



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[™]
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 m^3)

NG consumption & reserves (2013)

World 3.350 billion m^3

Europe

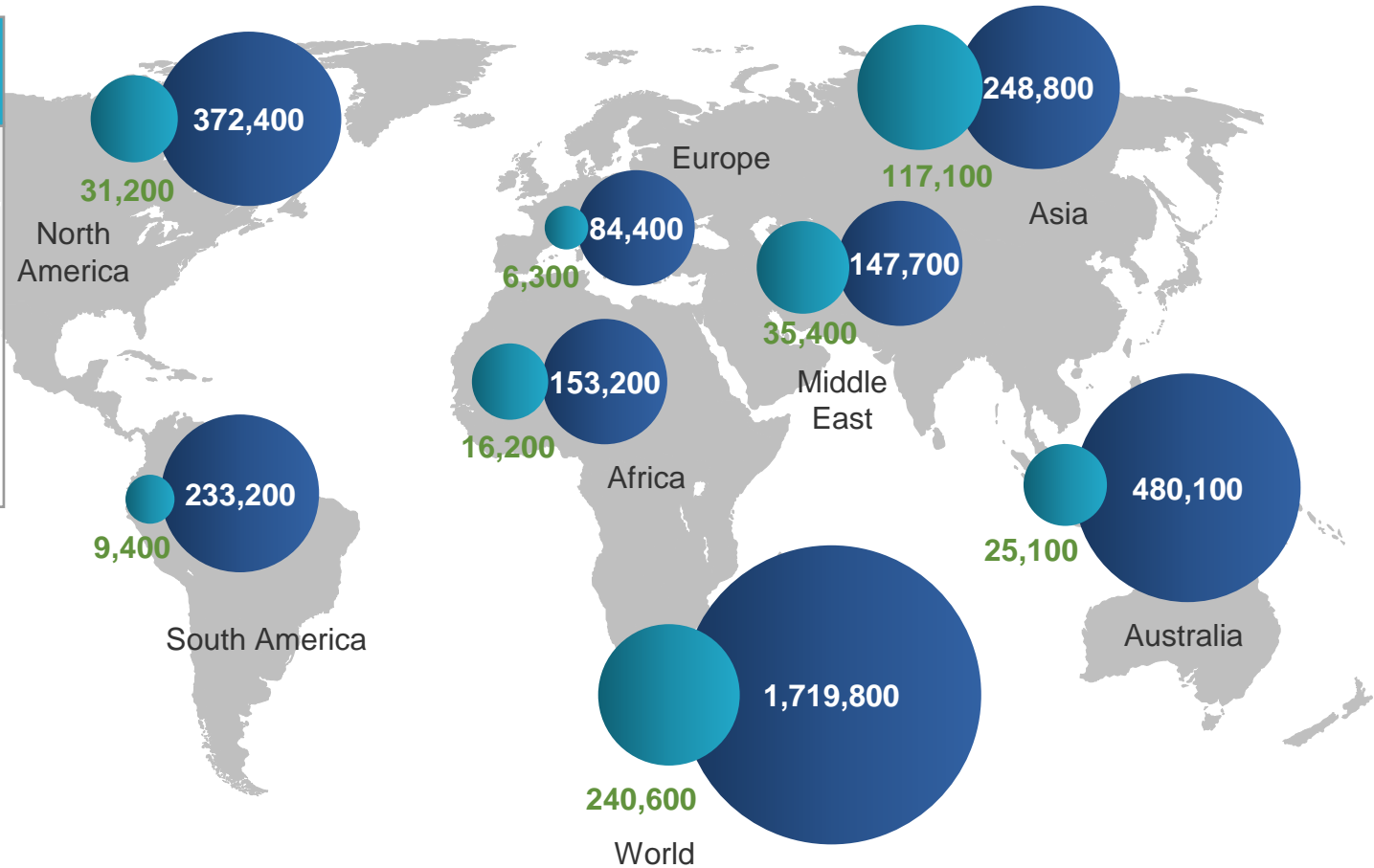
Total 472 billion m^3

NGVs ~ 2 billion m^3

