



## **IGU STUDY GROUP 5.3**

### **NATURAL GAS FOR VEHICLES**

Project:

# **Global Opportunities for Natural Gas as a Transportation Fuel for Today and Tomorrow**

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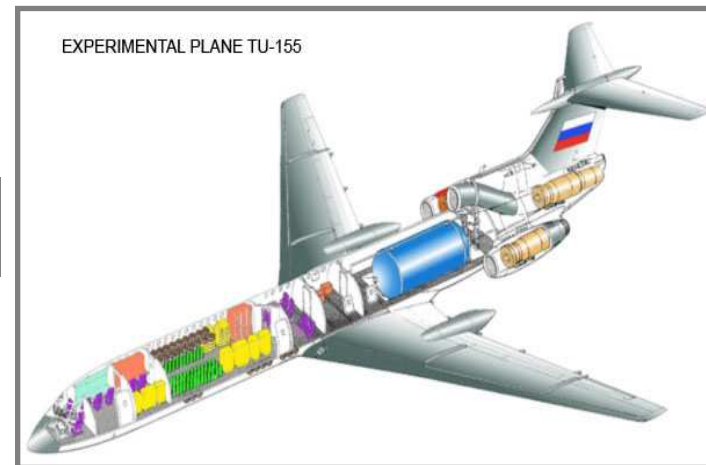


# International Gas Union (IGU) NGV Project

## Global Opportunities for Natural Gas as a Transportation Fuel for Today and Tomorrow



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## OBJECTIVES AND GOALS REACHED – CH<sub>4</sub> as transport fuel

- **Detailed study on fuels and technologies**  
( PAST ← TODAY → FUTURE )
- **Detailed country reports (23 questionnaires)**
  - ✓ Overview of existing technologies used
  - ✓ Trend analysis
  - ✓ SWOC analysis
- **Detailed desk-research (25 countries)**
- **Descriptive scenarios of worldwide future use of (CH<sub>4</sub>) in transport**
  - ✓ CNG, LNG, bio-methane, hydrogen produced from natural gas
  - ✓ Road & off-road applications
  - ✓ Market, technology and fuelling infrastructure development, leg/reg
- **Recommendations**
  - ✓ LONG TERM - SHORT TERM

In total 48  
countries covered !!!



## WORLDWIDE NETWORK AND ORGANIZATION OF THE STUDY GROUP





## TECHNOLOGY DATA BASE

- **Country by country overview of technologies used**
  - ✓ **Vehicles:** OEMs
    - Natural gas – petrol, natural gas – diesel technologies
    - Emissions control technologies
  - ✓ **Storage (on-board):** Cylinder type (I,II,III,IV)
  - ✓ **Filling:** Filling connector type
    - Maximal allowed pressure in CNG cylinder
    - Measuring units
    - Home refueling
  - ✓ **Biogas:** Sources
    - Methods for biogas purification (biogas upgrading technologies)
    - Biogas allowed to enter high pressure NG transport system?
  - ✓ **LNG:** Sources

