

Natural gas, small scale LNG and and bio-methane for sustainable transport

UNECE workshop decarbonising transport with natural gas

9 December 2020

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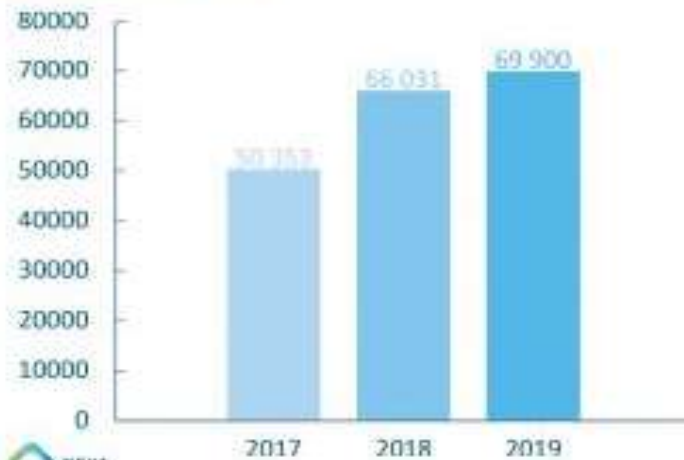
NGV Italy



- Reflects the Italian chain of natural gas for transport gathering companies active in: natural gas upstream and midstream operations; engine design (car, truck, ship); OEM production; natural gas network management; retail station owners; cryogenic technologies; bio-methane production.
- Belongs to NGV Global and NGV Europe, thus connecting with international know-how, technology expertise, and best practices for the implementation of natural gas solutions in transport
- Fosters at a global level the Italian industrial excellence and expertise for natural gas, LNG, bio-CNG/LNG fueled transport

CNG-LNG vehicle evolution in Europe

NEW CNG PASSENGER CAR REGISTRATIONS
EU + EFTA PER YEAR



NEW CNG PASSENGER CAR REGISTRATIONS 2019
EU + EFTA PER YEAR IN PERCENT



- ✓ In Italy, the number of new CNG cars added to the national car fleet is flattening
- ✓ CNG cars are suffering from a low level of policy support and incentives
- ✓ CNG retrofit of gasoline and diesel cars would improve environmental benefits and allow people to change for a more sustainable fuel with low investment

