm in 2008 to 7.9 bcm in 2020.

Figure 10: Evolution of Annual Natural Gas Demand in Spain (BCM)



Source: CORES, BP statistical reviews and IEEFA calculations.

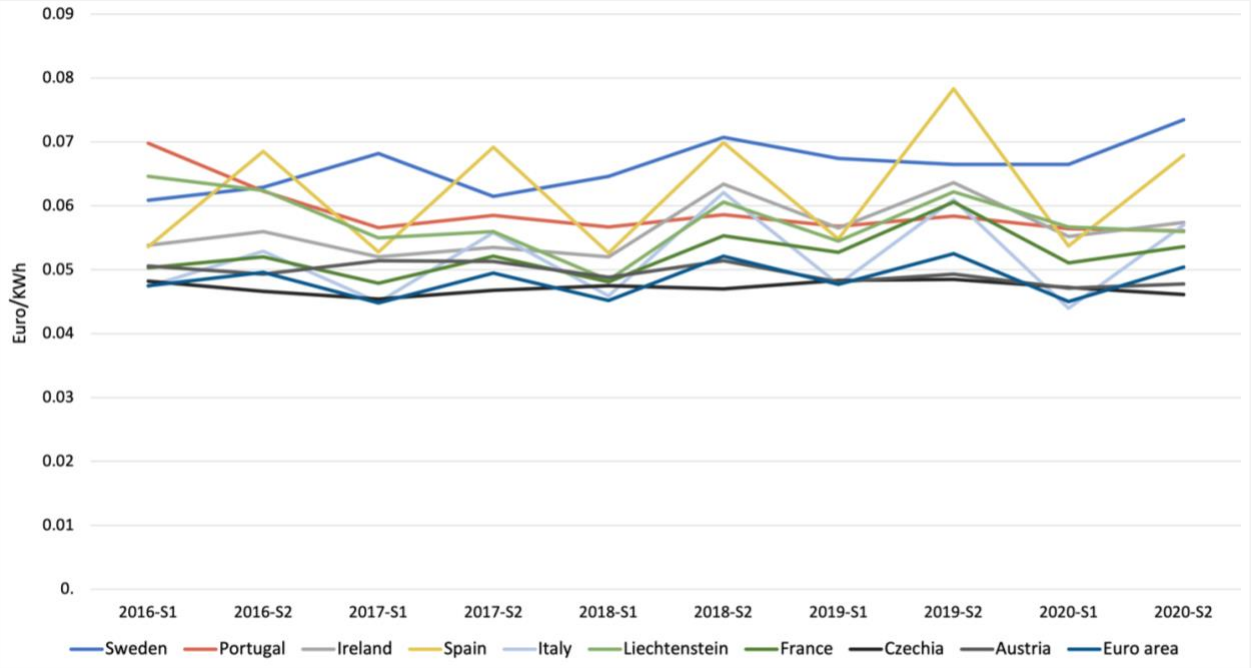
If gas demand in Spain has been falling, what has been happening with gas prices to consumers?

Spain has among the highest natural gas prices for household consumers in Europe. Household consumers are medium-sized consumers with an annual consumption between 20 gigajoules (GJ) and 200 GJ. The average price in the EU—a weighted average using the most recent (second half 2020) data for natural gas consumption by household consumers—was approximately 7 Euro cents per kWh.[29] These values do not include taxes and levies.

[29] European Commission. Natural gas prices for household consumers. April 2021.

Analysing the last five years, Spain has had the second-highest average gas prices for household consumers in Europe, behind only Sweden. It holds the record for the highest gas price in Europe on the second half of 2019 of EUR 0.0783 per kWh (~8 Euro cents per kWh).[30]

Figure 11: Natural Gas Prices for Household Consumers in Europe Bi-annual Data (euros/kWh)[31]



Source: Eurostat and IEEFA calculations.

Electricity and Gas Price Breakdown[32]

The main components of the electricity and gas prices paid by household consumers are:

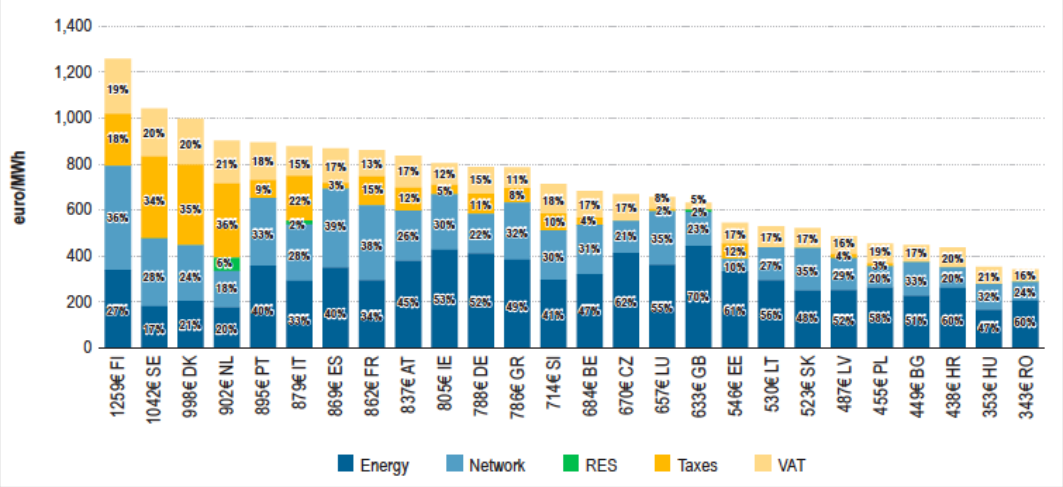
- Energy costs. The costs reflect mainly the cost of purchasing electricity and gas on the wholesale market, as well as suppliers' operating costs to run the business, including sales and billing, and profit margin.

