Decarbonizing heavy duties transport. The role of SNAM/Greenture

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infrastructure for a new transport

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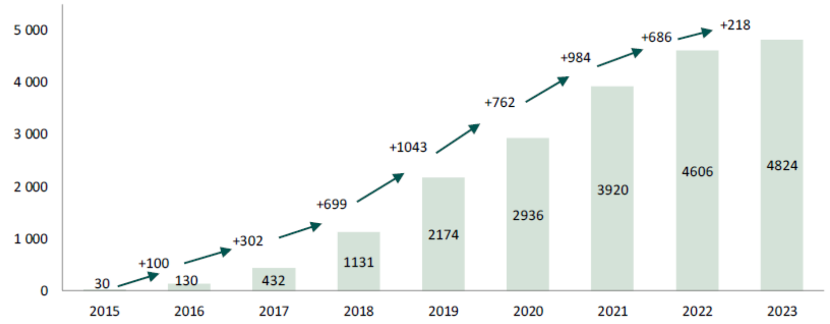
(Bio)methane Heavy Duty fueled mobility is steadily growing in the Italian market, even tough new registrations slowed down in the last 3 years

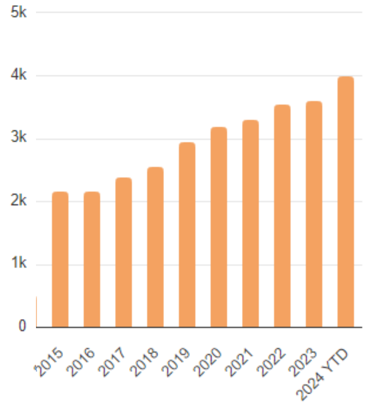
LNG-fueled heavy duty vehicles in Italy 2015 – 2023
(Vehicles' fleets and annual registrations)



Fonte: elaborazioni e stime MBS Consulting su dati MIT e Anfia

Fleet of **LNG trucks** has increased since '15 to reach **5.000 units in '24.** This upward trend is expected to continue in the coming years supported by: the offer of a broad range of heavy duty vehicles, a new **price stability** and **fuel's cost effectiveness**

CNG-powered medium-heavy duty vehicles in Italy 2015 – 2024 (YTD)



The **medium-heavy duty CNG fleet has expanded.**
The launch of new, more efficient and autonomous **models** can favor the development of this sector

LNG refuelling station network in Italy

Since 2016, the amount of L-CNG Stations in Italy has been steadiliy growing, reaching **1.500+ Compressed Natural Gas refueling stations and 150+ Liquefied Natural Gas refueling stations (in the map)**

Italy is the European country with the **biggest refueling infrastructure**

https://alternative-fuels-observatory.ec.europa.eu/transport-mode/road/italy

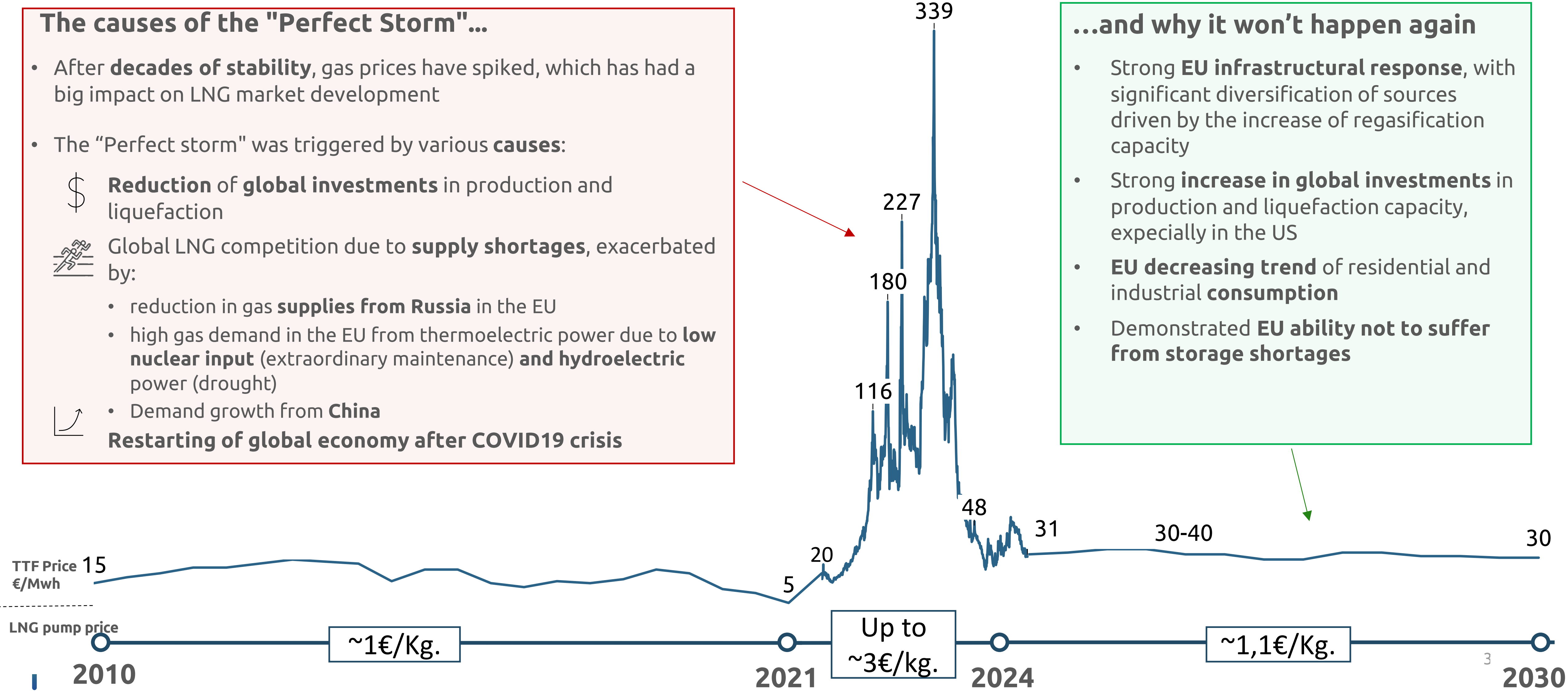
The price of CNG/LNG has reached a new stability that ensures long-term competitiveness of the product, providing a “boost” for the recovery of vehicles’ registrations

