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Austrian Energy Agency

Biomethane & 10% RES in transport RED target

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Overview

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- Studies
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- Markets
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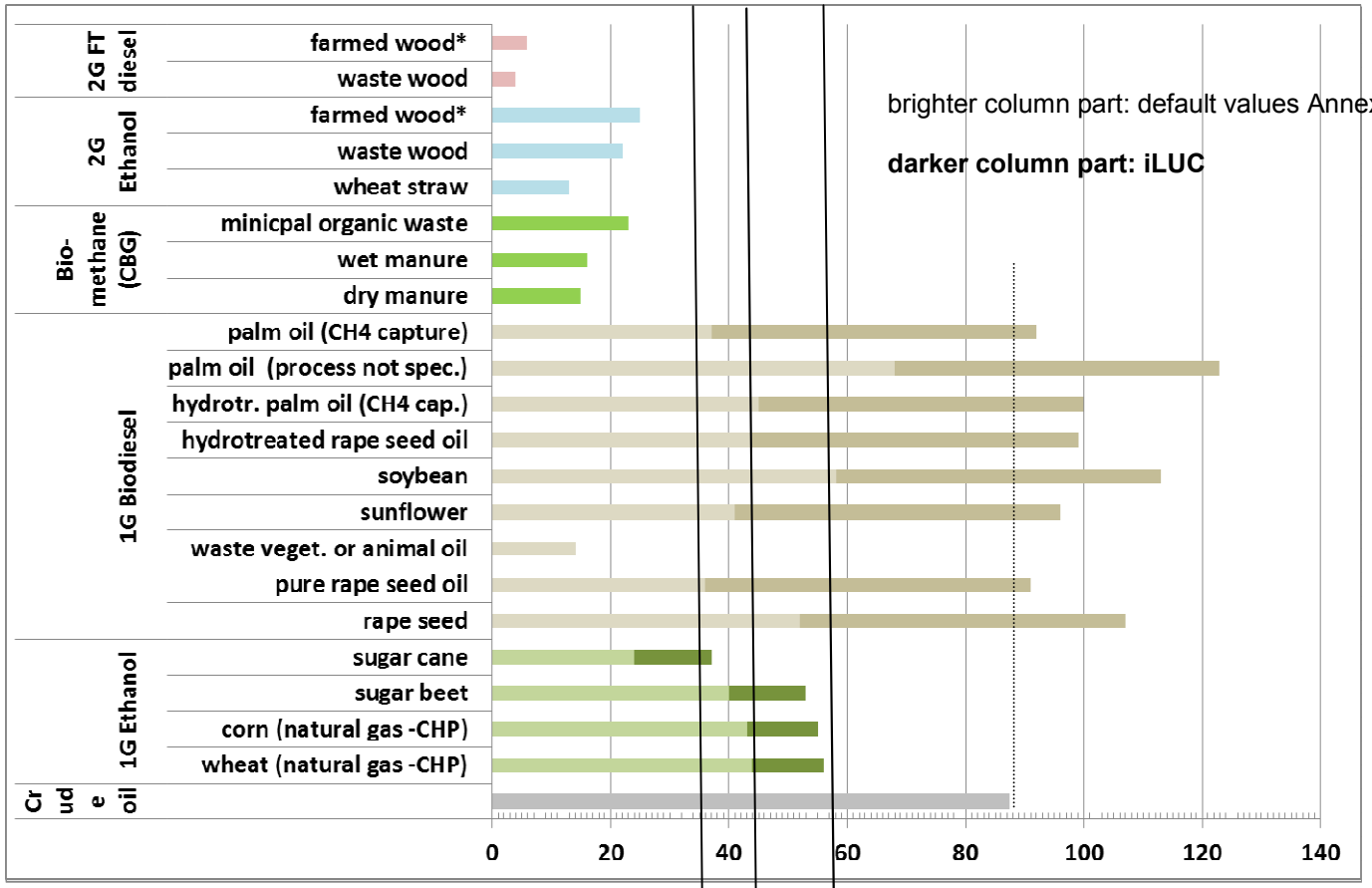
EU Framework conditions for RES-T
New EC proposal 2012/0288 (COD) of 17.10.2012

- RES Directive 2009/28/EC **transport target shall remain**
  - **Energy from RES must substitute 10% of energy** used as petrol, diesel and biofuels consumed in road and rail transport, and electricity **used in all forms of transport by 2020** according to the.
- The energy content of biofuels counts towards the 10% target
  - twice for used cooking oil, classified animal fats, non-food cellulosic material, and ligno-cellulosic material except saw and veneer logs,
  - four times for the biomass fraction of municipal and industrial waste, sewage sludge, animal manure, cobs, straw ...,
  - with a factor of 2.5 for electricity from renewable energy sources consumed by electric road vehicles
- The share of energy from biofuels produced from cereal and other starch rich crops, sugars and oil crops shall be no more than the final consumption of energy in transport by end of 2011 in 2020 or 5% of the energy used in transport in 2020, respectively.

