

# Study "Legal and Regulatory Environment for the Construction and Operation of CNG Filling Stations in European Countries"

### BACKGROUND TO THIS PROJECT (2011-2012)

- Sponsor: European Business Congress
- Primary Contractor: National Gas Vehicle Association Russia, assisted by Clean Fuels Consulting
- Project Scope
  - 21 European NGV Country Profiles (West & East Europe) – PowerPoint file
  - Legal & regulatory environment to build fuelling station network – Excel File
  - Strategic approaches to create NGV fuel infrastructure – PowerPoint file
  - **NGV Infrastructure Calculation Tool (NICA)** – Excel File

The European market for natural gas vehicles has been expanding steadily since 1994 when there were 524,000 natural gas vehicles (NGVs) and 1,693 CNG fuelling stations. Today the European market has expanded to 1.5 million NGVs and 4,000 fuelling stations; growth of 286% and 236% respectively.

While NGVs and the fuelling infrastructure are a practical potential business opportunity they compete with the 'politically attractive' technologies such as hydrogen fuel cells and electric battery vehicles.

Thus, the time is right for the wider European business community to be made aware of the 'NGV potential.' This is best done by highlighting the excellent opportunities to invest in a sustainable fuel and technology that addresses today's important concerns about energy and the environment through the wider use of NGVs, whether they run on fossil natural gas, liquefied natural gas or renewable biomethane.

The European Business Congress has recognized this need and now is seeking a way to inspire new investments in the CNG fuelling infrastructure across Europe. Once in place, this can lead to a much more widespread development of the European NGV market in individual countries that are linked across Europe along the normal transportation corridors.

**The project sponsors wish to thank the following individuals for their dedicated research and analysis in making this project possible**

- EBC Project Coordinator: Detlef Wessling, E.On Ruhrgas
- NGVRUS Project Manager: Eugene Pronin, Gazprom
- Clean Fuels Consulting
- Principal Investigator: Dr. Jeffrey M. Seisler
- Research Assistant: Marco Dal Pont
- Project engineer for the Natural Gas Infrastructure Calculation Tool (NICA): Gijs van Schoonhoven (Ingenieurbüro van Schoonhoven)

NGV Country profiles provide, in a PowerPoint format, a template of information that represents in-depth analyses on a country-by-country basis. The profiles focus on the specific elements that are important to understand the investment environment to develop a CNG fuelling infrastructure. Taken together, these country profiles provide a unique window into individual markets that may be attractive to different commercial interests investing in the NGV infrastructure.

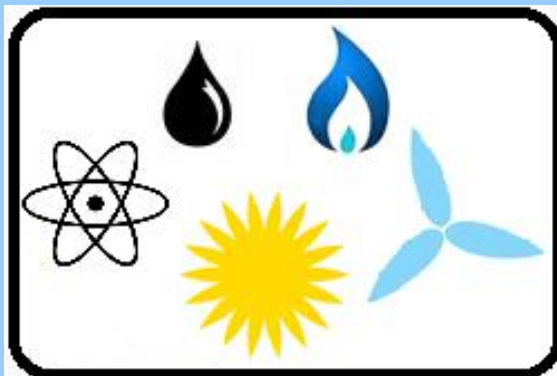


- NGV Profile
- Motivation
- Energy Profile (oil & gas/imports & exports)
- Vehicles
- Fuelling Infrastructure
- Government Support
- Gas Industry Support
- Conclusions

- Number of NGVs: 5,910
  - NGVs are 0.11% of total vehicle population
  - 0.64 NGVs per 1000 population
  - CNG fuelling stations: 221
  - 27 vehicles per fuelling station
  - Price differential CNG-Petrol/diesel:
    - CNG equivalent per liter gasoline: 0.66 €/liter
    - Regular Gasoline: 1.377 €/liter
- Natural gas costs 52% less than gasoline

Source (February 2012) [www.metanoauto.it](http://www.metanoauto.it) <http://www.energy.eu> and  
<http://www.bmwfj.gv.at/EnergieUndBergbau/Energiepreise/Seiten/MonitorTreibstoff.aspx?Report=2>

- Economics
- Environment





- In the absence of nuclear power plants, Austria is strongly promoting an increase of the share of renewables to increase the domestic production of energy
- Austria counts among the IEA member countries with the highest share of renewable energy supply
- To reduce the dependence on Russian gas, Austria is promoting the development of the Nabucco pipeline to bring Caspian gas to Europe and the construction of an Adriatic LNG terminal on the Croatian island of Krk

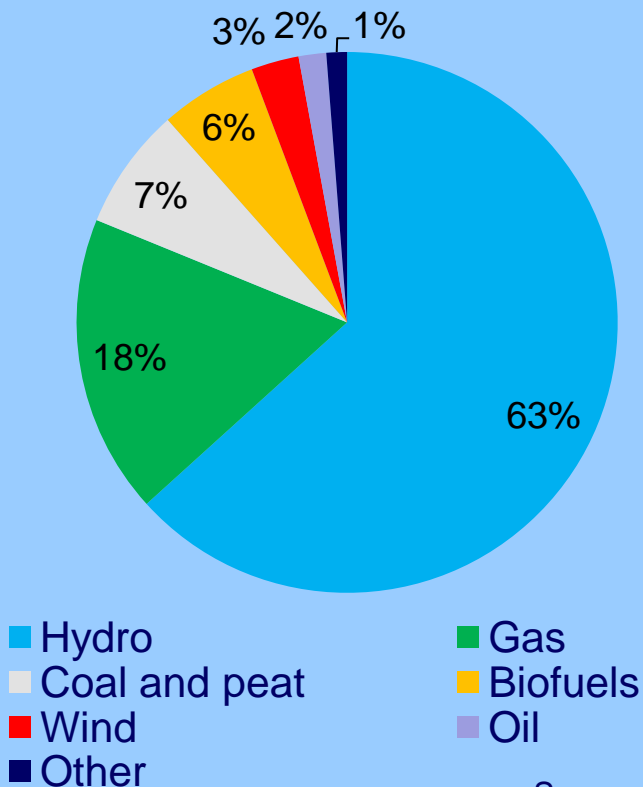
## Austria is heavily reliant on outside sources of energy

- **Oil**
  - production: 2,590 bbl/day
  - consumption: 277,900 bbl/day
  - imports: 282,200 bbl/day
  - exports: 46,020 bbl/day
  - reserves: 0 bbl
- **Natural gas**
  - production: 1,716 billion m<sup>3</sup>
  - consumption: 9,116 billion m<sup>3</sup>
  - imports: 12,13 billion m<sup>3</sup>
  - exports: 5,439 billion m<sup>3</sup>
  - reserves: 16,14 billion m<sup>3</sup>

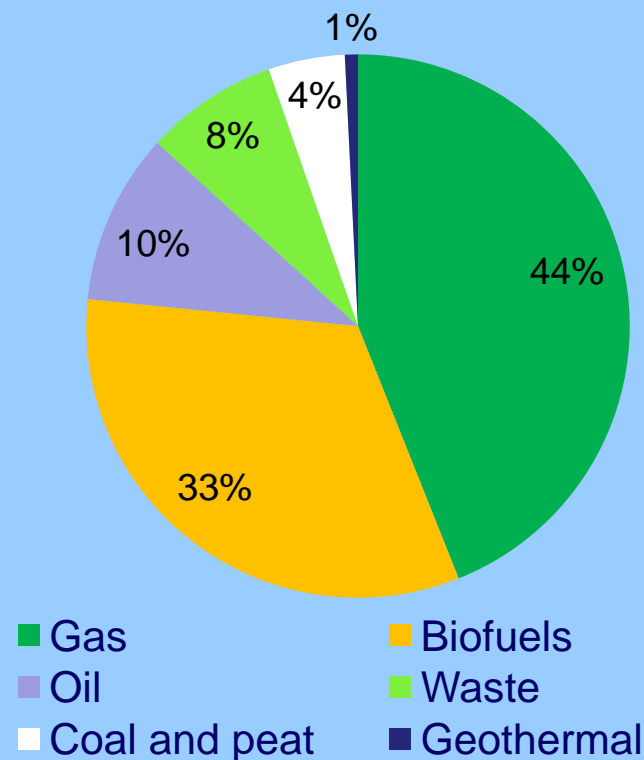
Source: CIA World Factbook 2011

**Austria is one of only five countries in the EU that already fulfils the 2020 target of covering at least 20% of their primary energy supply from renewables**

