



The GoBiGas Project - Efficient transfer of biomass to biofuels



*IEA Bioenergy EXCO66 meeting in York
Workshop of 12 October 2010
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Our vision....

Göteborg Energi shall actively contribute to the development of a sustainable society in Göteborg



Our vision:

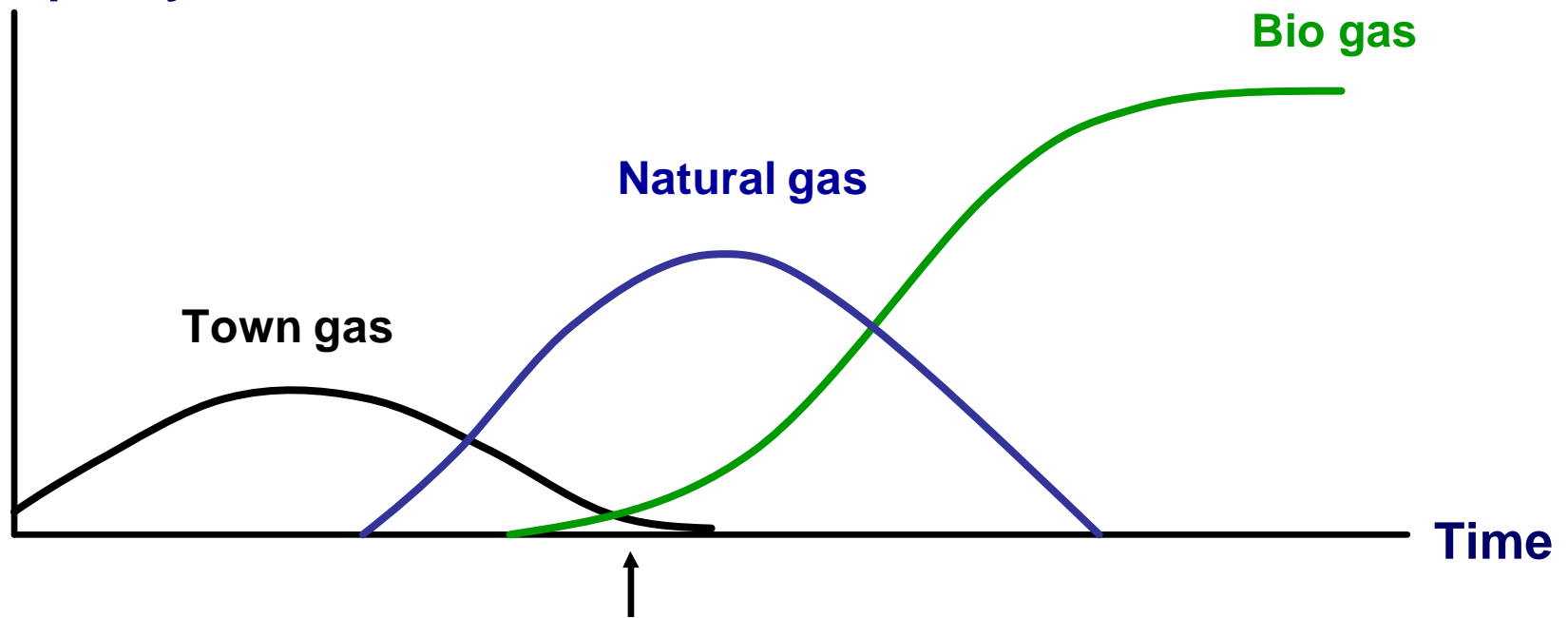
Only renewable gas in the future

Short term target 2020 for Gothenburg > 1 TWh of biomethane

Short term target 2020 for Sweden > 15 TWh of biomethane

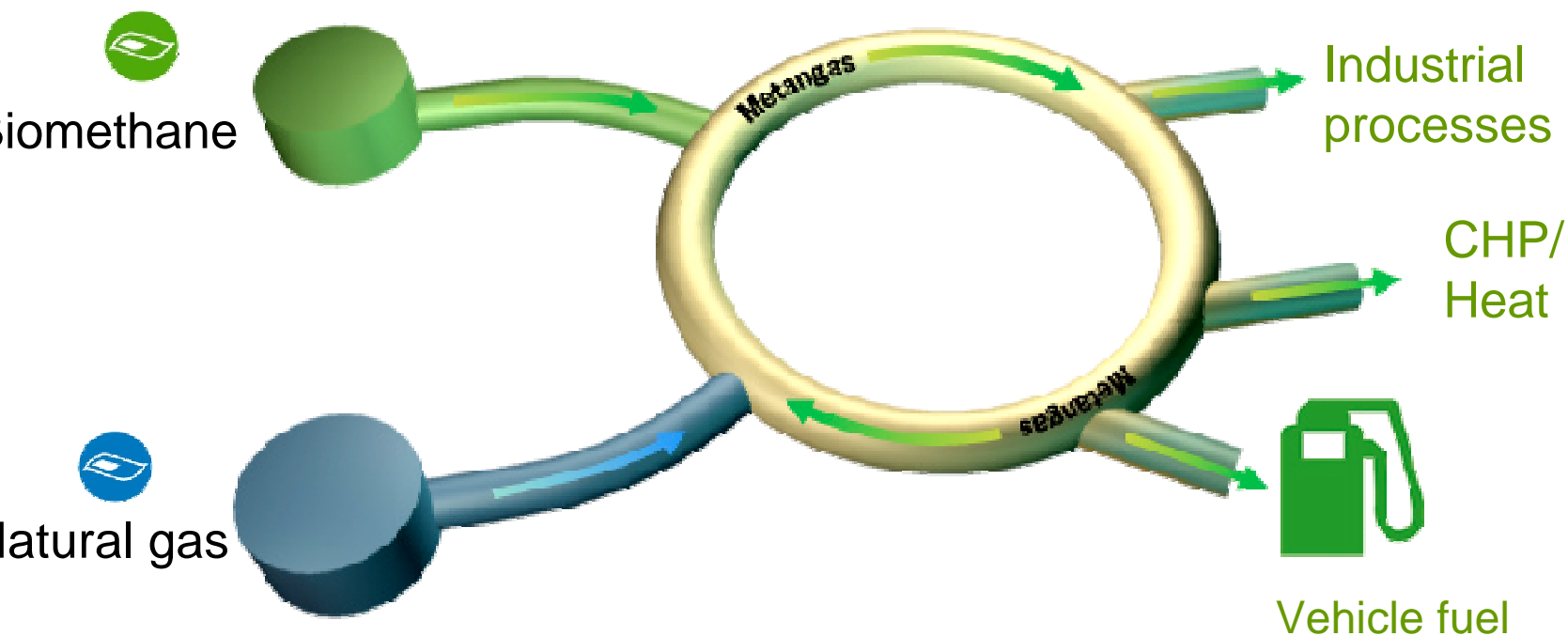
Long term target – only renewable energy sources

Capacity



“Green gas concept”

- A huge market potential is opened for biogas
- The reliability of the biogas supply improves



- **Commercial scale**

