



NGVA
— Europe
for sustainable mobility

Natural Gas as a Transportation Fuel

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Bucharest, 28 April
2017

Where we are starting from?

Worldwide vehicles running fleet



**Close to 1.3 Billion vehicles
running worldwide**

74% Passenger Cars

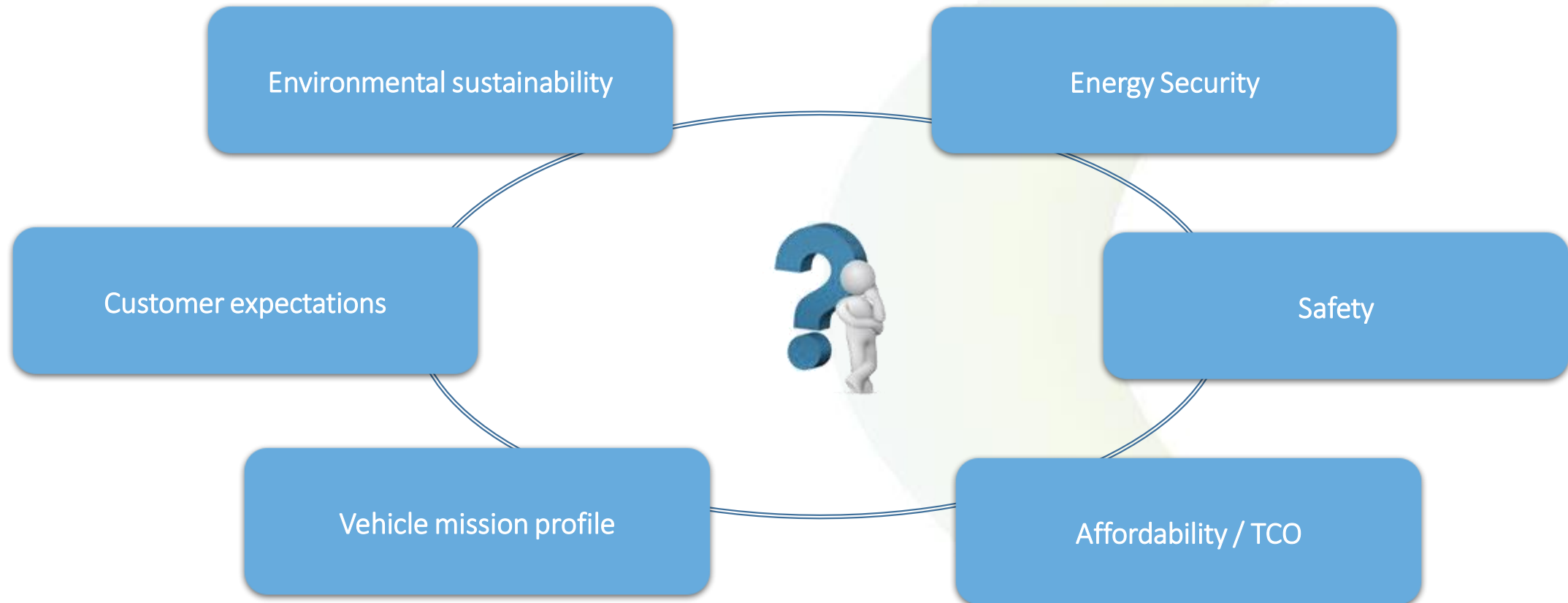
26% Commercial Vehicles
(LDV, HD trucks, Coaches and Buses)

	CURRENT TRANSPORT ENERGY MATRIX	ENERGY CONSUMPTION
	%	Mtoe
OIL DERIVED (GASOLINE and DIESEL)	95%	1.865
NATURAL GAS	2%	39
BIOFUELS	2%	39
ELECTRICITY	1%	20
	100%	1.963

Data source: IEA Energy Outlook – 2015 data

Data source: OICA - 2015 data

Expectations from the mobility and transport system



Environmental sustainability

Combustion Perspective

Lowest tailpipe CO₂ emissions

Emissions mainly composed by methane → not a pollutant!

