

Gasification of forest residues – IRL in a large demonstration scale



Malin Hedenskog
Project Manager Gasification
Göteborg Energi

Outline

- What is the GoBiGas project ?
- Technical solution
- Project status

Biogas/ bio-methane/ Bio-SNG from many renewable sources

Cities



Sludge
Household waste
Industrial organic
Waste
Landfills

Agriculture



Manure
Residues
Energy crops

Forestry



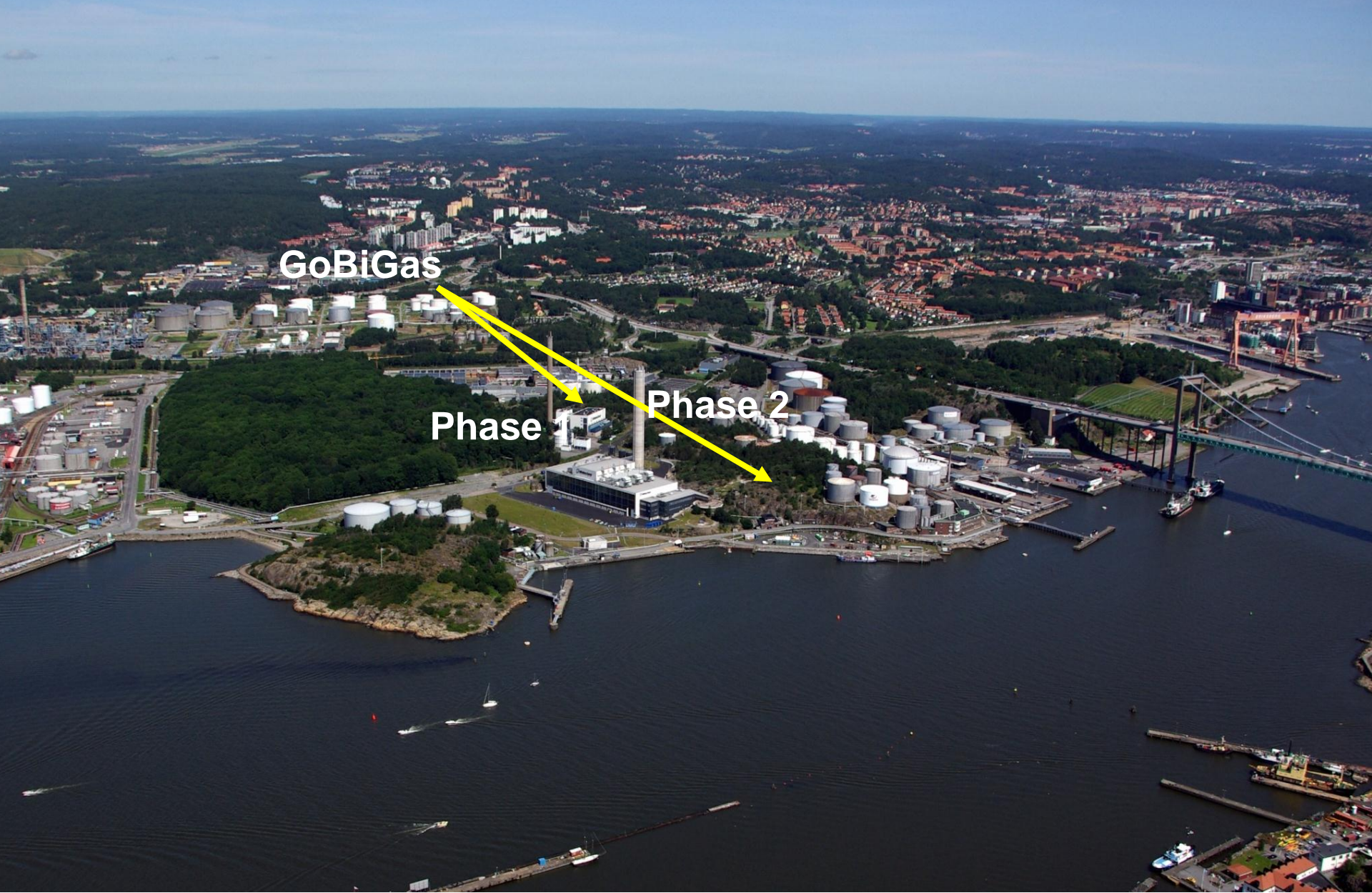
Residues from
forestry and
forest industry

