CONFERENZAGNL 2017

Small Scale to large Market

Strategies & Technologies towards the Mediterranean Area

LNG production from national natural gas fields

Romano Giglioli

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MOSTRA D'OLTREMARE

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In collaboration with WORLD ENERGY COUNCIL ITALIA

opportunities

- The liquid form enhances the extracted gas both for traction uses and for transporting it to sites not served by the national network and the islands.
- The availability of small liquefaction systems allows to liquefy, at an acceptable cost, the natural gas of small reserves present on the national territory, that, currently, supply the gas extracted into the national network.

technologies

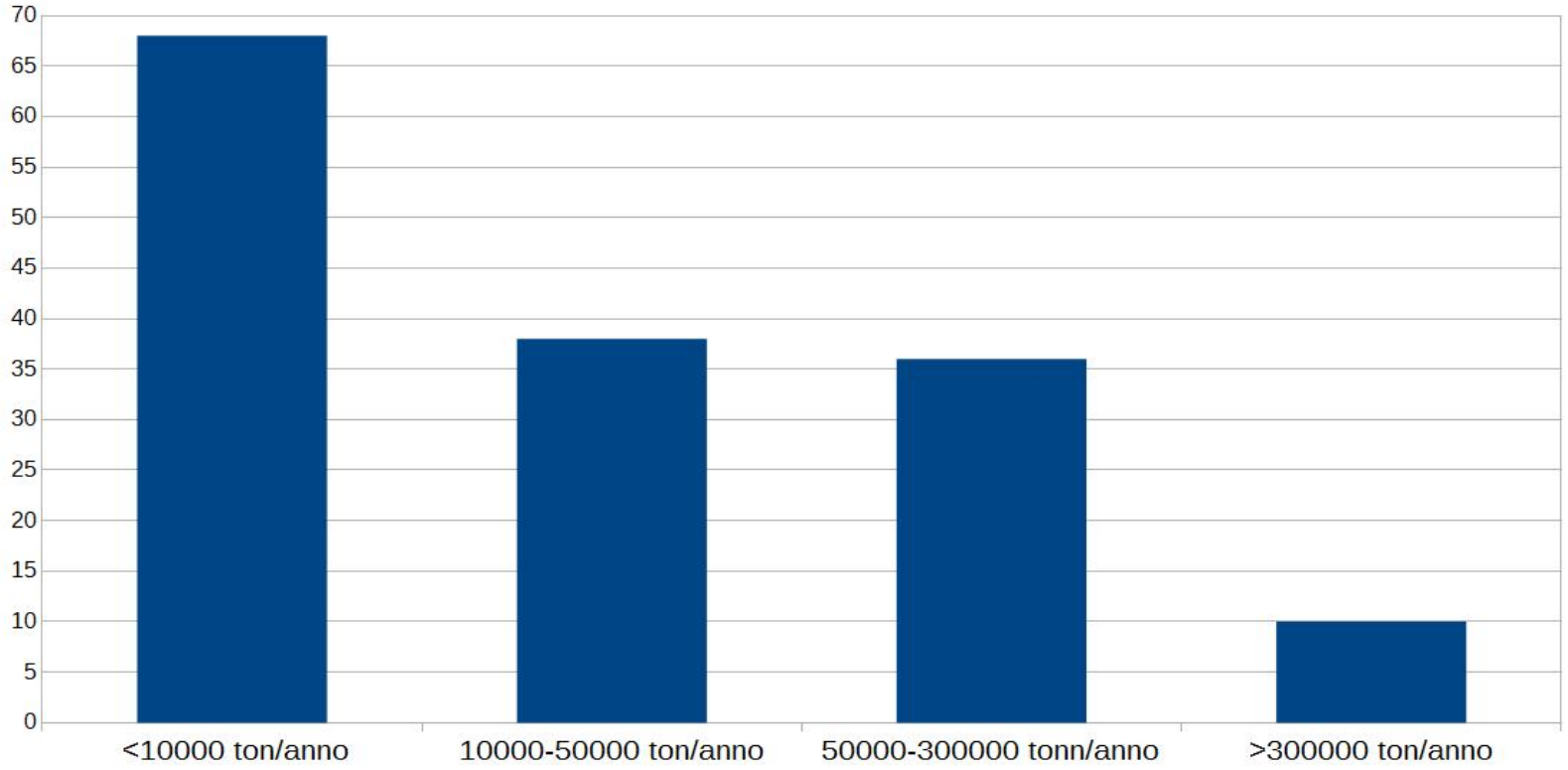
- A first (subjective) classification of plants and technologies for liquefaction can be as follows:

- Large Scale (LS) plant (multi train) > 10 Mt/y
- Mid Scale (MS) plant (single train) 50-300 kt/y
- Micro Scale (μS) plant (special plant) 10-50 kt/y
- Very Small Scale (VS) plant (N_2 cryogenic plant) < 10 kt/y

Localization of Italian production

Annual production classes

Number of fields per year average production



VS μS MS LS

production costs

- Excluding large-scale (LS) installations, the **specific cost** of Mid and Micro scales, interpolating some available cost data, can be roughly estimated using the following cost formula:
- $C' = 400\ (q/30)^{-0.5}$
- **C'** specific cost [€/(t/y)] ; **q** annual production [kt/y]
- The power consumption of the plant to produce a kilogram of GNL is about 1kWh, with a cost of 0.06 €/kWh in self-production.
- The cost for liquefaction, with these assumptions and O&M cost about 4% of CAPEX per year, useful life of plant 10 y and WACC 7%, is:
- for Mid Plant about 100 €/t ; for Micro plant about 125 €/t

production costs

For VS systems, plants are simpler (cryogenic tanks, exchangers and circulation pumps), but require discrete amounts of liquid nitrogen: about 2.5 kg of liquid nitrogen per kg of LNG.

Based on a draft plan and with the market prices of liquid nitrogen it is estimated that natural gas can be liquefied at around **300 € / t**

comparisons

- Purchase and transport the LNG by road from great distances (eg from Barcelona to Naples), entails today to have the LNG at about **€ 600-650 / t.**
- By investing the gas on the grid at 250 € / t, with the local liquefaction it could have LNG at a cost of about
- 350 €/t for MS plants,
- 400 €/t for μS plants,
- 550 €/t for VS plants.
- **Then with a likely cost reduction.**

conclusions

- Although with many approximations, it can be considered that it would be advantageous to produce LNG locally, enhancing current national productions.

- Note: For local production, it might also be interesting to consider the costs of the production of flare gas liquid fuels.

Thanks for your attention