Mandatory GHG emission reductions
New EC proposal 2012/0288 (COD) of 17.10.2012

- Member states **can subsidise and count biofuels** and bioliquids towards the 10% target **only, if** the **GHG emission reduction** achieved is
  - **at least 35% compared to fossil fuels** by plants existing on or before 1.7.2014; this requirement rises to **at least 50%** by 1.1.2018 for these facilities,
  - **at least 60%** for biofuels and bioliquids produced in new installations, commissioned after 1.7.2014
- According to the new proposal the estimated GHG-emission values for indirect land-use change (iLUC) must be published and have to be considered with the calculation of GHG reductions by 2021

Default GHG emission (RED Annex V) and suggested iLUC[1] GHG values



*iLUC for farmed wood could not be estimated

35% reduction (by plants existing on or before 1.7.2014)

50% reduction (for plants existing on 1.7.2014 by 1.1.2018)

60% reduction (by plants starting operation after 1.7.2014)

1 Proposal for a Directive amending Directive 2009/28/EC and Directive 98/70/EC. http://ec.europa.eu/clima/policies/transport/fuel/docs/com_2012_595_en.pdf

RES-T in EU-27
2010 and 2020 according to nREAPs

- RES-T in EU-27 Renewable Energy Action Plans (REAPs) (Source: ECN)

	2010	2020	2010-2020	
Bioethanol / Bio-ETBE	34	85	51	TWh
Biodiesel	128	251	123	TWh
Hydrogen from renewables	0	0	0	TWh
Renewable electricity	15	36	21	TWh
Other biofuels	2	9	7	TWh
Total	179	**381**	202	TWh

- According to Enerdata 169 TWh RES-T were consumed in 2010
- 381 TWh RES-T were expected to be needed in 2020 (+210 TWh)
- Stop of expansion of biodiesel and bioethanol usage (EC proposal)?
- How to fill the possible gap of ~180 TWh RES-T by 2020?