Should serve as basis for  
standards recommendations



# TECHNOLOGY DATA BASE

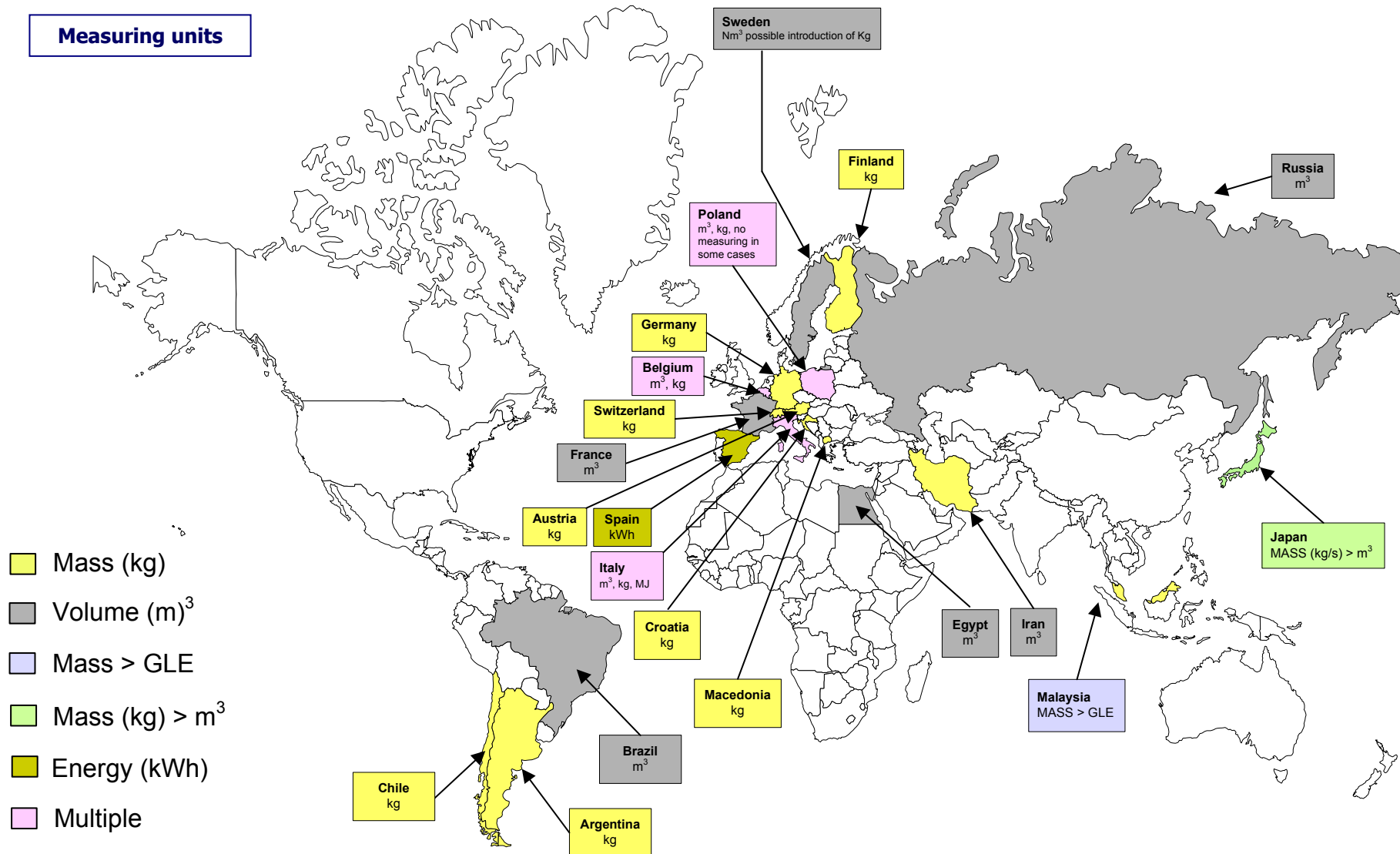
Filling connector





# TECHNOLOGY DATA BASE