Low aldehydes emissions and zero emissions (PAH) from heavier HC

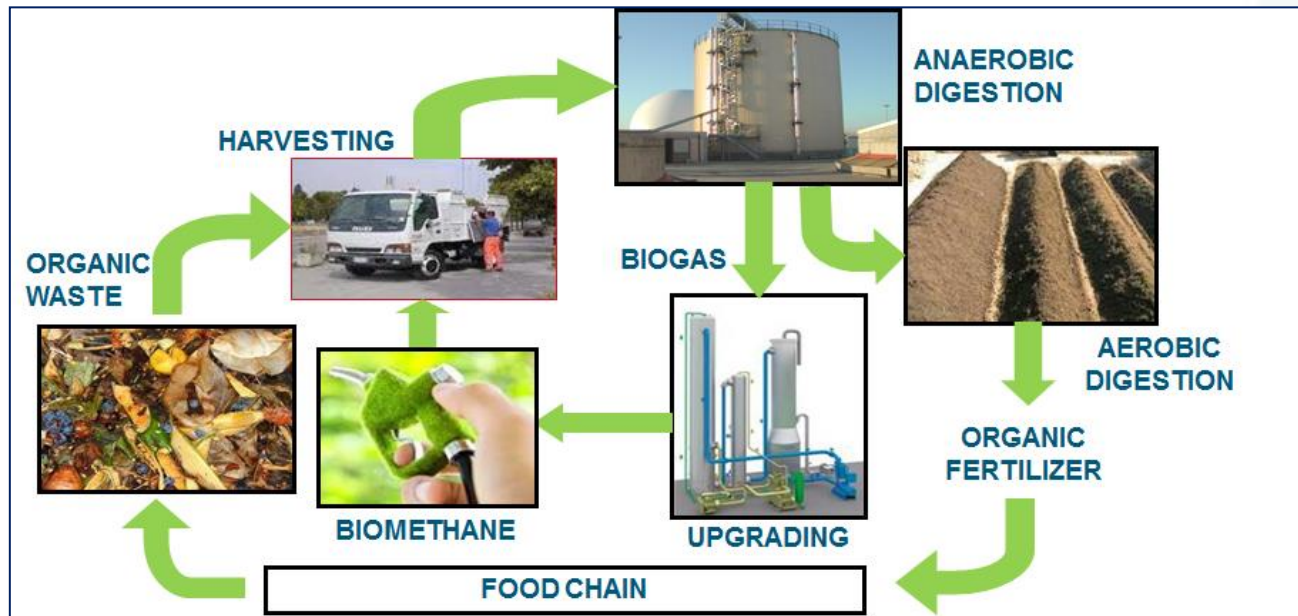
Lower NO_x emissions

Lowest levels of PM/PN

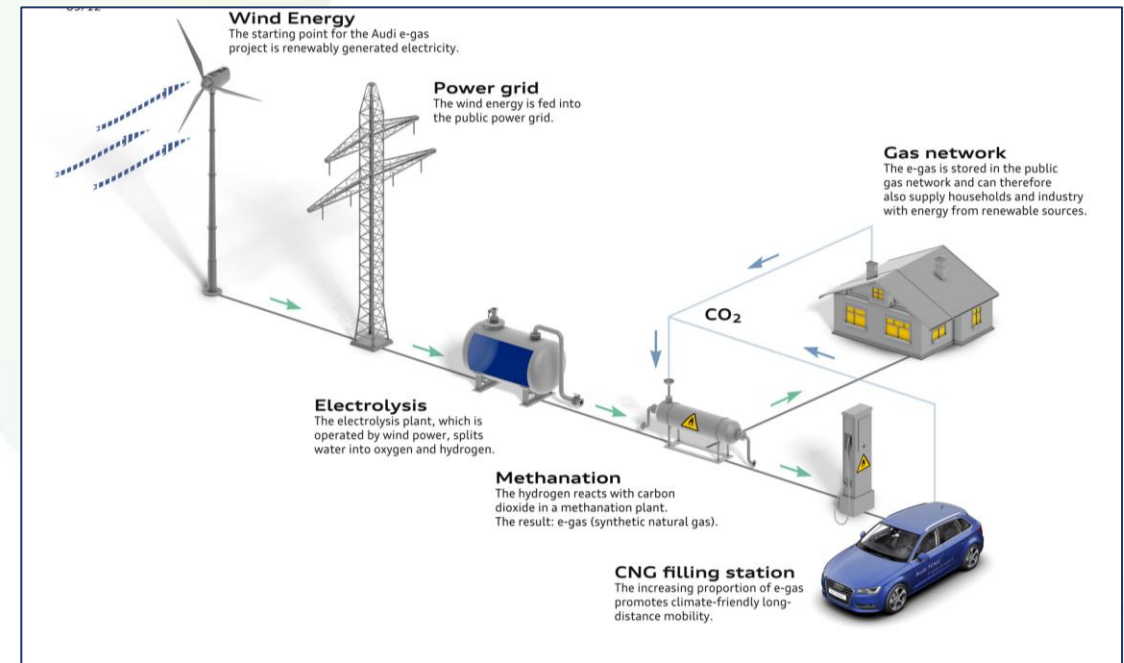
Environmental sustainability

Great Opportunities from Bio and Synthetic Methane

ANAEROBIC DIGESTION



POWER TO GAS



What Is Expected From The Mobility And Transport System?