New vehicle registrations in 2019



CNG-LNG station deployment in Europe



CNG stations

CNG STATION GROWTH EU + EFTA



CNG STATION DISTRIBUTION DEC 2019



LNG stations

LNG STATION GROWTH EU + EFTA



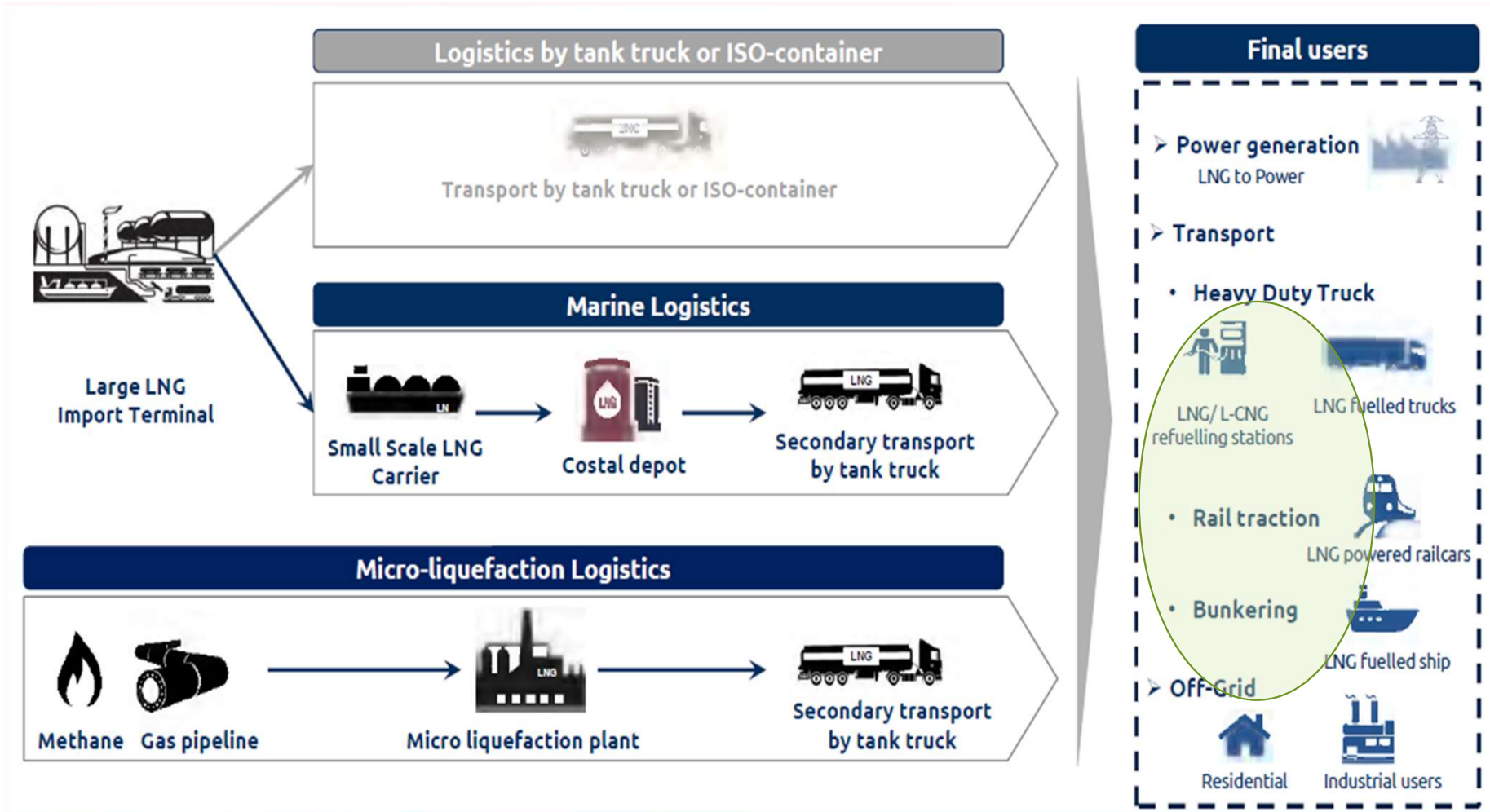
LNG STATION DISTRIBUTION DEC 2019



LNG-CNG distribution network In Italy

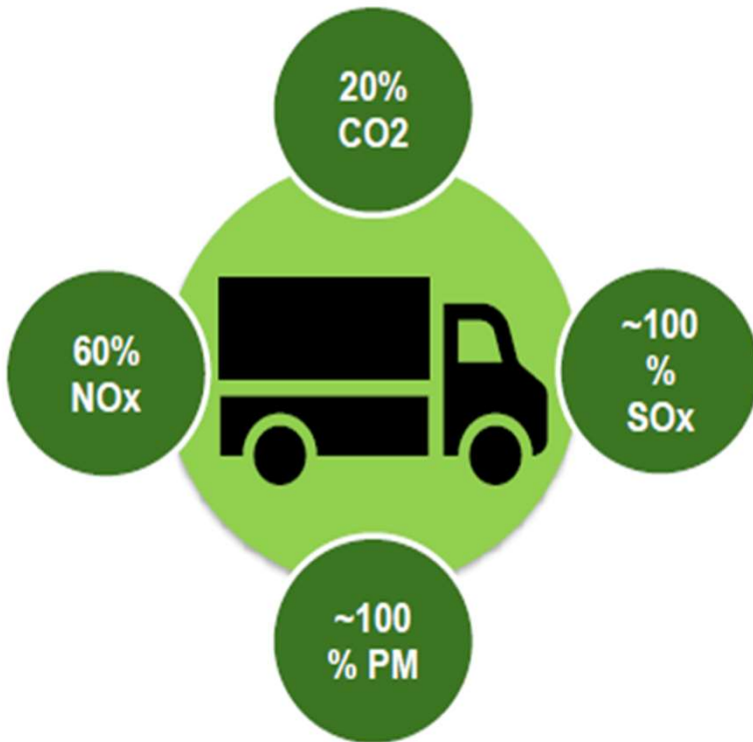
- ✓ 1,315 CNG refueling stations
- ✓ 81 LNG stations for trucks
- ✓ 25 off-grid plants fueled by LNG
- ✓ 2 isolated grids supplied by LNG