Reserves

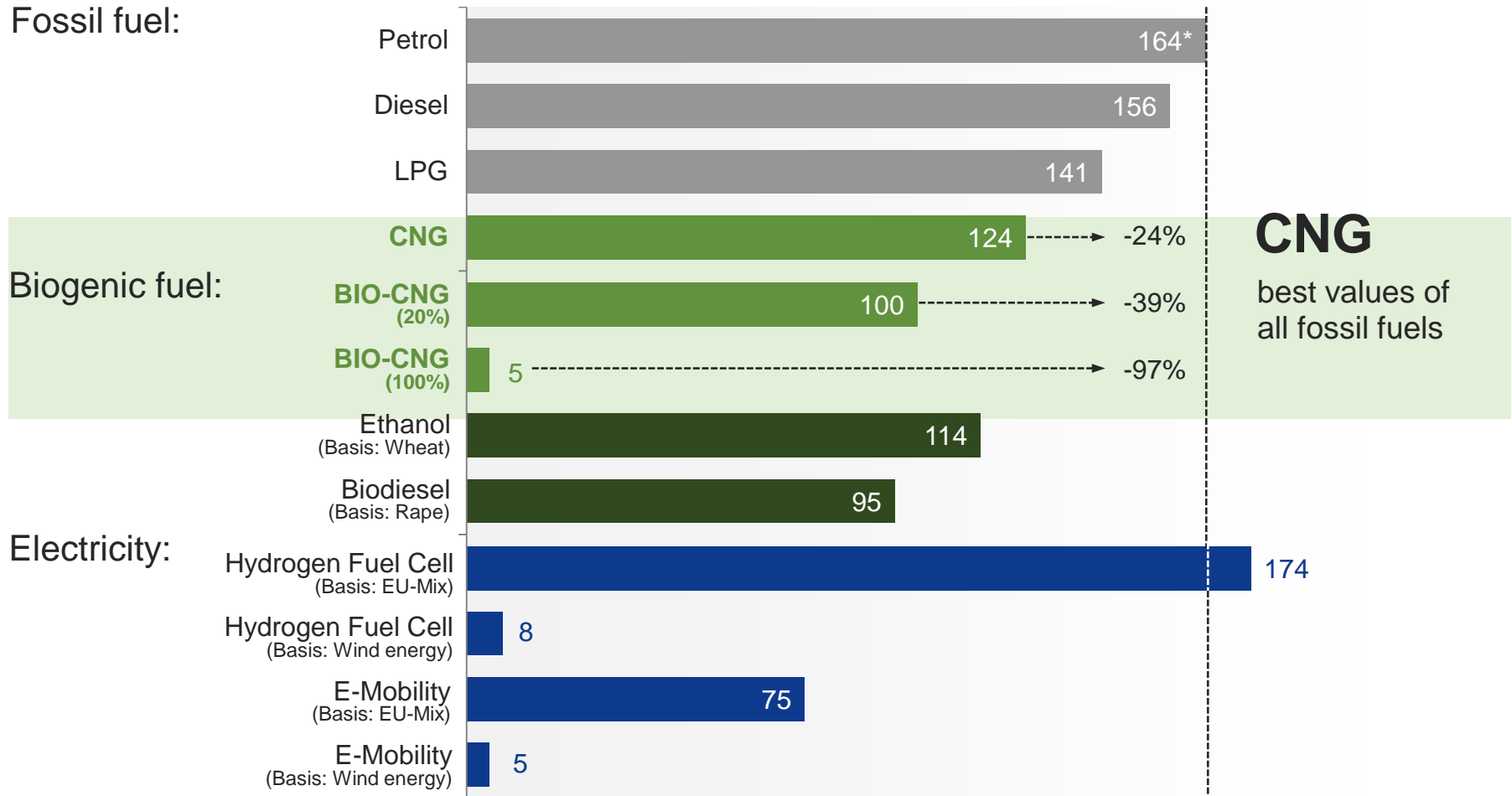
World 513 years

Europe 179 years



Methane & CO₂ – The cleanest fuel on a WTW basis

THG-Emission WTW in gCO₂ äq/km



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

Methane for all type of vehicles and transport modes.