1 EU proposal COM(2012) 595 final
http://ec.europa.eu/clima/policies/transport/fuel/docs/com_2012_595_en.pdf

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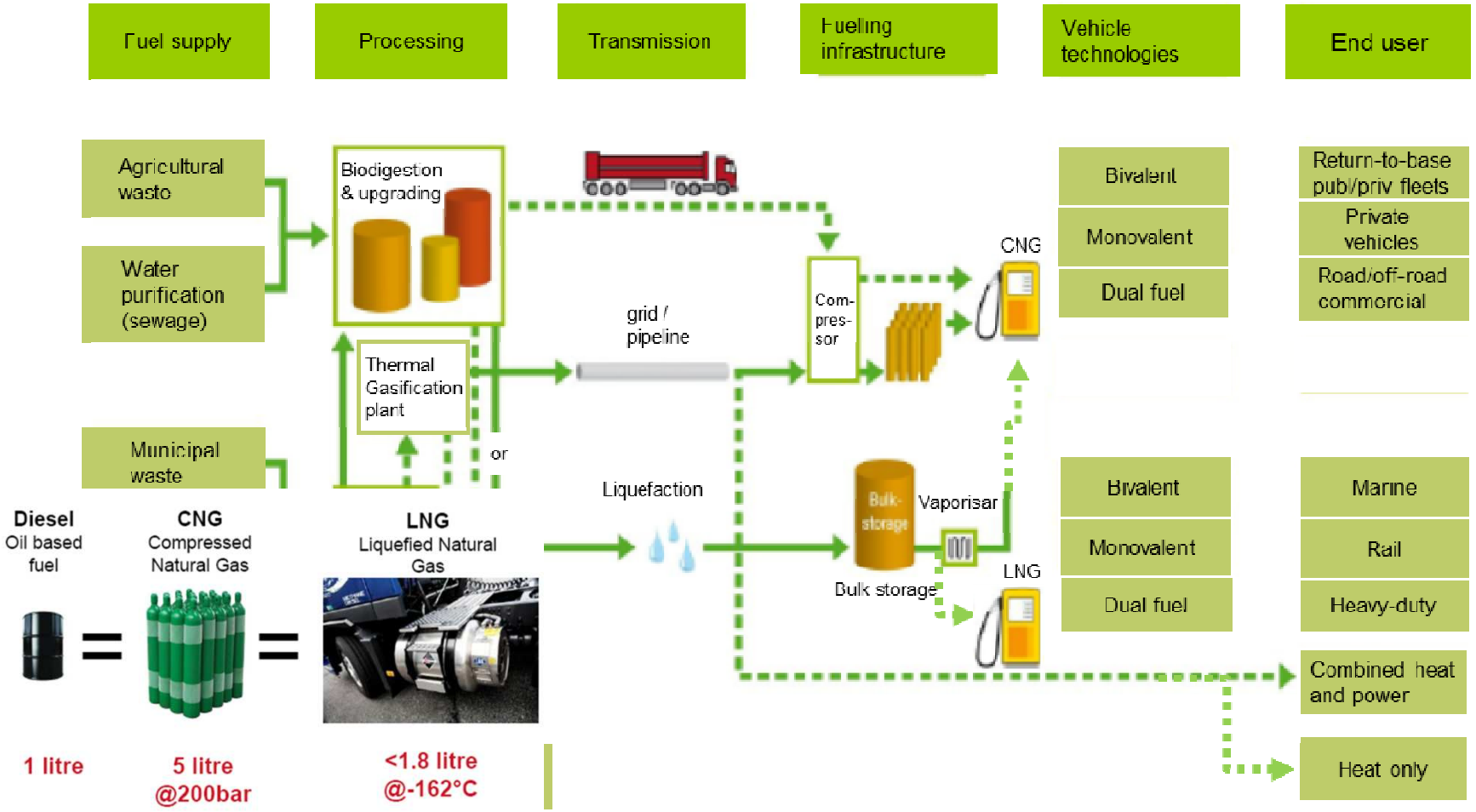
Technical biomethane potential by 2020 in EU-27 (without usage of food and fodder)

Origin		Potential	Potential 2020	Usage 2009	Techn. add. available until 2020
Biogas from	Source	Aebiom	Aebiom	EurObserver	Aebiom 2020 – EurObserver 2009
	Unit	TWh	TWh	TWh	TWh
Agriculture	**Straw**	96	5	50	3
	Manure	197	69		43
	Energy crops				
	Landscape mgm	12	5		3
Waste	**Municipal biowaste**	96	38		24
	Industrial biowaste	29	14		9
	Sewage Sludge	58	38	12	27
	Landfill gas	50	40	35	5
Total		**537**	**210**	**97**	**113**

- DBFZ study: technical biogas potential of 270 TWh for 2020 from animal manure & litter and herbaceous biomass residues along EU-27 gas networks
- >+100 TWh bioagas technically available until 2020, partly usable as CBG
- CBG from waste could be counted four times towards 10% RES-T target
  - Eurostat: CBG is counted fully, if it is used pure; for “grid extracted CBG” only the Ø ntl. grid biogas share is counted