GoBiGas project will demonstrate that it is possible to gasify biomass

- for the production of bio-methane / bio-SNG
- of a quality that can be deployed in existing gas grid

GoBiGas – Facts in short

- The first plant in the world to produce bio-methane from biomass continuously through gasification
 - Using forest residues as feed stock
 - Polygeneration – producing fuel and heat, in future electricity
- The first Swedish plant to inject bio-methane into the national grid for:
 - Vehicle fuel
 - Feedstock to process industry
 - Fuel to CHP or heat production
- Commercial scale in two phases:
 - 20 MW Demonstration plant, partly financed by Swedish Energy Agency
 - 80 – 100 MW commercial plant, when first phase proven successful and acceptable revenues can be met.
 - Phase 2, Selected project by the EU-Commission in NER300



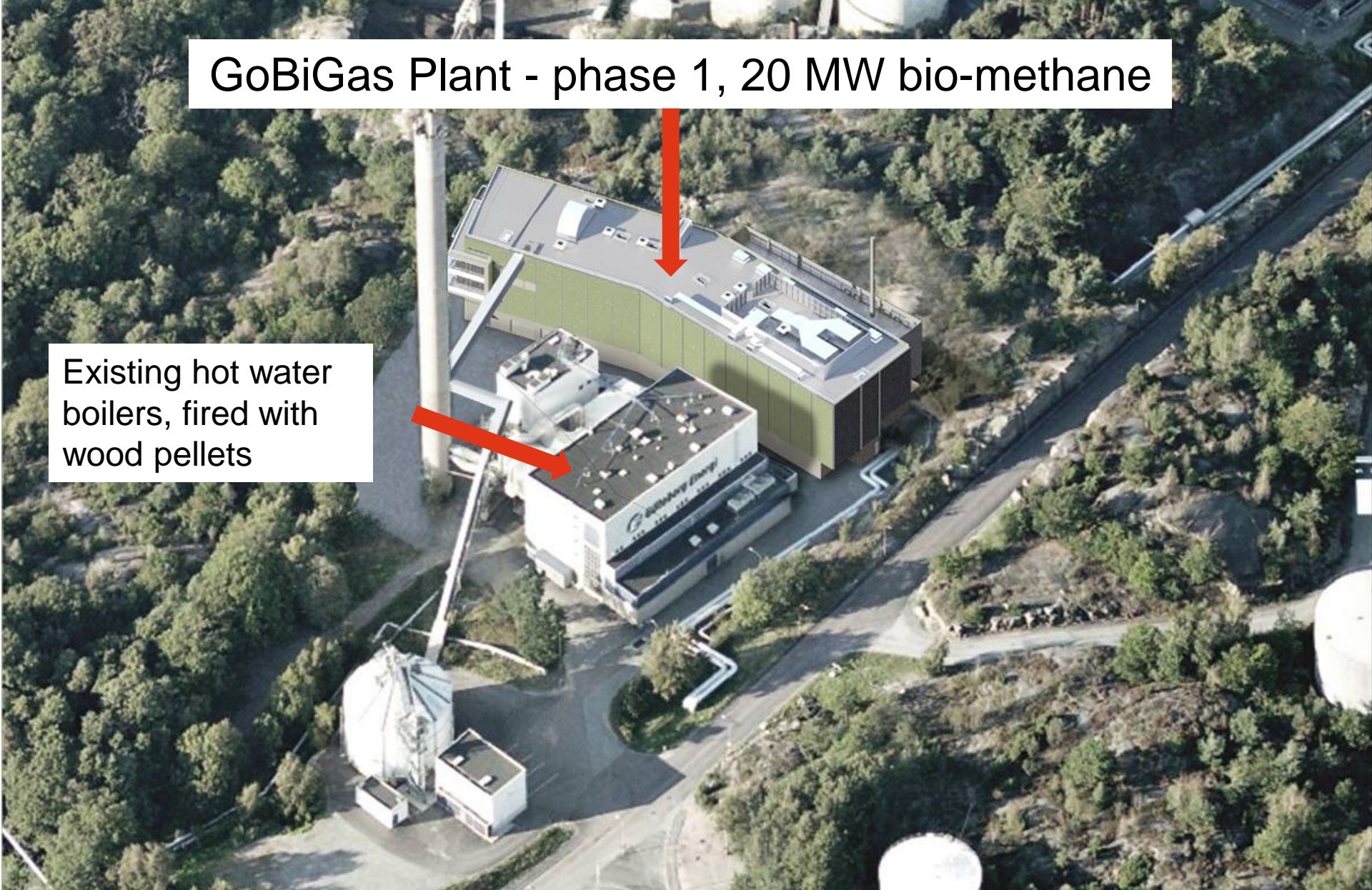
GoBiGas

Phase 1

Phase 2

GoBiGas Plant - phase 1, 20 MW bio-methane

Existing hot water
boilers, fired with
wood pellets





Pellets delivery by truck running on liquid biogas

Reference installations - gasification

Güssing

Repotec technology

1/4 the size compared to GoBiGas

Gas-fueled motor 2 MW el

4,5 MW district heating

In operation since 2002 (> 60 000 h)



