



COMISIÓN NACIONAL DE LOS
MERCADOS Y LA COMPETENCIA



General Overview of Spanish LNG Sector

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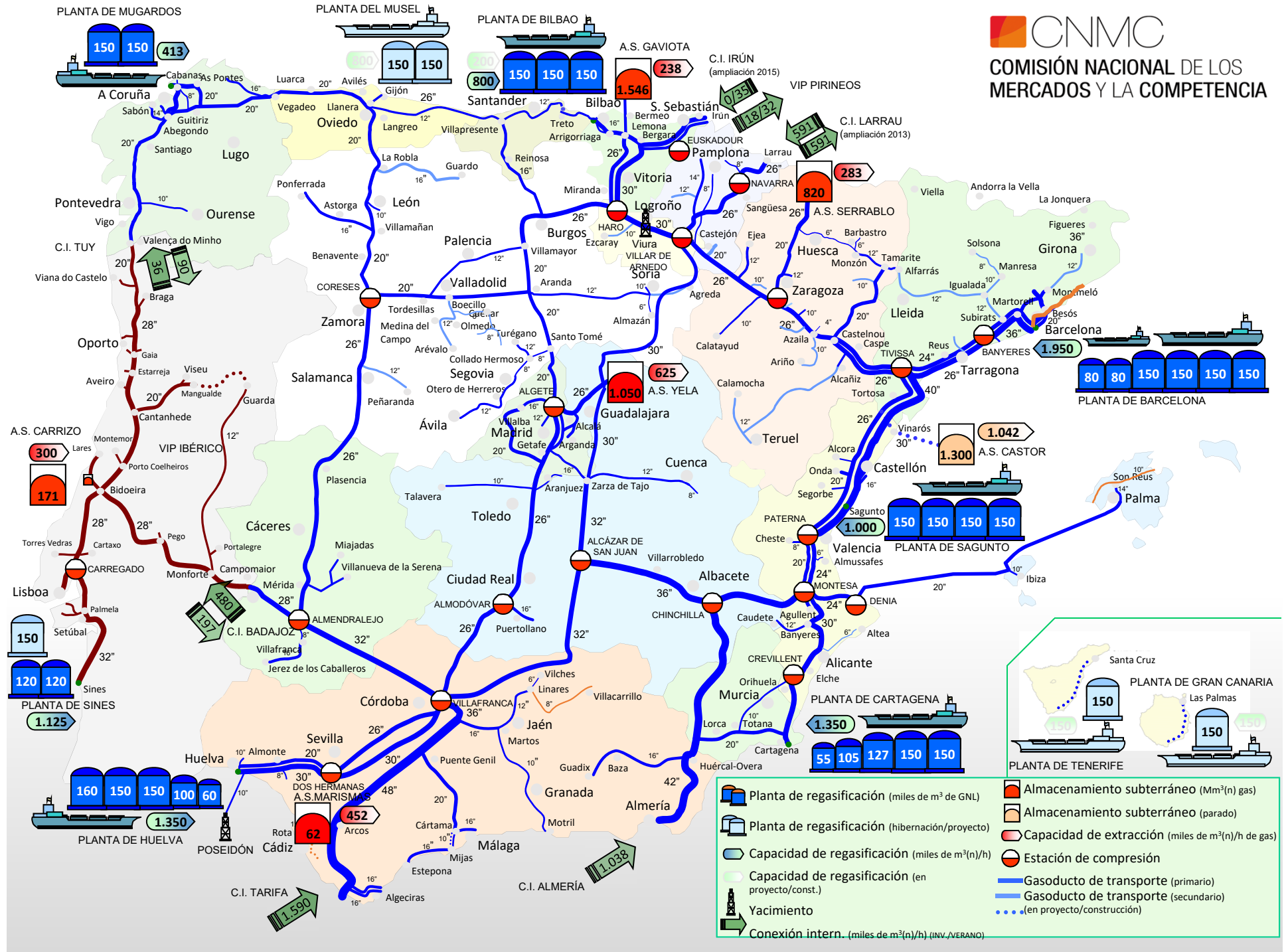
- **Wholesale prices and LNG**
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General Overview

Gas Indicators Evolution	1998	2018
Demand	13 bcm	30 bcm
Customers	3,5 mill.	7,8 mill.
Ratio in primary energy	11%	20%
Number of shippers	Almost only one	More than 70
Transmission Network size	5.000 km	More than 12.000 km
Distribution Network size	24.000 km	More than 60.000 km
Regasification terminals	3	7
Underground Storage capacity (working gas)	22.864 GWh	32.057 GWh
Supply diversification	5 different origins	13 different origins