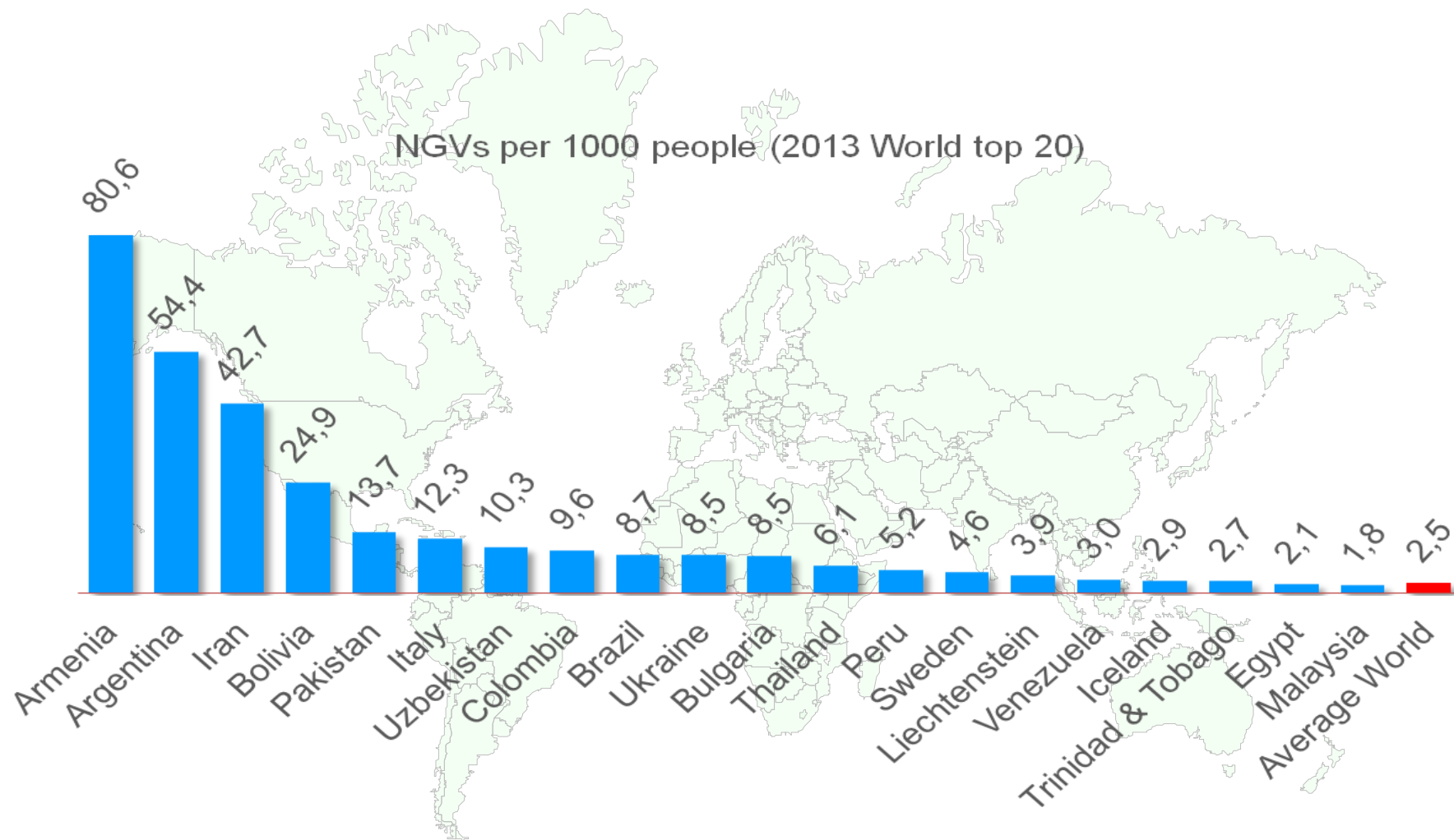


CNG

LNG

- Significant reduction/avoidance of CO₂ emissions
- Integration of renewable methane, Bio-Methane, no blending limitations
- Substantial reduction of Particles and NO_x
- 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 ,