- 100 MW biomethane (biomethane)
- Operating period 8000 hr/yr
- ⇔ 80 MNm³/yr or 800 GWh/yr

- **Gasification** of forest residues

- Production of **biomethane** for distribution in the existing gas grid.

- Plant situated **in the harbor of Gothenburg**, fuel transport by ship or by train

- **Joint project** Göteborg Energi and E.ON



GoBiGas – step by step

- **Performance goals:**

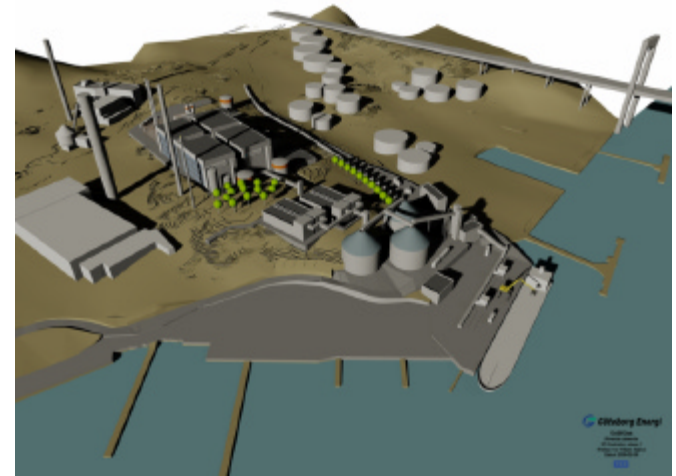
- Biomass to biomethane 65 - 70%
- Energy efficiency - >90%

- **Phase 1:**

- 20 MW generating 160 GWh/year in operation 2012
- Allothermal (in-direct) gasification
- 2000 Nm³/hr or 16 MNm³/yr

- **Phase 2:**

- 80 MW generating 640 GWh/year in operation after evaluation of Phase 1
- Technology not yet chosen
- 8000 Nm³/hr or 64 MNm³/yr