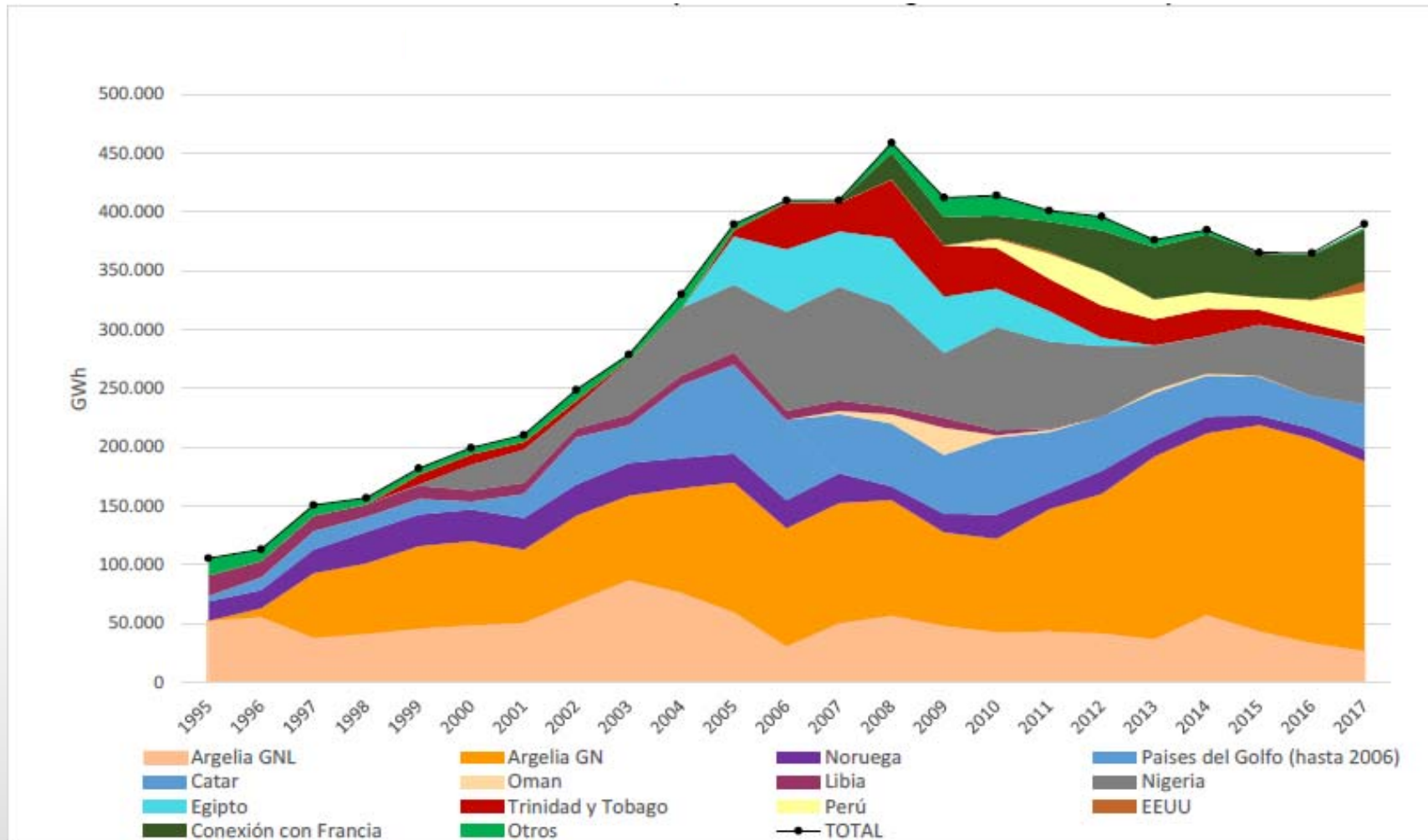
Spanish gas sector developed initially and expanded geographically because of LNG availability



	Planta de regasificación (miles de m^3 de GNL)		Almacenamiento subterráneo ($Mm^3(n)$ gas)
	Planta de regasificación (hibernación/proyecto)		Almacenamiento subterráneo (parado)
	Capacidad de regasificación (miles de $m^3(n)/h$)		Capacidad de extracción (miles de $m^3(n)/h$ de gas)
	Capacidad de regasificación (en proyecto/const.)		Estación de compresión
	Yacimiento		Gasoducto de transporte (primario)
	Conexión intern. (miles de $m^3(n)/h$) (INV./VERANO)		Gasoducto de transporte (secundario)
			(en proyecto/construcción)

