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# IEA Bioenergy Task 33 – Gasification: Methan aus Holz;

## Österreichische und internationale Aktivitäten

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# Content

Basics in SNG production

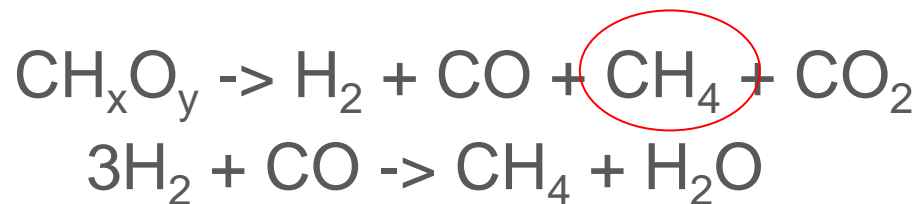
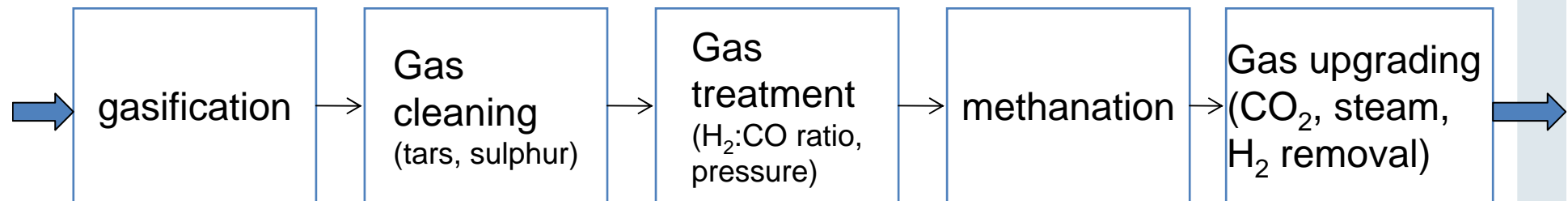
International activities in SNG

