

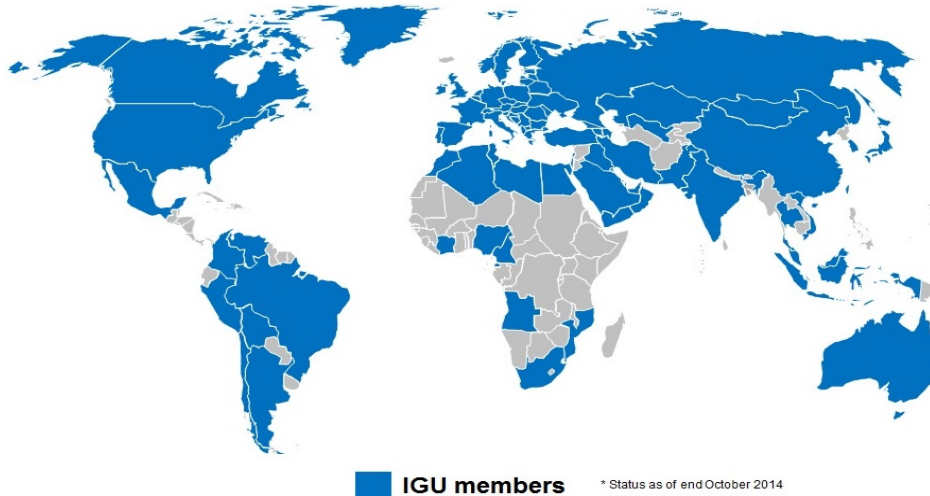
# World NGV

## Statistics, Challenges, Future

**Colin Sergey**

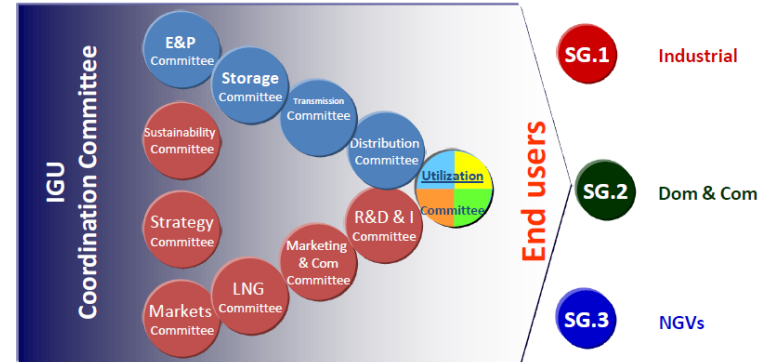
Vice Chair of Gas for Transport Group within IGU Utilization Committee  
Member of NGV Italy BoD, Head of MIPD Promgas SpA/Gazprom Group

Moscow, 2016



## Utilization Committee: Topics, & Structure

End user - the focal point of Gas Industry



•The International Gas Union (IGU) is a worldwide non-profit organisation registered in Vevey, Switzerland with the Secretariat currently located in Oslo, Norway.

•The mission of IGU is to advocate gas as an integral part of a sustainable global energy system, and to promote the political, technical and economic progress of the gas industry. The more than 140 members of IGU are associations and corporations of the gas industry representing over 95% of the global gas market.

## Scope defined:

- ✦ LNG, CNG, LCNG, bio-methane / other alternative fuels as “watchpoints” to learn from / NGV, Bunkering = core / Trains, Planes = strategic

## Working packages and responsibilities defined:

- ✦ *Commercial* - best practice TCO tool, 2<sup>nd</sup>/3<sup>rd</sup> hand markets for NGVs / best practice configurations for CNG/LNG stations in different markets)
- ✦ *Market* – NGV statistics, how to handle safety concerns, demand growth and marketing strategies to drive G4T forward
- ✦ *Technical* – Standards available and in development, hybrid concepts, true view on emissions, new technical developments addressing current shortcomings of gas technology
- ✦ *Political* – macro view on natural gas-related TCO (incl. macroeconomic effects), share regional policy developments, recommendations for securing gas demand providing long-term benefits to both investors in infrastructure and end users
- ✦ *Engagement* – mobilize members and get new active members joining forces

## Additional items

- ✦ *WTW-emissions counter studies + Article for IGU magazine on LNG for Bunkering*
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## Top 10 NGV Countries Worldwide