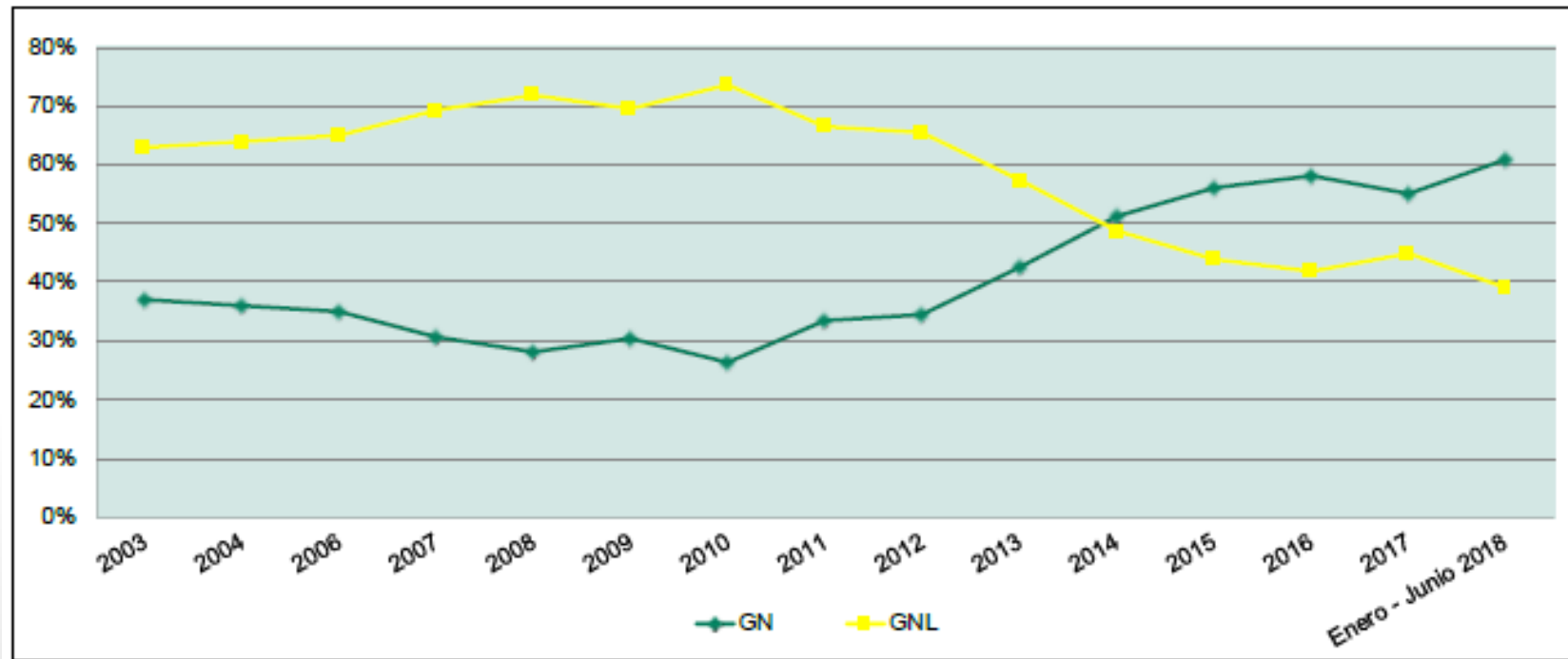
General Overview

LNG increase diversification of sources, and therefore SoS enhancement



General Overview

LNG vs NG Supplied to Spain

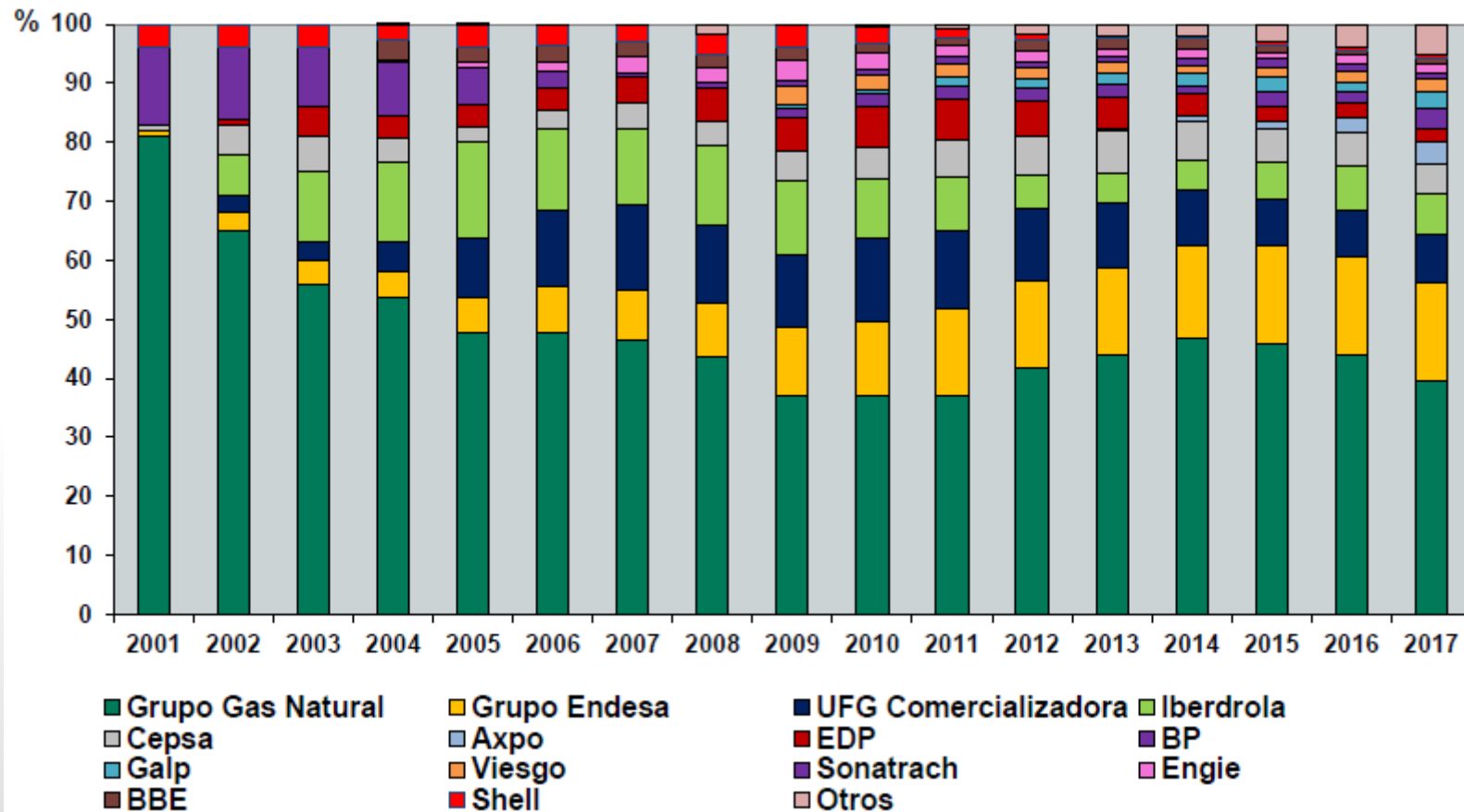


General Overview

More traders in a market... more gas sources and vice versa...