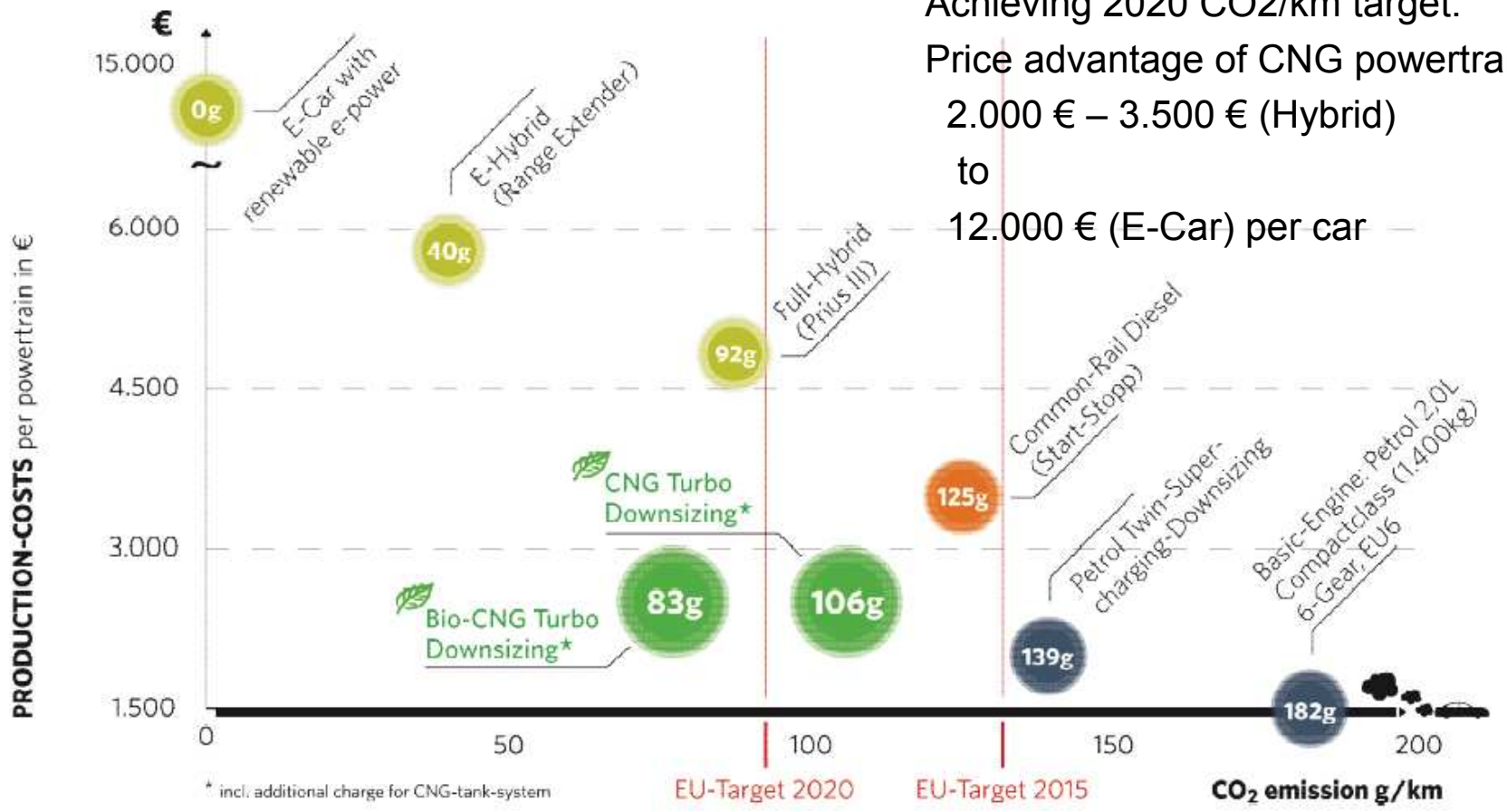
1) 90% recovery of a conservative estimate of 4 mill. ton CH4/yr emitted per year. Source: H. Scharff 2008: Untapped potential – Achieving adequate control of landfill gas in Europe