**Electricity production**

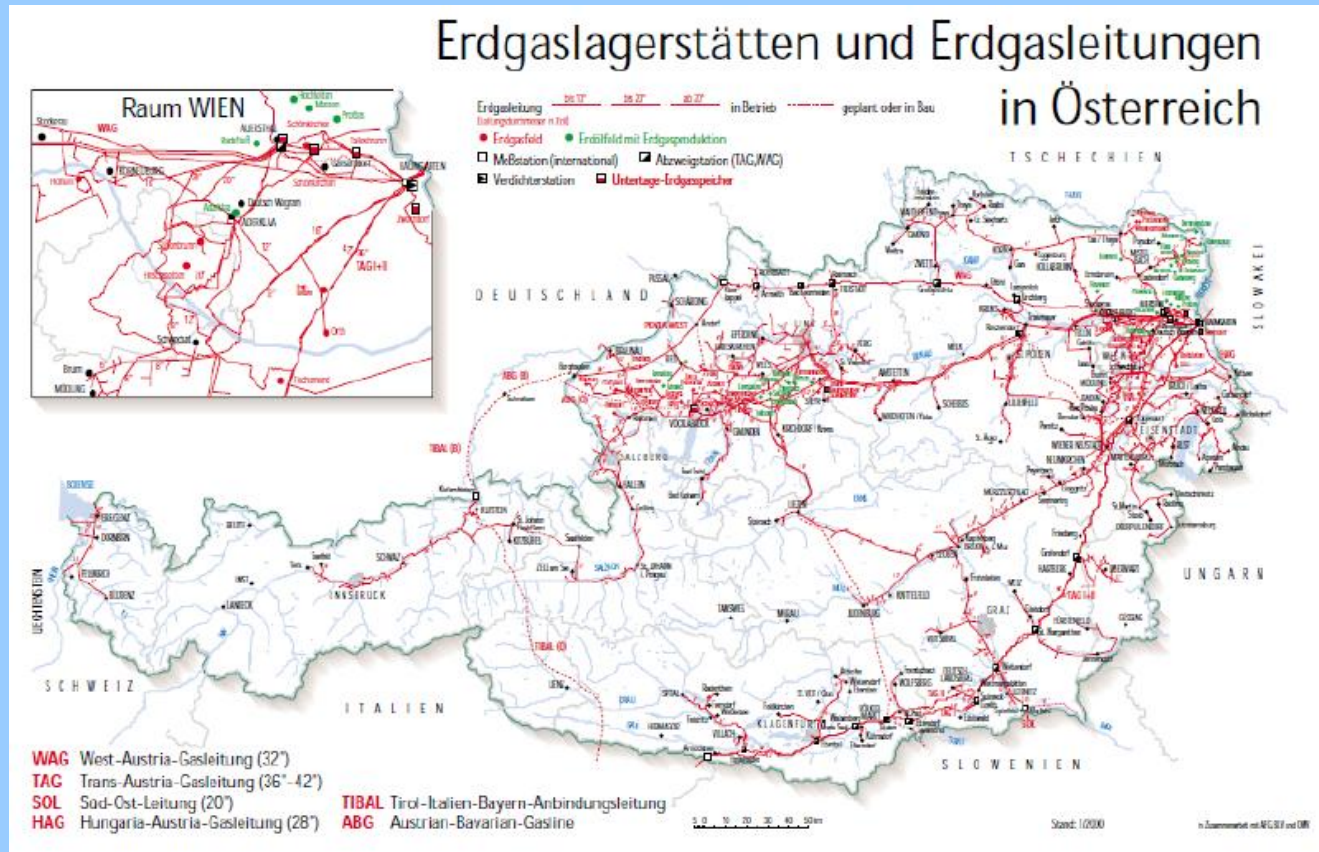


**Heating production**



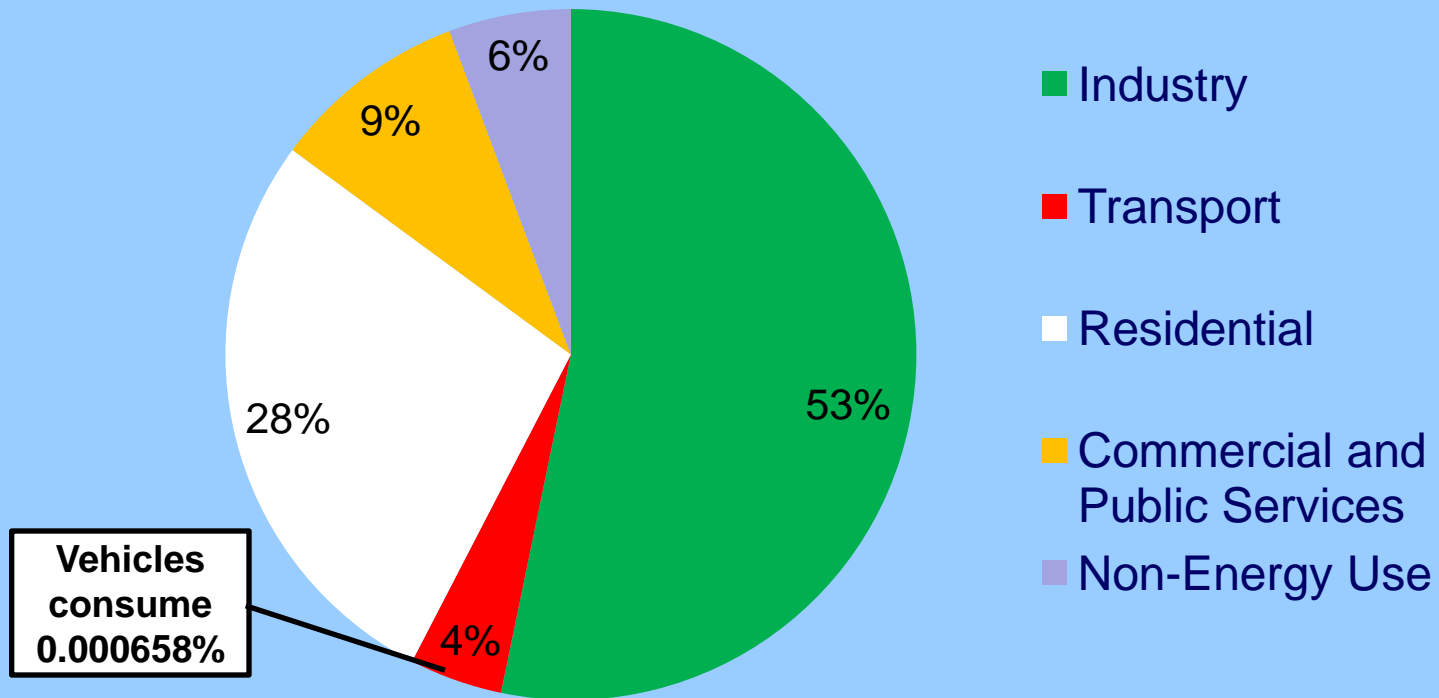
Source: IEA statistics

## Austria gas has an important function as a hub that transports natural gas imports onwards to destinations in Western Europe



Source: GasHighWay, Optimal location for new gas filling stations by 2020, April 2011

## 4% (?) of natural gas is used in the transport sector\*



\*Source: IEA statistics, 2011: Note: 4% is far overestimated since only .11% of the transport sector uses CNG.%. Total annual gas consumption nationally is 9.1 bil m3; GVR magazine indicates 6 mil m3 consumption per year for NGVs or 0.000658.

## The gas market was fully liberalized in October 2002, but substantial competition has not yet emerged

Over 72% of the gas market is controlled by one supplier:

- 72.3% EconGas+EnergieAllianz
- 12.5% STGW
- 10% Terragas
- 2.5% Salzburg AG
- 1.7% KELAG