- Great Plains US
- ECN, Netherlands
- GoBiGas, Sweden

Austrian activities

- TU Graz, Heat Pipe Reformer
- TU Wien, BioSNG in Güssing

# Basics of SNG from solid fuels

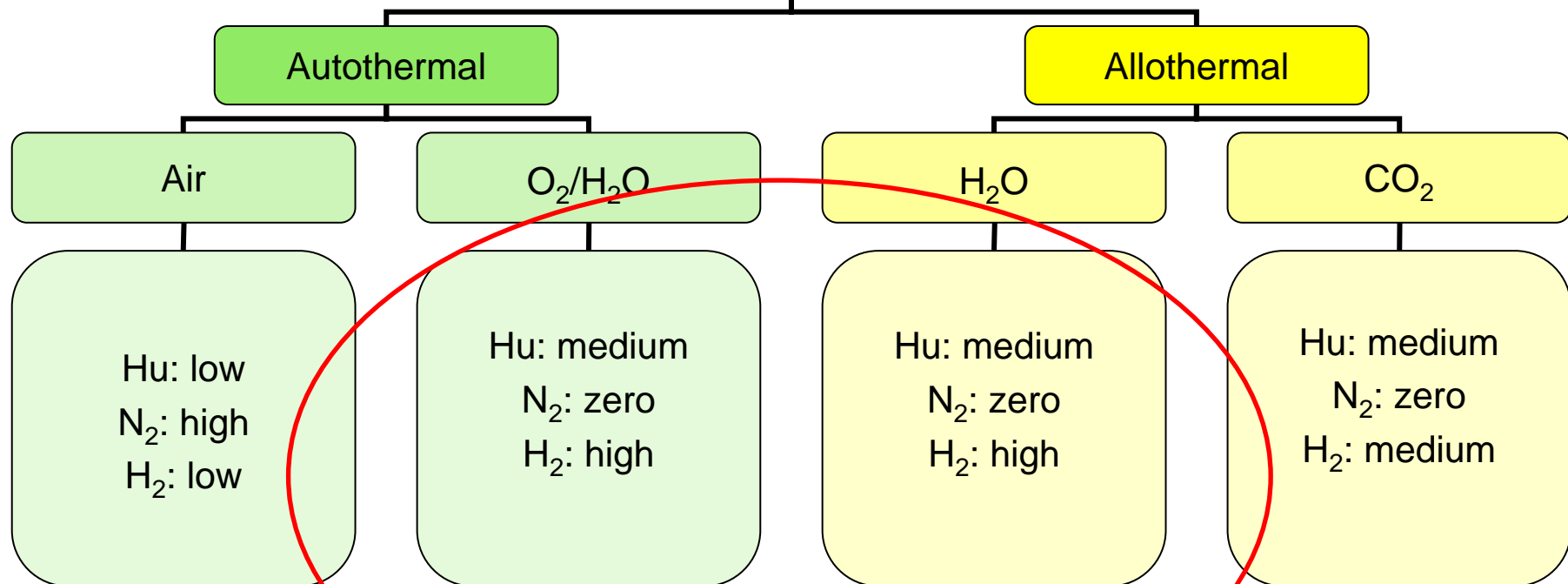


300-400°C, Nickel catalyst  
fluidised bed, fixed bed or slurry  
reactor

- High Efficiency
- Usability of product
- Robust synthesis
- Know how available

# Gasifiers for BioSNG

## Biomass Gasification



# BioSNG activities

Gothenburg Biomass Gasification Plant	Sweden	Feasibility study
Dakota Gas	USA	Commercial plant
BioSNG	Güssing Austria	Demonstration
Milena Gasification	Netherlands	R&D
Heat Pipe Reformer Agnion	Germany, Austria	R&D
ArtFuel Cutec	Germany	R&D

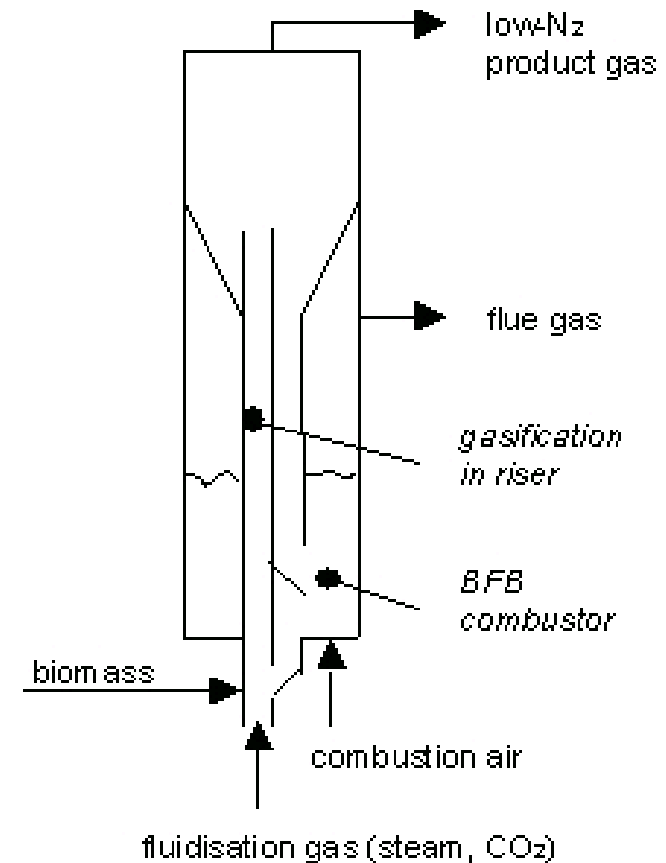
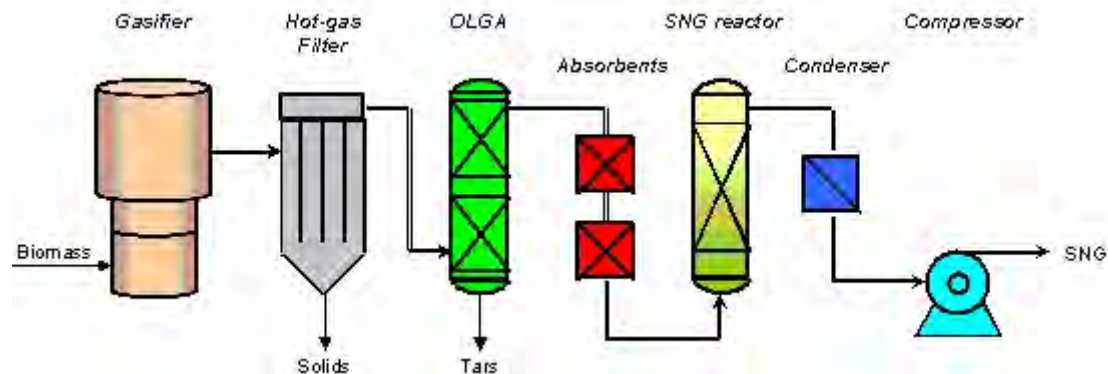
# Great Plains Synfuels Plant