Possible CBG production and utilization pathways



Source: IEE-project Biogasmax

Obligatory car CO_2-reduction requirements
Production costs per powertrain

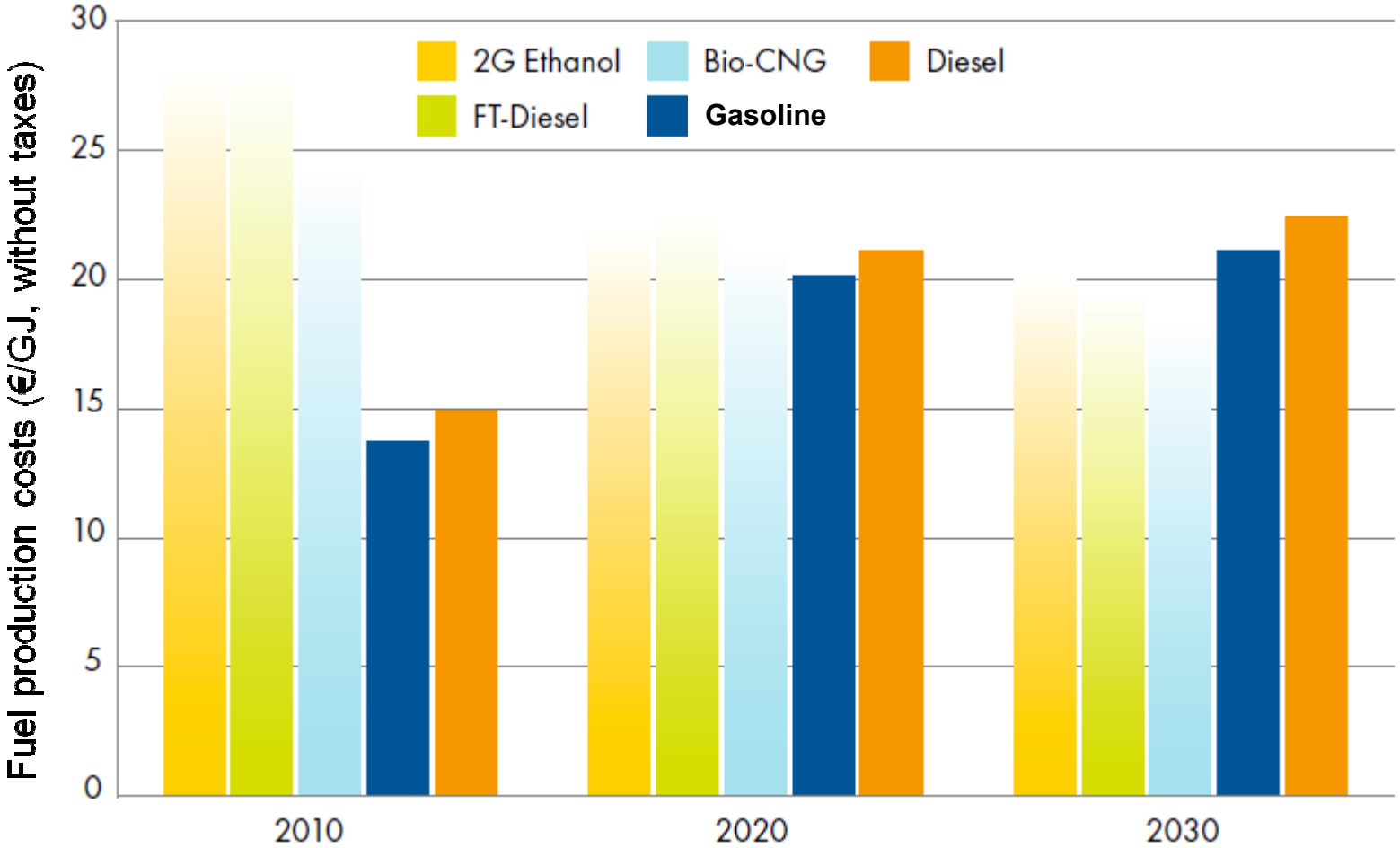


Achieving 2020 CO2/km target:
Price advantage of CNG powertrain
2.000 € – 3.500 € (Hybrid)
to
12.000 € (E-Car) per car