Source: IEA, Energy Policies of IEA Countries, Austria, 2007

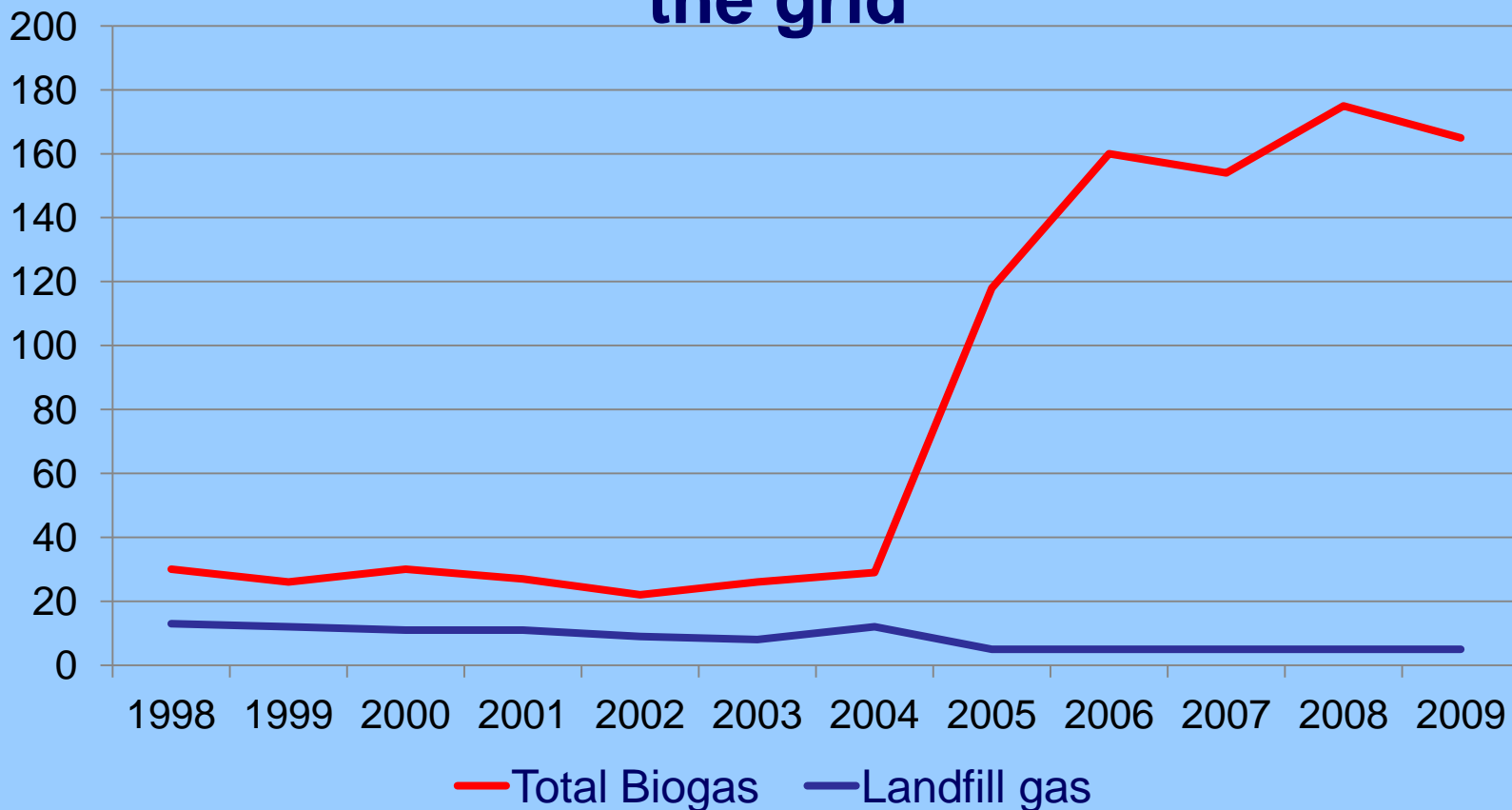


- Austria, as a landlocked country, makes it impossible to receive any LNG imports**
- LNG as a vehicle fuel is not of interest in Austria because of a lack of supply and the high investment costs for LNG filling stations
- For regions that are not directly linked to the natural gas grid, LNG could be an alternative product in the future
- Austria is pushing for the construction of an Adriatic LNG terminal on the Croatian island of Krk

Source: GasHighWay, Optimal location for new gas filling stations by 2020, April 2011



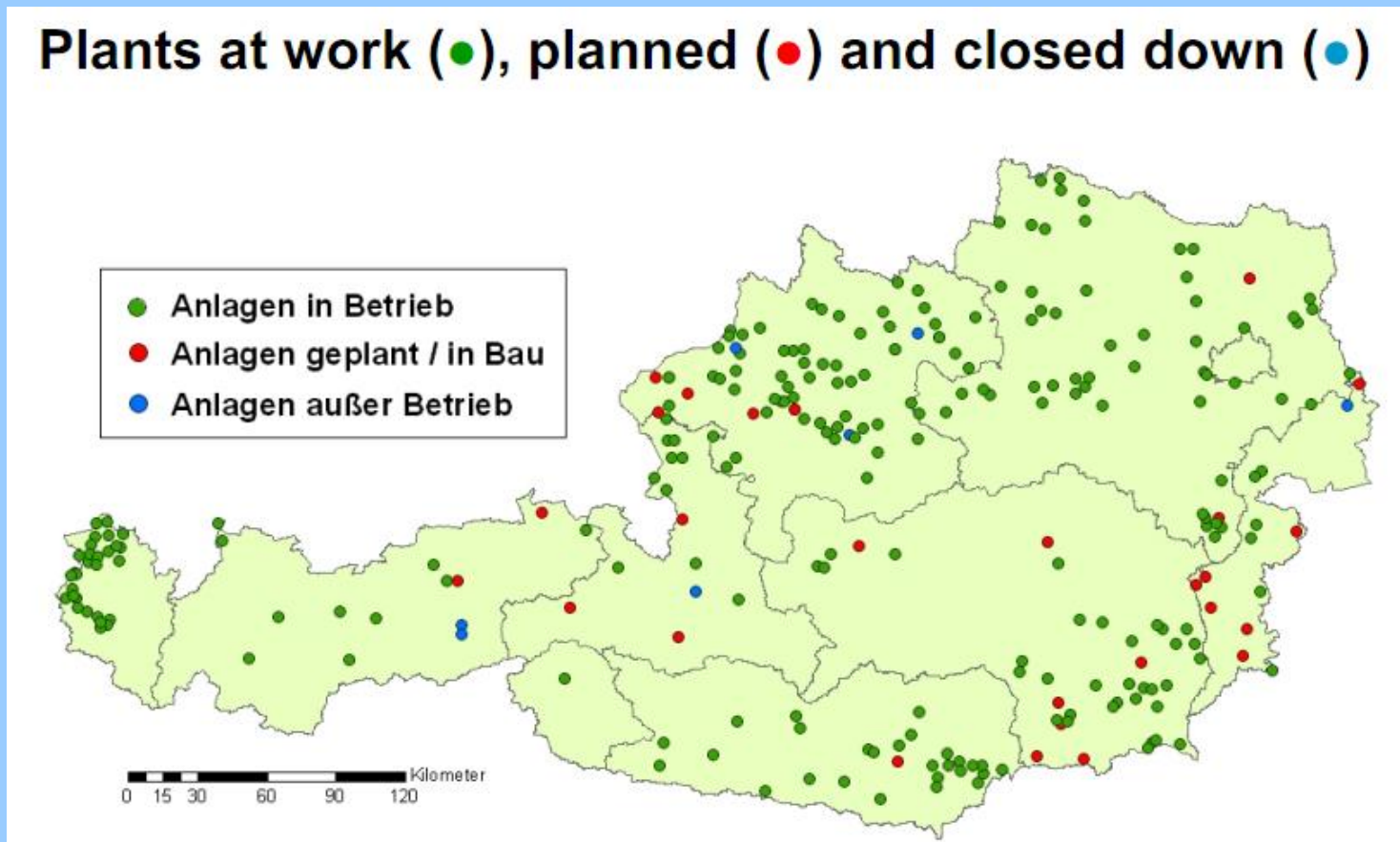
## Biogas production increased suddenly in 2005; but landfill gas cannot be injected into the grid



Source: Eurostat

**There are about 300 biogas plants with a production capacity of ~265-414 Mio m<sup>3</sup>/year**

**Plants at work (●), planned (●) and closed down (●)**



Source: IEA Bioenergy task 37, Country Report Austria, April 2011



## At the moment there are five biogas plants with upgrading units in operation

- Pucking (Upper Austria), Asten (Upper Austria), Eugendorf (Salzburg), Bruck a.d. Leither (Lower Austria) and Leoben (Styria)
- All of them are connected to the natural gas grid and inject biomethane into the gas grid
- Three of them are equipped with a CNG/Bio-Methane filling station (Pucking, Eugendorf and Bruck a.d. Leither)

Source: GasHighWay, Optimal location for new gas filling stations by 2020, April 2011



## Policies in Austria tend to favor increased use of biogas

- Gas quality: prescribed
- Mandatory acceptance of grid injection: No
- Regulatory Style: Prescriptive
- Government Incentives: Subsidizes R&D. There are different types of mechanisms that support or enhance national biogas incentives
- Restrictions: Gas from landill and sewage are not allowed to be injected in the grid
- Tariffs: Established

Source: Clean Fuels Consulting, Position paper on grid injection of biogas, Sept 2011