- Network costs. The costs include the rates charged for transmitting and distributing energy to end users, including transmission and distribution losses, system operation costs and metering and meter rental.

[30] European Commission. Gas prices for household consumers. May 20, 2021.
[31] Taxes and levies are not included.
[32] Agency for the Cooperation of Energy Regulators. ACER Market Monitoring Report 2019. October 26, 2020.

- Renewable energy source (RES) charges. The charges are levies paid for government policies to support renewable energy sources.
- Other taxes and charges. The charges include: (i) taxes and charges for promoting and improving energy efficiency and combined heat and power generation, (ii) taxes and charges related to air quality and environmental purposes, (iii) taxes and charges related to CO_2 and other greenhouse gas emissions, (iv) taxes and charges related to the nuclear sector, capacity payments, energy security and generation adequacy, (v) energy consumption tax, and (vi) other taxes and charges not covered by any of these items and/or not linked to the energy sector.
- VAT. Consumers also pay a value-added tax.

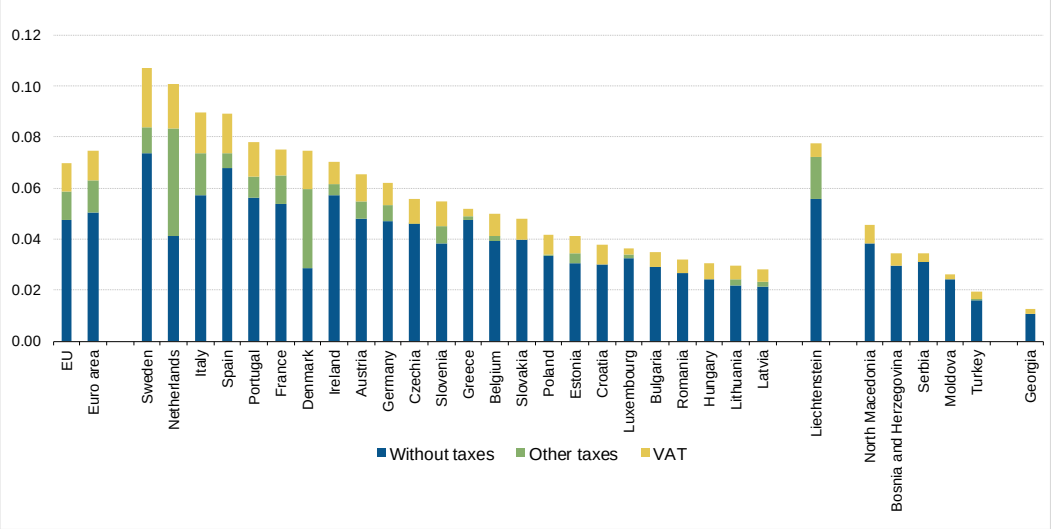
Figure 12: Breakdown of Incumbents' Standard Gas Offers for Households in EU Capitals – November/December 2019 (%)



Source: ACER calculations based on data from price comparison tools, incumbent suppliers' websites and NRAs, collected via ACER Retail Database (2019).

In 2019, Spain's breakdown of standard gas offers for households consisted of 40% for energy supply, 39% for network costs, 3% for taxes and 17% for the VAT.

Figure 13: Natural Gas Prices for Household Consumers, H2 2020 (€/kWh)



Source: Eurostat (online data codes:nrg_pc_202).
Note: Cyprus, Malta, and Finland do not report natural gas prices in the household sector.

Like power companies, gas TSOs needing to invest in transmission and/or distribution reliability must balance the costs of investing and maintaining infrastructure with the degree of reliability needed. In the end, the costs are paid by consumers. How reliable should a gas network be? Does security and diversity of supply really justify such high "insurance costs" being paid by customers?

Rate-of-Return Regulation

Are We Seeing the Averch-Johnson Effect in Action?

Rate-of-return regulation is a form of price-setting regulation in which government regulators determine the fair price that a monopoly, such as a gas utility, is allowed to charge its customers. Rate regulation is designed to protect customers from being charged higher prices due to the monopoly's power, while still allowing the monopoly to cover costs and earn a reasonable return for its owners.[33]

[33] Investopedia. Rate of Return Regulation. November 18, 2020.