Source: CAR Study

 Source: CNG as automotive fuel for Europe, CAR-Center Automotive Research, 2011

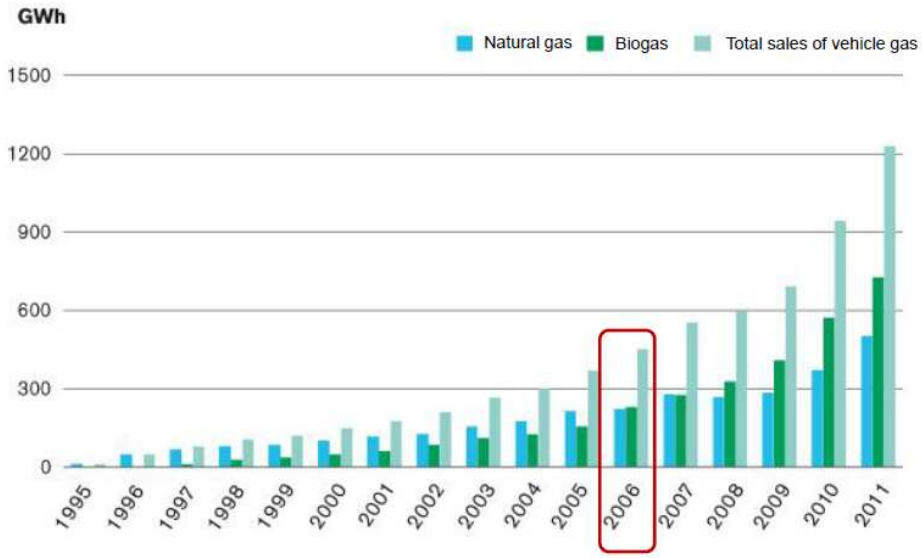
Possible cost development 2010-2030

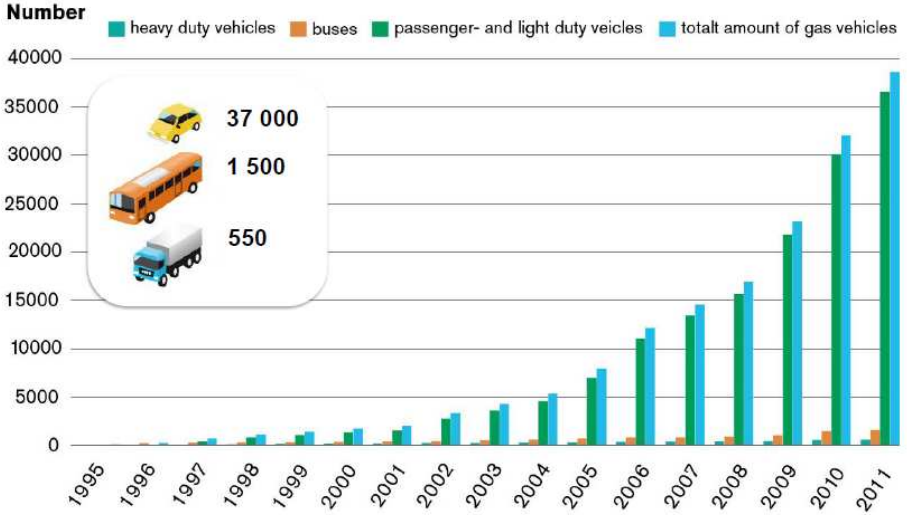


Source: IEA Energy Technology Perspectives 2012; Paris, 2012

Development of the CBG market in Sweden

- Rapid growth in the last 10 years
  - +1 TWh compressed methane gas (CMG)
  - Thereof +600 GWh biomethane (CBG), 720 GWh 2011