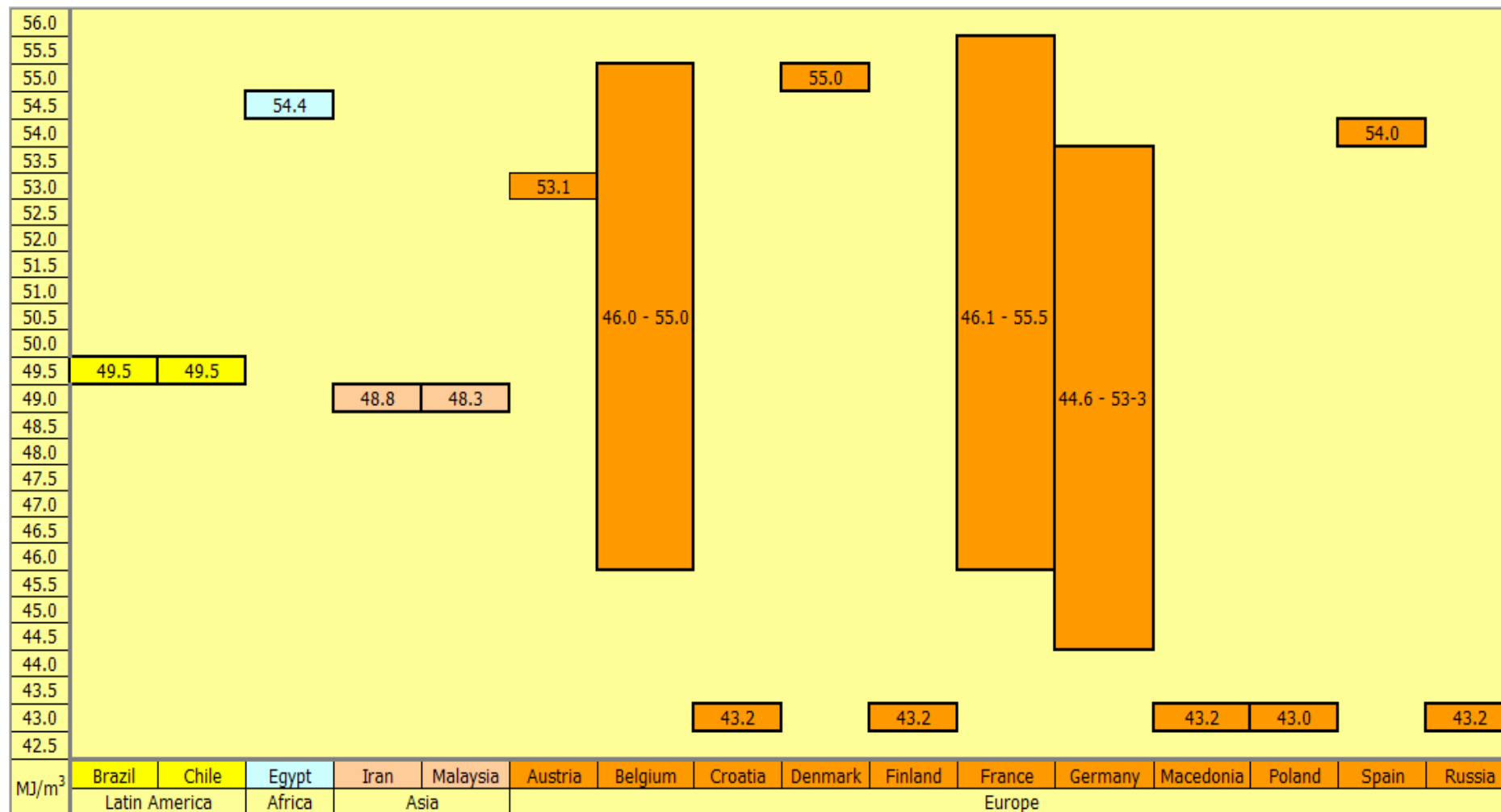
## Measuring units





# TECHNOLOGY DATA BASE

GAS QUALITY - Wobbe index of natural gas used for vehicles (MJ/m<sup>3</sup>)