Retail Market share evolution

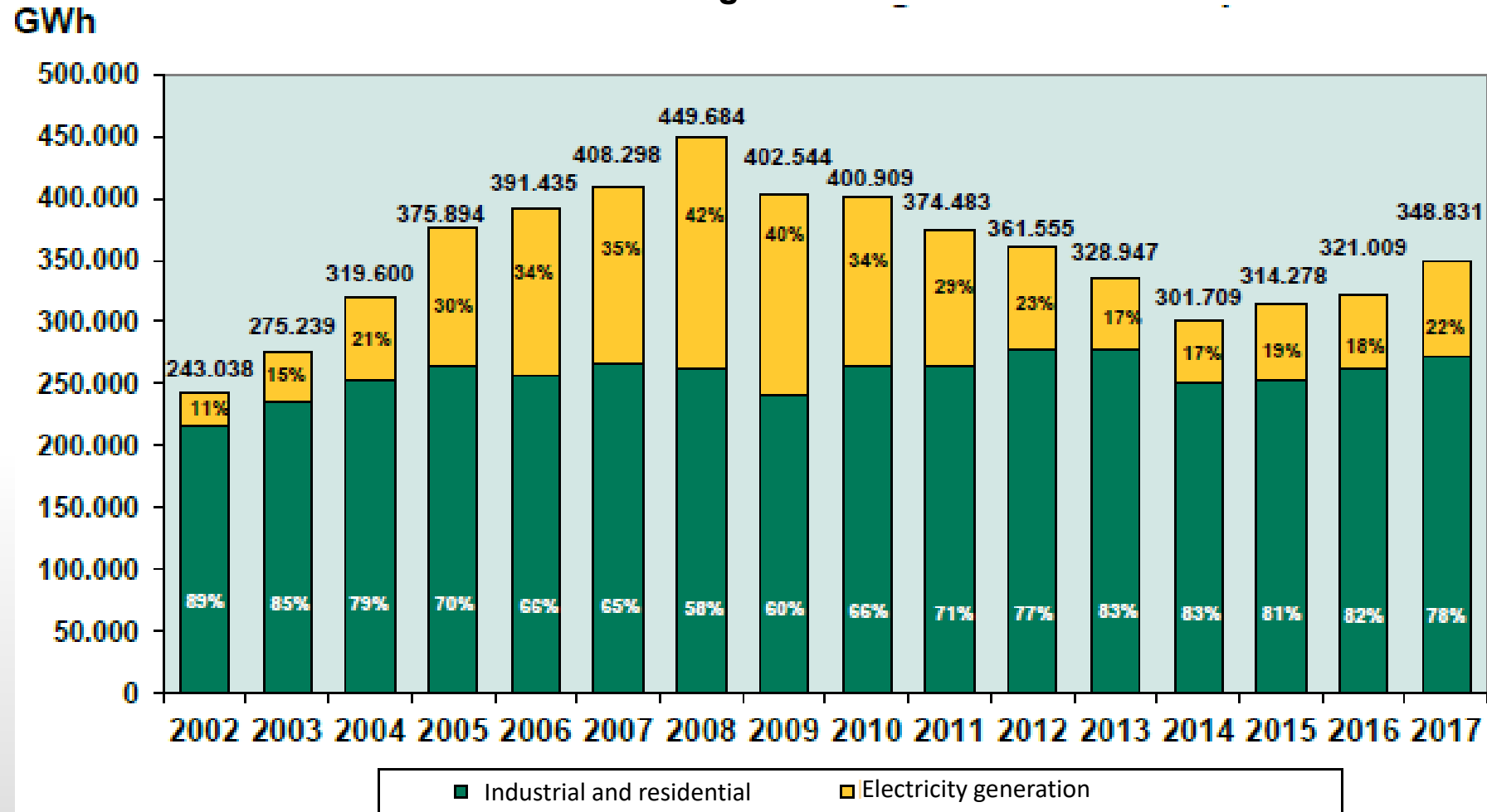
(in terms of gas volume supplied to final customers)



General Overview

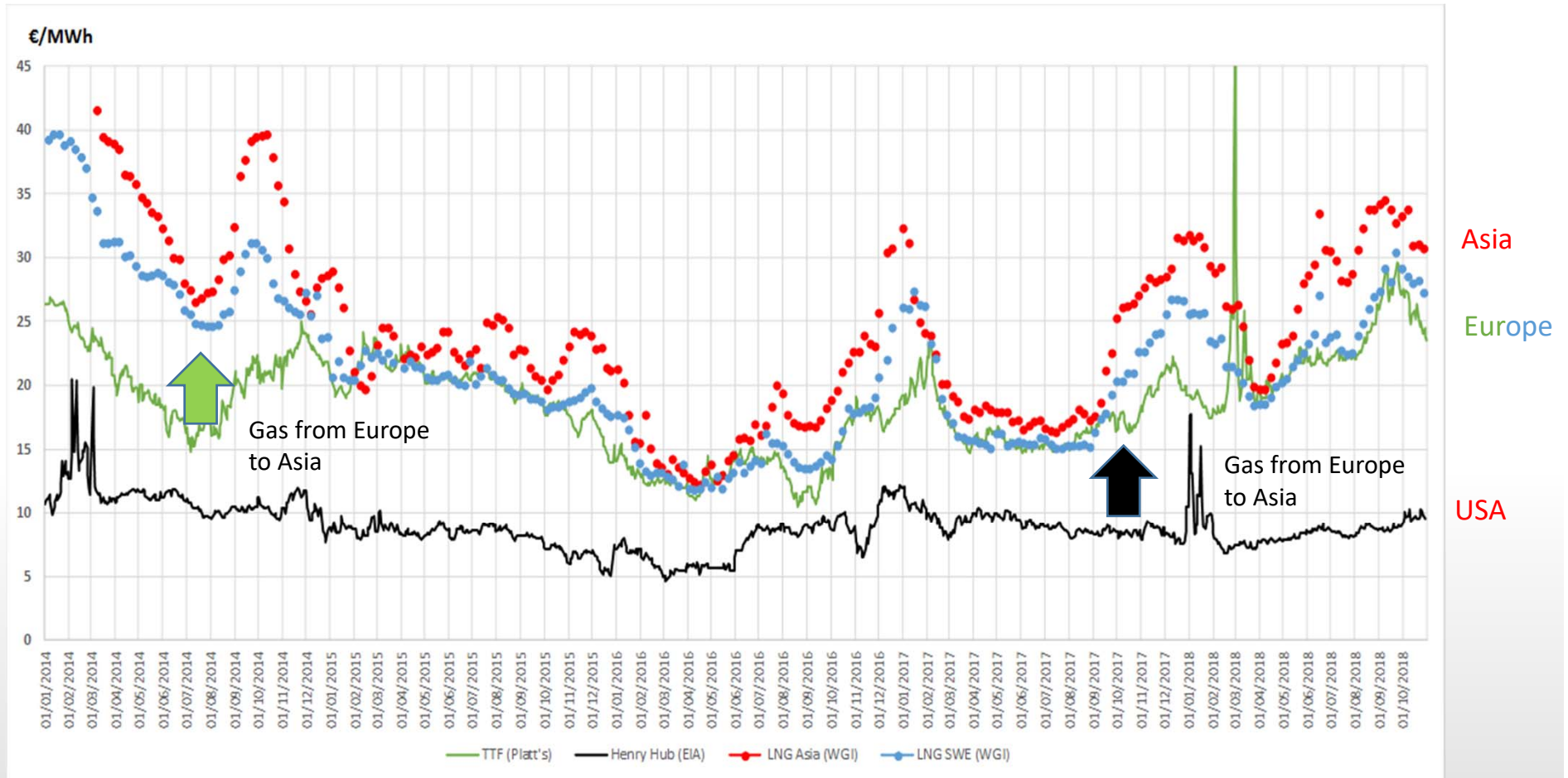
Gas demand for electricity generation fostered the development of LNG terminals in the 2000's