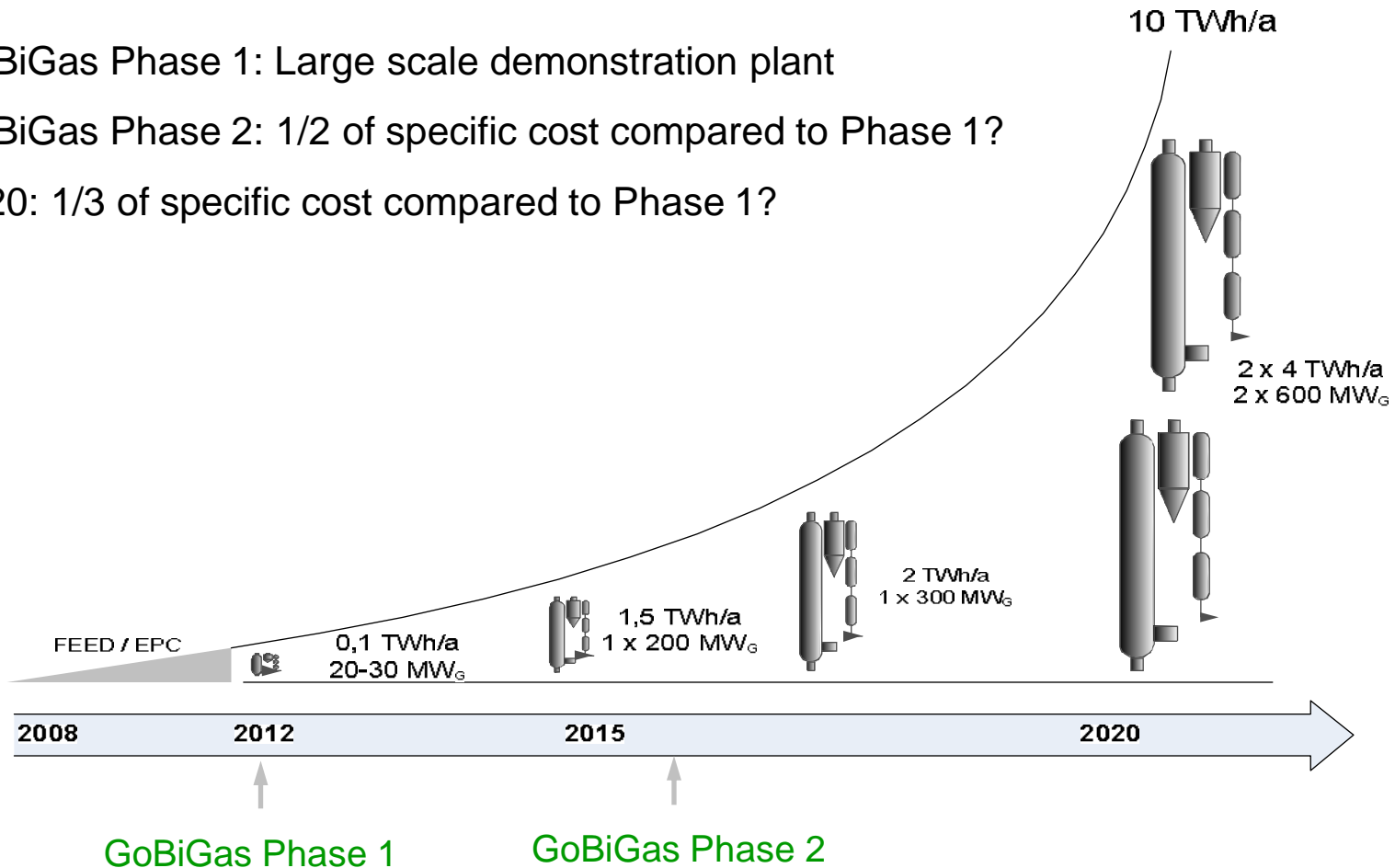


Commercial development of gasification technology in Sweden

GoBiGas Phase 1: Large scale demonstration plant

GoBiGas Phase 2: 1/2 of specific cost compared to Phase 1?

2020: 1/3 of specific cost compared to Phase 1?