Rate-of-return regulation is often criticized because it provides little incentive to reduce costs and increase efficiency. A monopoly that is regulated in this manner does not earn more if it reduces costs, because its returns are fixed. Thus, customers may still be charged higher prices than they would be under free competition. Rate of return regulation can contribute to the Averch-Johnson effect,[34] which is named after two economists who developed a stylized model of the rate-of-return regulated firm. They found that firms which are subject to rate-of-return regulation will over-invest in capacity if the allowed return is greater than the required return on capital.[35]

Under rate-of-return regulation, utilities have a guaranteed rate of return for all capital investments.

Under rate-of-return regulation, utilities have a guaranteed rate of return for all capital investments. Given the reduced risks, investors are willing to lend money at low rates.[36] For Enagás, debt costs averaged 2.3% during the last six years,[37] while the utility's return on equity (ROE) averaged 16.4%, above the maximum value allowed by regulatory agencies in other countries.

Table 5: Enagás Economic Indicators

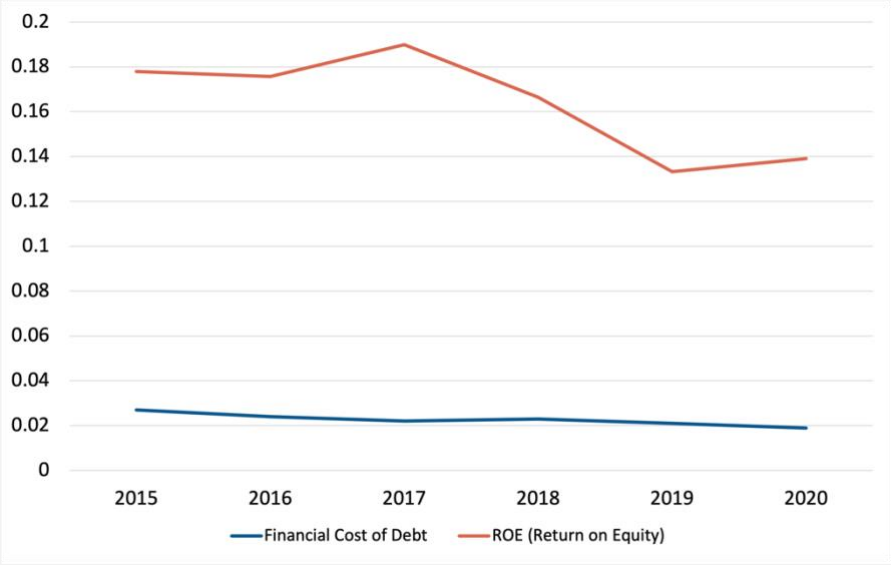
Economic Performance and Cost Efficiency						
	2015	2016	2017	2018	2019	2020
Net Debt (Million €)	4,237	5,089	5,008	4,275	3,755	4,288
Shareholders' Equity (Million €)	2,319	2,374	2,586	2,659	3,170	3,193
Net Debt/Equity Ratio %	183%	214%	194%	161%	118%	134%
Net Profit (Million €)	413	417	491	443	423	444
Financial Cost of Debt	2.7%	2.4%	2.2%	2.3%	2.1%	1.9%
Net Debt/EBITDA (Adjusted)	4.5x	5.2x	4.4x	4.0x	3.9x	4.8x
ROE (Return on Equity)	17.8%	17.6%	19.0%	16.6%	13.3%	13.9%

Source: Enagás Annual Accounts 31 December 2019 and 2020 and IEEFA calculations.

ROE is a measure of financial performance calculated by dividing net income by shareholders' equity. Because shareholders' equity is equal to a company's assets minus its debt, ROE is considered the return on net assets. ROE is considered a measure of a corporation's profitability in relation to stockholders' equity.[38]

[34] Body of Knowledge on Infrastructure Regulation. Averch-Johnson Effect. 2021.
[35] *Ibid.*
[36] Pennsylvania State University. The Averch Johnson Effect. 2021.
[37] Enagás Annual Accounts. Economic Indicators. 2019.
[38] Investopedia. Return on Equity. April 8, 2021.

Figure 14: Enagás Cost of Debt Compared to ROE



Source: Enagás financial statements.

Some regulatory bodies set the maximum allowed return on equity of gas utilities.

Spain's allowable ROE far exceeds other returns authorised around the planet. For example:

- Ontario, 8.5 percent
- Alberta, 8 percent
- Philippines, 13.7 percent
- Singapore, 9.4 percent[39]
- Germany, 6.91 percent for new assets and 5.12 percent for old assets[40]

[39] U.S. Agency for International Development. A Cost of Capital and Capital Markets Primer for Utility Regulators. April 2020.
[40] Eon. Facts & Figures Edition 2021.