Senden

Repotec technology

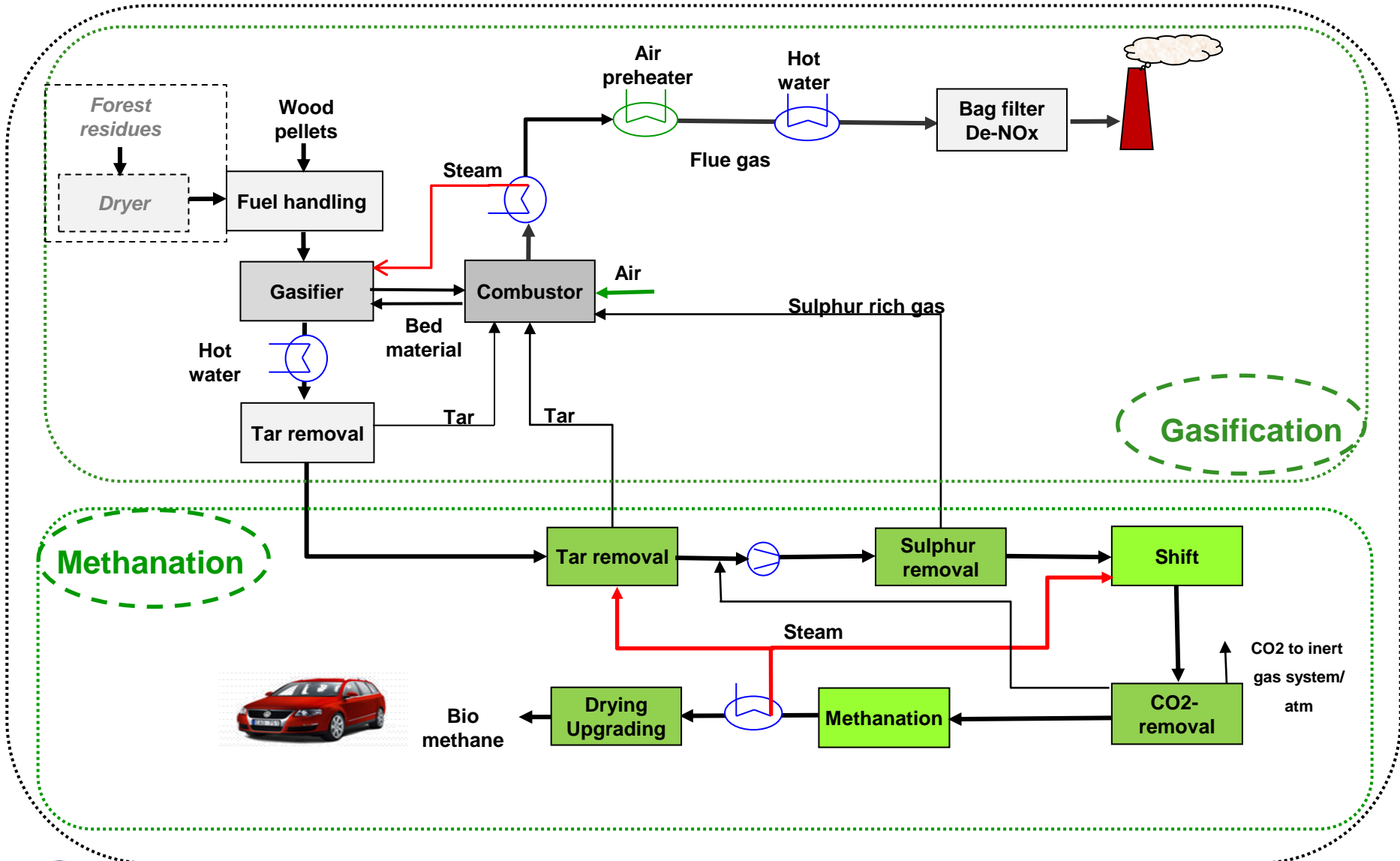
1/2 the size compared to
GoBiGas

Production of electrical
power and district heating

In operation autumn 2012