Customer expectations

Vehicle mission profile

CNG buses – cleaner air for all



Garbage collection – quiet truck



Delivery vehicles – no limits



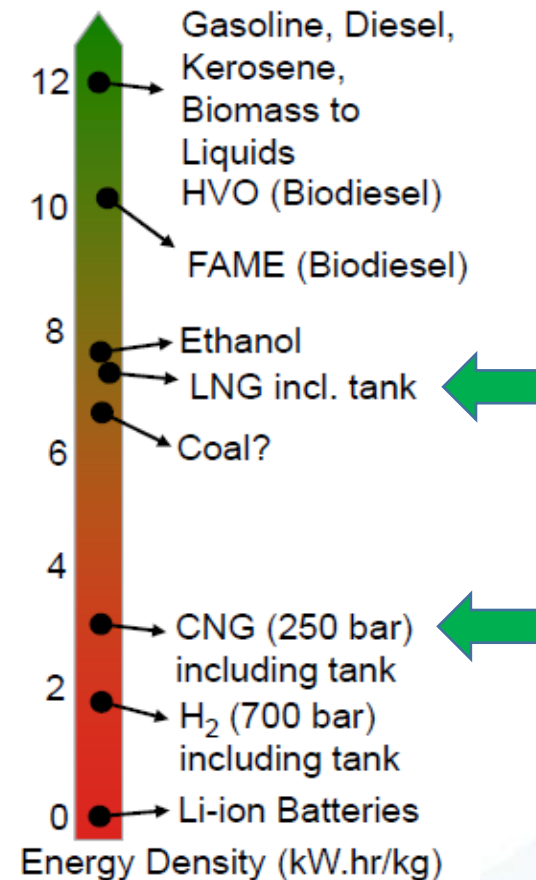
Product range up to higher segments



CNG distribution and LNG long-haul trucks – a solution for all



FUEL ENERGY DENSITY





“AFI” Directive 94/2014/EU

Member States presented National Policy Frameworks (Nov. 2016)



LCNG station, Gasrec, UK



CNG station, Bohlen & Doyen, Germany



Appendix A - Suggested Template for National Policy Frameworks

6.3.2 Natural Gas Refuelling Station

Table 6.8: Planned Number of Natural Gas Refuelling Points in the TEN-T Comprehensive Network

ROAD NAME		2020			2025			2030		
		Number	Max Distance	% of completion	Number	Max Distance	% of completion	Number	Max Distance	% of completion
Road name	CNG									
Road name	LNG									

What is NGVA Europe's role?

NGVA Europe involves 140+ members in 40 countries promoting the use of natural gas and renewable methane as transportation fuel

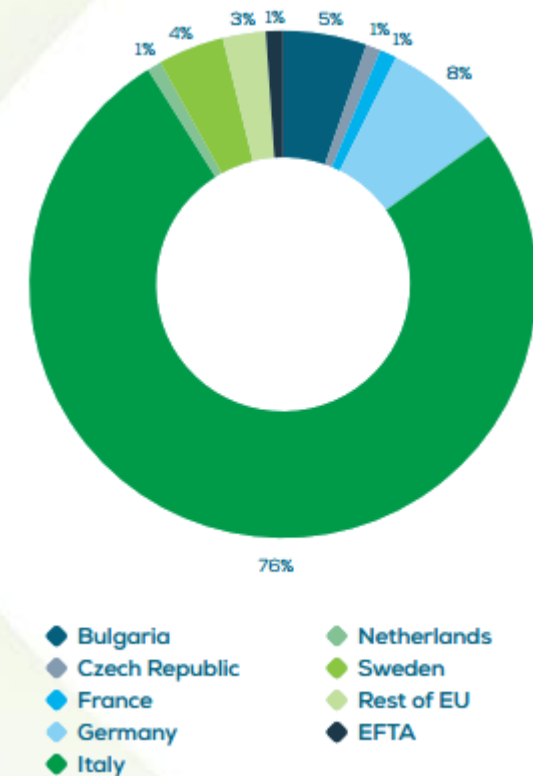
- Creating consensus on natural gas benefits through facts and figures
- Supporting the industry development through advocacy and lobby actions, as well as the definition of new standards and regulations.