Spain's Regulatory Framework

Remuneration From Investment Costs and From Continuity of Supply

The main oil and natural gas regulatory bodies in Spain are the:[41]

- Ministry for the Ecological Transition and the Demographic Challenge (the Ministry of Energy and Environment).
- CNMC (Comisión Nacional de los Mercados y la Competencia), an independent authority in charge of both competition and regulatory matters in Spain.
- The Corporation on Strategic Stocks, which supervises oil and gas stocks, CORES (Corporación De Reservas Estratégicas De Productos Petrolíferos).[42] CORES is the leading information resource for the hydrocarbon sector in Spain and provides official statistics to different organisations, contributing official data to various chapters of the National Statistics Plan.
- Community energy departments.
- Community environment departments.

The regulation of the natural gas sector in Spain is essentially contained in Law 34/1998 (the "**1998 Hydrocarbons Law**"). The law requires a diversity of supply sources. Wholesale suppliers and direct gas consumers importing natural gas must ensure that imports from the same country do not represent more than 50% of aggregated gas imports into Spain.[43]

Has this law encouraged the over-investment in gas infrastructure in Spain?

The Ministry of Energy grants approvals for constructing, modifying, closing and transferring gas transportation pipeline facilities if the facilities belong to the primary network or affect more than one region. In other cases, the permits are granted by the regional authority where the facility is to be located.[44]

In the gas regulated market, gas tariffs are determined by the Ministry of Energy and the CNMC, but the main regulated component of gas prices is the tolls and charges (*peajes*) payable for the use of the gas system (pipelines, LNG plants and underground storage facilities).

According to Article 60 of the hydrocarbons law,[45] the gas system is structured around two types of activities:

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[41] Thomson Reuters Practical Law. Oil and gas regulation in Spain: overview. November 1, 2020.
[42] CORES. Activities.
[43] Global Legal Group. The International Comparative Legal Guide to Gas Regulation 2011. 2011.
[44] Thomson Reuters Practical Law, *op. cit.*, Section 15.
[45] Agencia Estatal Boletín Oficial del Estado. Legislación consolidada. October 8, 1998.

I. Regulated activities, including regasification, primary storage, transportation and distribution of natural gas.

II. Unregulated activities, including production, liquefaction and supply of natural gas, as well as non-primary storage.

Six-year regulatory periods are established for both electricity and gas activities. Regulatory parameters are not updated by price indexes within the regulatory period.[46] As of July 2014, the annual remuneration of the regulated activities (transmission, regasification and underground storage) was established according to Royal Decree-Law 8/2014 (see Table 6).[47]

The remuneration formula takes these components into account:

- Remuneration to Availability or Return on Investment Costs (RD or RDA).
    - RD is the sum of investment costs and the maintenance and operational costs of each facility.
    - Remuneration for investment costs includes:
        I. Guaranteed financial returns for investment, at 5.09% per year of total net investment for 2015 through 2020.
        II. Amortization.
        III. Remuneration for extension of useful life (Costes de extensión de la vida útil, COEV; or Retribución por extensión de vida útil, REVU). COEVs are determined as a percentage of the remuneration for O&M costs that vary according to the age of the asset.
        IV. Costs of Exploitation (COPEX, Gastos de Explotación Activados) are those expenses incurred from updating facility equipment due to obsolescence or the need to improve operating conditions, availability, safety and maintenance.[48]
        V. Payback for gas heel, where applicable.[49]
- Remuneration to Continuity of Supply (RCS).

[46] Council of European Energy Regulators. Report on Regulatory Frameworks for European Energy Networks 2020. March 11, 2021.
[47] Agencia Tributaria España. Royal Decree-Law 8/2014.
[48] Comisión Nacional de los Mercados y la Competencia. Memoria Justificativa de la Circular. 2020.
[49] It is normal practice to keep onboard 5% to 10% of an LNG cargo after discharge. This is referred to as the heel, and is used to cool down the remaining tanks that have no heel before loading.

- RCS is a remuneration assigned to each activity—transmission, regasification and underground storage—that is then distributed to all installations of each activity, while they are in operation, according to their standard investment value.

- This remuneration is updated annually for each activity, according to the evolution of the established demand, the regasified volumes in the regasification plants, and the gas stored in the underground storages, corrected by an efficiency factor.

Table 6: Regulatory Framework 2015-2020

Regulatory Framework 2015-2020	
Total Remuneration	RD + RCS + OPEX
Return on investment Costs (RD or RDA)	Remuneration linked to net assets during their regulatory lives
	Extension of regulatory life pre 2008 transport assets
	Financial remuneration rate: 5.09%
RD=	Amortization + Remuneration for extension of useful life COEV or REVU + Costs of Exploitation COPEX + Payback for gas heel
Remuneration for Continuity of Supply (RCS)	Remuneration linked to the long-term availability of Gas System assets with adequate maintenance
	RCS is not affected by assets' amortization
	Limited impact of changes in demand in the formula
RCS=	Previous year RCS x 0.97 x (1 + delta gas demand)
Operation and Maintenance (OPEX)	Remuneration based on opex availability
	Once the useful life ends, the extension of useful life will be remunerated in addition to O&M remuneration
	TSO remuneration updated from €11M to €24M from 2016 onwards

Source: Enagás.