- began operating in 1984
- 14 parallel Lurgi gasifiers with a capacity of 150 MW each
- daily production of natural gas is about 153 million cubic feet (~4.3 mill m<sup>3</sup>/day)



# ECN, The Netherlands

- Milena Gasifiers +
- OLGA gas cleaning
- 25kW and 800kW gasifiers for R&D



# GoBiGas

- Gasification of biomass and production of biomethane
- Commercial scale – approximately 100 MW gas - with the potential of producing 800 biomethane GWh per year
- High-calorific gas (SNG) by methanation for distribution in the existing gas grid
- Also possible to use the gas as fuel in Rya CHP-plant
- Situated in the harbour of Gothenburg with the potential to transport fuel by boat or train

## Phase 1

- 20 MW generating 160 GWh/yr in operation 2012
- Allothermal gasification
- 2000 Nm<sup>3</sup>/hr or 16 MNm<sup>3</sup>/yr (equal to 15 000 vehicles/yr)

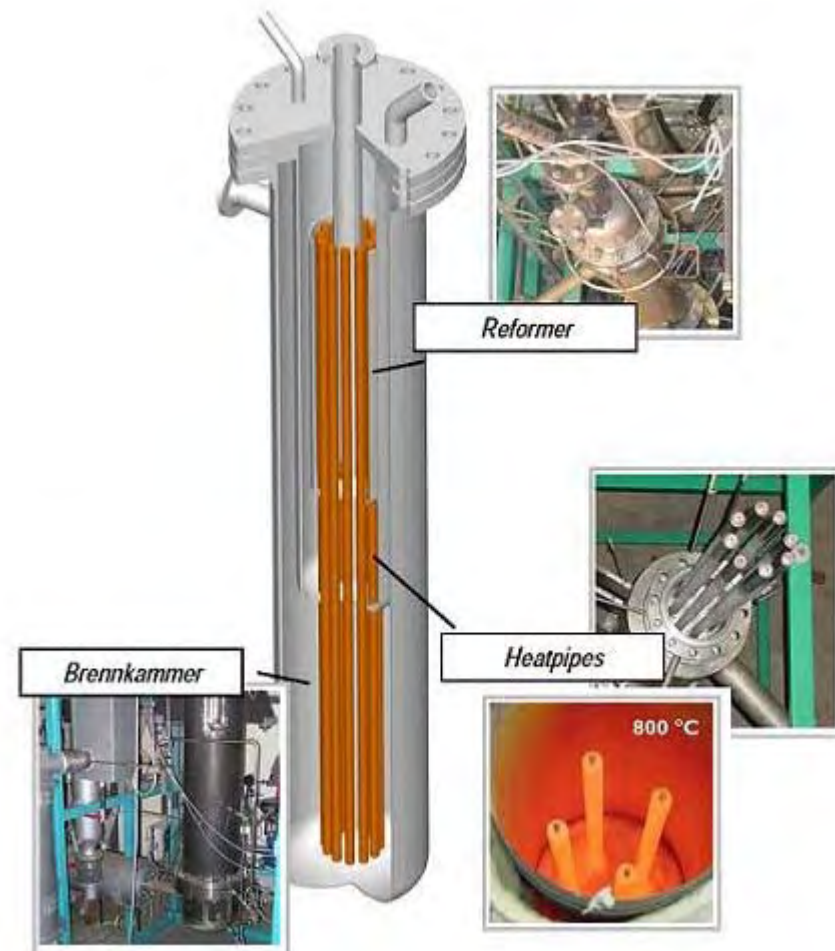
