



# Potential for Natural Gas and BioMethane in Transports

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# European Association for gas in transport

- Main objective is the promotion of Natural Gas & biomethane as fuels for transport
- We represent more than 160 manufacturers and associations (21 Board members)

DAIMLER



xperion  
ENERGY & ENVIRONMENT

 BORD GÁIS  
NETWORKS

 THE LINDE GROUP

gas**mob**il



HEXAGON  
RAUFOSS

**CNH**  
INDUSTRIAL

**Westport**<sup>™</sup>  
INNOVATIONS INC.

Swagelok

 CLEAN AIR  
POWER

Combining diesel and natural gas for clear cost efficiency

**ERDGAS**   
Natürlich mobil

 ENERGIGAS  
SVERIGE

**GNVERT**  
GDF SUEZ



gasNatural  
fenosa 

**VOLVO**

**BOHLEN  
DOYEN**  
MEMBER SAG GROUP

 GAZPROM

gas**rec** 

# We all depend on transport





**Energy needs  
may double  
in 30 years**



# Worldwide gas reserves

(Unit =  $10^9 \text{ m}^3$ )

## NG consumption & reserves (2013)

**World** 3.350 billion  $\text{m}^3$

### Europe

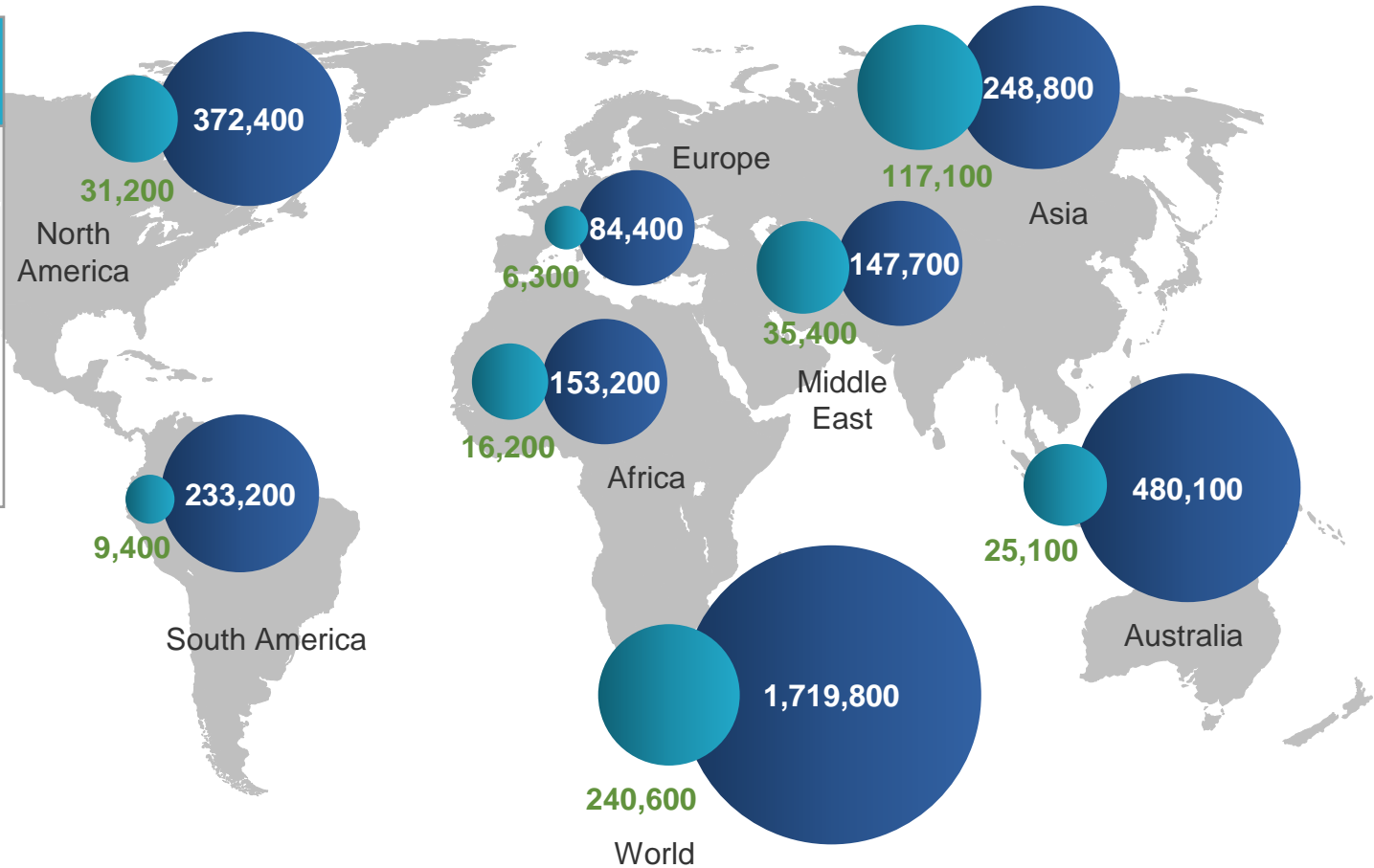
Total 472 billion  $\text{m}^3$

NGVs ~ 2 billion  $\text{m}^3$

### Reserves

World 513 years

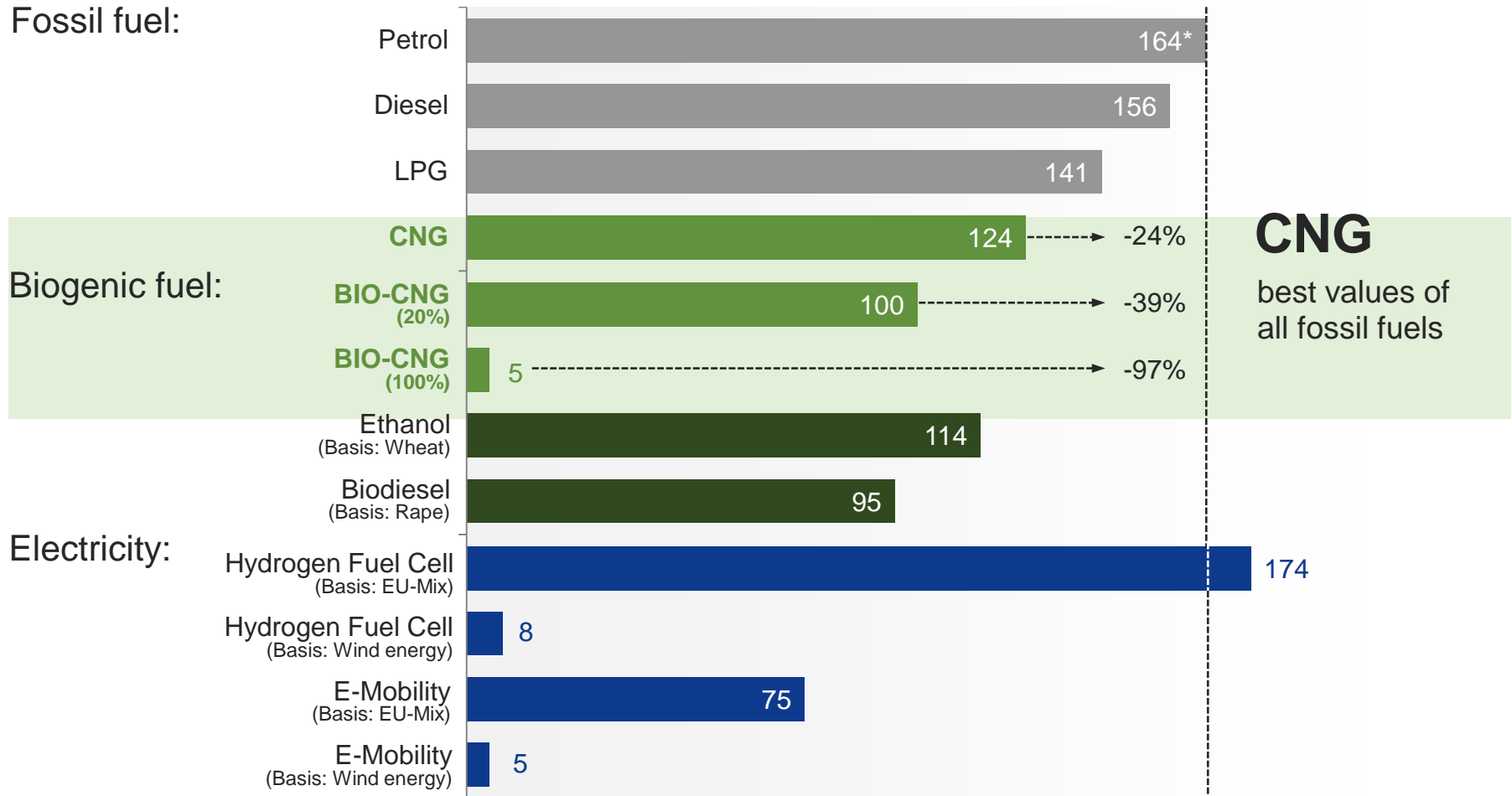
Europe 179 years



■ Conventional NG  
■ Unconventional NG

# Methane & CO<sub>2</sub> – The cleanest fuel on a WTW basis

## THG-Emission WTW in gCO<sub>2</sub> äq/km



\*Basis: (Petrol, naturally aspirated engine), Fuel-consumption: 7l/100km  
 Source: DENA; EUCAR-CONCAWE