## TREND ANALYSIS – Lessons learned from the past

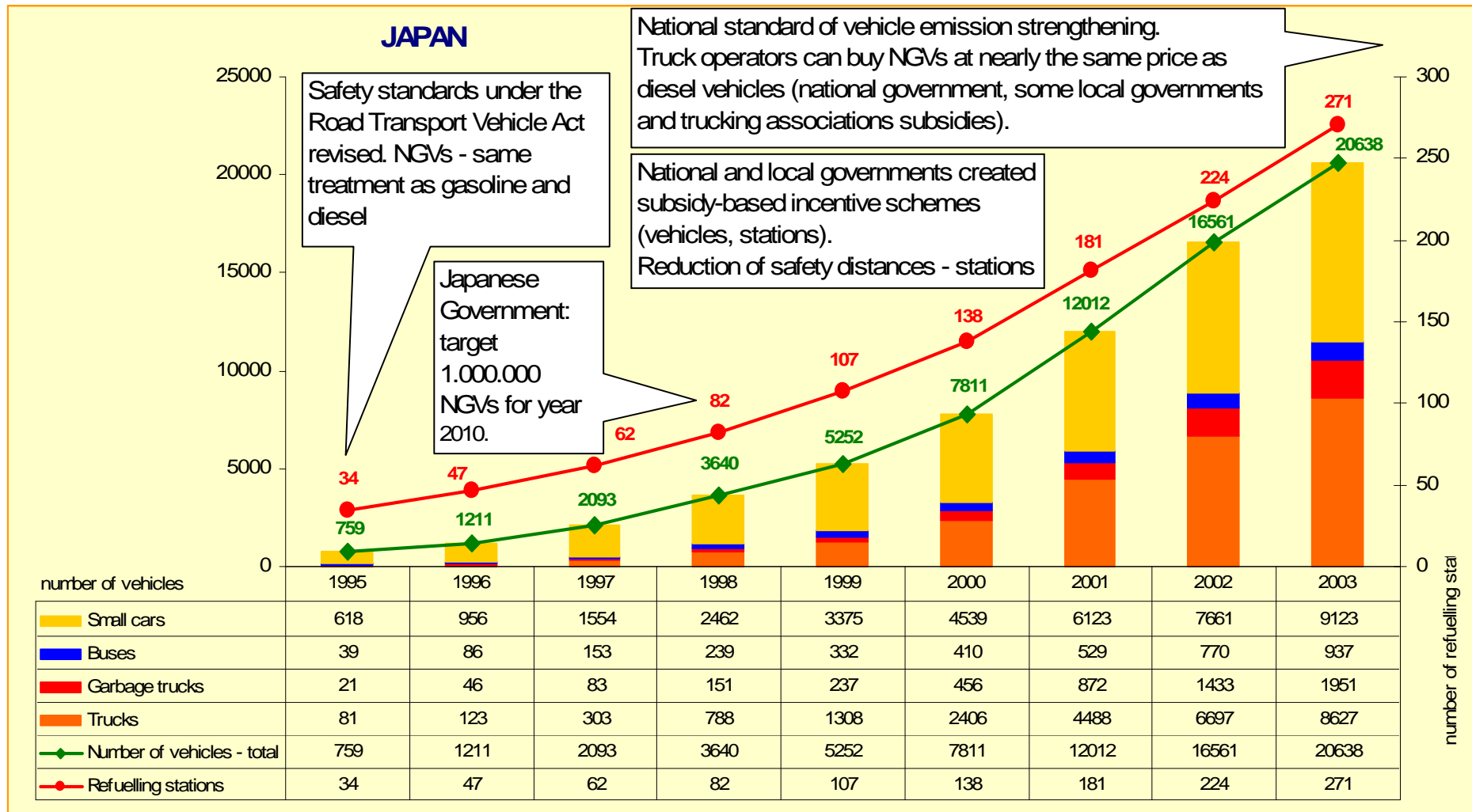
- **Trend analysis** - Analysis of past trends in NGV market development and factors that influenced such market behavior

Data needed (past X years):

- ✓ Number of natural gas vehicles,
- ✓ Number of filling stations,
- ✓ Volume of gas sold,
- ✓ Factors influencing trends in 1 - 3 in respective period