Technical principles

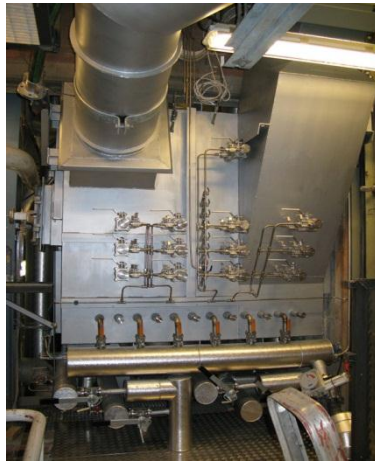


GoBiGas – a step-by-step development

Chalmers
Lab-reactor



“The Chalmers gasifier”
Chalmers 2-4 MW
Pilot plant



GoBiGas Phase 1
20 MW bio-methane
Demonstration plant



GoBiGas Phase 2
80-100 MW bio-methane
Commercial Plant

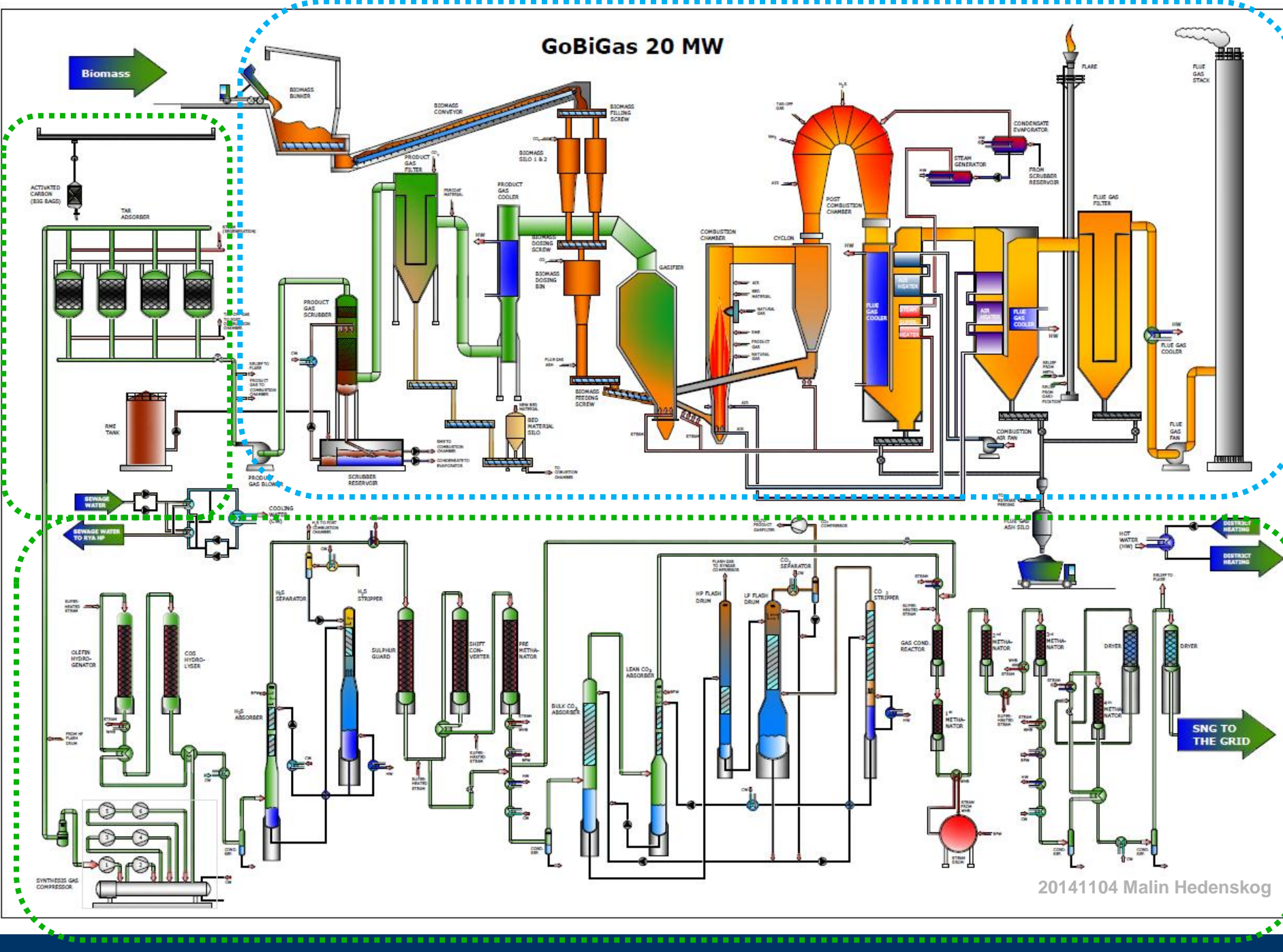


2008