New Regulatory Framework 2021-2026

Reduction From 2020 to 2021 Would Be 4.8% But Will Increase if Maximum COPEX Is Allowed

Royal Decree Law 1/2019 gives the CNMC powers to set revenues and tariffs, which was previously done by the energy ministry. Consequently, CNMC has published a new regulation to set revenues for gas and electricity TSOs and distribution system operators for the following regulatory periods (2020-25 for electricity and 2021-26 for gas).[50]

In late 2019 and the first half of 2020, the CNMC approved a series of regulations (*circulares*),[51] including rules for calculating remuneration for natural gas transport facilities, LNG plants, gas distribution activities and for the technical manager of the gas system, as well as calculation of the tolls for accessing the facilities of natural gas transportation, local networks, and regasification.[52]

[50] Council of European Energy Regulators. Report on Regulatory Frameworks for European Energy Networks 2020. March 11, 2021.
[51] Comisión Nacional de los Mercados y la Competencia. . December 12, 2019.
[52] Thomson Reuters. Oil and Gas Regulation in Spain. November 2020.

In the new regulatory period (2021-26), costs of exploitation (COPEX) will be audited and will have a maximum cap. CNMC will approve the maximum amount of investment that can be made for 2021 for COPEX by companies entitled to remuneration and the provisional remuneration for this concept.[53]

Return on investment will include amortization plus financial remuneration and gas heel compensation. The compensation for operation and maintenance costs will be calculated separately and will include costs for useful life, other costs and COPEX.

RCS will include the payback for continuity of supply related to the demand plus the remuneration for extension of useful life and plus payback for improvement of productivity.

Table 7: Regulatory Framework 2021-26

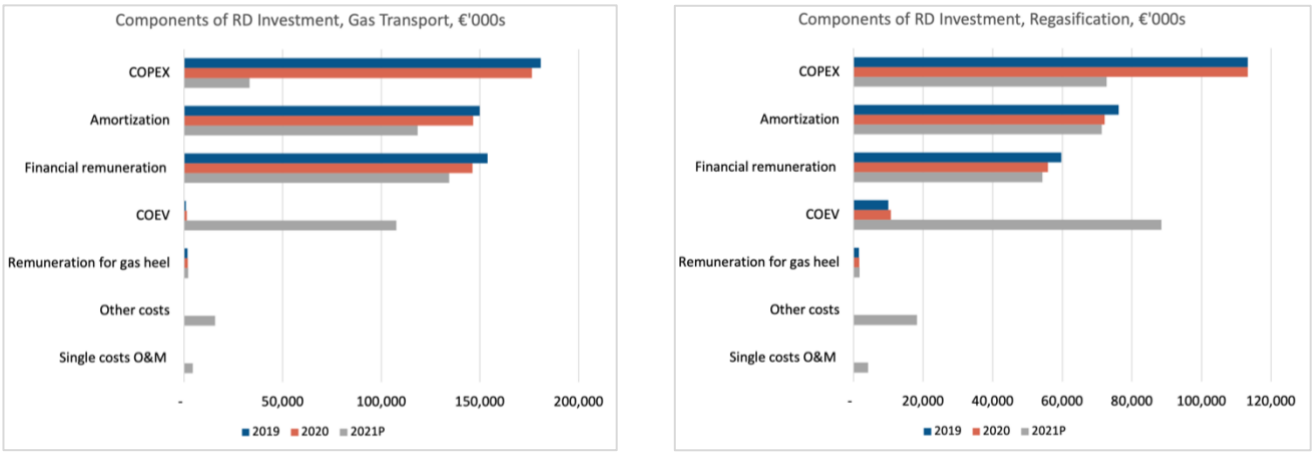
Regulatory Framework 2021-2026	
Total Remuneration	ROI + RCS + REVU
Return on investment Costs (ROI)	Remuneration linked to net assets during their regulatory lives
	Change to a stable and predictable WACC methodology
	Financial remuneration rate: 5.44%
RD=	Amortization + Financial Remuneration + Compensation for gas heel
Compensation for Operation and Maintenance costs=	Costs for useful life + Single and other costs + COPEX
	COPEX will be audited and will have a maximum cap
ROI = RD+O&M	Amortization + Financial Remuneration + Compensation for gas heel + Costs for useful life + Single and other costs + COPEX
Remuneration for Continuity of Supply (RCS)	Remuneration linked to the long-term availability of Gas System assets with adequate maintenance
	RCS revenues established for 2020 will progressively decrease to 20% at the end of the 2026 regulatory period
RCS=	Payback for continuity of supply related to the demand + Remuneration for extension of useful life + Payback for improvement of productivity
Incentives for extending Life of Assets (REVU or COEV in Spanish)	Compensation based on Opex standards, with room for efficiency
	The company could maintain 50% of the efficiencies
	REVU component: once the useful life ends, the extension of the useful life will be remunerated with the O&M remuneration, with a progressive long-term formula
Investments in the sytem (not RAB)	Financial rate: 5.44% and two years of amortisation
	Investments greater than 250,000 euros
Principles	Incentives to keep the gas system's transmission infrastructure available
	Use of existing gas infrastructure is essential to move forward with the energy transition at the lowest cost
	Predictable WACC methodology, similar to main European frameworks
	Strengthens incentives to extend the useful life of assets
	Regulatory period of 6 years without reviews
	First time the regulation is implemented by an Independent Regulator, CNMC

Source: Enagás.