# Methane for all type of vehicles and transport modes.

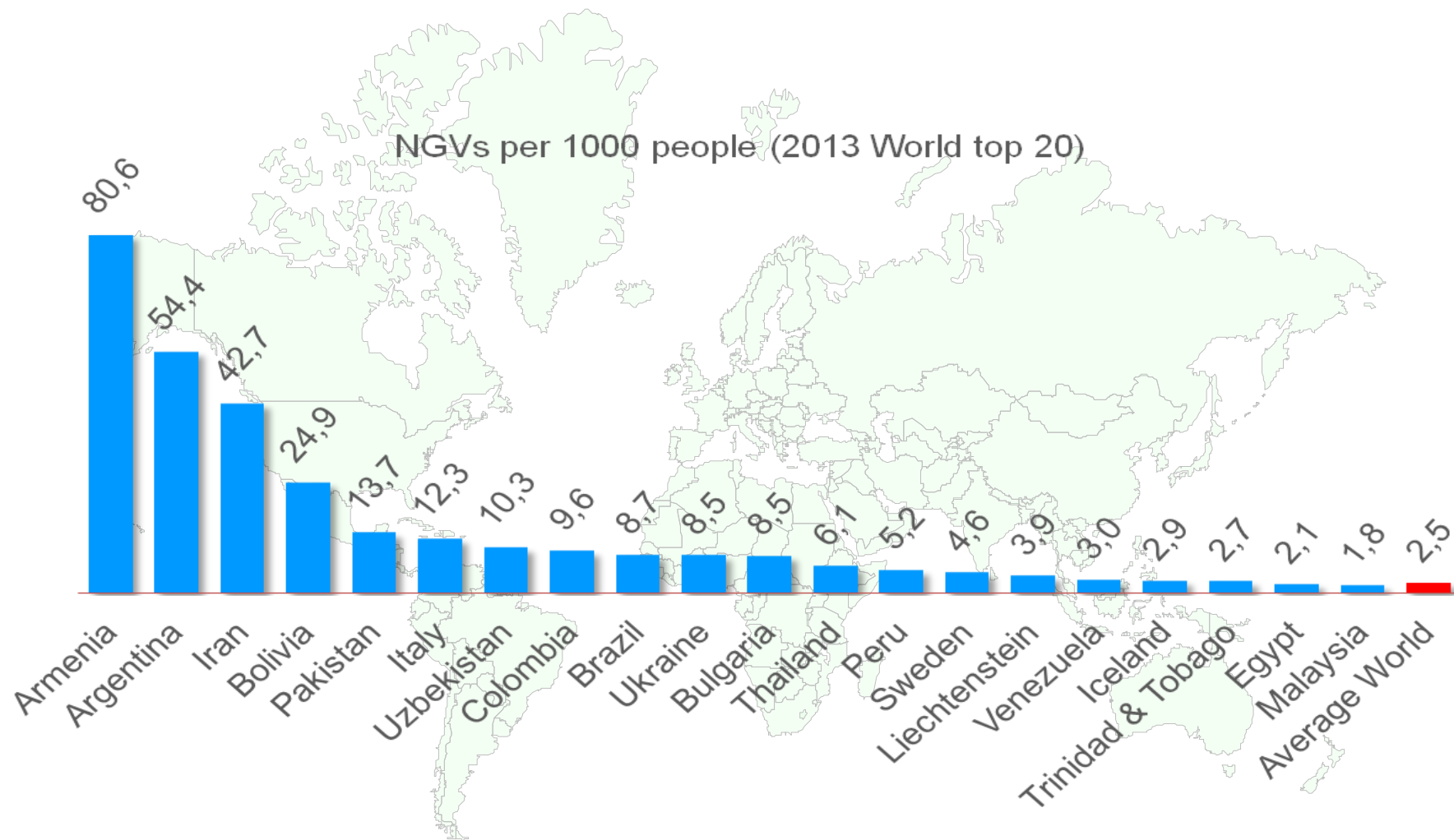


CNG

LNG

- Significant reduction/avoidance of CO<sub>2</sub> emissions
- Integration of renewable methane, Bio-Methane, no blending limitations
- Substantial reduction of Particles and NO<sub>x</sub>
- Reduction in noise levels
- **Only real alternative to oil available today!**