## Phase 2

- 80 MW generating 640 GWh/yr in operation 2015/2016
- Technology not yet chosen
- 8000 Nm<sup>3</sup>/hr or 64 MNm<sup>3</sup>/yr (equal to 75 000 vehicles/yr)



# Heat Pipe Reformer

- Developed at TU Munich
- Pressurised gasifier at 5 bar
- Demonstration plant in Germany in commissioning



# BioSNG Güssing

A 1 MW SNG Process Development Unit (PDU) is erected within the EU project BioSNG and allows the demonstration of the complete process chain from wood to SNG in half-commercial scale.

A consortium consisting of four partners is responsible for the PDU:

- CTU – Conzepte Technik Umwelt AG
- Repotec GmbH
- Paul Scherrer Institute
- Technical University Vienna

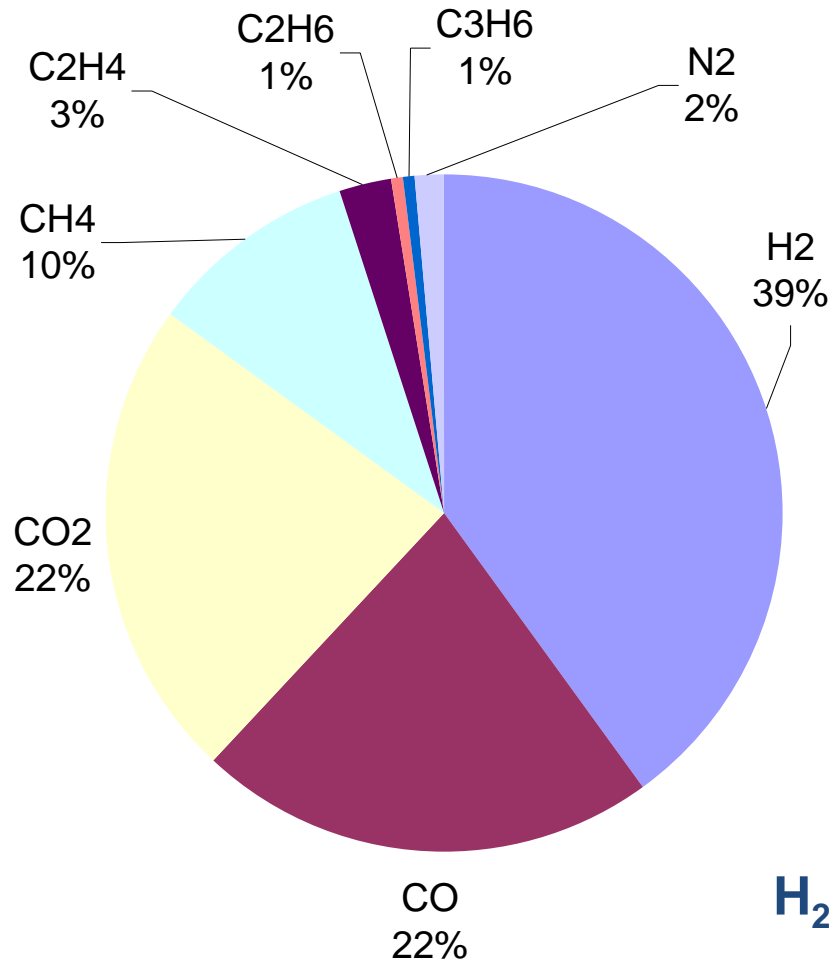
The project BioSNG is co-funded by

- the European Commission
- 6th Framework Programme  
PrNo TREN/05/FP6EN/S07.56632/019895
- Swiss electric research
- Bundesförderung Österreich
- WIBAG