SSLNG: a driver for decarbonisation

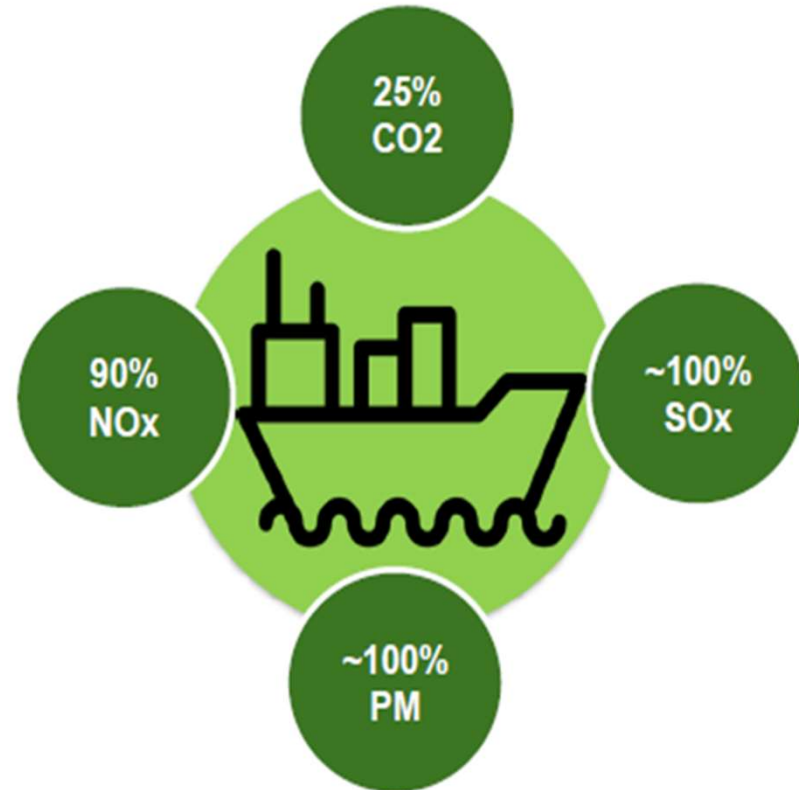


Environmental benefits

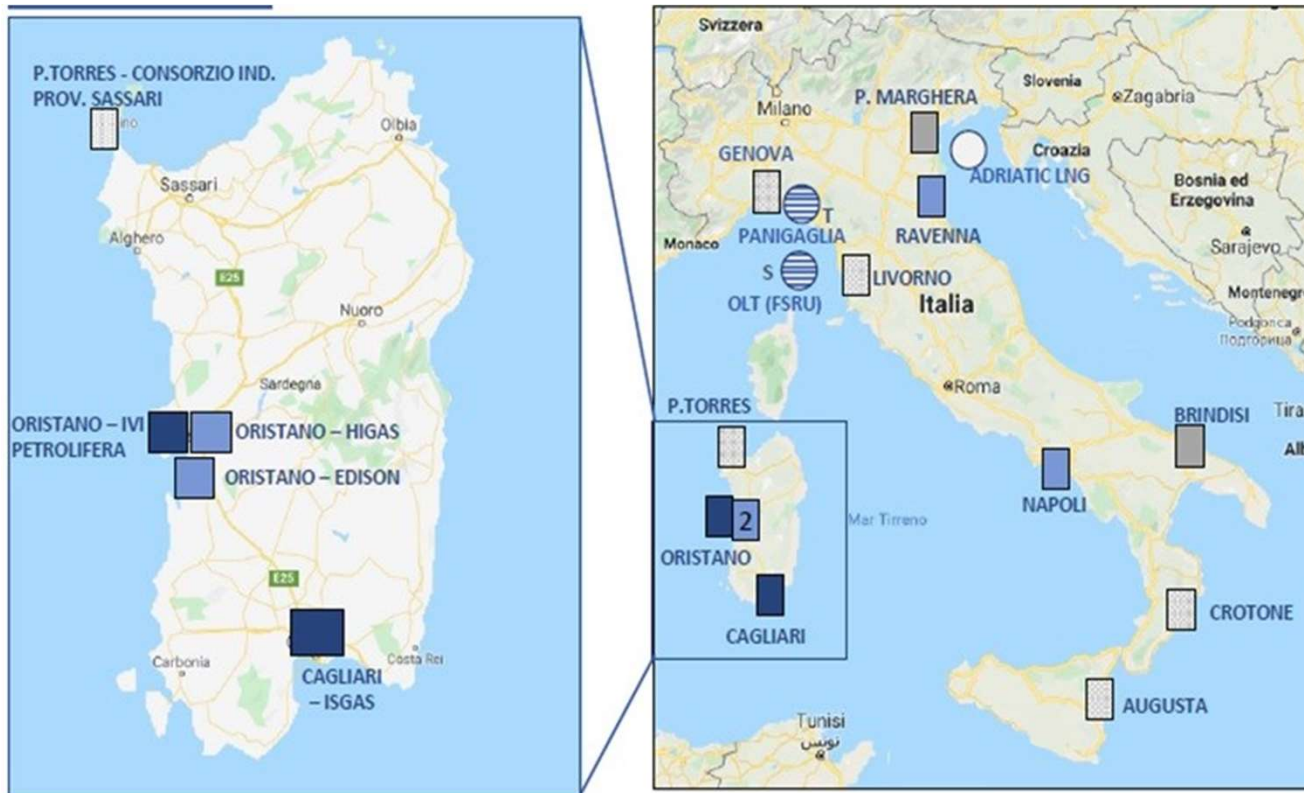
HEAVY- DUTY ROAD TRANSPORT:
(% emission reduction vs diesel)