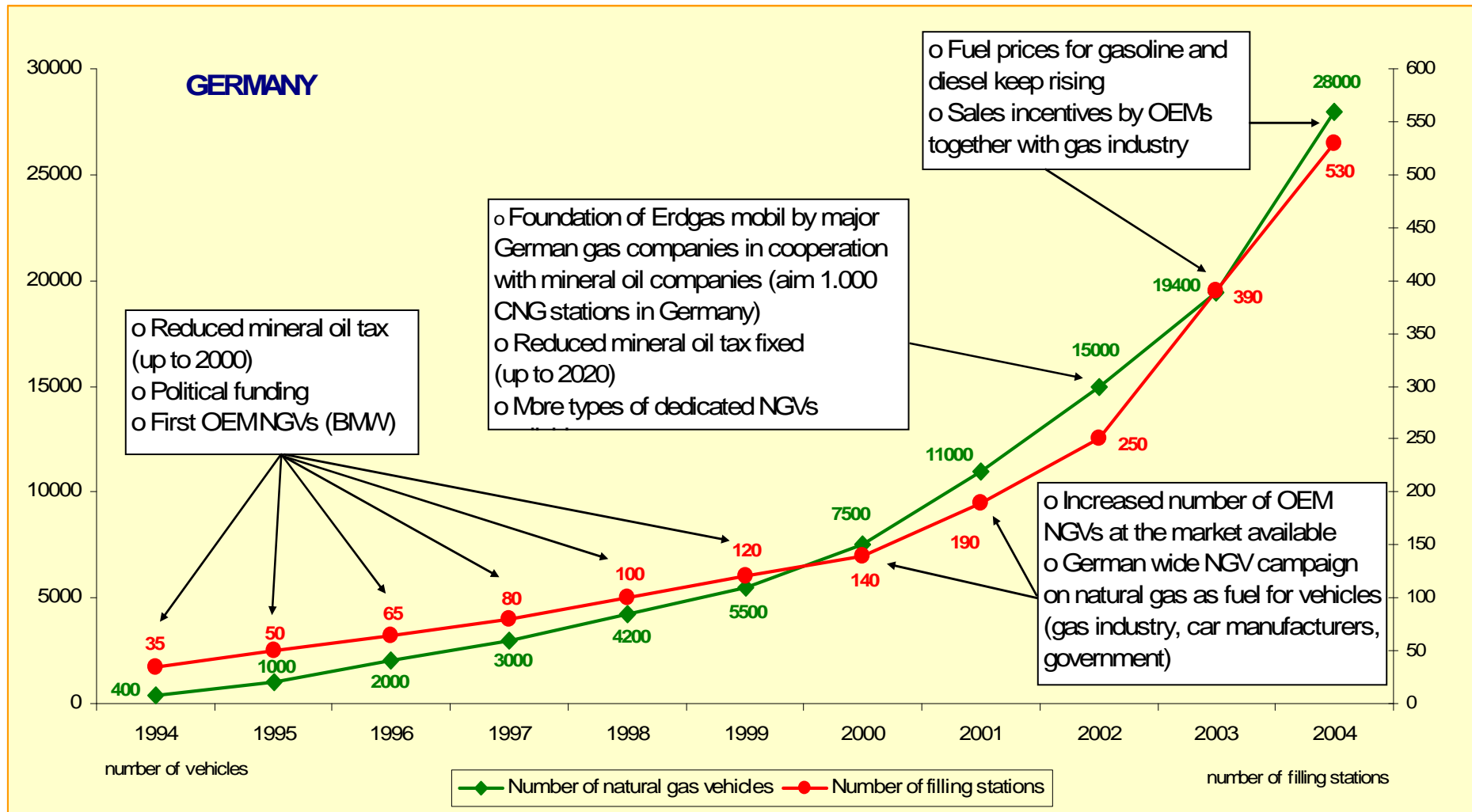


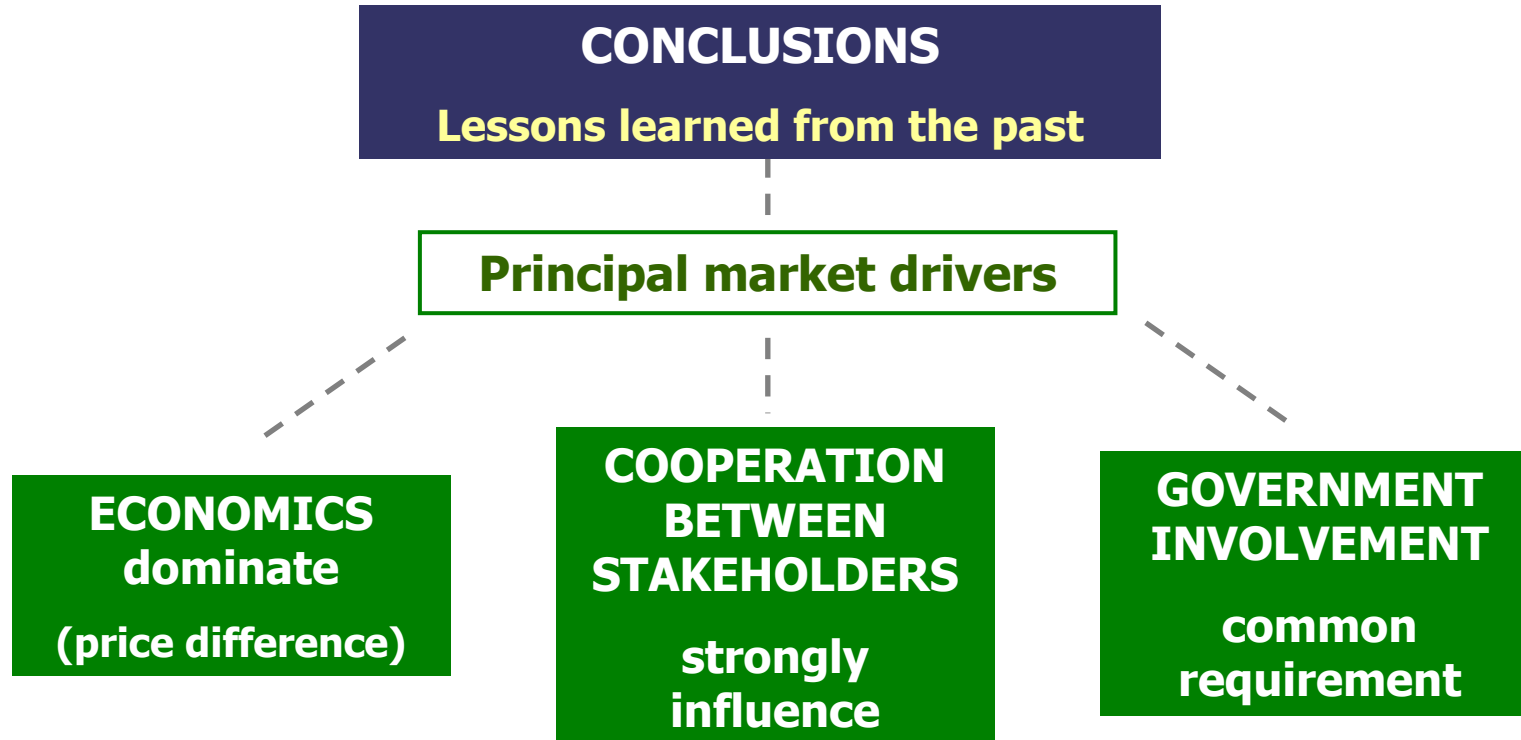
# TREND ANALYSIS – Lessons learned from the past