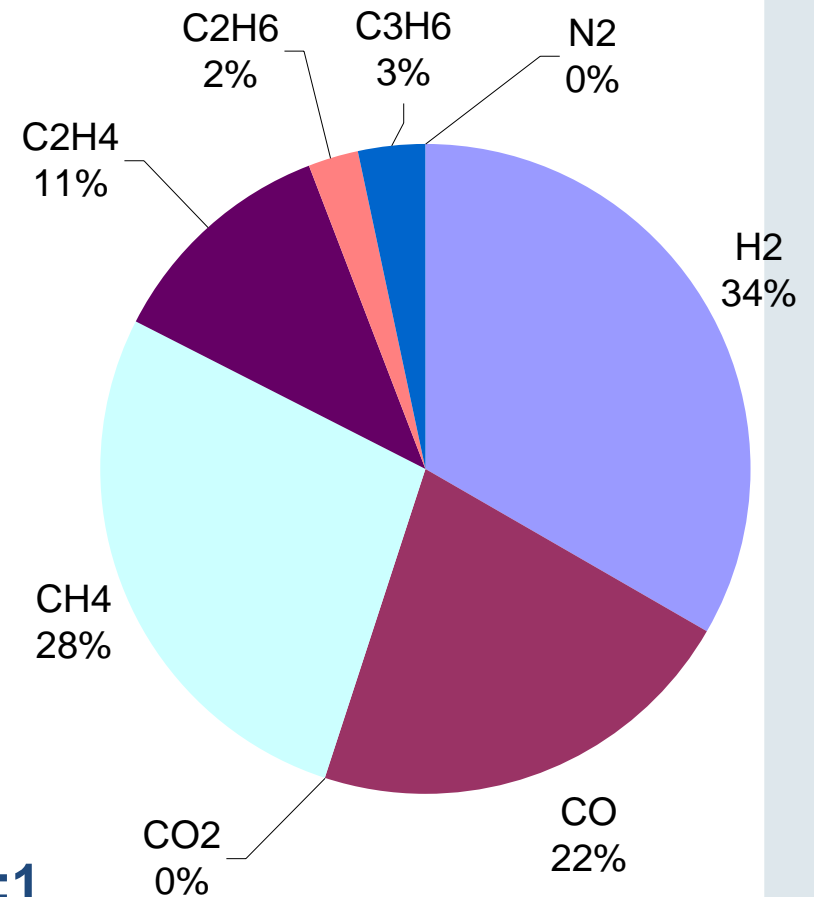


# Gas composition at CHP Güssing

On volume basis

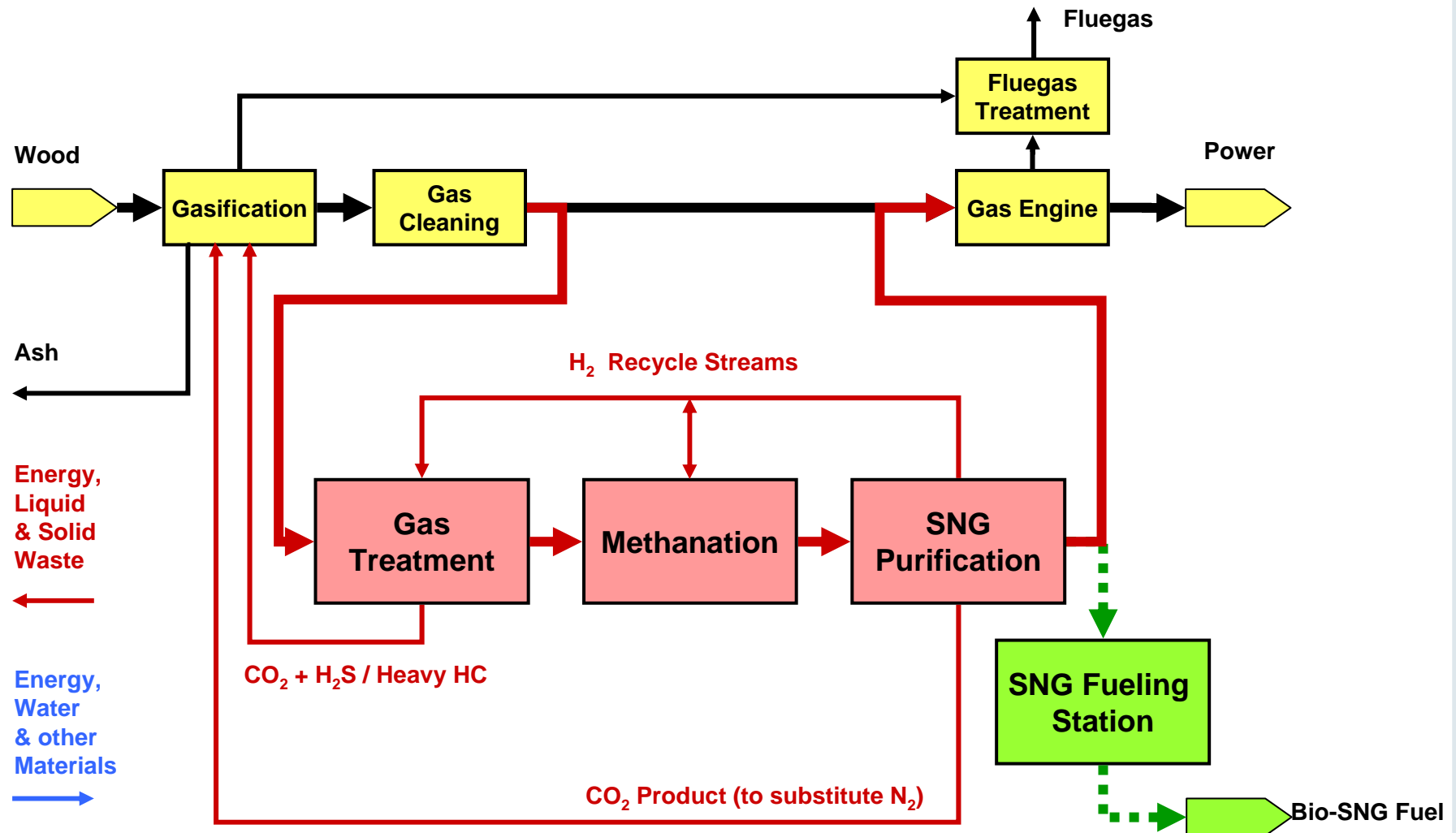


On energy basis

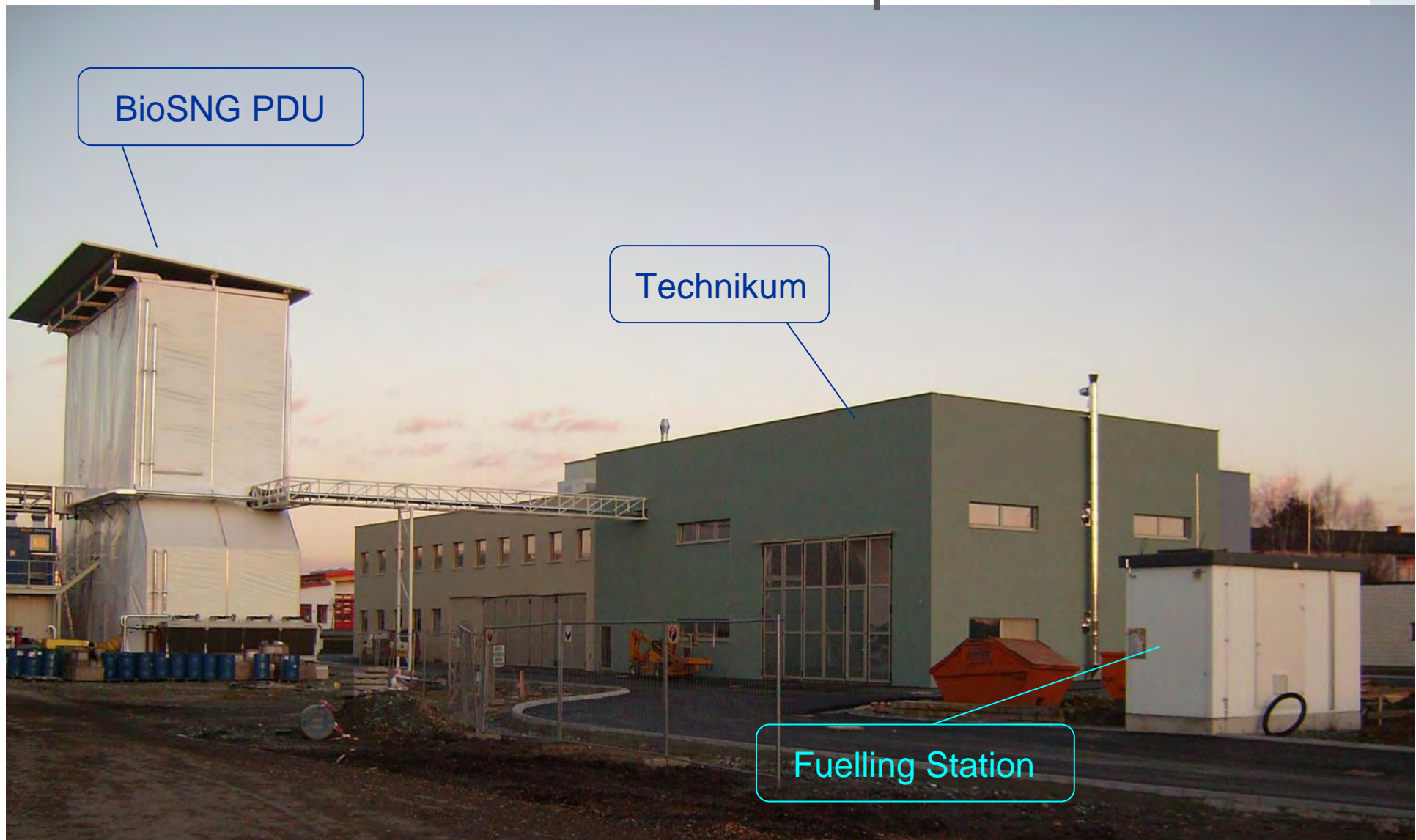


**H<sub>2</sub>:CO = 1.8:1**

# Integration into CHP Güssing



# BioSNG demonstration plant



# Results

- December 2008: First conversion of product gas into rawSNG
- June 2009: BioSNG at H-Gas quality produced
- June 24<sup>th</sup> : inauguration – CNG cars were fuelled using BioSNG from wood
- June 2009 CNG-car was successfully used for 1000km with BioSNG



# Quality BioSNG

	unit	Germany DVGW regulation G260	Austria ÖVGW regulation G31	BioSNG
Wobbe Index	[kWh/m <sup>3</sup> ]	12,8-15,7	13,3-15,7	14,15
Relative density	[-]	0,55-0,75	0,55-0,65	0,56
Higher heating value	[kWh/m <sup>3</sup> ]	8,4-13,1	10,7-12,8	10,7

# Summary

- R&D on BioSNG is going on worldwide, but especially in Europe
- BioSNG has a very high efficiency (60-70% from biomass to SNG)
- One possibility for the transport sector (CNG cars)
- Method to use biomass also in large cities



Figure from Agnion