The causes of the "Perfect Storm"...

- After **decades of stability**, gas prices have spiked, which has had a big impact on LNG market development
- The “Perfect storm" was triggered by various **causes**:
  - **Reduction** of **global investments** in production and liquefaction
  - Global LNG competition due to **supply shortages**, exacerbated by:
    - reduction in gas **supplies from Russia** in the EU
    - high gas demand in the EU from thermoelectric power due to **low nuclear input** (extraordinary maintenance) **and hydroelectric** power (drought)
    - Demand growth from **China**
  - **Restarting of global economy after COVID19 crisis**

...and why it won’t happen again

- Strong **EU infrastructural response**, with significant diversification of sources driven by the increase of regasification capacity
- Strong **increase in global investments** in production and liquefaction capacity, expecially in the US
- **EU decreasing trend** of residential and industrial **consumption**
- Demonstrated **EU ability not to suffer from storage shortages**



Nota: TTF 2024/2030 prices based on TTF and expected scenarios IHS

Snam: infrastructure operator in gas transport and storage and leader in the energy transition

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Snam is the leading infrastructure operator in Europe by size of transport network and gas storage capacity…

TRANSPORT	STORAGE	REGASSIFICATION
~37,400 km	**~20** bcm	**~20** bcm

… and is positioning itself as a regional leader in the energy transition

«Green infrastructures»

greenture BUILDING THE FUTURE
- cuboGas
- SSLNG Pignataro
- Truck-loading Panigaglia

renovit l'Italia che rinnova
- ENERGY SOLUTION TEP
- EVOLVE
- TEA
- MIECI

bio enerys
- IES
- RENERWASTE
- Biomethane projects

Decarbonization
- Ravenna CCS
- ITM POWER Energy Storage | Clean Fuel
- DE NORA our research · your future

Reforestation
- snam
- cdp
- ARBOLIA diamo radici al futuro

Greenture (SNAM) have developed various infrastructures enabling distribution and refueling of Bio-CNG and Bio-LNG in Italy

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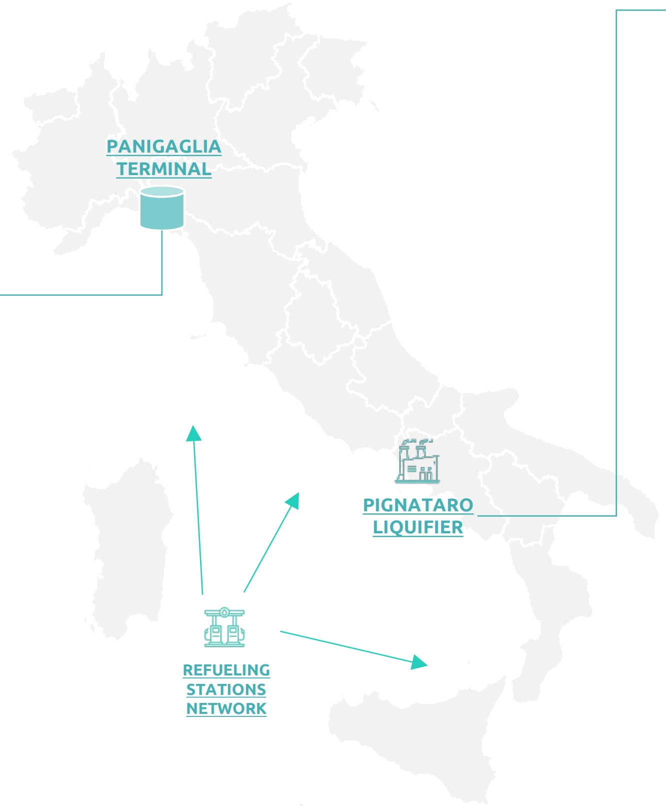
Truckloading Panigaglia