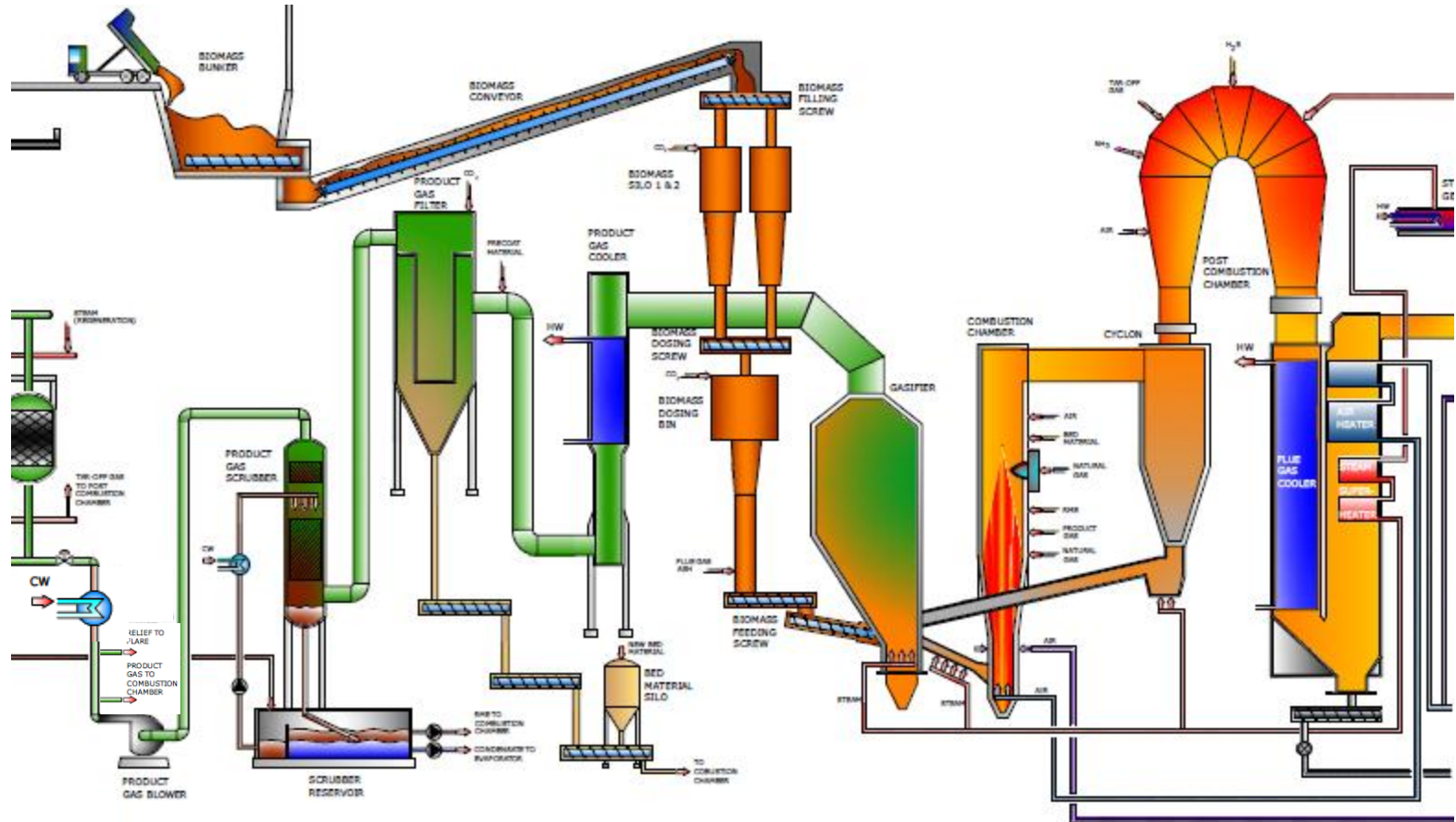
2012

2016

GoBiGas 20 MW



Gasification – operation experiences



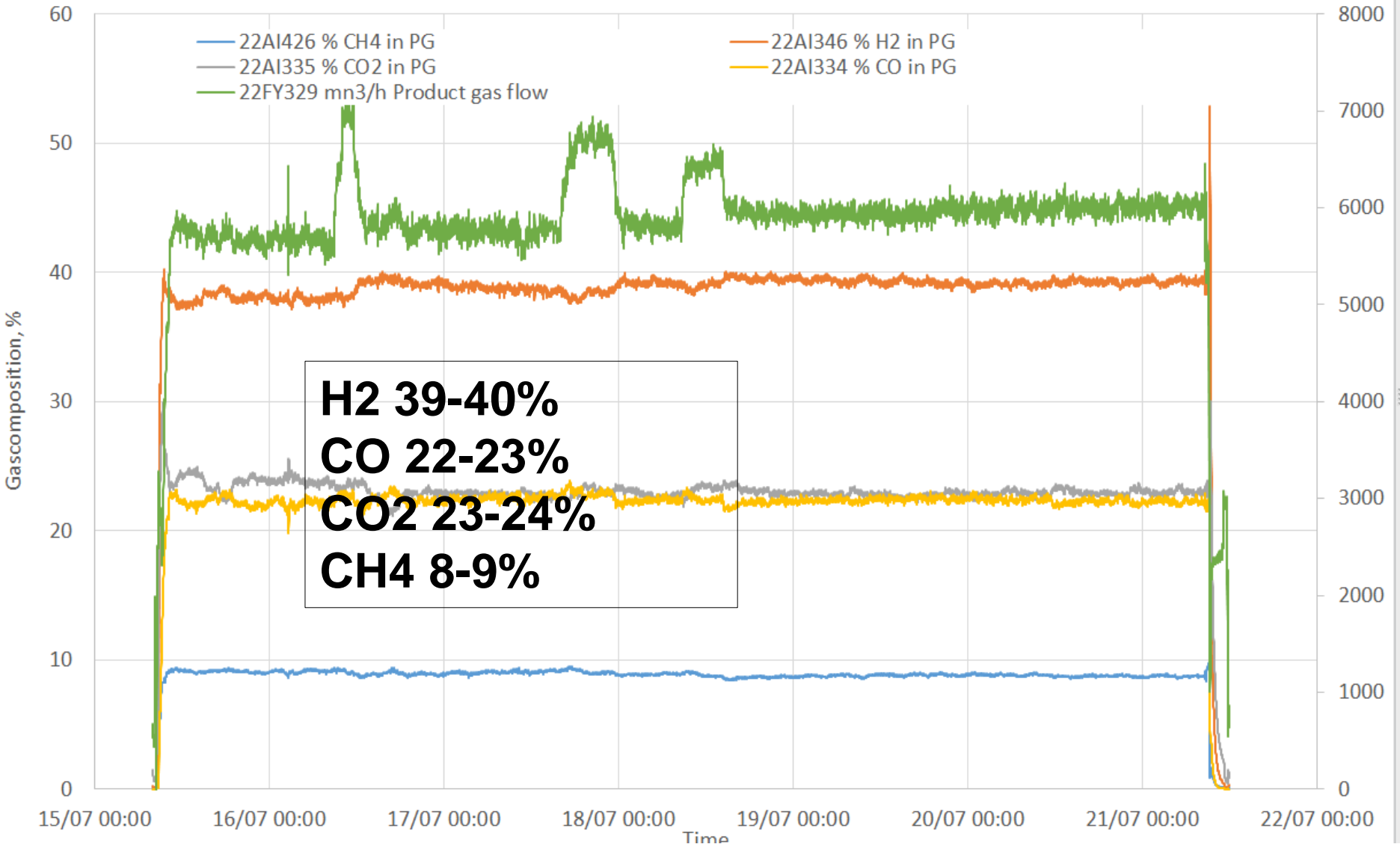
Task force – Göteborg Energi, Valmet and Chalmers