Natural gas demand evolution



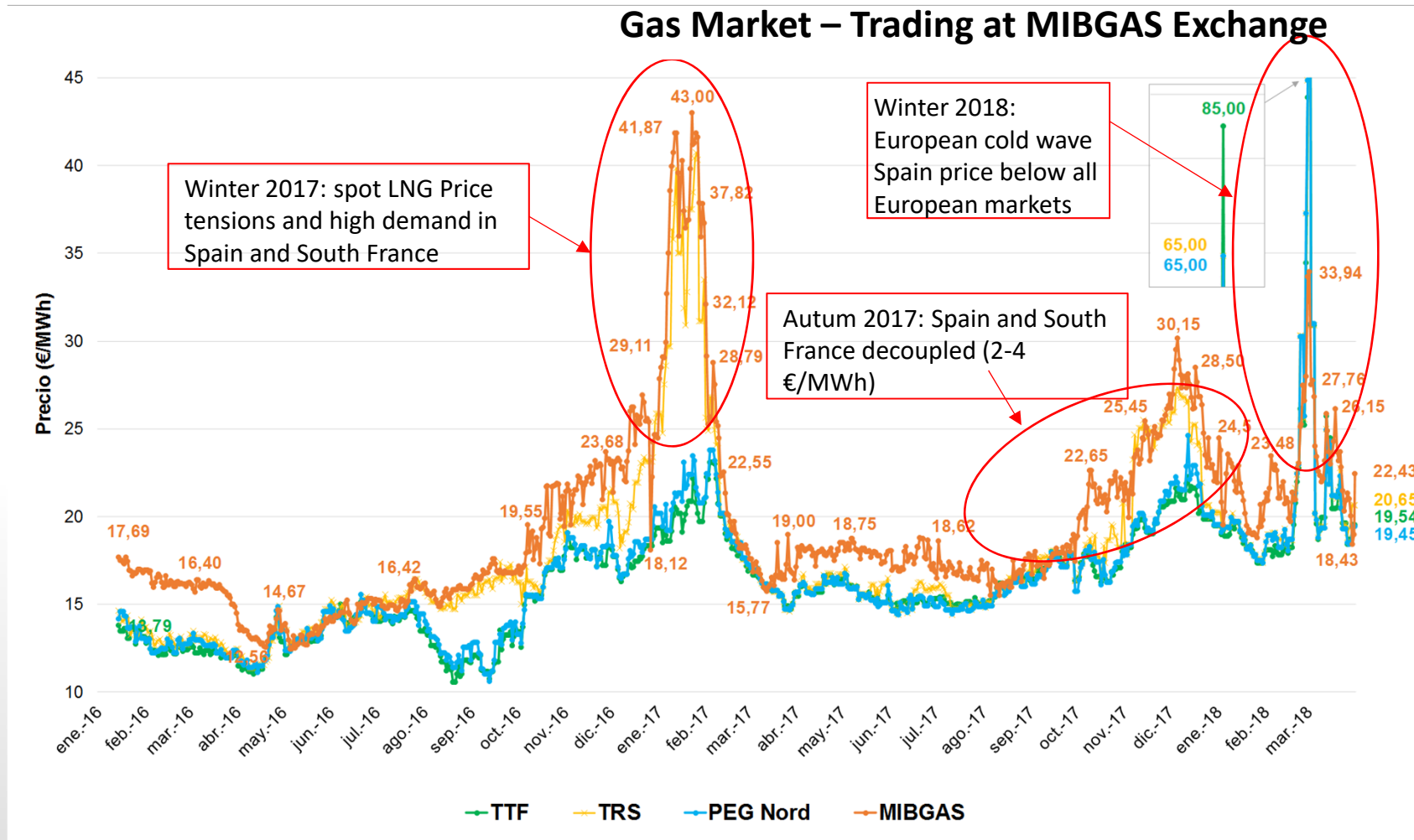
Wholesale prices and LNG

A market relying on LNG is exposed to global gas prices



Wholesale prices and LNG

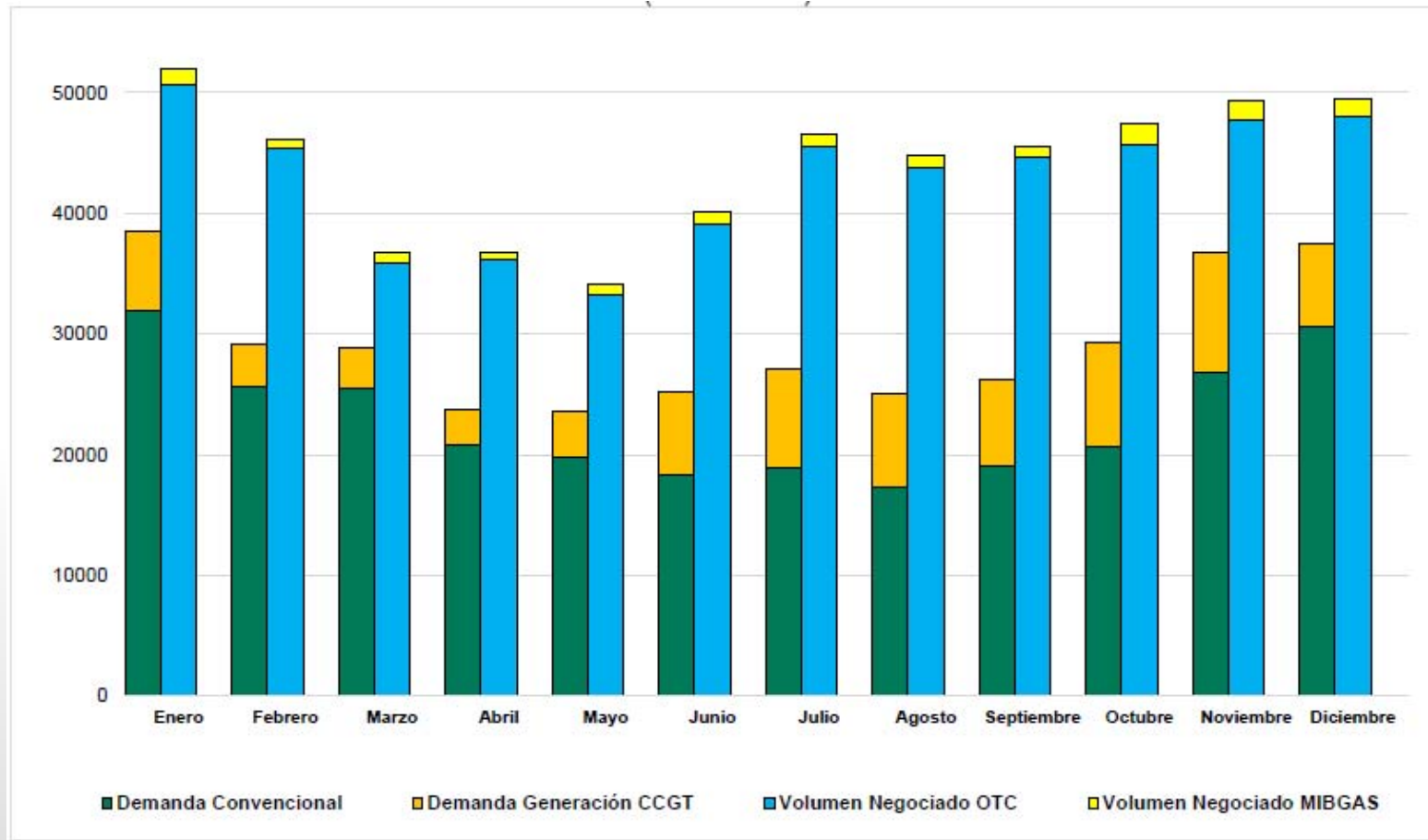