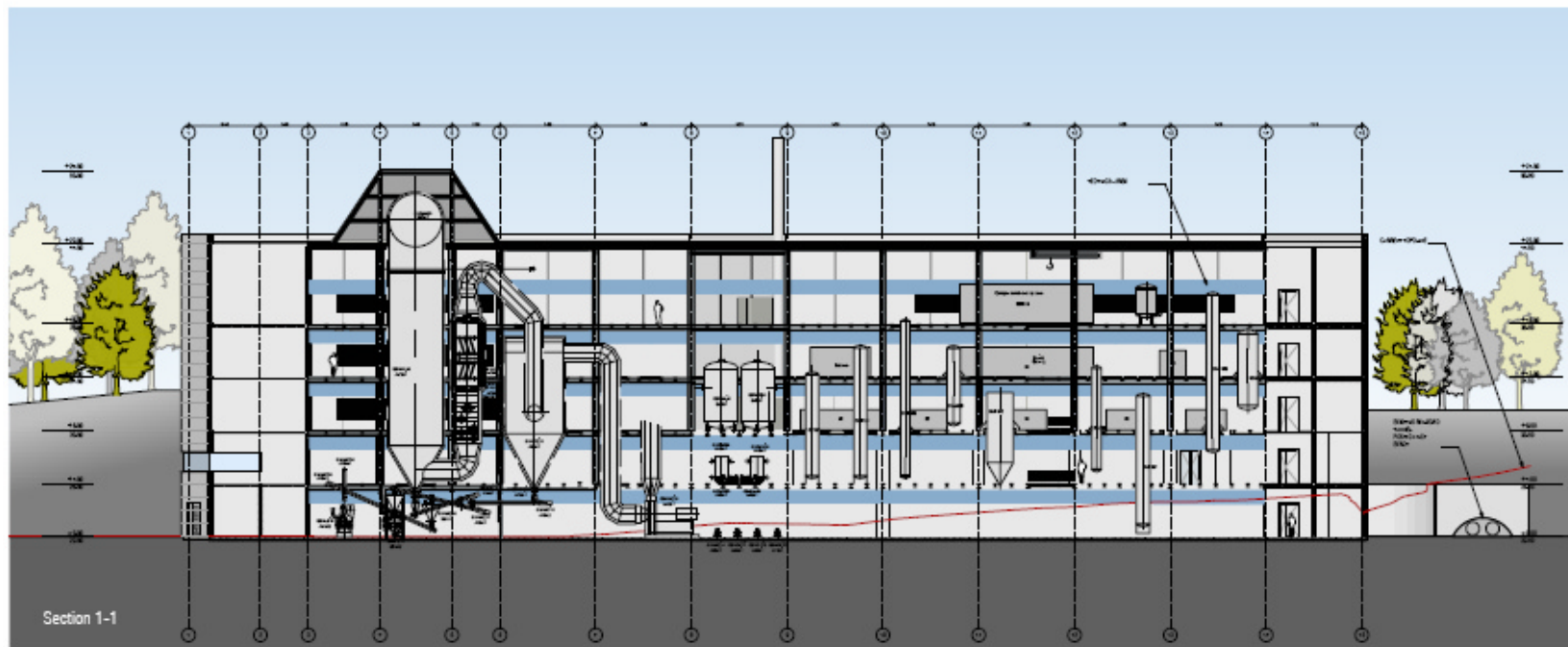
GoBiGas – Phase 1

Consumption:

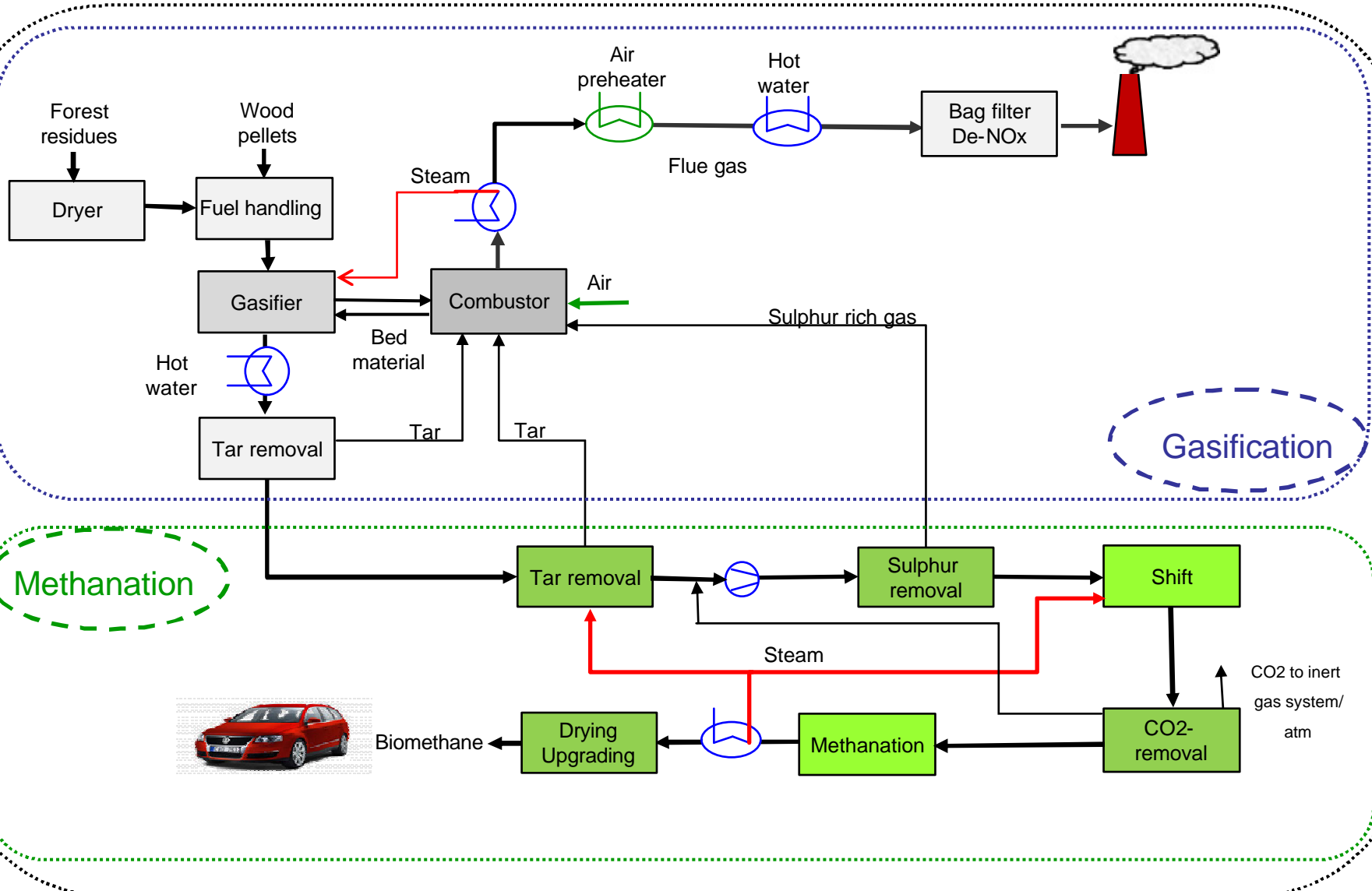
Fuel (wood pellets)	32 MW
Electricity	3 MW
RME (bio-oil)	0,5 MW

Production:

Biomethane	20 MW
District heating	5 MW
Heat to heat pumps	6 MW



Technical principles

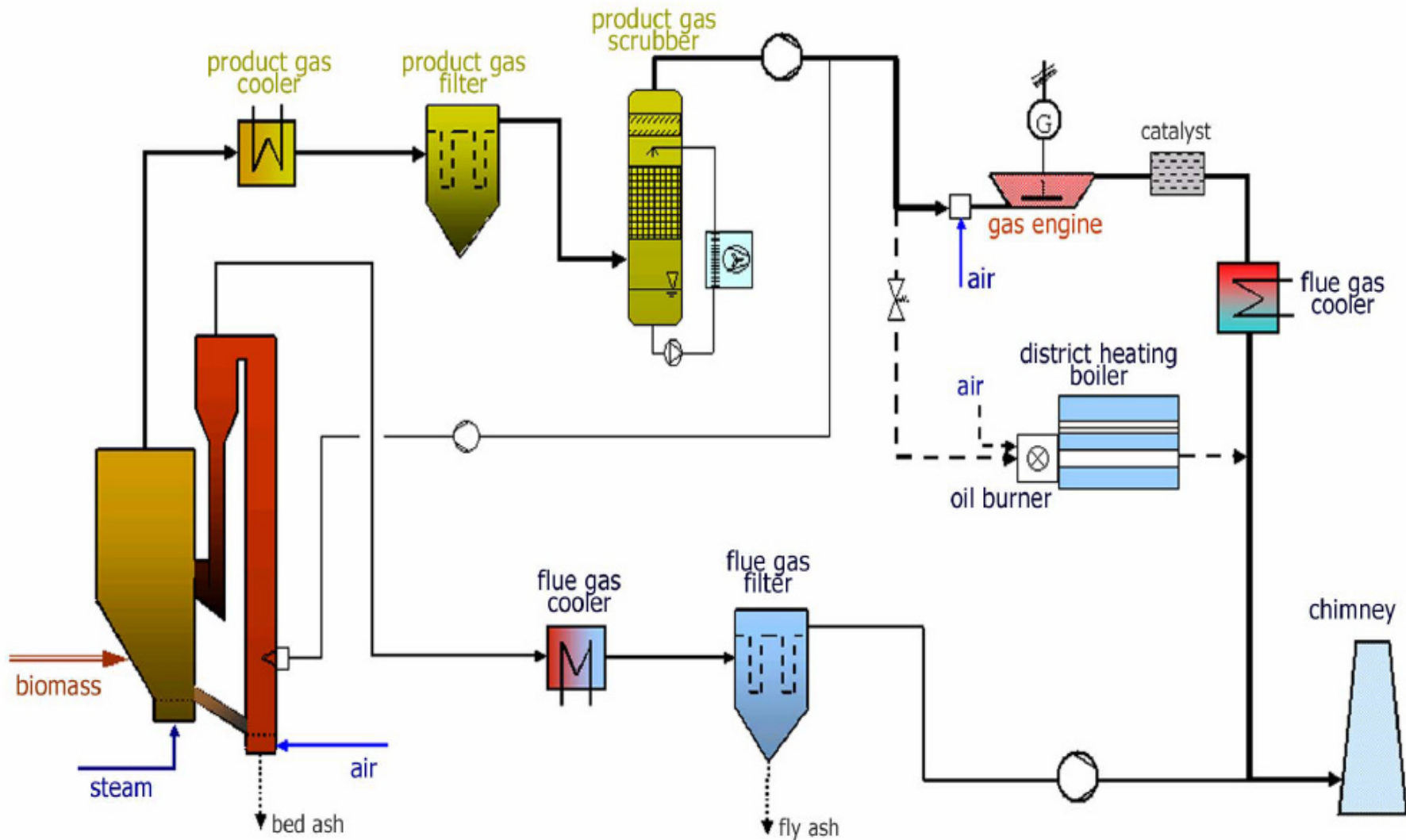


Reference plant: Gasification in Güssing, Austria

- Gasification in fluidized bed with separate combustion zone (in-direct, allothermal gasification)
 - 8 MW biofuel
 - Gas engine 2 MWe and 4,5 MWth to local district heating system
 - Operating time incl 2009 > 42 000 hours



