



NGVA
Europe
for sustainable mobility

ECE/ENERGY
Group of Experts on Gas
Fourth sessions

**Methane emissions: a challenge to
the sustainability credentials of gas**

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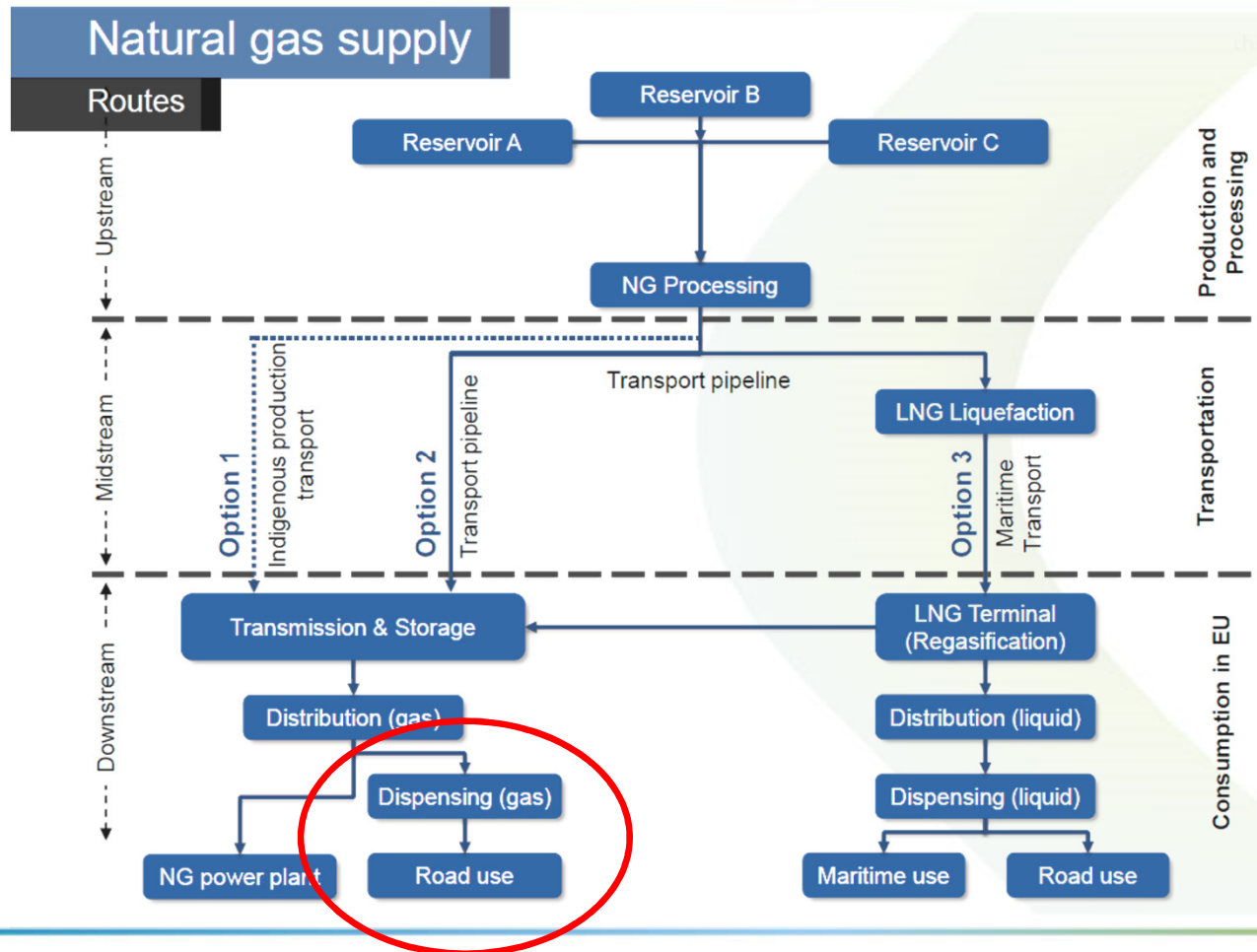
Natural Gas as transportation fuel

Moving from an oil based transportation system towards DECARBONISATION and AIR QUALITY improvements will ask for a set of solutions where Natural Gas has to play a key role

- *Low Carbon content*
- *Gaseous phase*
- *High knocking resistance*
- *Absence of heavy hydrocarbons (e.g. aromatics, olefins)*
- *Mature and affordable technologies*
- *Robust and simple aftertreatment system (3way catalyst)*
- *LNG opens to long range trucks (up to 1500 km)*
- *Competitive TCO (Total Cost of Ownership)*

Nevertheless very often *methane emissions* are indicated as crucial element affecting both CNG and LNG sustainability as transportation fuels

WTW GHG Intensity Study on Natural Gas



Methane emissions from vehicles

- No gas leakage is admitted on the engine / vehicle side.
- All crankcase ventilation systems are based on closed blow-by circuit, directly connected to the engine air intake manifold, so no emissions of methane occur from the vehicles.
- Only CH₄ from exhaust unburned hydrocarbons occurs from the combustion process as tailpipe emission
- Methane conversion needs for high energy (temperatures) and dedicated catalyst formulation to facilitate catalyst light off → technologies are nowadays well proven and reliable.

Methane emissions from vehicles

Passenger car

EURO 6 limit - THC	100 mg/km
EURO 6 limit - NMHC	68 mg/km
Representative SoA C-segm vehicle	
CO2 emissions	105 g/km
CH4 emissions	42 mg/km
N2O emissions	1,5 mg/km
Fuel consumption	3,9 kg/100 km
g emitted methane / g burnt methane	0,00107

NGVA/Thinkstep Natural Gas GHG Intensity – study under to be published April 2017

Methane emissions from dispensing

Methane emissions may occur during refuelling operations at the end of the operation, after the depressurisation of the filling line at the receptacle

g emitted methane / g burnt methane	
CNG operations	0,051
LNG operations	0,210

Technologies to recover vented gas and new designs for LNG receptacle enable NGV Industries to set a *target for zero venting* methane emissions

Conclusions

Current methane emissions from transportation sector show an intensity by 0,78% up to 1,20% respectively for CNG and LNG (as g of emitted CH₄ / g of burnt fuel)

Emissions from dispensing operations (venting) will be strongly reduced in the future thanks to new recovery systems and dedicated receptacle design

Future engine/vehicle technologies will provide further reduction in fuel consumption (-20% w.r.t. 2015 SoA according to the ongoing EU project « GasON »)

Biomethane will be a key enabler to additionally reduce methane emissions in the atmosphere



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