Gas prices at hubs with a big influence of LNG behaves differently



Wholesale prices and LNG

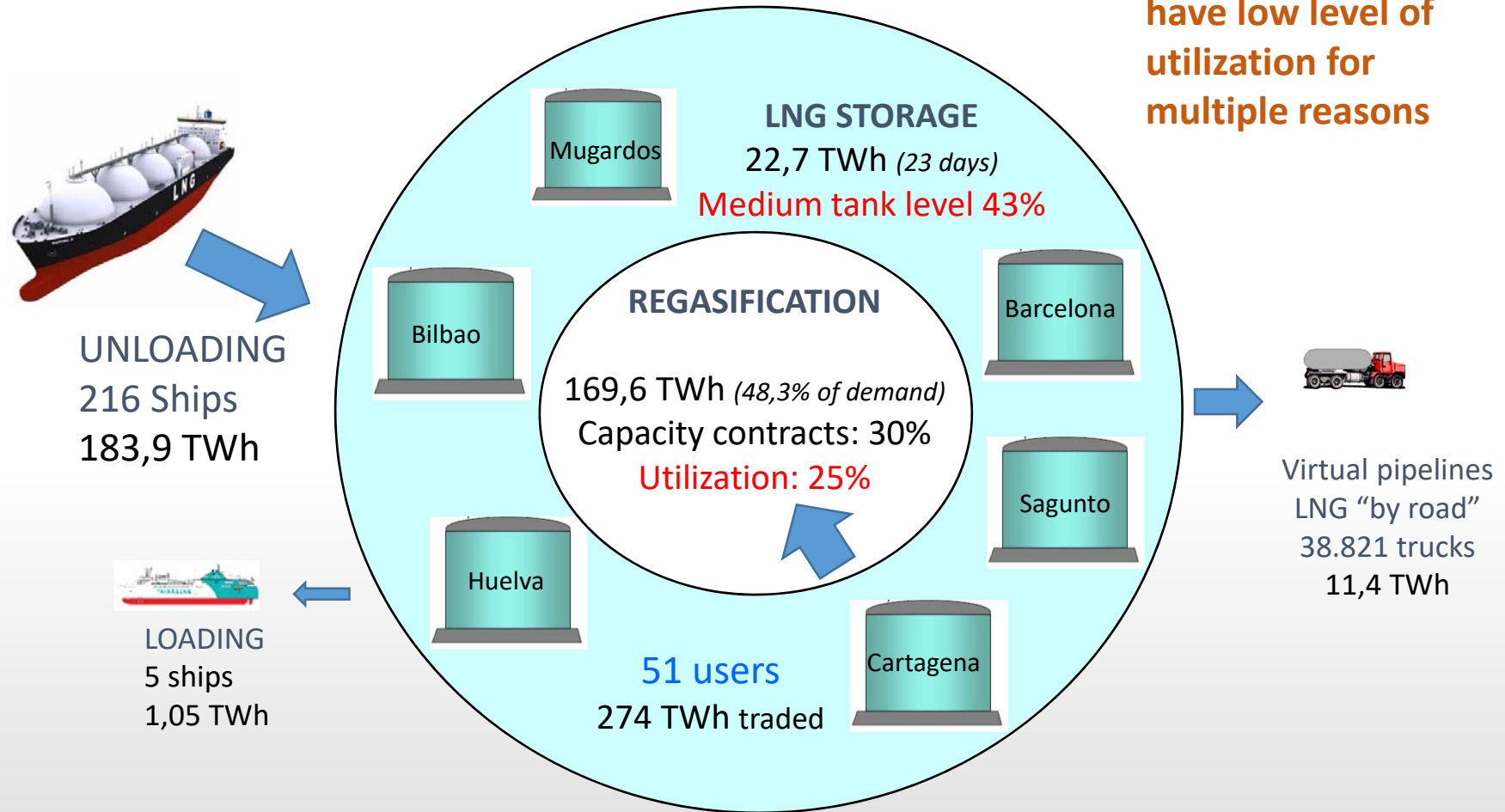
OTC trading volumes concentrate in LNG terminals