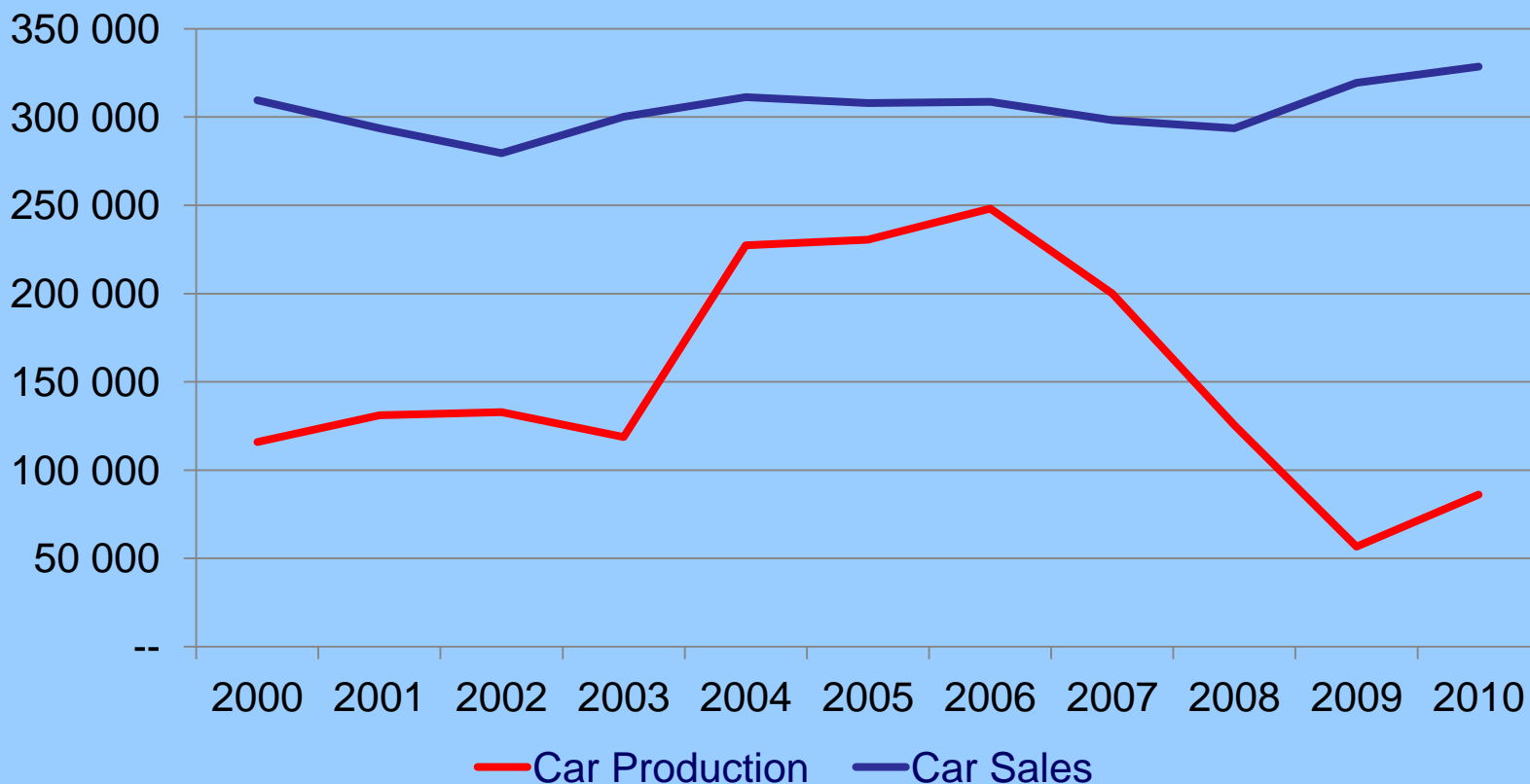




- Austria does not have a car brand of its own, although important European OEMs do have production plants there
- Austrian companies have a strong reputation in the supply of quality components and in automotive research and development
- The domestic market for vehicles is relatively small



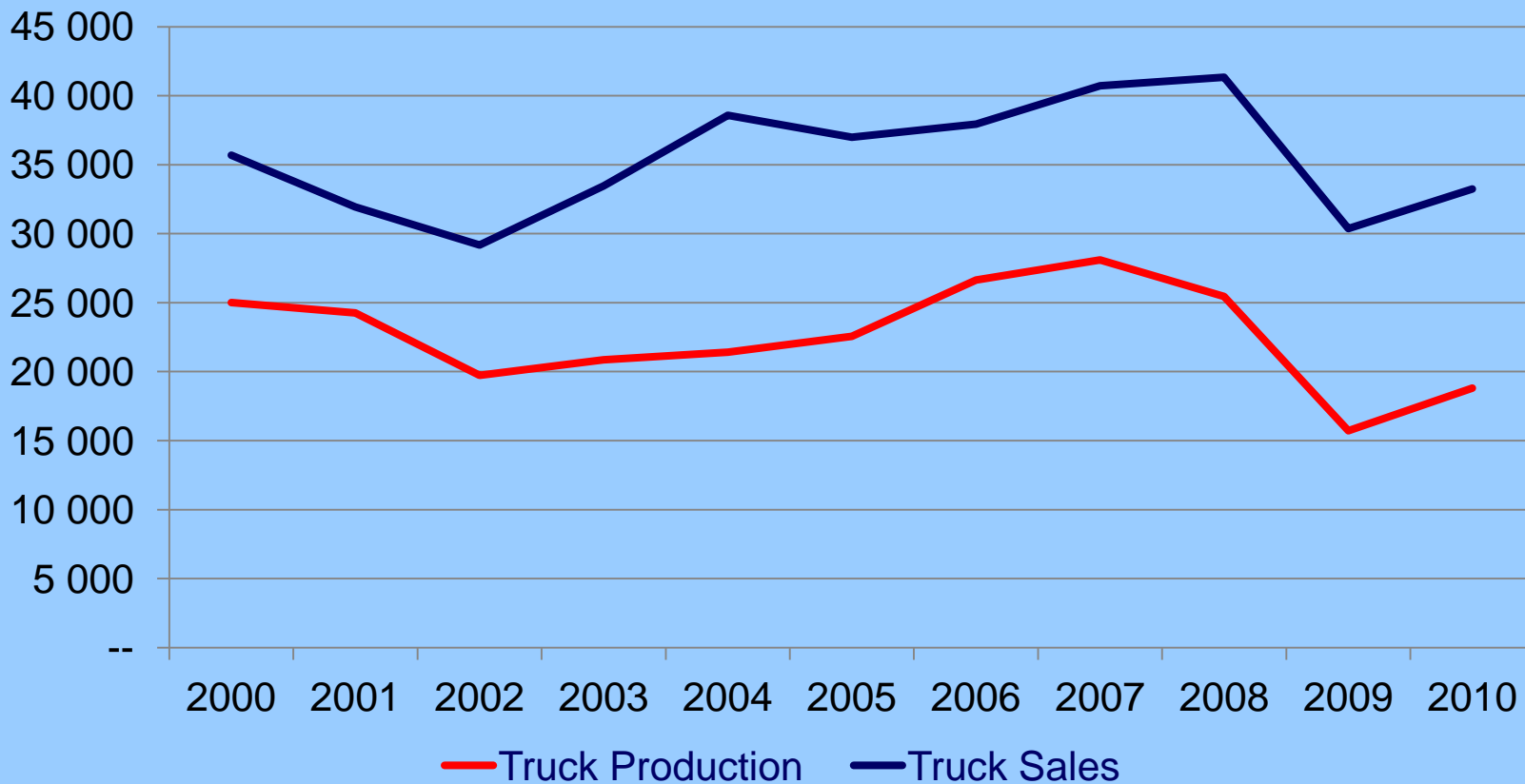
**Small car production decreased since 2006 compared to a constant number of cars sold. This assumes more vehicles imported**