For 2021-26, COPEX has been reduced from the previous two years. But remuneration for extension of useful life (COEV) has increased significantly, and additional costs have been added (see Figure 15).

[53] Boletín Oficial del Estado. Otras Disposiciones. February 23, 2021.

Figure 15: Enagás Returns for Investment 2019, 2020 and 2021P



Source: BOEs, Official State Bulletins, IEEFA Estimates.

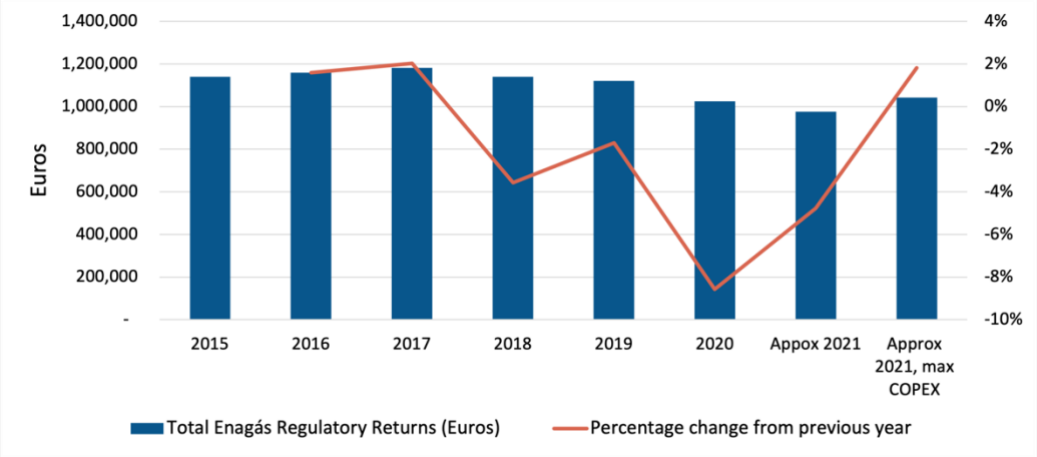
The state bulletins projected the remuneration for January through September, so the values shown for 2021P are estimates for the whole year, derived by simple extrapolation and considering the maximum COPEX allowed. As was the case in 2020, the values for underground storage are missing for 2021.

When calculating the 2021 regulated returns on investment for transport and regasification, COEV has the highest value with 27%, closely followed by financial remuneration (26%) and amortization (26%). COPEX accounts for 15%.

Comparing the historical returns, the reduction from 2020 to 2021 would be 4.8%. But if the maximum COPEX is allowed, the returns will increase 1.8% with respect to 2020. How can the regulator guarantee that this limit in COPEX will result in reduced returns?

The CNMC suggests that Enagás was over-remunerated and regulated returns should be reduced. But the new framework increases one area while decreasing in another, so there is no guarantee of an overall reduction in returns.

Figure 16: Enagás Regulatory Returns 2015-21



Source: BOEs, Official State Bulletins, IEEFA calculations.
Note: Values for underground storage facilities for 2020 and 2021 are not available in the Official State Bulletins

Decarbonisation, the New Investment Rationale

Slogan Change From "Security of Supply" to "Decarbonisation"

Enagás has created a significant oversupply of underutilized gas infrastructure, all justified by the concept of security and diversification of supply. Has the slogan to justify new investments changed to "decarbonisation?" How to be certain that these new investments won't be underutilised in the future, and that customers' bills won't be increased to pay for unnecessary infrastructure? Will the new regulatory regime prevent this from happening?

Enagás is planning and studying around 30 hydrogen and 16 biomethane projects, with more than 50 partners and in the majority of the autonomous communities in Spain, which could mobilise a joint investment of roughly 5 billion euros.[54] Enagás is also planning projects using natural gas, LNG and compressed natural gas (CNG) in various transport modes.

The most common methods for producing hydrogen are Steam-Methane Reforming (SMR) and electrolysis. In SMR, high-temperature steam is used to produce hydrogen from a methane source, such as natural gas. Electrolysis splits hydrogen from water using an electric current.[55] At the moment, "grey" hydrogen is mainly produced industrially from natural gas, which generates significant carbon emissions. A version in which carbon emissions are captured and stored (or reused)

[54] Yahoo. Edited Transcript of ENAG.MC earnings conference call or presentation. February 23, 2021.
[55] Energy Information Administration. Hydrogen explained. 2021.

is known as "blue" hydrogen. "Green" hydrogen is generated by renewable energy sources without producing carbon emissions.[56]