# Number of NGVs per 1000 people (2013 world top 20)



Source: NGVA Europe, Worldwide shares in vehicle market ,



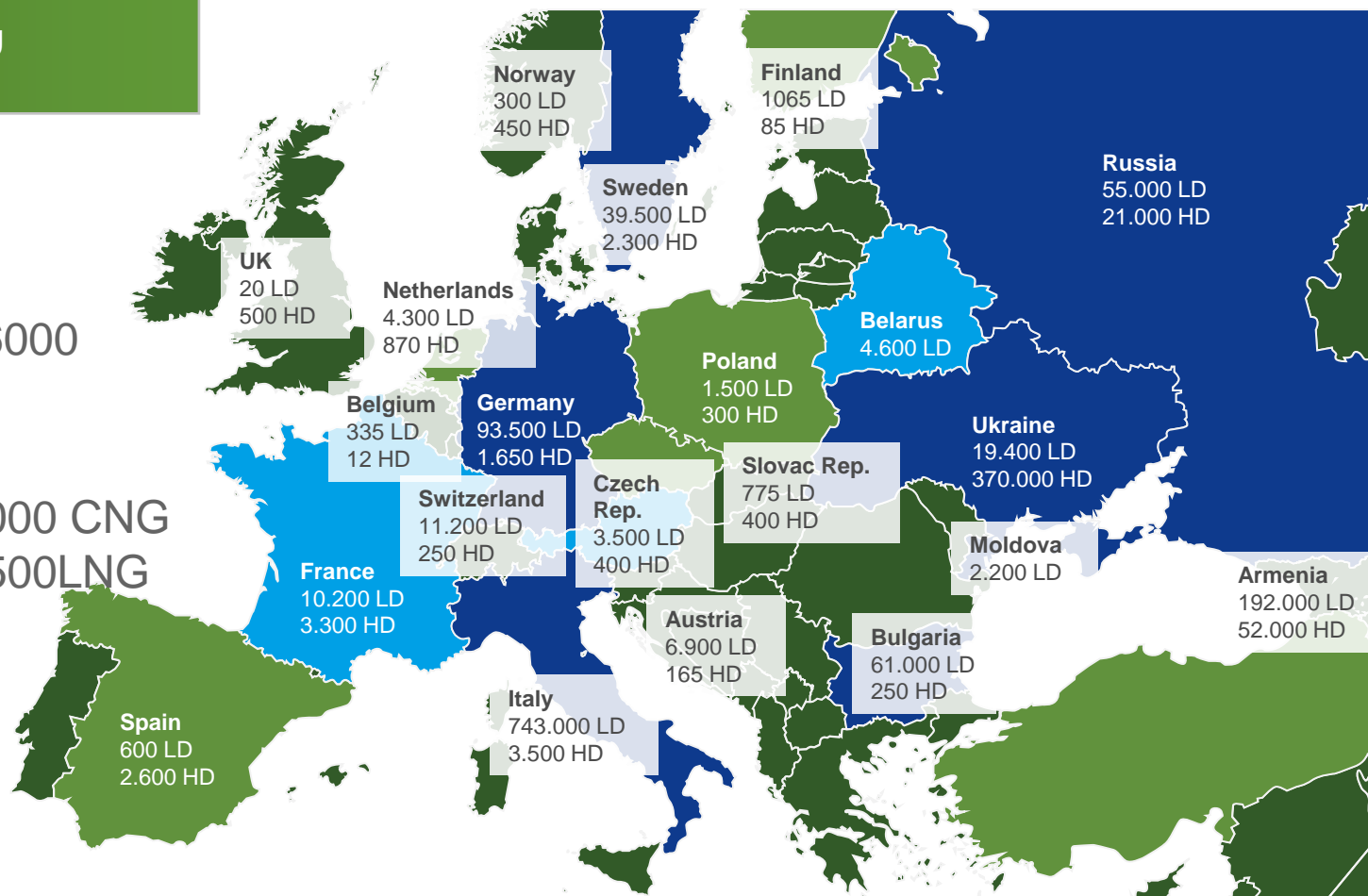
# European NGV Market

1,1 M NGVs in EU



16000

8000 CNG  
1500LNG



> 20.000

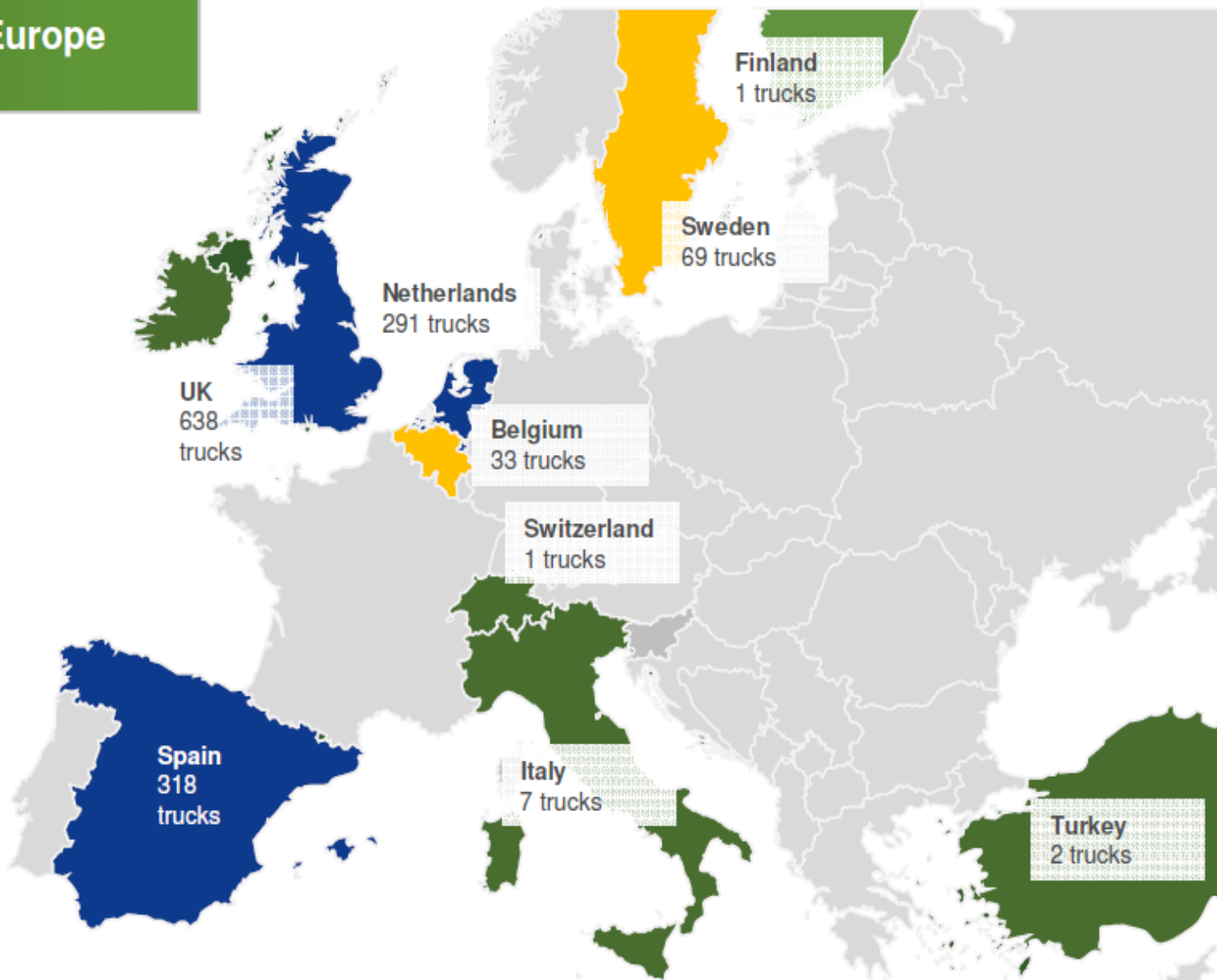
5.000 – 20.000

1.000 – 5.000

< 1.000

Source: NGVA Europe,

## LNG Vehicles in Europe



# Directive on fuel infrastructure: CNG & LNG



*Published in the EU Official Journal October 2014*

*National policy frameworks within 24 months from implementation.*



400 km



150km