Source: Ward's



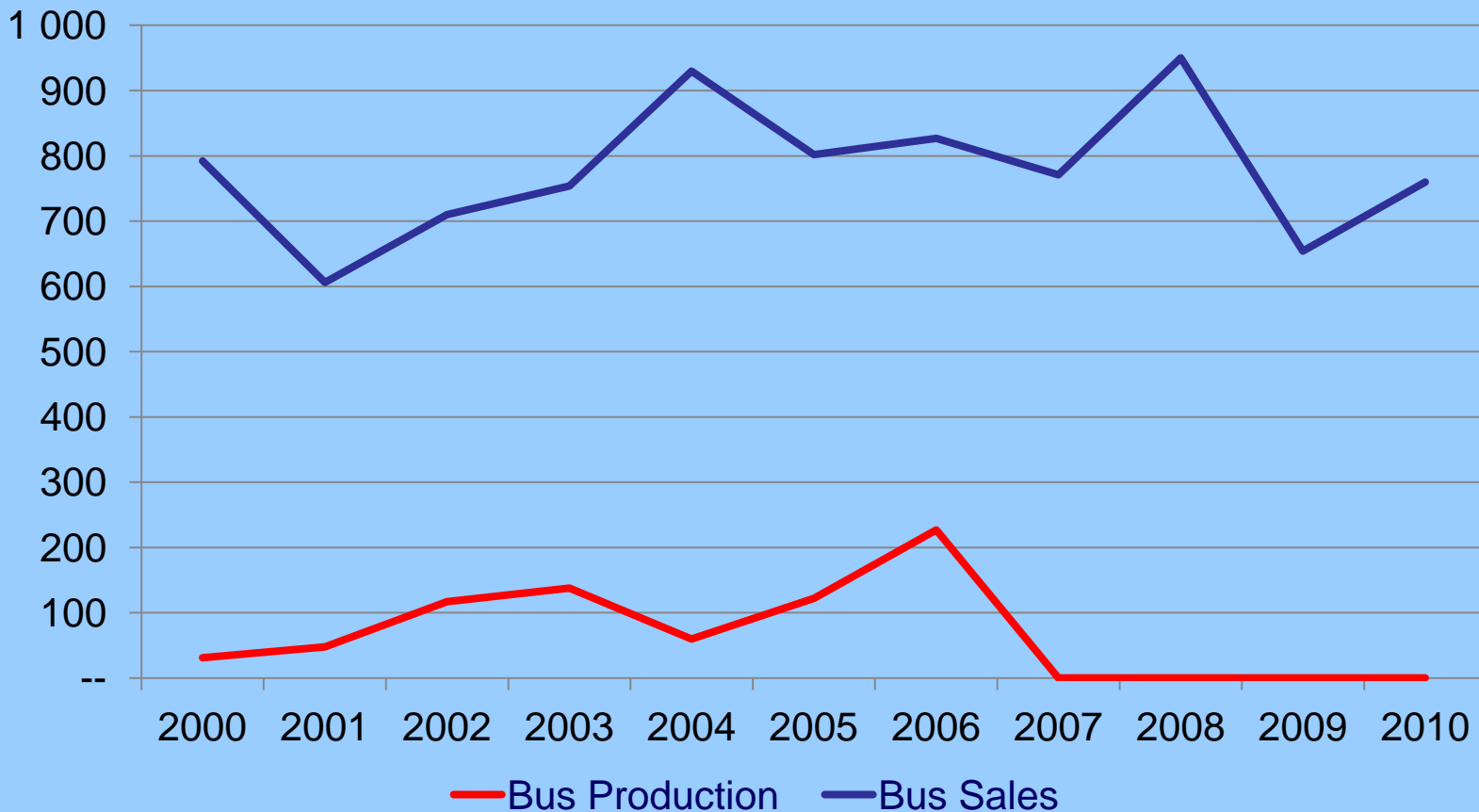
## Truck production and sales follow the same trend during the past years



Source: Ward's



## Insignificant domestic production of buses stopped in 2007



Source: Ward's



## 99% of NGVs are passenger cars

NGV market dominated by new cars, of which 90% are OEM and only 10% retrofitted

- 5.253 passengers cars
- 66 buses
- 6 Trucks

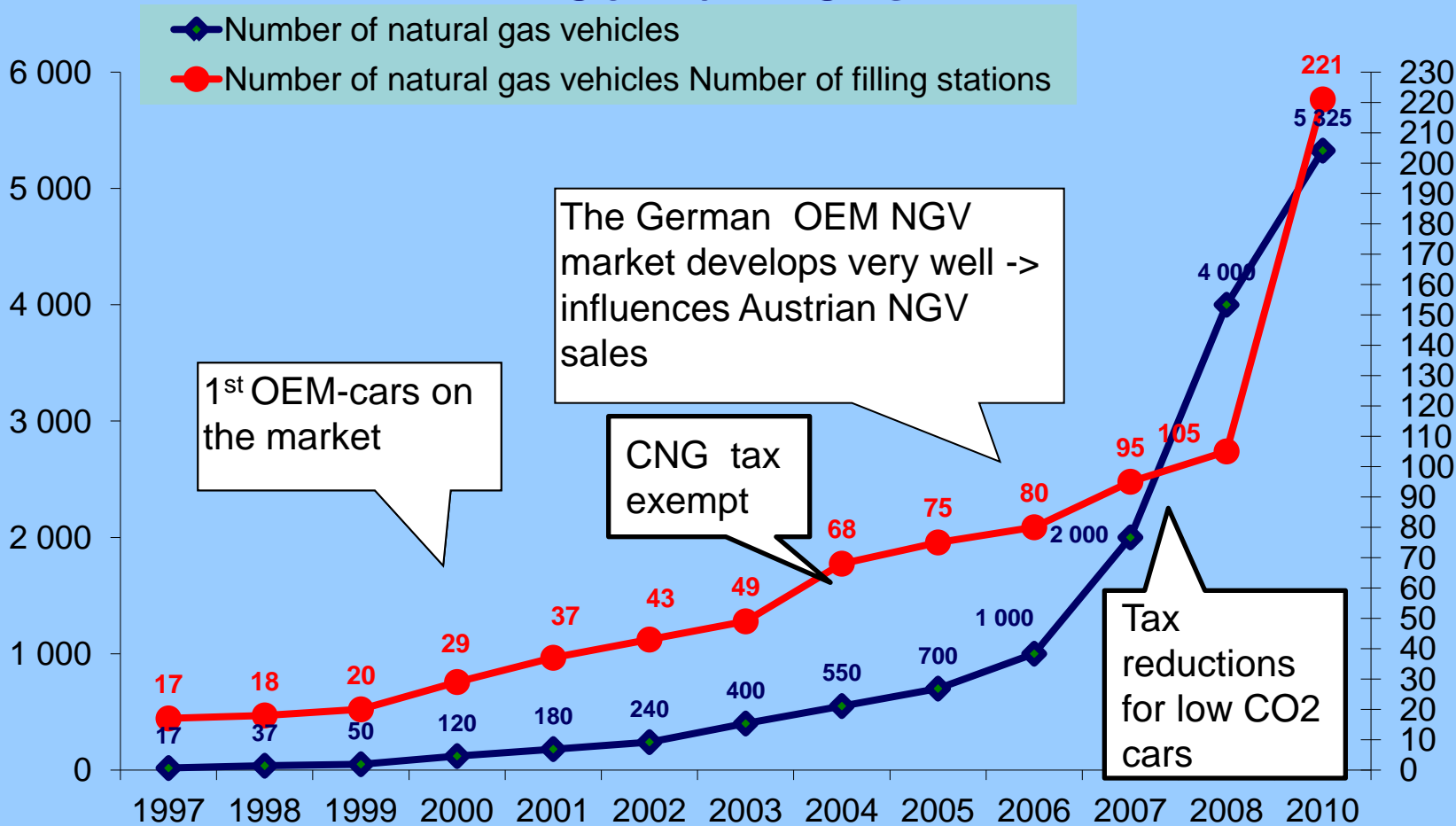
Source: IGU Country Profile, November 2011

## NGV market do not suffer from competition with LPG

- According to AEGPL public data there are only around 1000 LPG vehicles (latest info for 2007-2008)
- Positive aspect: there is no autogas as competitor
- Negative aspect: customers might not be so familiar with the use of gas in cars



## The Austrian NGV market has grown incrementally over time and is influenced positively by the availability of German NGVs



Source: IGU 5.3 Final Report, 2006



## Austrian NGV market has access to a wide variety of OEM NGV passenger car models

### FIAT

- Qubo
- Panda
- Punto EVO
- Doblò

### Honda

- Civic GX

### Mercedes

- B Class 180
- E 200

### Opel

- Zafira

### Volkswagen

- Caddy
- Multivan
- Passat
- Touran

Source: Erdgasautos



**NGV as commercial vehicles also are present in the market, even if is not yet developed**

## Chevrolet

- Express CNG

## Iveco

- Daily

## Opel

- Combo

## FIAT

- Fiorino
- Doblò Cargo
- Ducato van

## Mercedes

- Sprinter

## Volkswagen

- Caddy Maxi
- T5

**TRUCKS availables :**

Iveco Stralis, Mercedes Ecotonic and Scania P270/P310

Source: Erdgasautos



## NGV components industries are well developed

- Magna Steyr Fahrzeug Technik AG & Co KG
- Prof. Ernst Pucher TU Wien (R&D)
- Ventrex Automotive GmbH
- ÖAMTC Akademie
- Ingenieur Herbert Kitzler
- Opel Special Vehicles GmbH