Country	Natural Gas Vehicles
<b>EURASIA</b>	
Iran	4.068.632
China	3.994.350
Pakistan	3.700.000
India	1.800.000
Italy	990.300
<i>Russia</i>	<i>90.050</i>
<b>Total</b>	<b>14.643.332</b>
<b>S&amp;N Americas</b>	
Argentina	2.487.349
Brasil	1.781.102
Colombia	500.000
<i>United States</i>	<i>150.000</i>
<b>Total</b>	<b>4.918.451</b>
<b>Total TOP 10</b>	<b>19.561.783</b>
<b>Total World</b>	<b>22.404.405</b>

**Total Number of Stations  
~28.000**

**Total Nm3 sold  
~60 bln (only China ~30 bln)**

**No global LNG statistics  
on consumption/stations  
at the moment**

Source: GVR, NGV Global, NGVA, NGV Italy

## Available sources of NGV statistics:

1. <http://www.ngvjournal.com/worldwide-ngv-statistics/> (GVR)
2. <http://www.ngva.eu> (only for members)
3. <http://www.metanoauto.com/modules.php?name=Distributori> (only EU data)
4. [http://agnks.ru/agnks\\_map/](http://agnks.ru/agnks_map/) (only in Russian and only Russia)
5. <http://www.iangv.org/current-ngv-stats/> (NGV Global association)
6. <http://ngvamerica.stone-env.net/> (only US)

## Summary

- Mostly not updated since 2012/2013.
- Limited access.
- No global coordination on gathering and NGV data representation worldwide

## China

- China is expected to form the largest market by 2030.
- CNPC expects that natural gas demand for NGV in China will be 75bcm in 2030
- Reasons for NGV expansion are low natural gas price, regulation of environment, and low construction cost
- LNG demand for buses in China is expected to surge much higher than US and Europe.

## USA

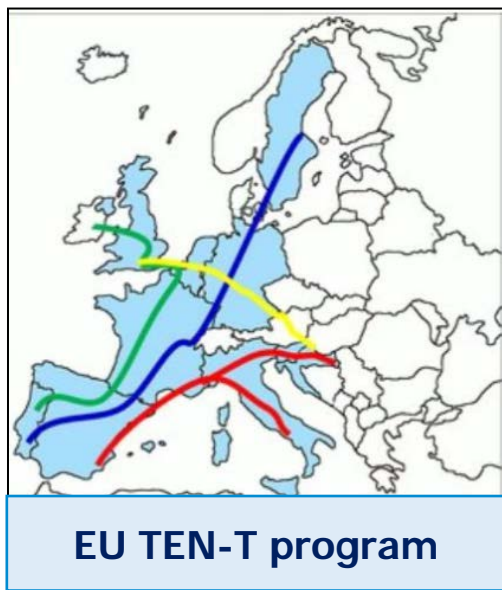
- Natural gas demand in the transport sector in USA will surge from 43 trillion in 2012 to 863 trillion BTU in 2040.
- Heavy Duty vehicles such as LNG trucks are expected to increase gradually because the investment recovery period is short due to the higher utilization of NGV.
- EIA estimates that 35% of the total railway fuel consumption in the US will be natural gas in 2035.

## EU

- Due to the infrastructure expansion project, the heavy-duty vehicles like trucks and buses are expected to grow at the fastest pace.
- NGV Europe expects that CNG/LNG Trucks will be 300,000 units in 2030.
- Due to the environmental regulation by the IMO in ECA, LNG bunkering demand is expected to increase.







- Due to low LNG price and the regulation of environment, the fastest growth rate in natural gas consumption is expected to be in the transportation sector.
- LNG demand for Heavy duty vehicles will be increased. Long-distances and high utilization requirements are typically better suited to LNG than CNG.
- The marine LNG fuel is expected to be 0.3~13 million tons in 2020 and 22~64 million tons in 2030.
- Due to **environmental regulations** by IMO, the LNG demand for **LNG fueled ships in North America and Northwest Europe** would rapidly increase from 2020 but Asia is expected to accelerate after 2025 in which the 0.5% sulfur regulation is likely to be introduced in the world.
- It is necessary that the LNG production and regasification facilities as well as LNG bunkering stations are well established to meet the increasing LNG demand as a transportation fuel.