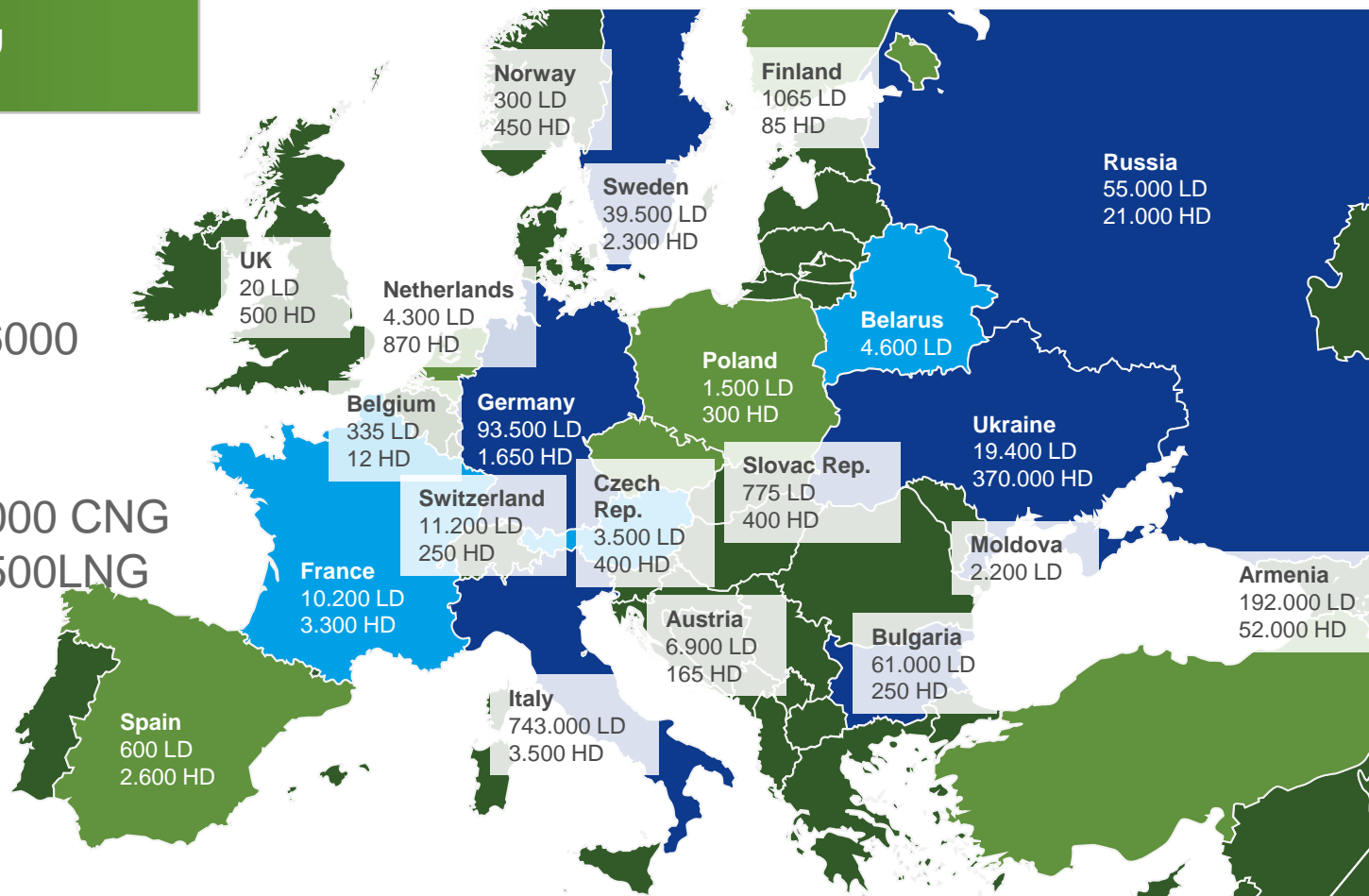
European NGV Market

1,1 M NGVs in EU



16000

8000 CNG
1500LNG



> 20.000