Despite their promise, blue and green hydrogen are not produced at scale today and are high-risk, early-stage technologies requiring more development through demonstration projects. Who will pay for this extra cost, and should such investments really be a priority for a regulated monopoly such as Enagás? Our concern is that decisions may be driven by political or remunerative motivations and not by technical system needs. We note that Spain has not approved an updated network development plan since 2008.[57]

In 2018, the company wrote in its annual report: "Enagás is committed to developing non-electric renewable energies, such as biomethane and hydrogen as new energy solutions that will play a crucial role in the decarbonisation process. Gas infrastructures are suited to the transport and storage of these renewable gases, meaning that additional infrastructure investments will not be required."[58] So why is there now so much new planned investment? According to latest estimates, the hydrogen backbone, which Enagás and other TSOs in Europe are proposing, requires an investment between €43 billion and €81 billion, based on using 69% of repurposed natural gas pipelines and 31% of new pipelines.

CNMC doubts the need of some of the projects to increase capacity in the gas network.[59]

In May 2021, the International Energy Agency (IEA) published their report, Net Zero by 2050, A Roadmap for the Global Energy Sector.[60] It indicates that the contraction of oil and natural gas production will have far-reaching implications for all the countries and companies that produce these fuels. Enagás needs to stop developing new gas projects if it is to avoid stranded assets before 2050.

[56] International Energy Agency. The clean hydrogen future has already begun. April 23, 2019.
[57] Agency for the Cooperation of Energy Regulators. Opinion No 09/2020 on the Review of Gas National Network Development Plans to Assess Their Consistency with the EU Ten-Year Network Development Plan. December 18, 2020.
[58] Enágas. Renewables Gases. 2018.
[59] Agency for the Cooperation of Energy Regulators. Opinion No 11/2018. October 18, 2018.
[60] International Energy Agency. Net Zero by 2050. May 2021.

Table 8: List of Main Projects Being Planned by Enagás

Type of Project	Description	Partners	Details	Place
Renewable Gases	Development of biomethane and hydrogen	Enagás and the government of Aragón	Hydrogen and biogas/biomethane	Aragón
		Enagás and Repsol	Renewable hydrogen	
		Enagás and Biogastur	Joint biogas and biomethane projects in the region	
		Enagás and Ferrovial	Promote the production and distribution of biogas	
		Enagás and Ence	development of renewable gas using biomass, using up surplus biomass to produce green hydrogen and synthetic natural gas	
	Green Hydrogen	Enagás and Naturgy	9,000 tones green hydrogen, from 250MW offshore, 100MW onshore wind farm. 200,000 tones CO2 savings.	Asturias
	Power to Green Hydrogen Mallorca project	Acciona, IDEA, Cemex and Enagás	Using renewable electrical energy, for which a PV solar park will also be built. 330 tons of green hydrogen per year that will be injected into the natural gas grid	Mallorca
	Green Hydrogen project in refinery	BP, Iberdrola and Enagas	20-megawatt (MW) electrolyser will be built, powered by renewable energy produced, among other sources, by a 40 MW photovoltaic plant. Reduce the refinery's emissions by up to 24,000 tonnes of CO2 per year	BP refinery in Castellon
	Green Hydrogen Hub Project	Enagás and the DISA Group	Production, distribution and commercialization of green hydrogen. This initial phase would have a capacity to produce about 1,000 tonnes of green hydrogen per year, whose final use would reduce CO2 emissions by 10,400 tonnes	Canary Islands
	H2Rail		Green hydrogen to be used as fuel in non-electrified trains	
	e-fuels	Enagás and Petronor-Repsol and Basque Energy Board	Replace grey hydrogen with green hydrogen. It consists of developing an industrial-scale pilot plant for the production of synthetic fuels (e-fuels) from green hydrogen and captured CO2	Basque Region
	BioRail		Green biomethane to be used as fuel in non-electrified trains	
	HYDEAL	Enagás (Spain), OGE (Germany), SNAM (Italy), GRTgaz (France), Teréga (France)	Solar to hydrogen network. A series of projects and partnerships are currently being launched involving several of the 30 participants of HyDeal Ambition, with a first initiative expected within a year in Spain, based on a portfolio of solar sites with a capacity of close to 10 GW.	
	DualMetha	Enagás and Terega signed agreement with DualMetha	Develop biomethane as part of their strategy to promote renewable energies and their commitment to the energy transition. Stake acquired in DualMetha: 20% Enagás, through its CVC subsidiary Enagás Emprende, and 20% Teréga.	French start-up DualMetha
	Franco-Spanish Lacq Hydrogen project	Gas operators Teréga and Enagás, the renewable hydrogen producer DH2 and the energy group GazelEnergie, have just signed a Memorandum of Understanding	Production and supply of renewable hydrogen from Spain to France between DH2 and GazelEnergie. Hydrogen transmission from Spain to France between Enagás and Teréga,	France and Spain
Natural Gas, LNG, CNG	CORE LNGas Hive	42 partners	LNG as fuel for heavy transport, especially maritime. 2 and 4 million tonnes of CO2 savings in 2030	Spain and Portugal
	LNG Hive 2		LNG as fuel for heavy transport, especially maritime	Port of Huelva
	Rail Transport: LNG in passenger train	Enagás, Renfe and other companies	LNG as fuel	Spanish Railway Network
	raiLNG project	Enagás and Renfe	Convert railway fraction of a diesel freight locomotive to LNG	
	LNG ISO containers	Enagás and Renfe	Intermodal transport of LNG ISO containers for combined transportation by Road-Rail-Sea	
	Freight locomotive		LNG as fuel	Sevlile, line connecting Huelva and Majarabique
	ECO-GATE	Consortium of natural gas operators and technology and service providers, end users and experts	Construct 23 gas stations (21 L-CNG, 1 Biomethane, 1 H2CNG) in the Atlantic and Mediterranean corridors of the road networks of Spain, France, Germany and Portugal	Spain, Portugal, France and Germany
	Sustainable Mobility Plan		Replacing operation and maintenance vehicles by vehicles powered by CNG, delivery of CNG vehicles to managers and the promotion of the purchase of this type of vehicle by their employees in advantageous conditions	
	Gas2Move and ScaleGas		Promoting the use of natural gas as an alternative fuel to oil in vehicle fleets	
	CNG and LNG for use as land transport fuel	Enagás, Gasnam, NGVA and Sedigas		