Biomass-CHP-Plant-Güssing



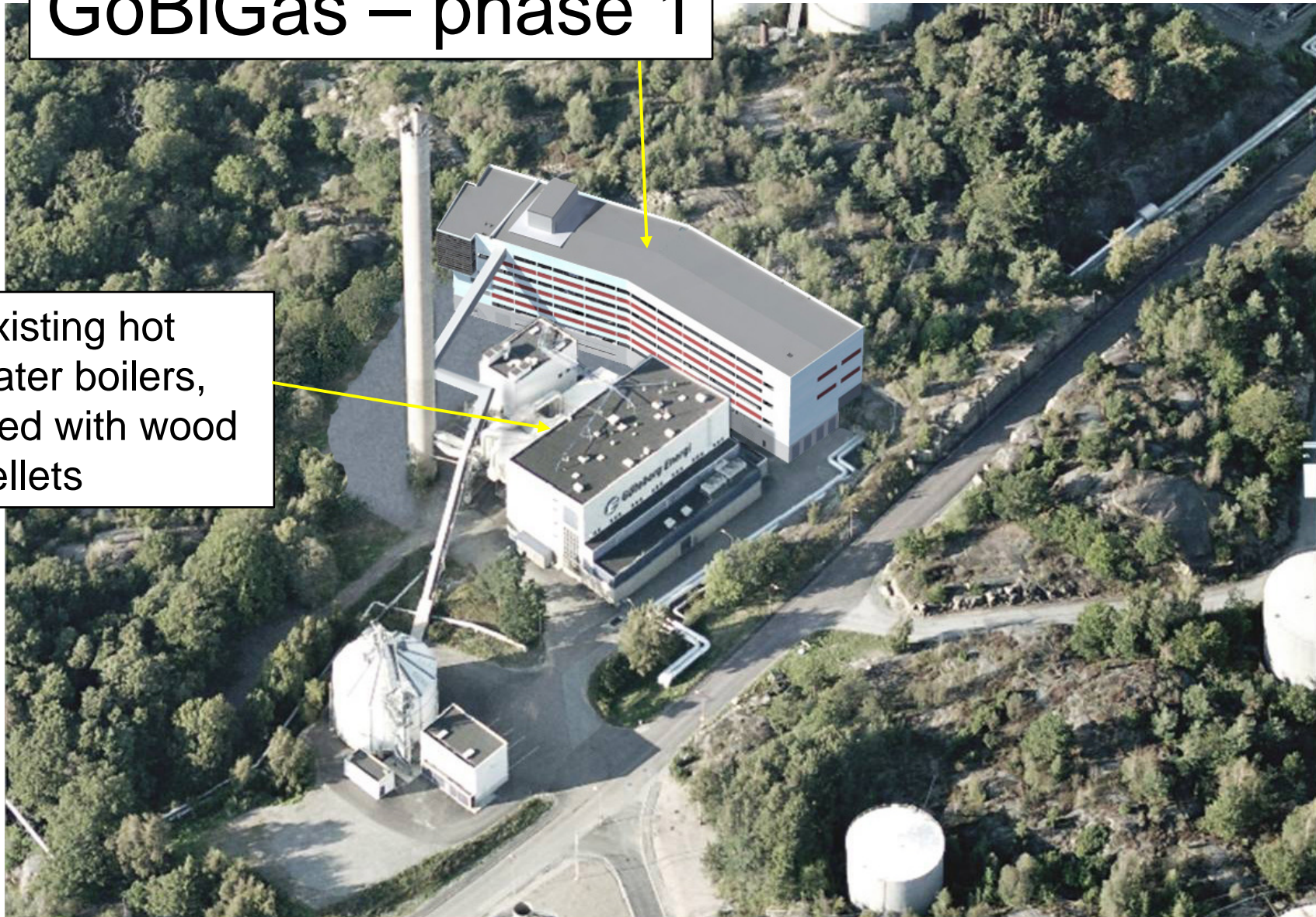
GoBiGas

Phase 1

Phase 2

GoBiGas – phase 1

Existing hot water boilers, fired with wood pellets

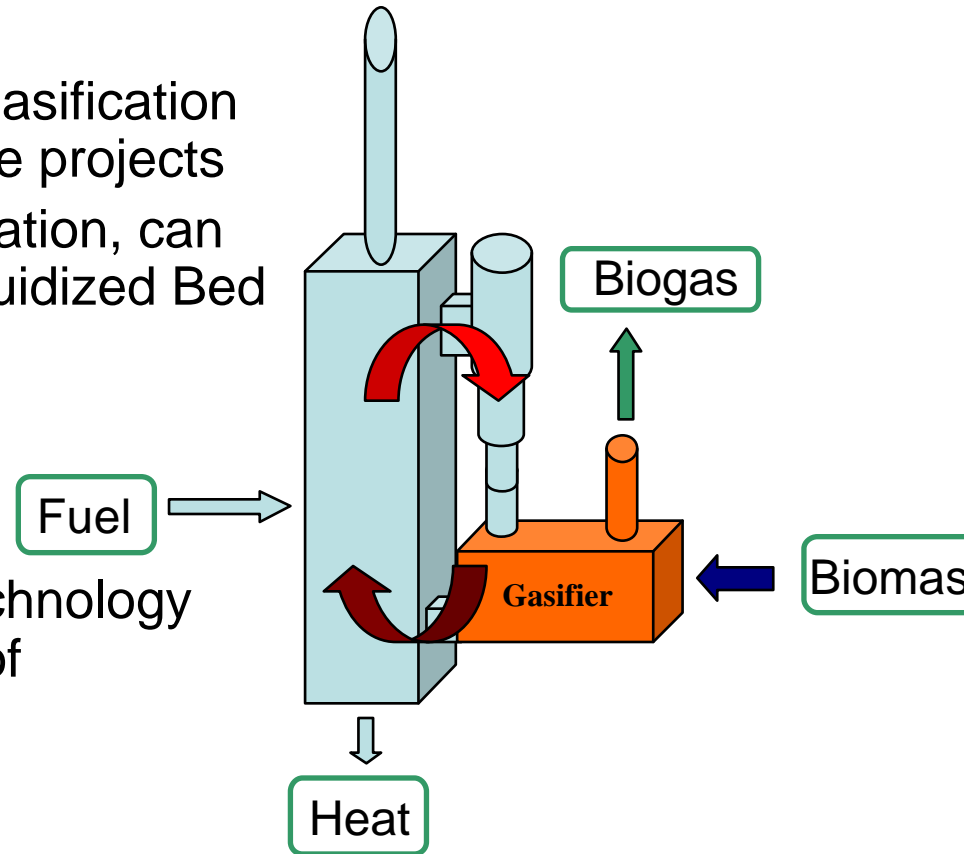


Project status – October 2010

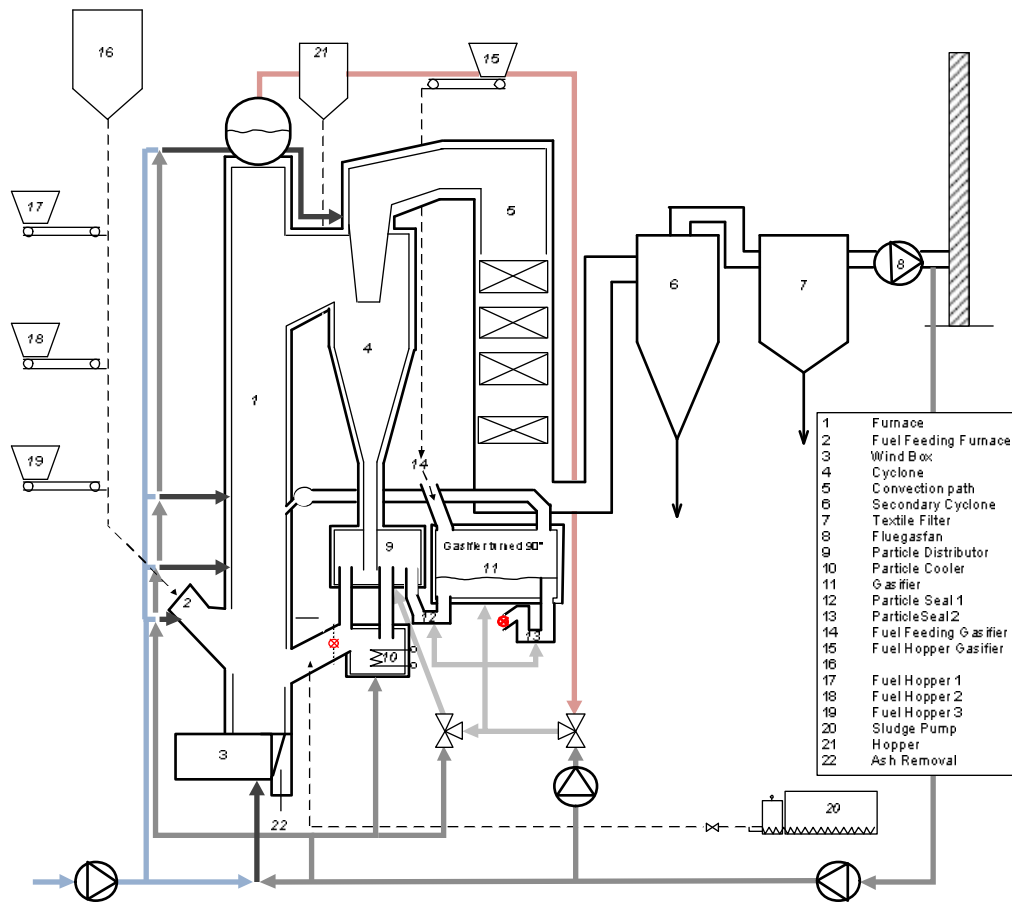
- **State funding**
 - **222 MSEK** granted from the Swedish Energy Agency under provision of approval by the EC, discussion undergoing.
 - **Gasification**
 - Cooperation between Metso Power and Repotec
 - **Methanation**
 - Cooperation with Haldor Topsöe
 - **Permits**
 - Environmental permit granted for Phase 1, applications building permit for Phase 1 in process
 - Preparatory work for environmental permit and building permit for Phase 2
- ⇒ **Investment decision** late 2010
- ⇒ **Plant in operation** late 2012

Pilot: Gasification of biomass at Chalmers University of Technology

- Built to further develop indirect gasification and grow local expertise for future projects
- Large potential for commercialization, can be added onto any Circulating Fluidized Bed (CFB) furnace
- Currently producing 2 MW of "green gas" now being utilized in existing boiler
- Development of methanation technology would allow for local production of biomethane for e.g. vehicle fuel



Chalmers pilot gasifier in connection with existing boiler





Thank you for listening!