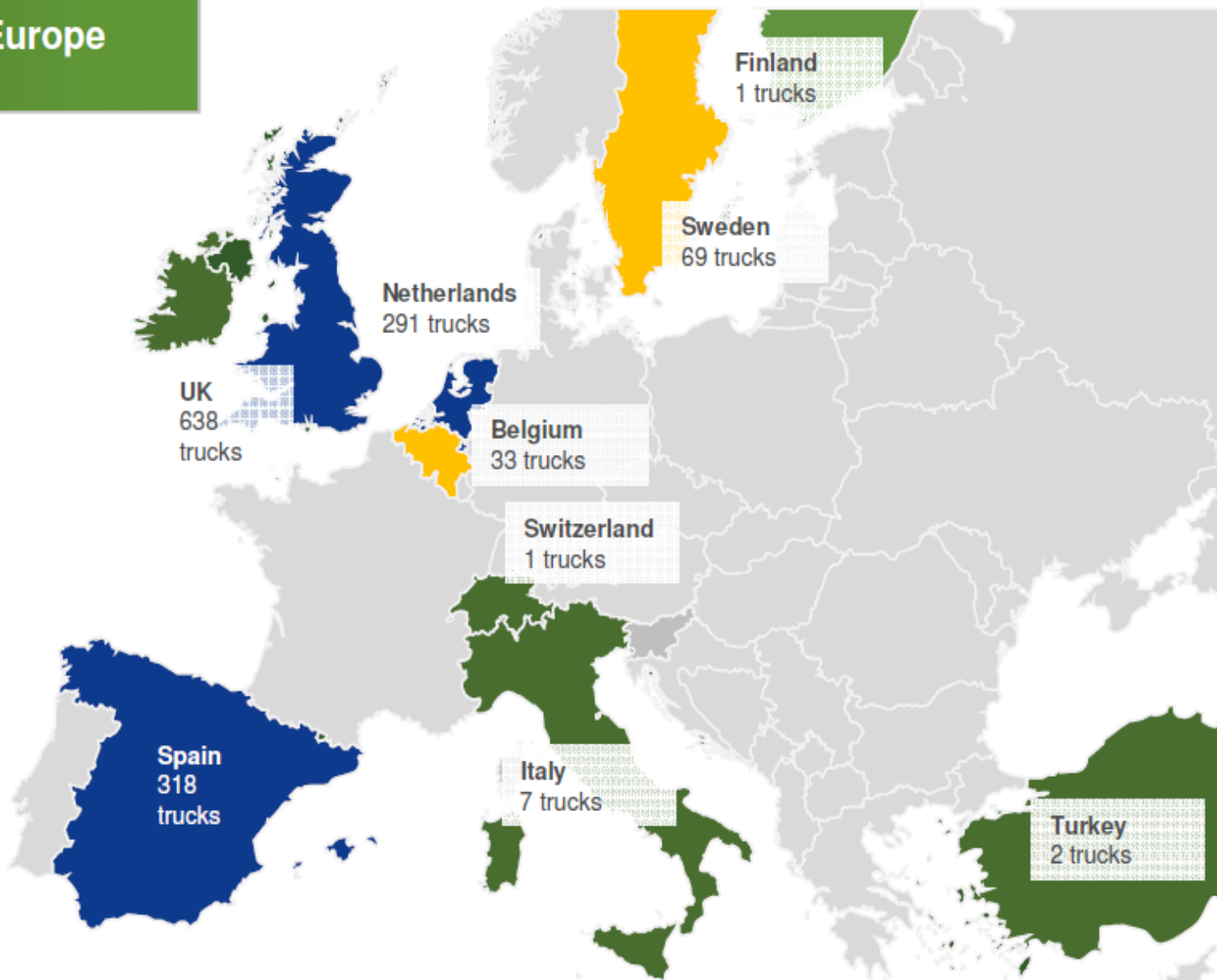
5.000 – 20.000

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:

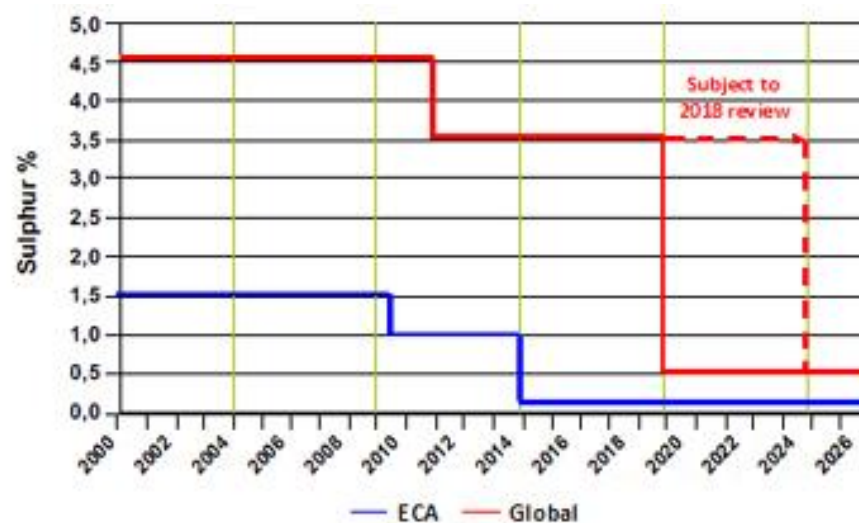
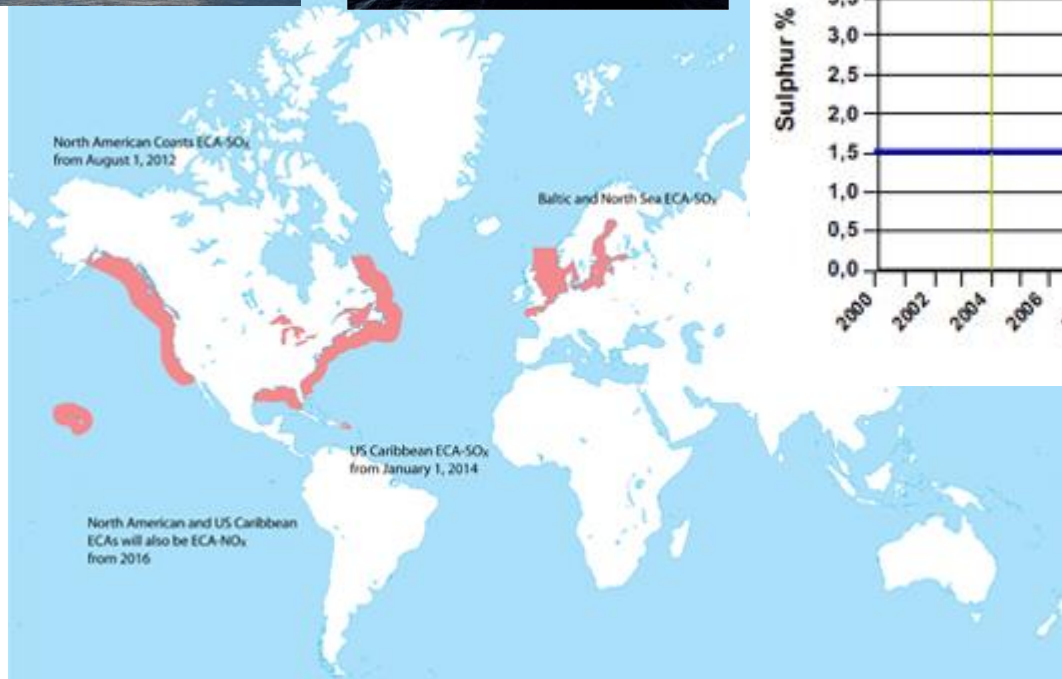
- Reduced CO₂
- Reduced costs for transport sector
- Achieving EURO VI

- 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