Some of the ongoing NGVA's activities towards the EU Institutions:

- ***Revision of Clean Vehicles Directive (CVD)***
- ***Revision of the Fuel Quality Directive (FQD)***
- ***Revision of the Renewable Energy Directive (RED II)***
- ***Revision of the CO₂ regulation for cars and light commercial vehicles***
- ***CO₂ emissions from HDVs (VECTO model)***
- ***CO₂ credits for renewable methane***
- ***New fuel pricing proposal (based on energy content)***

MARKET LEADERS

Italy	→	Germany	→	Bulgaria
76%		8%		5%
41 mln vehicles		47 mln vehicles		3 mln vehicles
~1mln NGVs		97 000 NGVs		68 000 NGVs
1100 CNG Stations		900 CNG Stations		105 CNG Stations



How Is It Achieved?



Several cities have fleets of CNG buses

- Economical
- Environmentally friendly
- Keeps air clean

➔ Appropriate choice for any city

Taxis running on natural gas

- Ability to retrofit vehicles
- Wide variety of vehicles can run on natural gas

➔ Economic business solution



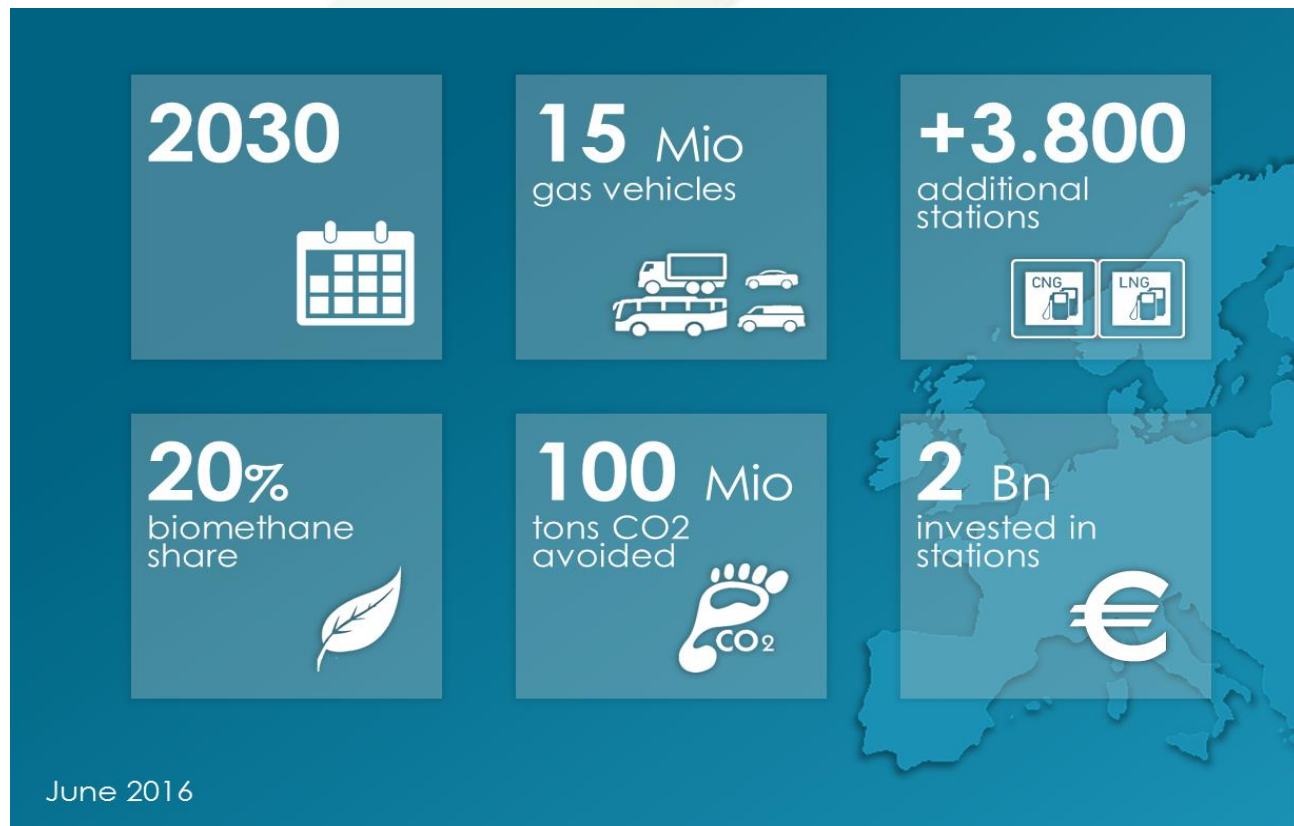
Bulgaria

5%

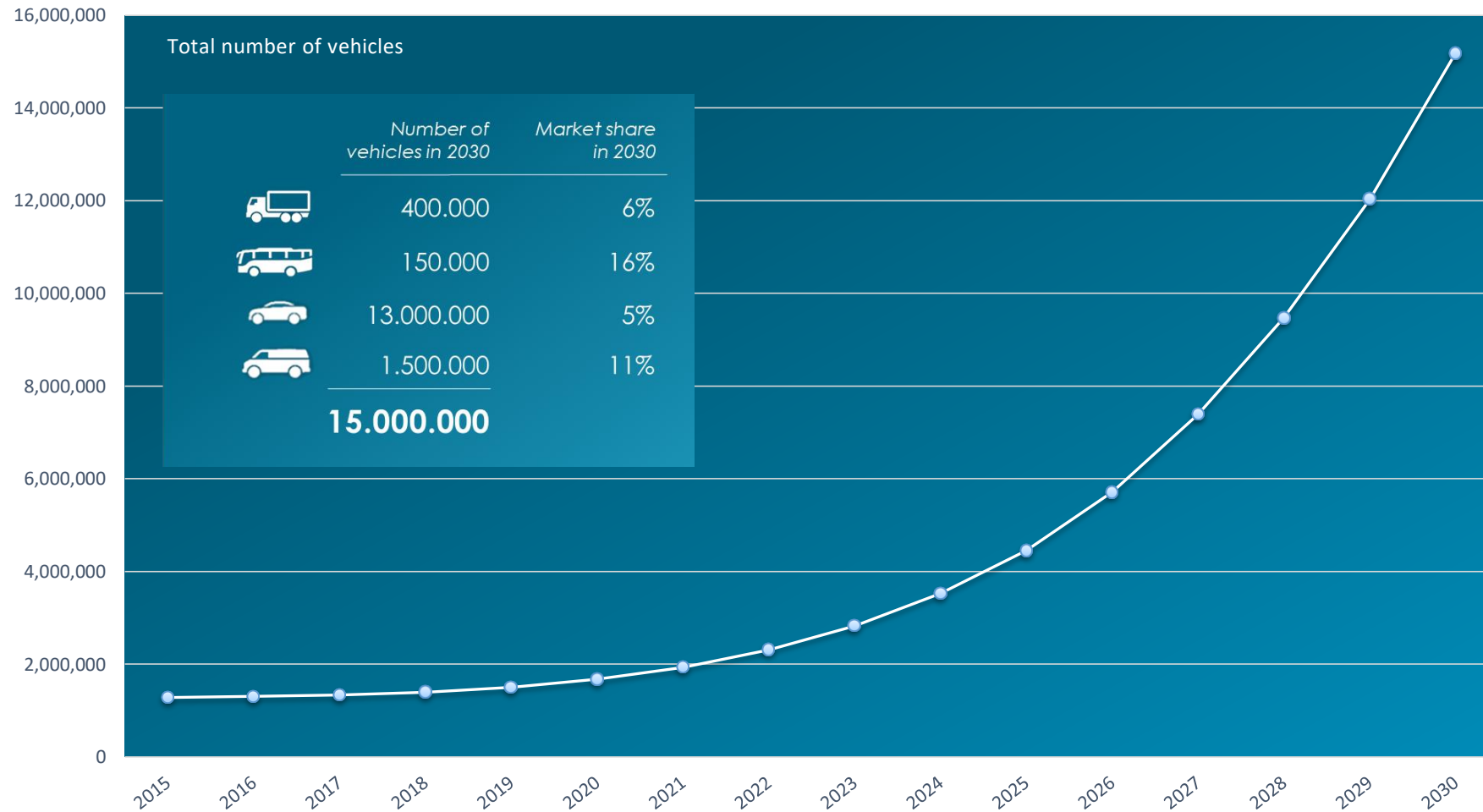
3 mln
vehicles

68 000
NGVs

105 CNG
Stations



NGV Roadmap for 2030



Source: NGVA Europe

What would drive such EU-wide market development?