## Development of LNG-powered fleet



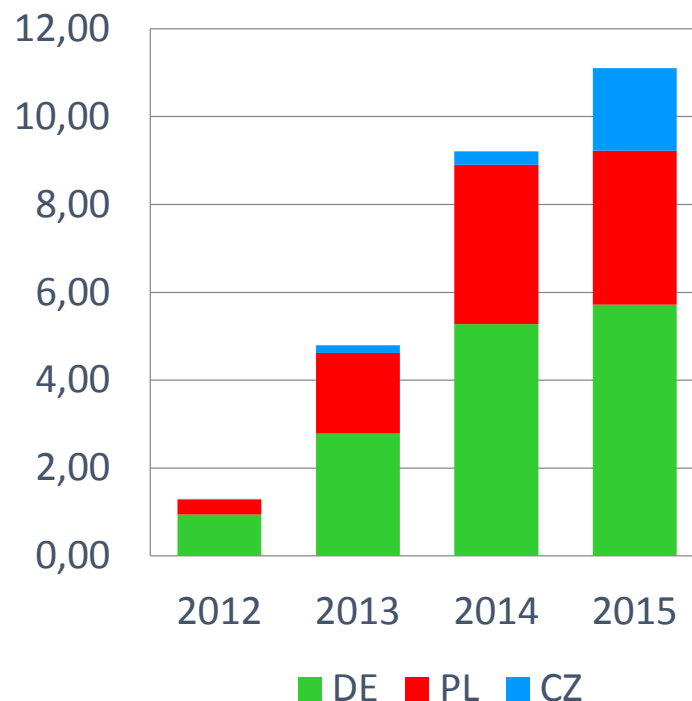
\* As of May 2015, DNV GL open source data