MARITIME TRANSPORT:
(% emission reduction vs fuel oil)



SSLNG storage facilities development Italy



-  LNG import terminals with SSLNG authorization process starting
-  LNG import terminals with SSLNG services at the evaluation stage
-  Coastal deposits or Regas. facilities with authorization process activated
-  Storage facilities authorized
-  Storage facilities with authorization process in progress
-  Initiatives for storage facilities without authorization process started

Source: REF-E and ASSOCOSTIERI

Italy: direct LNG uses potential



Road transport

- Mainly for **heavy duty trucks (HDT)**
- LNG consumption in **2018 ~60 ktpa**: strong growth from 2017 (+100%)
- Expected demand of **~800 ktpa by 2030**



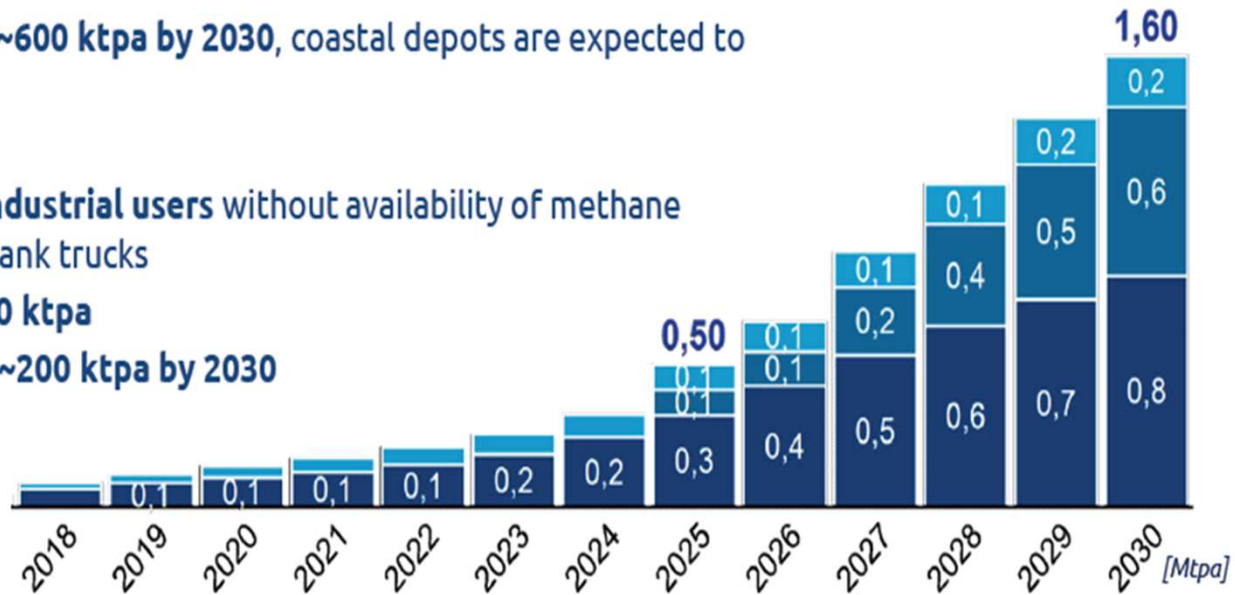
Bunkering

- LNG for maritime transport
- Expected total demand of **~600 ktpa by 2030**, coastal depots are expected to start from 2022



Off-grid

- **LNG for residential and industrial users** without availability of methane via pipe and reachable by tank trucks
- LNG consumption **2018 ~10 ktpa**
- Expected total demand of **~200 ktpa by 2030**



Source: NGVA

First LNG refueling of a Cruise ship in the port of La Spezia (Italy)