## TREND ANALYSIS – Lessons learned from the past







## RECOMMENDATIONS

### SUPPORT!

#### HARMONIZATION

Support worldwide harmonization efforts for regulations, codes and standards for NGVs (retrofit and OEM) **with path and speed of adoption based on local conditions (the transition from other earlier established local standards must follow a realistic time table avoiding unnecessary expenditures).**

- **ISO standards and UN regulations...**

- Fuel connectors and filling
- Vehicle type approval
- Regular vehicle (& cylinder) inspections
- Fuel metering accuracy and fuel pump display units

### SUPPORT!

#### REGIONALIZATION → INTERNATIONALIZATION

Strategic approach to regionalization → internationalisation of fuelling infrastructure strategy (and vehicle homologation):

- **Grouping (Strategic Alliances & Joint Action)** of national NGV Associations through regional NGV Associations (and International Association for NGVs) to achieve critical mass and worldwide standardization
- **Interlinking - "Blue Corridor" concept** (Europe, Russia & C.I.S., Latin America)



## RECOMMENDATIONS

### PROMOTE!

#### HARMONIZATION

- Promote at national and regional levels the adoption of international regulations, codes and standards
- Avoid adopting other countries national standards (new markets) and look to "higher level" international standards

### LOBBY!

#### CONSISTENCY

Lobby for consistency in long term policies

- Consistent fiscal and policy instruments
- Consistent financing schemes
- Consistent non technical measures (exemptions from cordon pricing etc.)
- Mandates

### SEEK!

#### SYNERGY

Stakeholders' involvement and synergy between them and develop a process to engage and involve all stakeholders



### Gas & Oil companies (& retail chains)

- Additional volume
- Image improvements
- Possibility to increase sales of other products at the stations

### OEMs

- Security of investments
- Additional volume
- Possibilities to increase market share on other markets (i.e. Europe vs. Asia)



### Benefits for different target groups

- Security of tax regimes
- International standards ...



### Politics

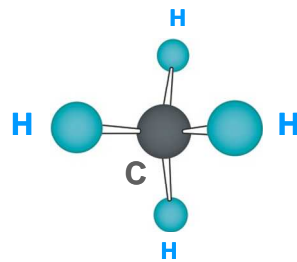
- Help to reach environmental targets (i.e. Kyoto...)
- Security of supply (diversification)
- Social aspects and positive influence on GDP (cheaper fuel)

### Car users

- Cost reductions (vehicles – cheaper in longer term)
- Comparable prices
- No disadvantages compared to diesel/petrol cars



## METHANE IS A DIVERSE & FLEXIBLE FUEL FOR THE TRANSPORT SECTOR



**Methane**  
**CH<sub>4</sub>**

**Compressed Natural Gas  
(CNG)**

**Liquefied Natural Gas  
(LNG)**

**Biogas-to-Biomethane**

- Liquid
- Gaseous
- Liquid-to-Compressed (LCNG)
- Liquefied





## SHORT-TERM ACTIVITIES ?

What to do in the short term?

- Consistent policies
- International standards ...

Gas industry

NGV Associations

IGU

Lobby !!!

Lobby !!!

Lobby !!!



**Thank you for you  
attention !!**