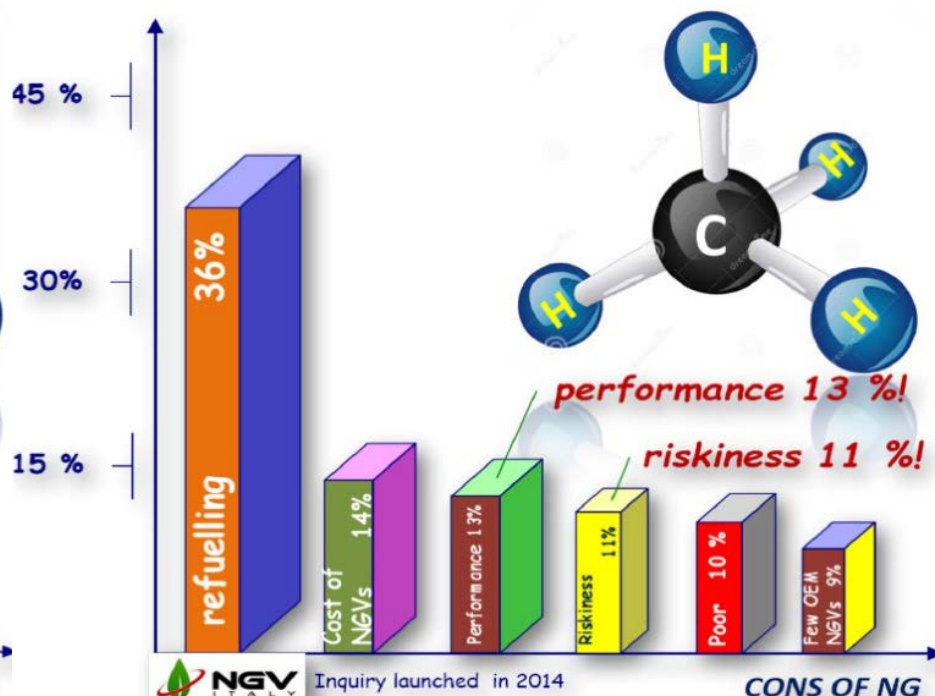
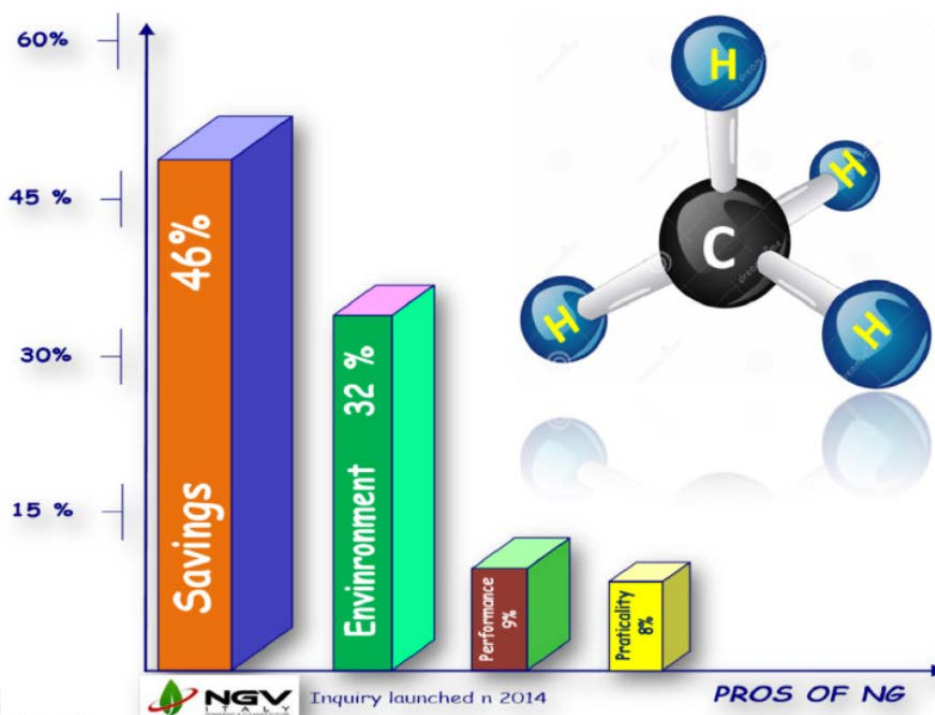
## Small scale LNG and CNG growth