Source: GasHighWay, NGV/CNG market Austria, 2009

# Some companies are using NGVs in their corporate fleets



Source: GasHighWay, NGV/CNG market Austria, 2009

## Natural gas buses are running in three major cities

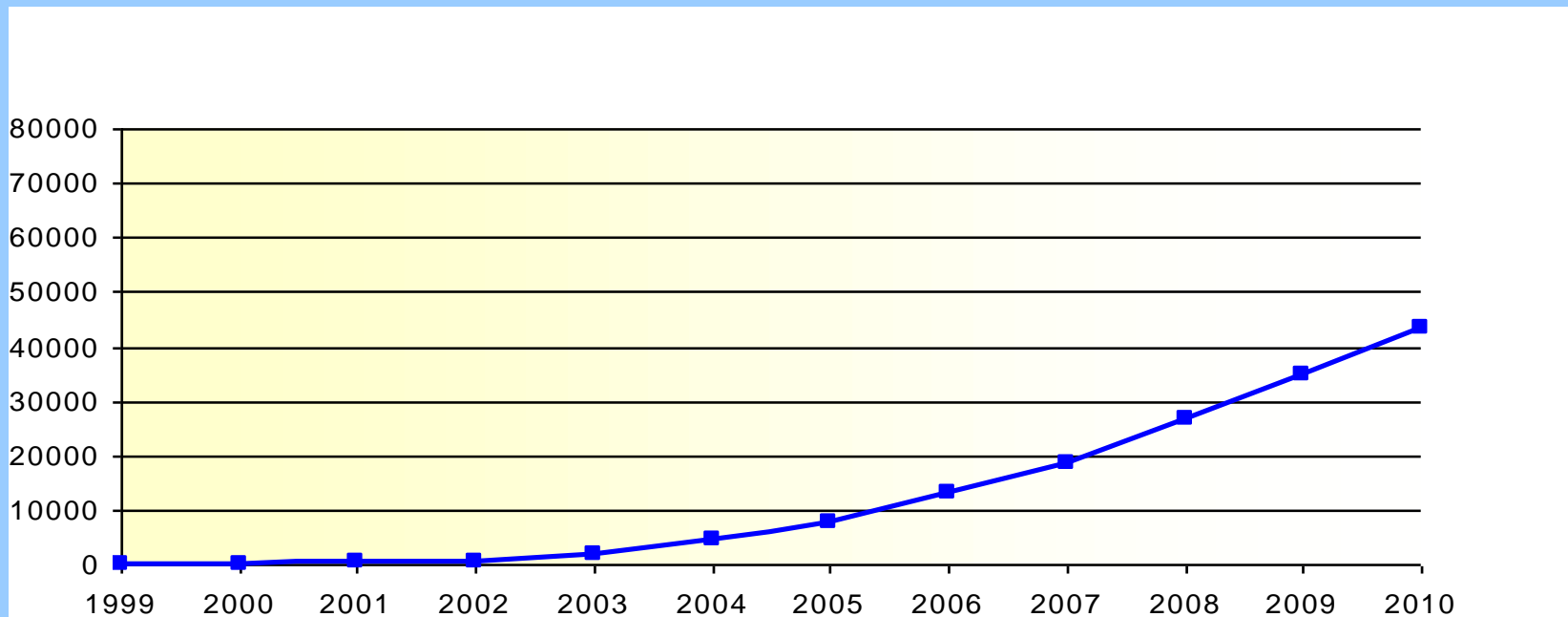
- Linz, St. Pölten and Salzburg
- whereas all of them are having a gas filling station near their bus depot
- In Linz and Salzburg bio methane is used as an alternative fuel for busses



Source: GasHighWay, Optimal location for new gas filling stations by 2020, April 2011



**Government target to reach 50.000 NGVs in 2010 was not achieved, while the target of 200 filling stations was reached**



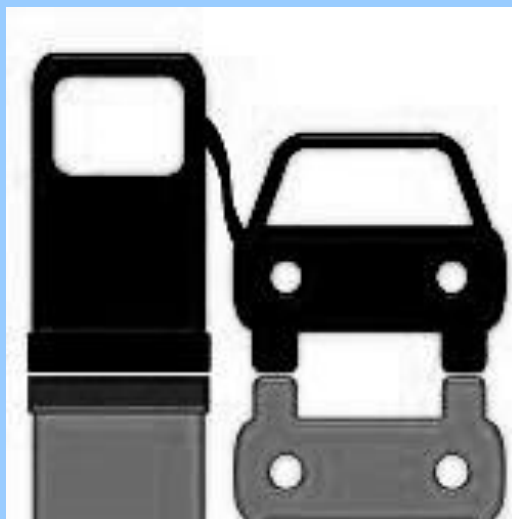
Source: Development of the Austrian NGV-Market: Measures, Activities, Expectations, October 2001



**In 2003 the Austrian gas industry had an ambitious target for CNG filling station and vehicle growth by 2020 but expectations are not likely to be fulfilled**

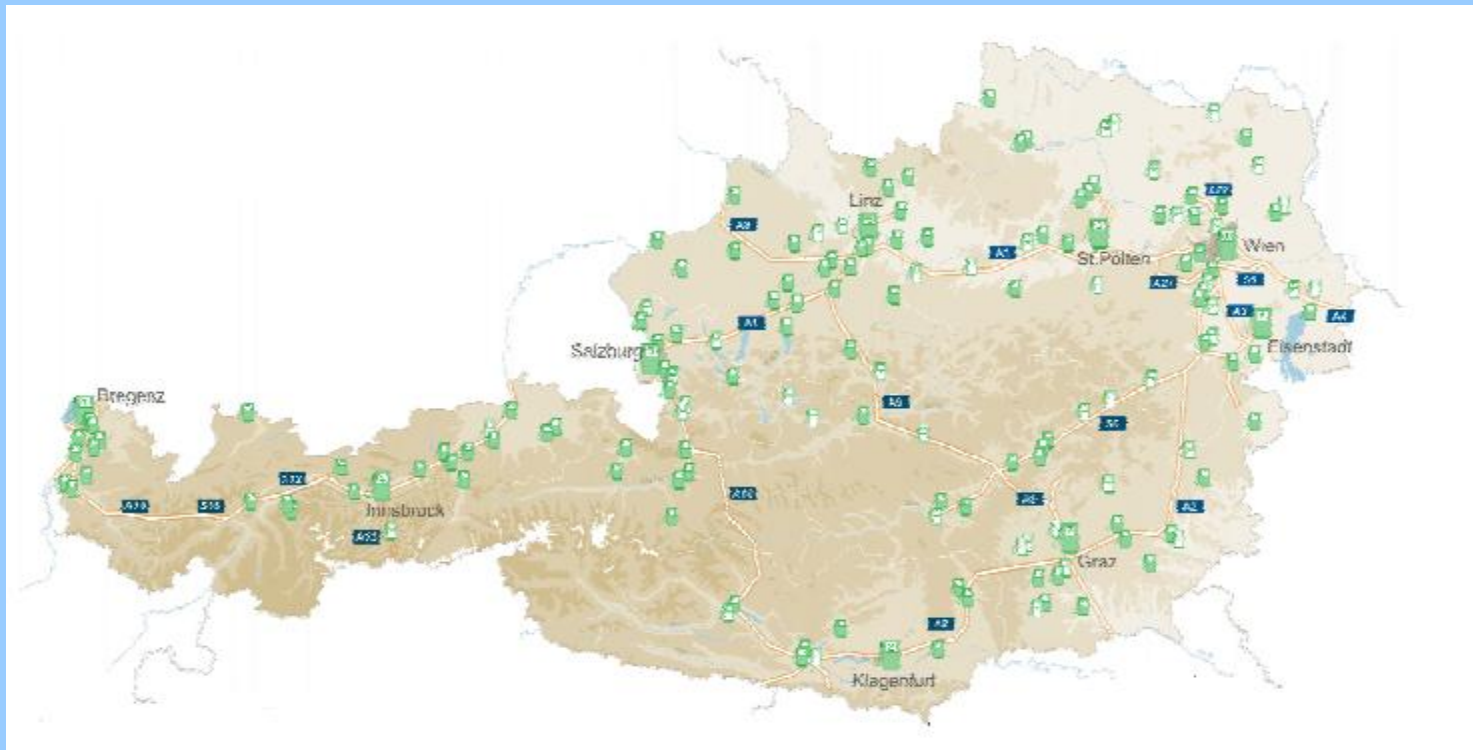
- According to this projection, by 2010 approximately 225 CNG filling stations (private and public) should be established and approximately 87.000 NGV should be on the road
- By 2020 the numbers of filling stations were supposed with 600 and the numbers of NGV with more than 650.000

Source: GasHighWay, Optimal location for new gas filling stations by 2020, April 2011





All CNG filling stations are next to the natural gas grid and also along major highways (A1, A2, A9, and A12) and motorways