Natural Gas: Key Player In The Transportation Scenario

CO₂ emissions reduction
from Well to Tank and
Tank to Wheel

Crucial to comply with CO₂ target

Effective to reduce GHG intensity from transportation

POLLUTANT emissions
reduction

Natural Gas ensures Nearly Zero Noxious Emissions
even under Real Driving conditions

Preserving AIR QUALITY in the urban areas
NGV must access Limited Traffic / Low Emissions Zones !

Oil-Based Transport



DECARBONISATION GOALS

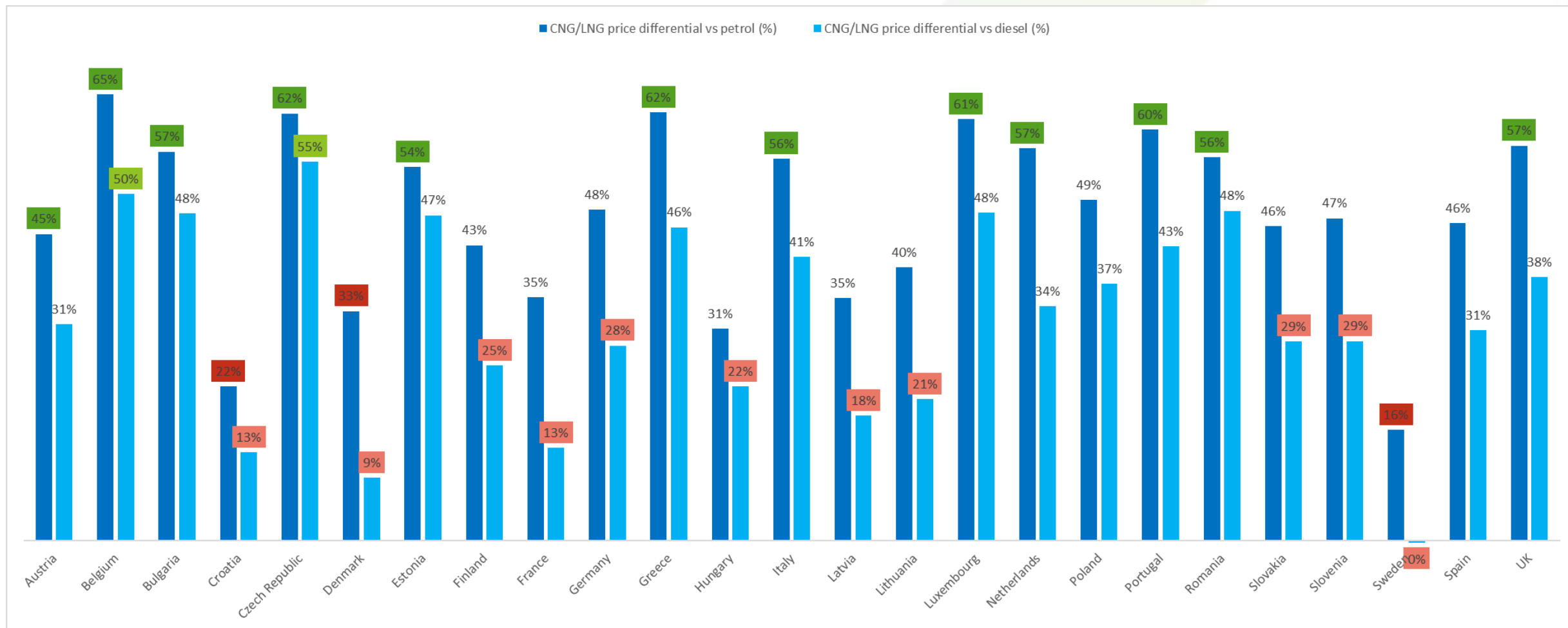
AIR QUALITY FOCUS

Natural Gas → Mature and safe technology, affordable and available today

g-mobility

- The WtW GHG emissions for a Passenger Car powered by CNG are **23 %** lower than those of the equivalent car powered by petrol and **7 %** lower than the equivalent vehicle powered by Diesel.
- The WtW GHG emissions for Heavy-Duty vehicles are **16 % lower (CNG SI engines)**, **6 % (LNG SI engines)** or **15 % lower (LNG HPDI engines)**, depending on the technology and compared to Diesel.
- The WtW GHG emissions for Maritime show a benefit of **11 %** (4-stroke engines) up to **21 %** (2-stroke engines) compared to HFO vessels.

Natural Gas – Clean and Economical Choice



Thank you for your attention!



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