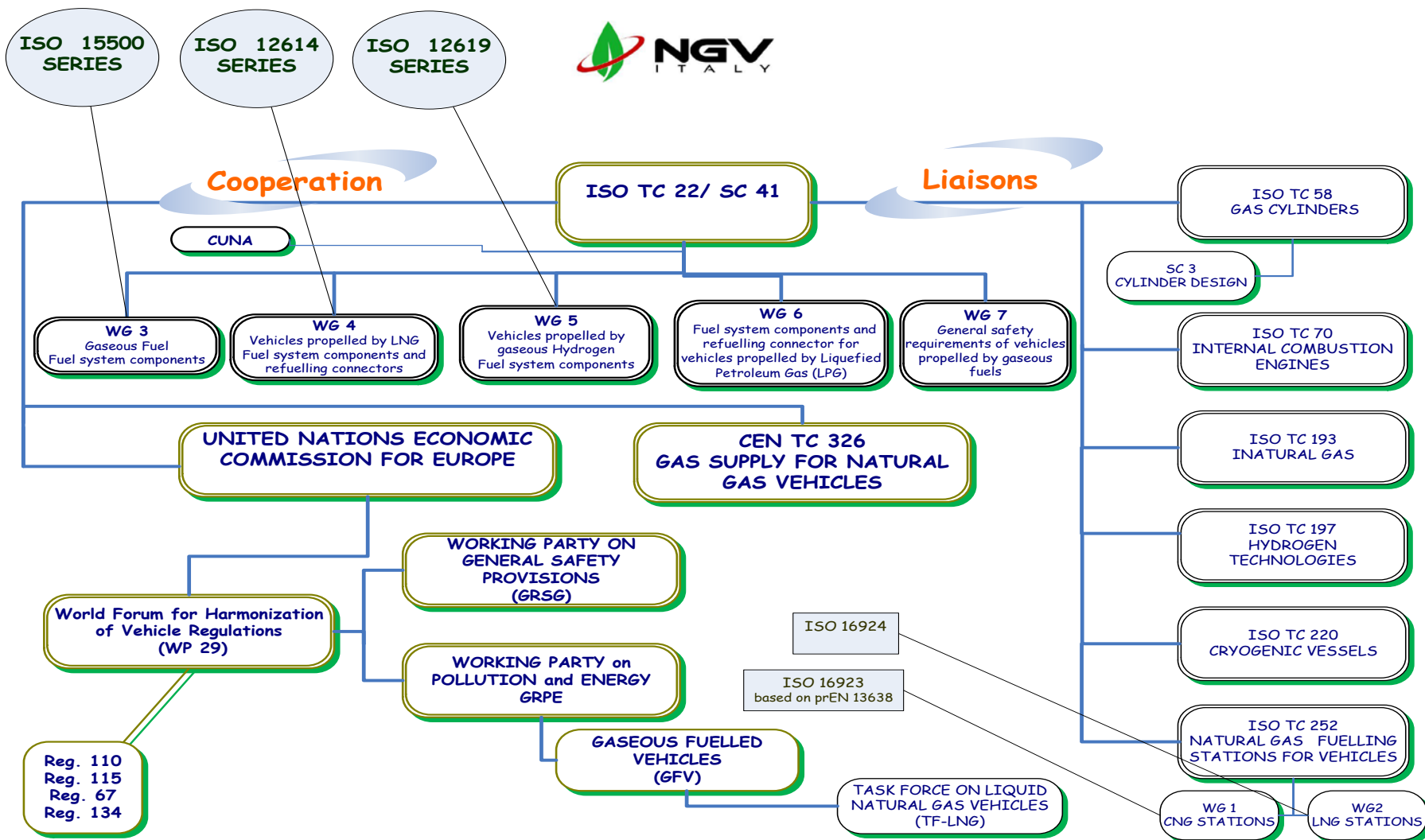
- In Russia, Gazprom is engaged into ssLNG business since 1995;
  - in 2016 demand for CNG grew to 450 Mcm (+ 7% to 2015)
  - Gazprom owns 213 NG filling stations in Russia, 6000+ LD, HD & UTV powered by NG
- Gazprom Group has sold 250 LNG cargoes to 14 countries, and is working on creating ssLNG hub in the Germany's Port of Rostock (southern Baltic). First truck-to-ship LNG bunkering operation successfully completed in March 2016
- By mid 2016 Gazprom Group operates 67 filling stations in Germany, Czech Republic & Poland through its entity Gazprom NGV Europe (former Gazprom Germania department).