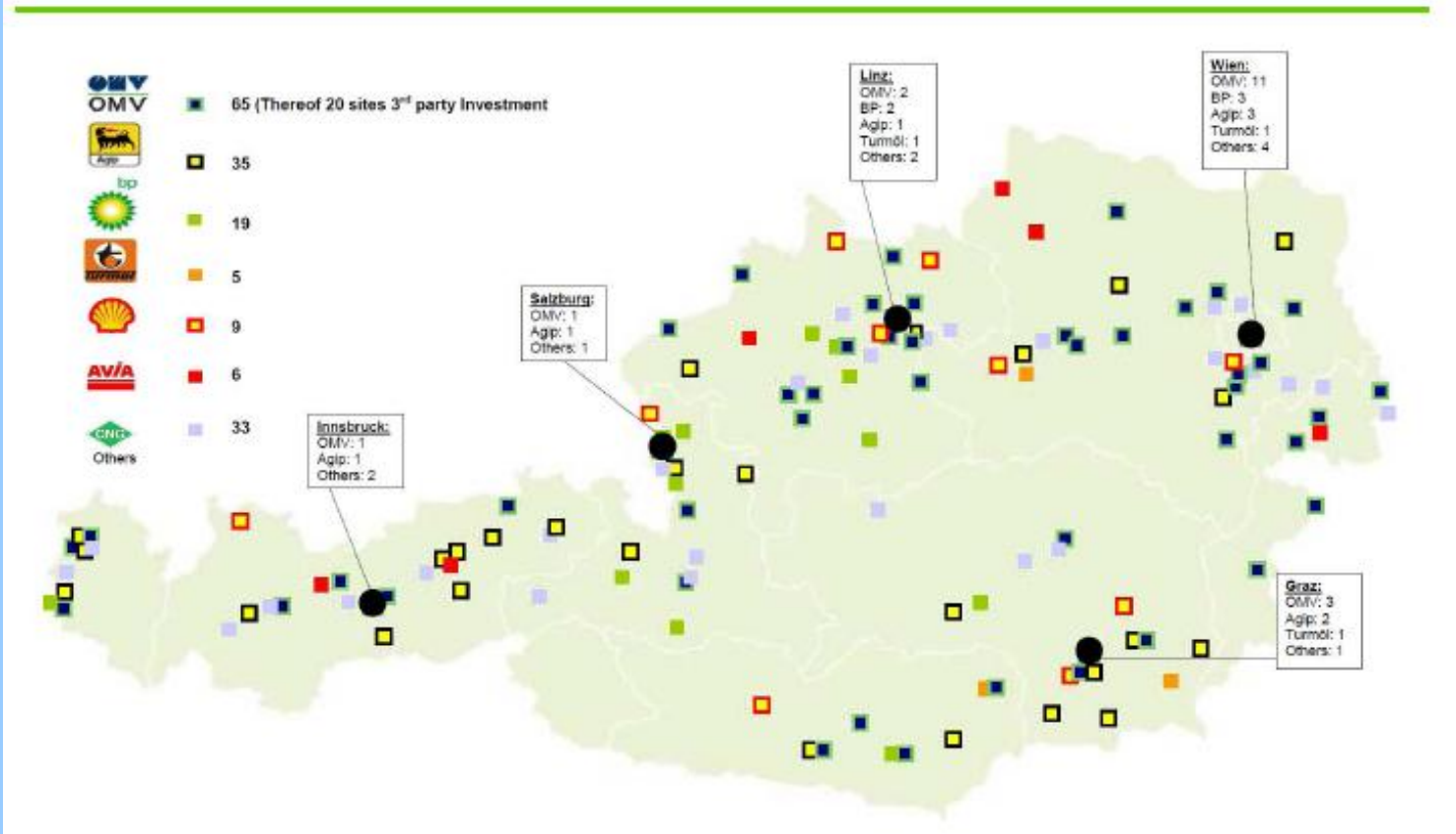


Source: GasHighWay, NGV/CNG market Austria, 2009



## OMV and AGIP dominate fuelling station network ownership

CNG network Austria: > 2/3 with Routex fuel Card



Source: OMV, CNG in Austria, report 2009-2011

## Public CNG self service allowed in Austria

- Multilingual product hints
- Underground security device for dispenser
- Pressure tightness test per filling
- Emergency shut down in case of danger



Source: OMV, CNG-Vision, 2004



## The investment costs for a CNG filling station can depend by different factors

- Expecting costs between 200.000 Euro and 350.000 Euro
- Costs depend on the type of compressor, amount of gas storage, pressure (0,22 mbar up to 6 bar), location, and station infrastructure (physical structure)

Source: GasHighWay, Optimal location for new gas filling stations by 2020, April 2011



- Currently only one pure biomethane public filling station in Margarethen am Moos**
- Opened in 2008
  - First biogas-upgrading plant in connection with a local fuel station without any connection to a natural gas grid
  - The fuel station had during the first year about 20 customers, and it is expected a fuel consumption of 150.000 kg (approximately 200 cars) a year





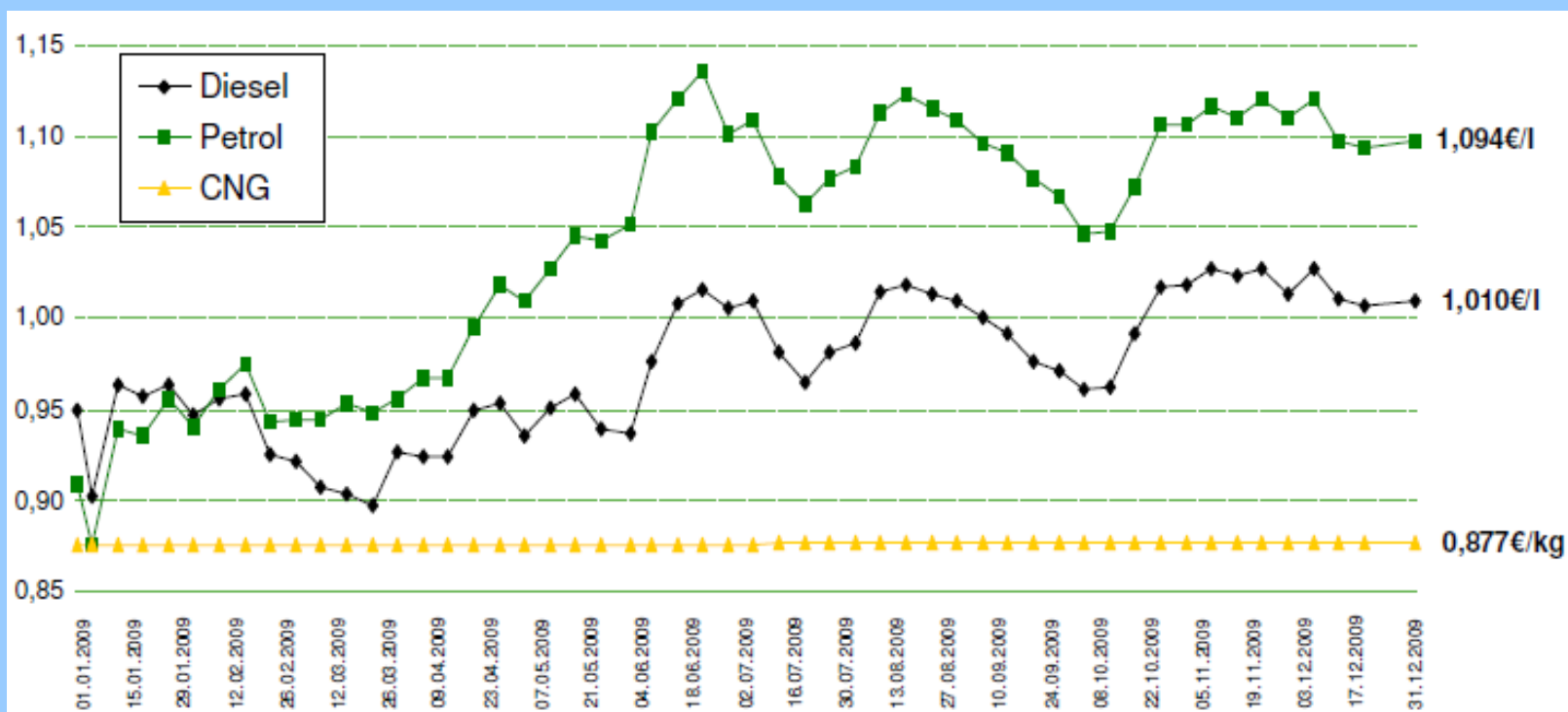
## All public filling stations are “fast-fill” with a filling time of 2-to-3 minutes

- All CNG-filling stations have a compressor and storage, gas dryer systems, filling priority and sequential refuelling controls as well as filling systems
- The dispensers are equipped with 1 or 2 hoses (using a standard NGV1 connector) and with 1 or 2 mass flow meters for a non-simultaneous or also simultaneous vehicle refuelling on both sides of the dispenser