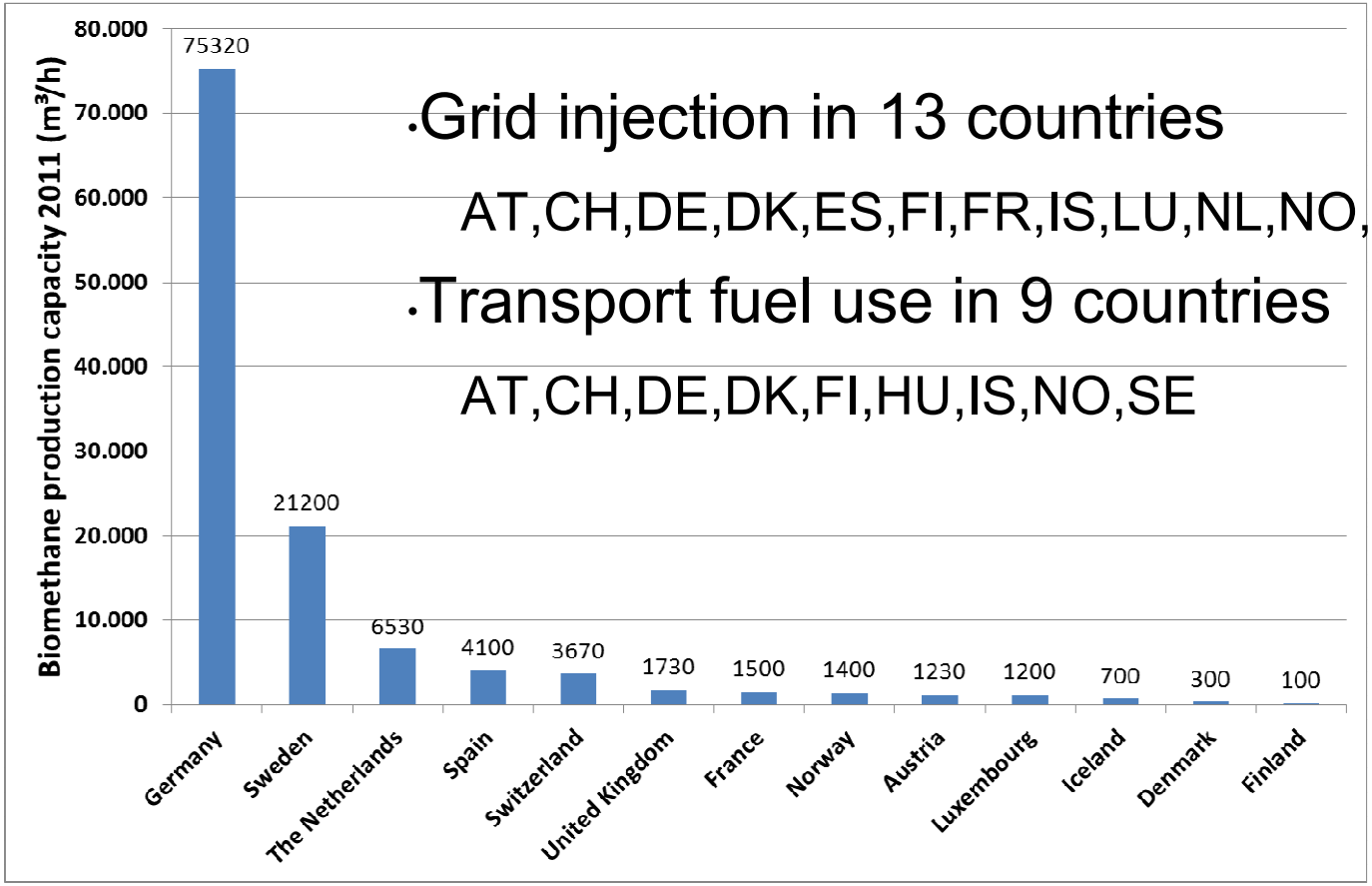




Source: SGC 2012

Installed biomethane production capacity 2010, Europe

- 2010 about 7.5 TWh/a capacity installed (119,000 m³/h)



Source: Fraunhofer IWES, 12/2010

Status of CNG infrastructure in EU-27
by the end of 2011

- CNG fuel stations
  - 2,800; there are 131,000 petrol stations; i.e. 2.1%
- Number of CNG vehicles
  - 995,000 cars (LD), of 230 mio.; i.e. 0.4%
  - 12,500 buses (MD+HD), ~70,000 in cities; i.e. 18%
  - 5,500 trucks (MD+HD); ~20,000 refuse collection trucks in cities
- Theoretical existing CNG consumption
  - 27 TWh (2,8 bcm)
  - If cars need 22 MWh/a, buses & trucks 360 MWh/a

Source: NGVA, status by end of 2011
LD (Light Duty), MD (Medium Duty), HD (Heavy Duty)

Status of CNG infrastructure in AT
By March 2013

- 175 public CNG stations (of 2,500 petrol stations; 7.0%)
- ~40 private, company owned CNG stations

- 7,000 CNG vehicles (of 5,4 Mio. vehicles in AT; 0.1%)

Marketing of biomethane as a fuel

- 2006 Bio-CNG (20% biomethane, 80% natural gas)
- Biomethane Certificates at CNG fuel station (Salzburg)
- Dedicated biomethane fuel stations (pure fuel)
  - 1. Organic waste treatment company (Rechnitz)

2. Linz AG (88 public buses; 50 cars 66.7% biomethane, 24.5 GWh)

3. Agricultural biogas plants
(Eugendorf, Margargethen/Moos, Güssing)

Crucial factors for building up a new biomethane fuel market

- Investment security
- Local demand
  - Basic CNG fuelling infrastructure (preferably in cities)
  - Captive NG/biomethane fleets at return-to-base truck and bus operations (by private public partnerships)
- The local government is a crucial market factor itself
  - should act accordingly, key target groups should be involved
- Legal and market barriers should be removed
- Targeted policy measures should be developed
  - fixed long-term financial and non-financial incentives (e.g. subsidies, tax cuts and exemptions, parking benefits, vehicle access regulations..)
  - green public procurement regarding fuels and vehicles
  - blend to CNG (green branding, cooperative marketing activities)