Loading Bays
Worksite status
(Sept. 2024)

- *Implementation of the **truck loading service at the Panigaglia LNG terminal**, which will allow LNG to be loaded onto tankers*
- *Thanks to Virtual Liquefaction, which is possible within the Interconnected infrastructure only, Panigaglia plant can supply **Bio-LNG, identifiable as such for ETS purposes** too*

Plant capacity	**200 ktpa** ~40 loads/d
Expected Start-up	**Q1 '25**



Microliquefaction plant Pignataro

- *The **Microliquefaction plant** in Pignataro Maggiore (CE) can provide **liquefaction and truck loading service***
- *Pignataro plant can supply **Bio-LNG , identifiable as such for ETS purposes** too*

Plant capacity	**50 ktpa** 7÷8 loads/d
Expected Start-up	**Q1 '26**

Refueling Network

- Construction of +**135 CNG, LNG and H2 refueling stations by2027 (of which 85 already in operation)**, all over the Italian peninsula

In Italy, methane for road transport will be almost 100% Bio by 2025. Biomethane allows reducing W-t-W emissions more than electricity from the grid and is 100% produced in Italy

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TRANSPORTS DECARBONIZATION

- Currently, **Well-to-Wheel emissions of biomethane vehicles** are **lower than BEV's ones**[1)] (Report v. 5 of the Joint Research Centre, the EU Commission's Advisory Group)

ENERGY INDEPENDENCE

- Biomethane is **produced in Italy** and promotes the country's energy independence
- Biomethane supports **circular economy** and the growth of **local economies**

WHAT OTHER ADVANTAGES?

- **Reduction of pollutants** (negligible NOx and PM emissions)
- **End-to-end infrastructural value chain in place**, able to support market growth (large availability of Fuel, diffused distribution and refueling infrastructures, broad range of vehicles)
- **Competitive price vs Diesel**: today LNG is 20-30%[2)] cheaper than diesel and this advantage is expected to remain stable for the coming years

1) Considering the average EU electricity generation mix
2) Dati 11 – 17 Novembre 2024 - Statistiche energetiche e minerarie - Ministero dell'ambiente e della sicurezza energetica, https://sisen.mase.gov.it/dgsaie/prezzi-settimanali-carburanti

Which institutional support is needed to lift Bio-LNG use for road transport?

LEGISLATIVE AMENDMENTS NEEDED

PIECE OF LEGISLATION	DESCRIPTION OF THE PROBLEM	IMPACT	PROPOSED AMENDMENTS

CO2 HDV Regulation	• The current Regulation sets reduction targets of **tailpipe emissions** (i.e. **Tank-to-Wheel** approach). That is:
	  • **It does not valorize biofuels** (considered with the **same** level of **emissions of fossil fuels**)…
	  • …and at the same time considers **electric vehicles as ZEV**, Zero Emission Vehicles, regardless how electricity is produced
	• **OEMs** not complying with the set targets, will be charged extremely **punishing penalties**
		(Bio)LNG Vehicles supply	**Revision** of this Regulation (**before** the expected date of **2027,** which might be too late to keep OEMs engaged with investments) so to **ensure** the **valorization of biofuels** (e.g. by including a correction factor of the tailpipe emissions approach)

EU ETS Directive	• Concerning **ETS2** (witch form 2027 will apply to road transport), the use of **auctions' revenues is restricted** to measures to favor the development of **BEVs and Fuel cells** and related infrastructures only	**Whole (Bio)LNG value chain**	Revision of the ETS Directive so to enable use of **ETS2 auctions' revenues** include the lift of **vehicles powered by biofuels**

NEEDED INCENTIVES

MEASURE	DESCRIPTION OF THE PROBLEM	IMPACT	PROPOSED MEASURES
Fiscal incentives	• Transport companies have invested in LNG fueled trucks because of their economic advantage. The **2022 gas prices spike** has caused serious damages to these companies. • Now, favorable economics (Bio)LNG vs diesel are back, but extra measures are needed to **reassure transport companies** that this advantage will last for the coming years	**BioLNG and Vehicles Demand**	Introducing **tax credits for the use of Bio-LNG** as a fuel for heavy vehicles
Extension of ZEV benefits to BioC-LNG vehicles	• The regulations on CO2 emissions of new vehicles consider T-t-W emissions only. Therefore, ZEV means Zero tailpipe emission vehicle • However, **at present average W-t-W emissions are lower for biomethane fueled vehicles than for BEVs**	**BioLNG and Vehicles Demand**	Due to their W-t-W decarbonization capacity, **biomethane fueled vehicles** should be have the **same benefits as Zero tailpipe emission vehicles**