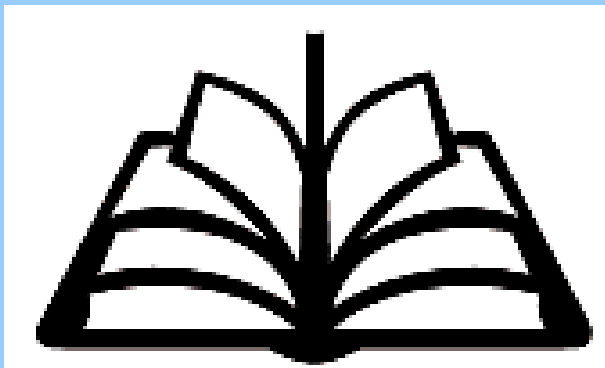
Source: GasHighWay, National report on state of CNG/biomethane filling station - Austria, April 2010



Natural gas price is more constant than diesel or gasoline. CNG demonstrated to be a safer investment



Source: GasHighWay, NGV/CNG market Austria, 2009



Most of the public CNG filling stations are integrated into conventional petrol stations, allowing self service and credit card payment

- Multi-fuel stations: **allowed**
- No limits on opening hours
- Self service: **allowed**
- Payment practices at the pump: cash, credit card and company fuel cards



## Austria is using ISO standards

- ISO 11439:2000, High pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles
- ISO 15403:2006, Natural gas for use as a compressed fuel for vehicles
- ISO 13423:2001, Compressed natural gas vehicle operations

Source: Austrian Standards Institute



## **ÖVGW (Austrian Association for Gas and Water) is responsible for the regulations**

- The design, production, installation and operation of NGV filling station is described in the regulation ÖVGW G97, Feb 2008
- The natural gas quality as well as the quality for upgraded biogas (biomethane) is regulated in the quality standards ÖVGW G31 and G33

Source: GasHighWay, National report on state of CNG/biomethane filling station - Austria, April 2010



- Injection of biogas is possible either via the existing gas network or via a local micro gas network
- **ÖVGW Regulation G 31** defines all those parameters and quality criteria, which are necessary to ensure safe transport. Moreover, the regulation determines the required gas fuel value data. The quality criteria phrased in the regulation refer to the characteristics of the imported gas
  - **ÖVGW Regulation G 33** applies to the injection of biogas based on renewable processes into the natural gas networks. This regulation, therefore, defines the quality of renewable gases and the quality control which are preconditions for the feed-in

Source: Clean Fuels Consulting, Grid injection of biomethane: a case for Portugal, August 2010



## Odorization of natural gas regulated by ÖVGW G 79

- Odorization required during the distribution
- Level of concentration and environmental permit for the transport are required
- Analytical controls with continuous inspections during the distribution are required

Source: Marcogaz



## Environmental Bonus-Malus system valid since 1 July 2008

- **Bonus** - tax deduction of max € 300 for all type of cars CO<sub>2</sub><120g/km
- **Malus** - tax charge of €25 per g/km exceeding 160g/km for all type of cars
- **Bonus** - tax deduction of up to €200 for gasoline cars NO<sub>x</sub><60g/km and for diesel cars NO<sub>x</sub><80g/km
- **Bonus** - tax deduction of up to €500 for Hybrid, E85 fuel, CNG, Biogas, LPG, Hydrogen

Source: ACEA tax guide 2010

- ## Transport fuels are taxed less in Austria than in neighboring Germany and Italy
- Since 2004 in Austria there is a fuel excise tax of €0.425 /litre for gasoline and € 0.325 /litre for diesel
  - Natural gas and biofuels as a vehicle fuel are exempt from excise tax

Source: IEA, Energy Policies of IEA Countries, Austria, 2007  
CleanVehicle.eu

## **“Klima:aktiv – mobility” is a national program to reduce CO2 emissions in the transport sector**

- Can apply natural and legal persons who are in the leisure and tourism business (regional authorities, companies, associations, non-profit associations)
- One part of this program is focused on NGVs: the financial support is up to 30 % of investment costs (additional costs to implement the CO2 reduction measurement)
- This program also includes a subsidy for building CNG-filling stations (per pump €10.000)

## Different measures supporting NGVs are present at the regional level

- Subsidy: all regions (from €300 in Styria up to €2,000 in Nieder-Osterreich)
- Free parking: Tirol
- Free annual highway «Vignette»: Ober-Osterreich
- Refilling voucher: Ober-Osterreich, Salzburg, Vorarlberg
- €3,000 subsidy for NGV taxi: Vienna, Tirol

Source: OMV, Promotion for NGV in Austria





## Most of the CNG filling stations are owned and operated by the main actors in the natural gas sector

- Salzburg AG, OMV Gas GmbH, OÖ Gas-Wärme GmbH and EAA Erdgas Mobil GmbH have invested heavily in the CNG fuel station expansion
- At the moment they are less interested to invest in the further expansion of the CNG station infrastructure as long as the existing stations have the potential to become more efficient

Source: GasHighWay, Optimal location for new gas filling stations by 2020, April 2011

## OMV is leading CNG marketing activities OEMs and CNG promotional activities

- CNG Around the World(2007)
- CNG-Testing event ÖAMTC Ring Melk(2008)
- NGV Test Days for OMV Employees
- Fairs, Exhibitions(i.e. Vienna Autoshow, LNdF, Grün Fahren, CO2 sparen“)
- Journalist-Events(2008/2009)
- CNG Symposium(2010)
- CNG Rallye Team



Source: OMV, CNG in Austria, report 2009-2011

# European Business Congress Study - 2012



## **Austria's overall regulatory framework has been marked by transparency and efficiency**

- Austrian system encourage business innovation and productivity growth
- Nonetheless, the absence of major regulatory reforms has eroded regulatory competitiveness
- Austria's trade policy is the same as that of other members of the European Union

Source: The Heritage Foundation, 2011 Index of economic freedom

**The transparent and competitive business environment has been effective in promoting a thriving entrepreneurial private sector**

- Myriad non-tariff barriers increase the cost of trade
- With an efficient investment regime in place, there are no controls on currency transfers, access to foreign exchange, or repatriation of profits

Source: The Heritage Foundation, 2011 Index of economic freedom





“The main barriers are that the Austrian government is restrictive regarding natural gas as fuel and that car dealers are not interested to sell NGVs – instead they find it easier to sell diesel or petrol cars”

Steirische Gas-Wärme GmbH



“Compared to other countries there was really quite strong governmental and industry support (by OMV). They (gas industry) should follow other cases of successful NGV projects (like in case of Iran\*) and start by picking up the “low hanging fruit” with HD/MD/fleet customers instead of building public sites first and waiting for the customers (LDVs).”

Gas industry stakeholder

\*The Iranian strategy began with buses, then taxis, delivery trucks and then passenger cars.

- Energy environment
- Gas industry support
- Government support
- NGV market development
- Legal and regulatory framework for CNG station development
- Investment environment

## Energy Environment

- Austria wants to diversify its energy supply and its achievements in developing renewable energy sources would be very positive for the development of the NGV biogas/biomethane market
- With the opening of an Adriatic LNG terminal in Croatia, Austria will have access to LNG and could have another opportunity to diversity into LNG or L-CNG development for the vehicle market

## Gas Industry Support

- The gas industry has invested substantially in creating an adequate public CNG station network but the lack of vehicles does not justify further investments, which will be harder for the gas industry to support unless there is an upturn in vehicle acquisitions
- In such cases where CNG stations are 'lost leaders' the question arises as to how much 'entrepreneurial stamina' does the gas industry have to maintain the CNG network already established

## Government Support

- National government incentives for NGVs are available based on their environmental merits
- In most cases, these subsidies refer to the new purchase of NGVs and/or the conversion of vehicles to natural gas operation
- Regional government support for NGVs has a substantial benefit and provides a greater opportunity for the technology
- Other financial incentives should help spur the market



## NGV Market Development

- Though the gas industry has invested heavily in creating a very visible public CNG station network the relative lack of vehicles (~27 NGVs per station) is far from making the business economic based on commuter NGVs
- Without substantial growth of the private vehicle market there is great opportunity to focus on municipal vehicles, (especially high gas-consuming heavy duty vehicles) and commercial fleet vehicles



## Legal and regulatory framework for CNG station development

- Austrian regulations are straightforward and transparent
- ISO standards are used for natural gas as motor fuel and the regulatory authorities maintain vigilance over their implementation as related to safety

## Investment Environment

- Austrian system encourages entrepreneurial activities with transparent and efficient rules, in line with all the majority of European countries

# AUSTRIA

(February 2012)