Gazprom Group Sales of NG in EU for Road Transport, Mcm/2016



In 2014 NGV Italy launched an inquiry to measure the role and effect of NG as a fuel for transportation after 80 years of use: sample group consisted of 726 persons (only 27% owning NGVs).

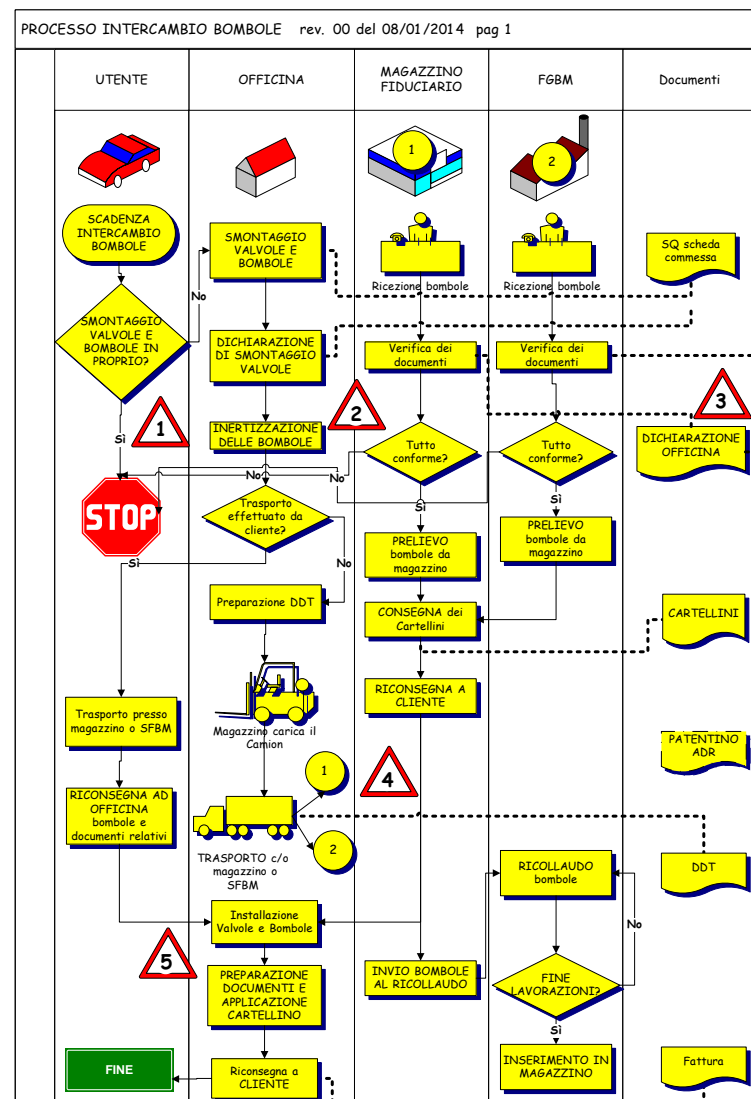




## WG3 ISO Gaseous Fuel System Components

ISO/DIS 15500-1 Part 1: General requirements and definitions  
ISO 15500-2:2012 Part 2: Performance and general test methods  
ISO 15500-3:2012 Part 3: Check valve  
ISO 15500-4:2012 Part 4: Manual valve  
ISO 15500-5:2012 Part 5: Manual cylinder valve  
ISO 15500-6:2012 Part 6: Automatic valve  
ISO/DIS 15500-7 Part 7: Gas injector  
ISO/DIS 15500-8 Part 8: Pressure indicator  
ISO 15500-9:2012 Part 9: Pressure regulator  
ISO/DIS 15500-10 Part 10: Gas-flow adjuster  
ISO/DIS 15500-11 Part 11: Gas/air mixer  
ISO/DIS 15500-12 Part 12: Pressure relief valve (PRV)  
ISO 15500-13:2012 Part 13: Pressure relief device (PRD)  
ISO 15500-14:2012 Part 14: Excess flow valve  
ISO/DIS 15500-15 Part 15: Gas-tight housing and ventilation hose  
ISO 15500-16:2012 Part 16: Rigid fuel line in stainless steel  
ISO 15500-17:2012 Part 17: Flexible fuel line  
ISO 15500-18:2012 Part 18: Filter  
ISO 15500-19:2012 Part 19: Fittings  
ISO/DIS 15500-20 Part 20: Rigid fuel line in material other than stainless steel  
ISO 1449-1:2004 CNG refuelling connector -- Part 1: 20 MPa (200 bar) connector  
ISO 1449-2:2007 CNG refuelling connector -- Part 2: 20 MPa (200 bar) connector, size 2  
ISO 1449-3:2006 CNG refuelling connector -- Part 3: 25 MPa (250 bar) connector

## CNG Cylinders Fond in Italy



**Source: NGV Italy**

- No problems from standardization point of view
- No problems form regulation side
- Almost No problems dealing with unsafe components....but...:
- Installer/Workshop is the weakest point of the NGV value chain mainly for the lack of certified competence
- Although OEM and System manufacturer must apply mandatory and voluntary standards, the value chain is badly effected by continuous demand of cheap products
- In order to stress the priority of safety start a massive campaign to train as much technicians as possible accordingly with the NGVs sold
- A strong action shall be implemented in order to include in regulations the requirements concerned with Workshops/Maintenance personnel (as we saw – the weakest part of the system)



**Taking into consideration all mentioned above points as:**

- Difficulties with global NGV statistics
- Wide variety of standards for NGV industry
- Quality control of workshops and personnel training
- No integral cross-border development but just country orientated

**And in order to give strong support to the entire NGV sector it is necessary to unify as maximum as it is possible NGV standards and create common NGV space within Eurasia and biggest NGV markets.**

**This can be done by creating World NGV Union by using BRICS and Shanghai Co-operation Organisation. World NGV Union should collect all best practices and competences within countries and organisations like NGV Italy, IGU, Russian Gas Society etc who are the leaders on NGV market by giving strong support for creation of NGV corridors within Eurasia and rest of the World.**





# Thank you