Gas demand vs gas trade - 2017

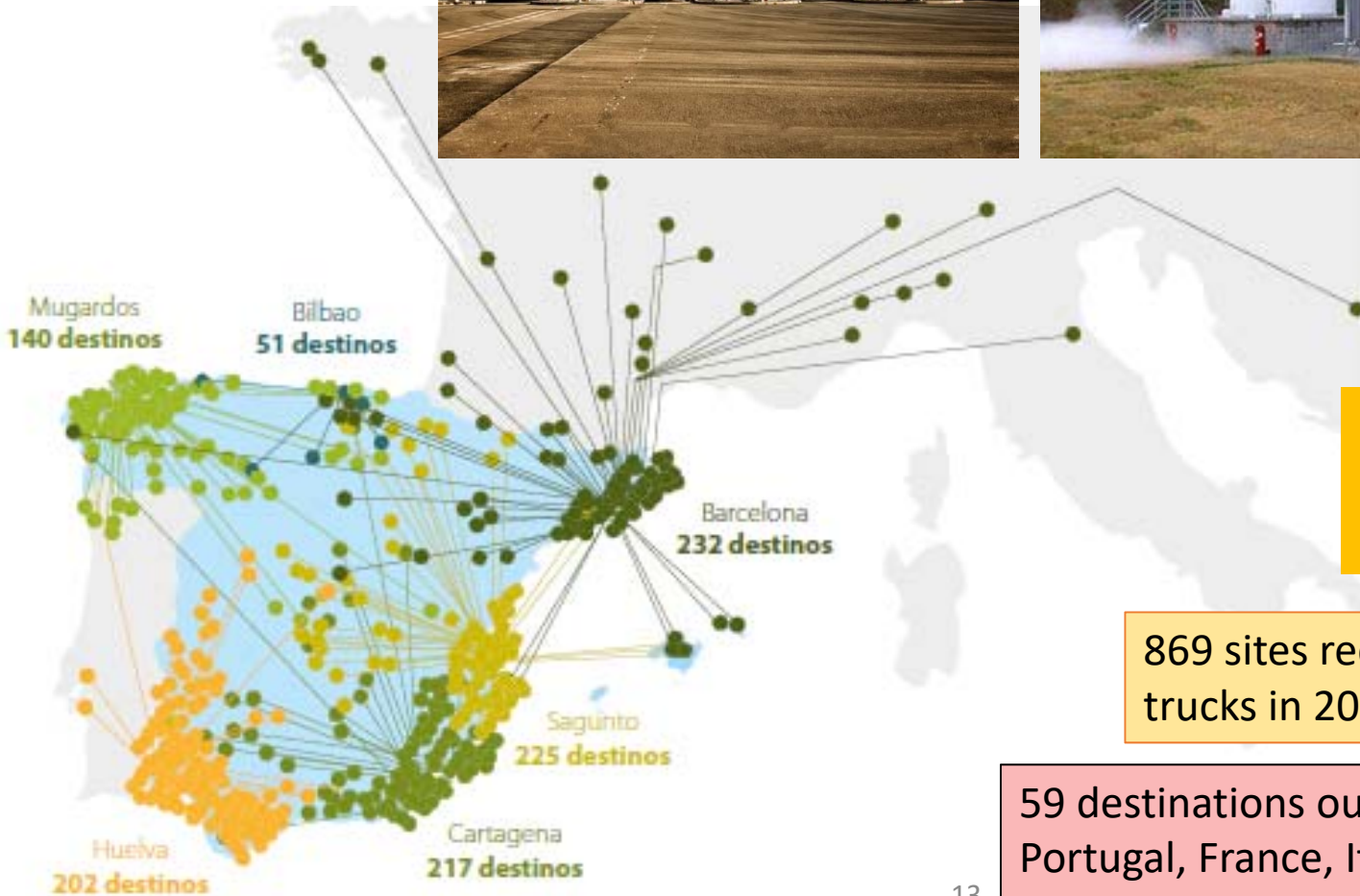


Spanish LNG Sector – Situation in 2017

**LNG infrastructures
have low level of
utilization for
multiple reasons**



Virtual pipelines : LNG transported in trucks to places where there is no pipeline, to satellite plants



2015
10.719 GWh supplied
34.400 trucks loaded

869 sites received LNG with trucks in 2015

59 destinations outside Spain in 2015: Portugal, France, Italy, Switzerland and FYROM

LNG Regulation - TPA Regime in Spain

Full REGULATED TPA to all the terminals and services

- Transparent and public **TPA tariffs**
- Transparent **Capacity Allocation Mechanisms**
- **Freedom** of LNG terminal **choice**
- Regasification (**send-out**) **rate decided by users**
- Possibility to **contract capacity at any time** and for **any duration**
- **Possibility to exchange and trade LNG (OTC market)**
- Possibility to exchange capacity at the secondary market
- Anti hoarding mechanisms

LNG Regulation - TPA Regime in Spain

Contracting **regasification capacity** give you the right to use the unloading, storage and regasification facilities



Capacity contracted FCFS, no time limit

- MWh/day of regasification / truck loading rights
- Unloading and storage rights included



Slots allocated when programming

- Initial yearly schedule
- Firm dates established by the 25th of m-1



Daily nomination and gas allocation

- Payments by the volume of gas stored each day
- by the gas regasified each day
- by each cargo unloaded/loaded

LNG Regulation - TPA Regime

ADDITIONAL SERVICES OFFERED in LNG terminals in Europe

- 1) **Transshipment:** transfer of LNG from one vessel to another.
- 2) **Truck loading:** transfer of LNG from the terminal into trucks.
- 3) **Small ship loading:** transfer of LNG from the terminal into small ships (<10.000 m³) for onshore uses.
- 4) **Bunkering:** when the LNG transferred from the terminal is used as fuel for transport (LNG fuelled ships, trucks, rail...).
- 5) **Cooling down service:** using LNG to cool down ships.
- 6) **Storage as unbundled service:** transfer of LNG into tanks of the terminal as a service not associated to the regasification capacity contract.

LNG market

What do the users of the terminal want?