## Detailed provisions:

- CNG in cities/densely populated areas by 2020
- CNG & LNG on TEN-T core network by 2025.
- LNG in sufficient TEN-T seaports by 2025.
- LNG in sufficient TEN-T inland ports by 2030.
- Common technical standards by 2016.
- Unit price per "1 petrol litre equivalent" allowed for comparability of fuel prices.

Source: Gasrec, Bohlen & Doyen, European Commission

# LNG Blue Corridors Project

## Kick-off 27/05 in Brussels



### DEMONSTRATION of LNG Blue Corridors



#### LNG fuelled HD vehicles (EURO VI):

Filling  
Low temperature aftertreatment  
Boil-off and solid state storage



#### LNG re-fueling infrastructure:

Cost efficient and safe distribution  
and re-filling



#### Roadmap for roll out of EU LNG-BC:

Definition of 4 EU LNG-BC  
Analyse data  
On the road measurement systems

#### Recommendations and standards



#### Recommendations for lowering non-technical barriers:

Future standards and Homologations  
- LNG fuelled HDV  
- LNG fuel stations

#### Outcome:

- Demonstration of 4 LNG Blue Corridors  
- Recommendations on Standards in EU

#### Impact:

- Reduced CO<sub>2</sub>  
- Reduced costs for transport sector  
- Achieving EURO VI