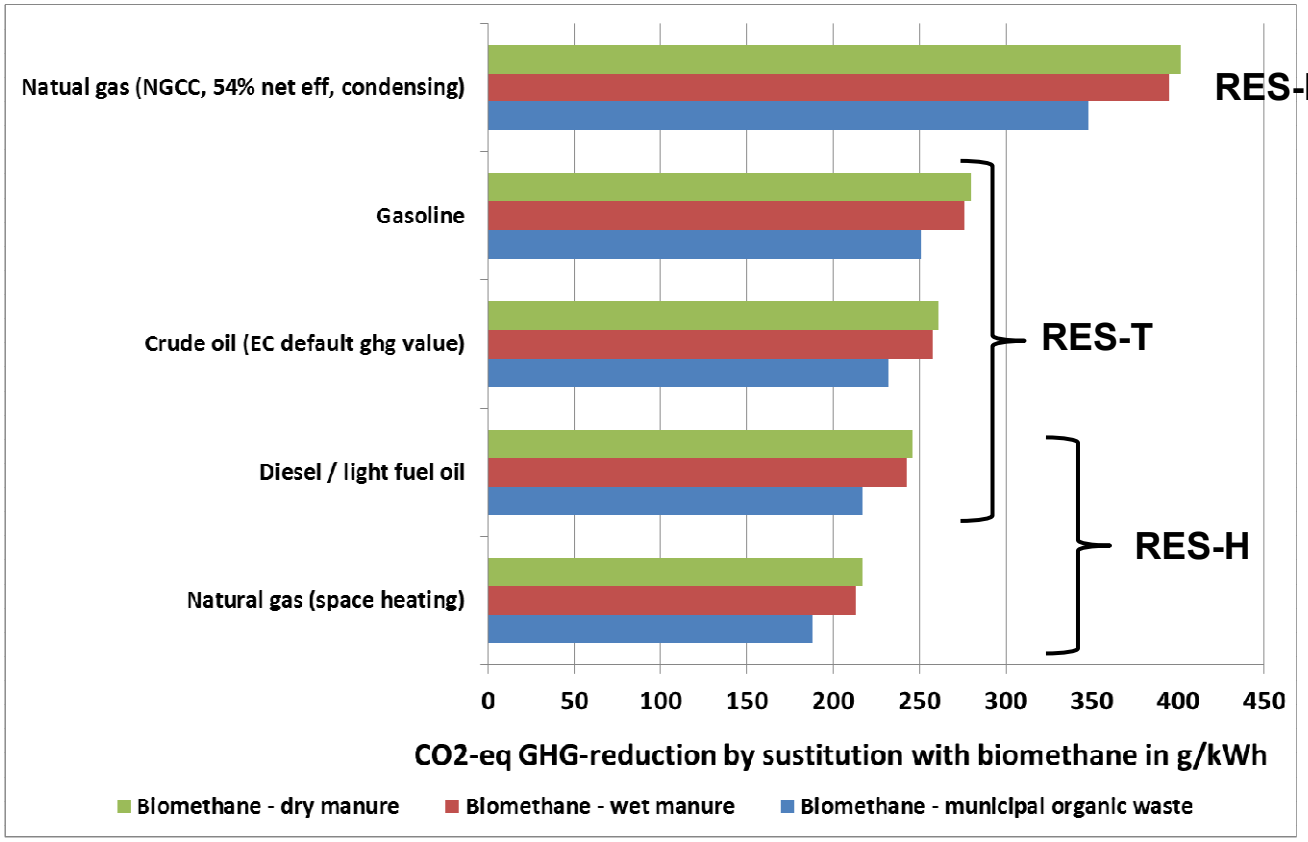
Sources: IEE-projects Biogasmax, Biofuel-Cities

Conclusions

- (Bio-)Methane is a “ready-to-go” transport fuel
- Biomethane has a lot of benefits, especially if it is produced from waste and used in cities
- (Bio-)Methane has a high potential in the transport sector in the medium and long term
- „Pure CBG“ from organic waste might become countable four times towards the RES-T 2020 target of the RED
  - Disadvantageous approach of Eurostat for “grid CBG”
- Infrastructure would need to be built up to facilitate a broader market take-up of (bio-)methane gas vehicles
- Public authorities‘ decisions on infrastructure, taxation and possible incentives will have a powerful influence

Comparison of biomethane utilisation in terms for GHG-reductions

- Highest CO2-eq GHG-reduction if electricity from natural gas is substituted



Source: AEA, emission factors from Environment Agency Austria and RES-D Annex V
Differences in diesel/gasoline/CNG powertrain efficiencies are not considered

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Thank you for your attention

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