Sources: Enagás, Iberdroala, Acciona, Offshore Energy, Terega, PV Magazine, Argus Media.

Conclusion

Evidence analysed by IEEFA suggests that rate-of-return regulation has encouraged Enagás to over-invest in gas infrastructure, thereby boosting costs for Spain's gas consumers (and returns for Enagás' shareholders). Its largest shareholder beneficiaries include Spanish billionaire Amancio Ortega and the government of Spain, both of whom hold a 5% share of the company.

Over-capacity

- Spain's natural gas demand hasn't grown since 2008 and is set to decline further given EU climate commitments.
- The utilisation rate of installed LNG capacity has averaged just 27% over the last 10 years and dropped as low as 20% in 2015 and 2016.
- The operating LNG terminals in Spain account for almost one-third of Europe's LNG import capacity, but have some of the lowest utilisation rates in Europe.
- Barcelona has the biggest regasification capacity in Spain and has only reached a utilisation rate of 33% in the last six years.
- Enagás is today one of the companies with the most LNG terminals in the world.
- Over the last six years, the international pipelines have had an average utilisation rate of 61%. Despite the low utilisation rate, Naturgy (formerly Gas Natural Fenosa, a Spanish-based natural gas and power multinational corporation) and Sonatrach (the state-owned oil company of Algeria) plan to increase the capacity of Medgaz pipeline by 25%.

High Spanish Gas Prices

- Spain has among the highest natural gas prices for household consumers in Europe.
- Spain has had on average the second-highest gas prices (before taxes and levies) for household consumers in Europe, behind only Sweden, and holds the record for the highest gas price in Europe during the second half of 2019, at approximately 8 Euro cents per kWh.
- In 2019, Spain's breakdown of standard gas offers for households consisted of: 40% for energy, 39% for network costs, 3% for taxes and 17% for VAT.

Regulated Returns

- Over the last six years, 92% of Enagás' revenue has come from regulated activities.

- Enagás' receives remuneration through its subsidiaries, including Enagás Transporte S.A.U., Enagás Transporte del Norte S.A.U., Enagás GTS, and also through its percentage of ownership in Sagunto and Bilbao Regasification Plants.

- Since 2015, Enagás Transporte, S.A.U. has received an annual remuneration for the El Musel regasification plant (which has never been used) of € 23.6 million.

- Remuneration for investment costs has been Enagás' largest source of revenue, contributing 71% of total regulated revenue, followed by renumeration to continuity of supply (RCS) with 25%, and return for operation and maintenance with 4%.

- The guaranteed financial returns for investment of 5.09% annually represents just 28% of all Enagás' remuneration for investment costs in 2020, while COPEX (capitalised operating expenses, or costs of exploitation) accounted for 40% and amortization 30%.

    - COPEX is a very significant value in Enagás' remuneration for investment. In both 2019 and 2020, it was greater than the financial returns of investment of 5.09%.

    - Comparing the historical returns, the reduction from 2020 to 2021 would be 4.8%, but if the maximum COPEX is allowed, returns will increase of 1.8% from 2020.

- In the new regulatory framework (2021-2026), costs are still high but with different names.

    - COEV (Remuneration for extension of useful life) comes as the highest value with 27%, closely followed by financial remuneration and amortization. COPEX accounts for 15%.

Future Projects, 'Decarbonisation'

- To guarantee income growth and support shareholder dividends, Enagás wants to invest in new projects.

- Enagás is planning 30 hydrogen and 16 biomethane projects, as well as gas and LNG projects.

    - The new projects are justified under the slogan of "Decarbonisation."

    - Could these new investments become stranded assets in few years?

    - Will the gas network become even more oversupplied?

    - Will Spanish customers continue to bear the costs of over-investment?

About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

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