- **Availability of capacity** in the long and short term (avoid uncertainty)
 - ✓ Unloading capacity
 - ✓ Storage capacity
 - ✓ Regasification capacity
 - ✓ Truck loading
 - ✓ Ship loading
- **Flexibility**
 - ✓ Slot flexibility
 - ✓ Services that could be adapted to the final market (different regasification schemes)
- **Compatibility**
 - ✓ Ship-Dock (unloading arms)
 - ✓ Gas quality

LNG regulated tariffs in Spain

LNG Tariffs are applied to 3 concepts:

- **Unloading LNG** (fix & variable terms)
- **LNG storage** (only variable term). Penalties for having “too much” LNG stored
- **Send out /regasification capacity** (capacity & commodity charges)
- Other services are also available: reload of LNG to ships / bunkering.

Terminal	Tariff					Gas in kind %
	Send out		Unloading		LNG Storage	
	Capacity c€/kWh/d/m	Commodity c€/kWh	Fix €/ship	Variable c€/kWh	Variable c€/kWh/day	
Huelva, Cartagena and Sagunto	1.961	0.012	33,978	0.007	3.24	0.005
Barcelona, Bilbao and Mugardos			16,988	0.004		

These are the values for **annual tariffs**. In case of shorter term capacity multipliers are applied (only to the capacity regasification charge).

Remuneration of LNG Spanish terminals

- Infrastructures development under a regulated economic regime:
- Investment recovery guaranteed with a reasonable rate of return. No risk

1. *Remuneration for availability*

- a. **O&M costs**: are established through standard costs
- b. **Investment costs**: Depreciation costs + Financial remuneration (net of depreciation)
 - Remuneration for **depreciation** = Investment value / working life
 - Remuneration for **financial costs** = Net investment value (investment less depreciation) multiplied by rate of return

2. *Remuneration for Continuity of Supply*

- Dependent of the Demand Variation with respect to the previous year:
Higher if demand increase / Lower if demand decrease.

LNG Market in Spain – OTC trading 2017

- **LNG terminals in Spain** are used by **many shippers**. Many companies unload and regasify in the terminal, and other can also storage LNG or load trucks (small scale), and others only trade

Balancing point	Traded gas (GWh)	Production (GWh)	Churn rate	active traders	Share of 3 main traders
Barcelona LNG Terminal	127.422	59.954	2,1	42	45%
Huelva LNG Terminal	42.564	48.374	0,9	31	63%
Bilbao LNG Terminal	56.477	29.916	1,9	26	59%
Cartagena LNG Terminal	8.780	9.377	0,9	25	59%
Mugardos LNG Terminal	9.880	11.756	0,8	20	65%
Sagunto LNG Terminal	29.676	21.614	1,4	25	58%
Total LNG	274.799	180.991	1,5	51	36%
Underground storage (UGS)	3.497			21	68%
Virtual balancing point (PVB)	237.471	169.897	1,4	77	22%
Total Spain	515.767	350.888	1,5	82	27%

Current problems

What happen when there is almost no gas in the terminals?

- **Finantial problems:** In the Spanish case, created a déficit to be paid by consumers (tariffs) in the coming years. Rate of return were decreased and linked with gas demand
- **The incentive for creativeness:** LNG operator looking for new markets, ofering **new services**, compiting among each others to load cargoes, develop small scale, bunker...
- **Phisical and enviromental problems**
 - Operational problems
 - Boil off gas: avoid emisions

Current LNG market constraints

The Current LNG market might still be limited because:

1. Is exclusively based on OTC operations
2. Is not transparent
3. Is not very liquid
4. There are as many LNG markets as LNG terminals:
 - Liquidity is limited to those terminals having enough users
 - Users willing to trade LNG at a particular terminal need to have TPA contract in the terminal
 - Users with bigger LNG portfolios have competitive advantages and more flexibility

Challenges – Towards a new LNG model

1. Provide **new services**, adapted to market needs, with competitive tariffs:
 - Bunkering
 - Virtual liquefaction, etc.
2. To give the **right value to the flexibility offered** by Spanish LNG terminals
3. Facilitate LNG management
4. Easy and agile TPA processes: contracting, nominating, etc.
5. **Alleviate current congestions** at specific LNG terminals
6. Reduce competitive advantages for large suppliers

Challenges – Towards a new LNG model

7. Facilitate LNG transactions and increase **liquidity** in the LNG market.
8. Encourage the creation of a **potential LNG hub for Europe**.
9. Provide **more flexibility** for users:
 - ✓ Unbundled services
 - ✓ Possibility to customize bundled services
 - ✓ Standard services, similar to other European LNG terminals



Improve competition in the Spanish (and European) LNG market

Future situation - Type of LNG services in Spain

BUNDLED		UNBUNDLED	
<ul style="list-style-type: none"> Ship unloading, LNG storage and regasification 		<ul style="list-style-type: none"> Ships unloading Regasification LNG storage LNG trucks Ships loading 	<ul style="list-style-type: none"> Transshipment Cooling down Bunkering Virtual liquefaction
LOCATIONAL		NO LOCATIONAL	
<ul style="list-style-type: none"> Ships unloading LNG trucks Ships loading 	<ul style="list-style-type: none"> Transshipment Cooling down Bunkering 	<ul style="list-style-type: none"> Regasification LNG storage Virtual liquefaction 	
DISCONTINUOUS		CONTINUOUS	
<ul style="list-style-type: none"> Ships unloading Ships loading Transshipment 	<ul style="list-style-type: none"> Cooling down Bunkering 	<ul style="list-style-type: none"> Regasification LNG storage LNG trucks Virtual liquefaction 	

Innovation in LNG

Use of LNG as fuel for road transportation

Filing stations: Compressed Natural Gas and LNG for vehicles



Source: Criogénicas Técnicas aplicaciones industriales

Innovation in LNG

Use of LNG as fuel for maritime transportation



Calorific values:

1 Tm LNG = 15,200 kWh

1 Tm LPG (propano) = 13,800 kWh

1 Tm Diesel = 10,400 kWh

1 Tm Fueloil = 10,100 kWh

Thank you for your attention!

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