LNG fuelled vessels and ships



LNG and dual fuel trucks, and bio-methane tractor



LNG for rails

Long-haul freight service



USA/ Canada: dual-fuel locomotives have been tested for long-haul services. A dedicated fuel tender is used for LNG storage



Russia: LNG powered shunting locomotive and LNG fuelled gas-turbine locomotive

Short-haul passenger service



Spain: tests are ongoing for the conversion of diesel railcars to LNG (first passenger train to run on LNG)

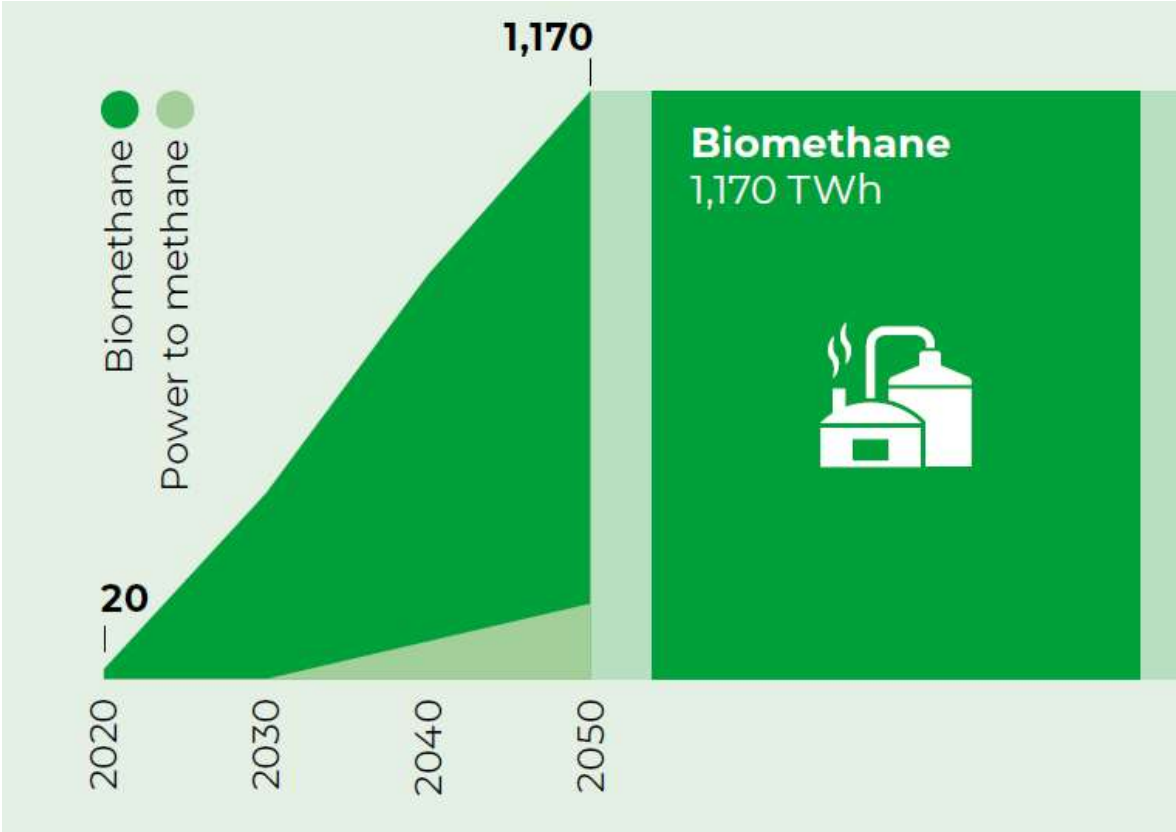
Best benchmark for Italy's plans:

- Short passenger railways (mainly tourist lines)
- Large numbers of diesel driven railcars (Aln 663/668)

Bio-methane: the game changer!



EU biomethane potential 2050



Italy, 2020, the first bioLNG refueling



Potential bio-methane uses in the UE by 2050



Source: Navigant 2019

Conclusions



- Natural gas stakeholders have to join forces at the international and national levels for calling on
 - I. technology neutrality in environmental policies
 - II. a life-cycle approach in CO2 emission evaluation;
- NGV Global, NGV Europe, and their constituencies have the technical and industrial expertise needed to make CNG, LNG, and biomethane the main options for transport decarbonization and pave the way to hydrogen development, starting from hydromethane blending
- In the short term, we have to collectively push the support to CNG retrofit for light-duty vehicles to make it competitive with other incentivized solutions