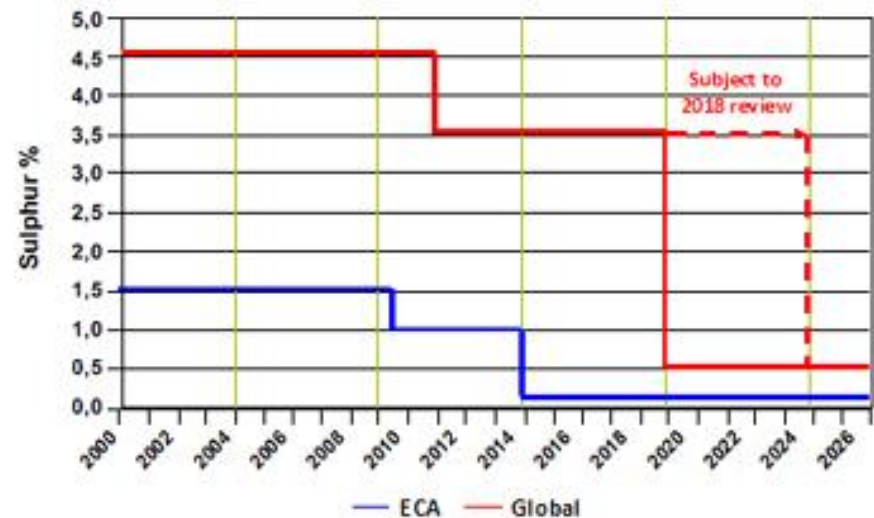
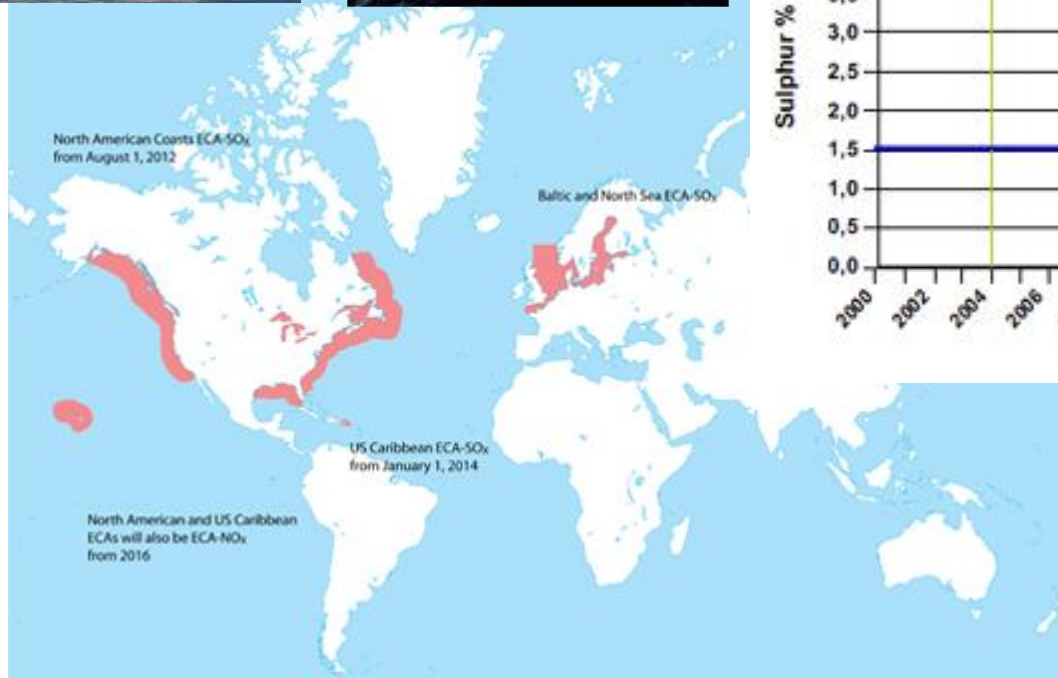
- 27 industrial partners during a 48-month project
- 100 new LNG trucks and 14 LNG new refuelling stations
- <http://www.lngbluecorridors.eu>

Source: LNG Blue Corridor project



# LNG in shipping

## Marine fuel sulphur limit of 0,1% in ECAs



# CNG vehicles – low emissions champions

**Golf VII TGI**  
Best selling car of its class



**Skoda Octavia g-tec. Downsizing & turbo charging + CNG is ideal**



**New Audi A3 TCNG. Cleanest combustion engine with e-gas**



**Fiat 500 L & Mercedes-BENZ B-Class**  
Family Vans 800-1000 km range (upt to 500 km on CNG)



# LNG trucks for long distance transport



## Diesel vs. CNG / LNG

1 Liter



Diesel

CNG  
5 litre



LNG/LBG  
1,8 litre



Two technologies are available for heavy engines:

- Dedicated, spark ignite 100% gas
- Dual fuel, gas 75%, diesel 25%, high power and efficiency

**LNG for longer transports, CNG in cities**



## Cooperation is the only way forward:

- Politicians, authorities and stakeholders
- Fuel distributors
- Vehicle and component producers
- Transport organizations and buyers

## Must work together to:

- Set standards for vehicles, emissions, fuels, filling stations and safety
- Create a well functioning market for supply and demand of methane