”Pellets ash content is low and ash components matters”

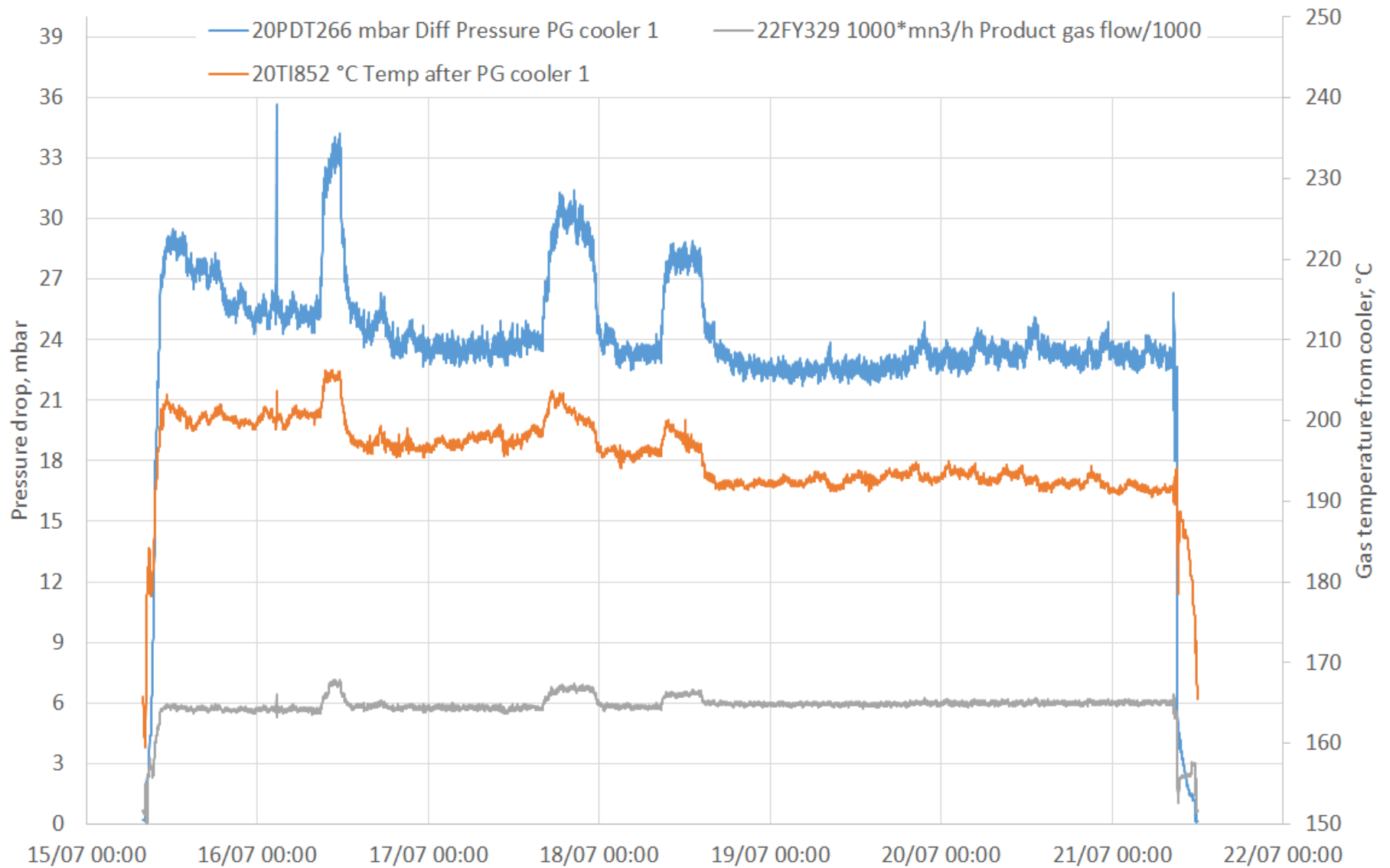
- Recirculate coarse ash
- Add some alkali



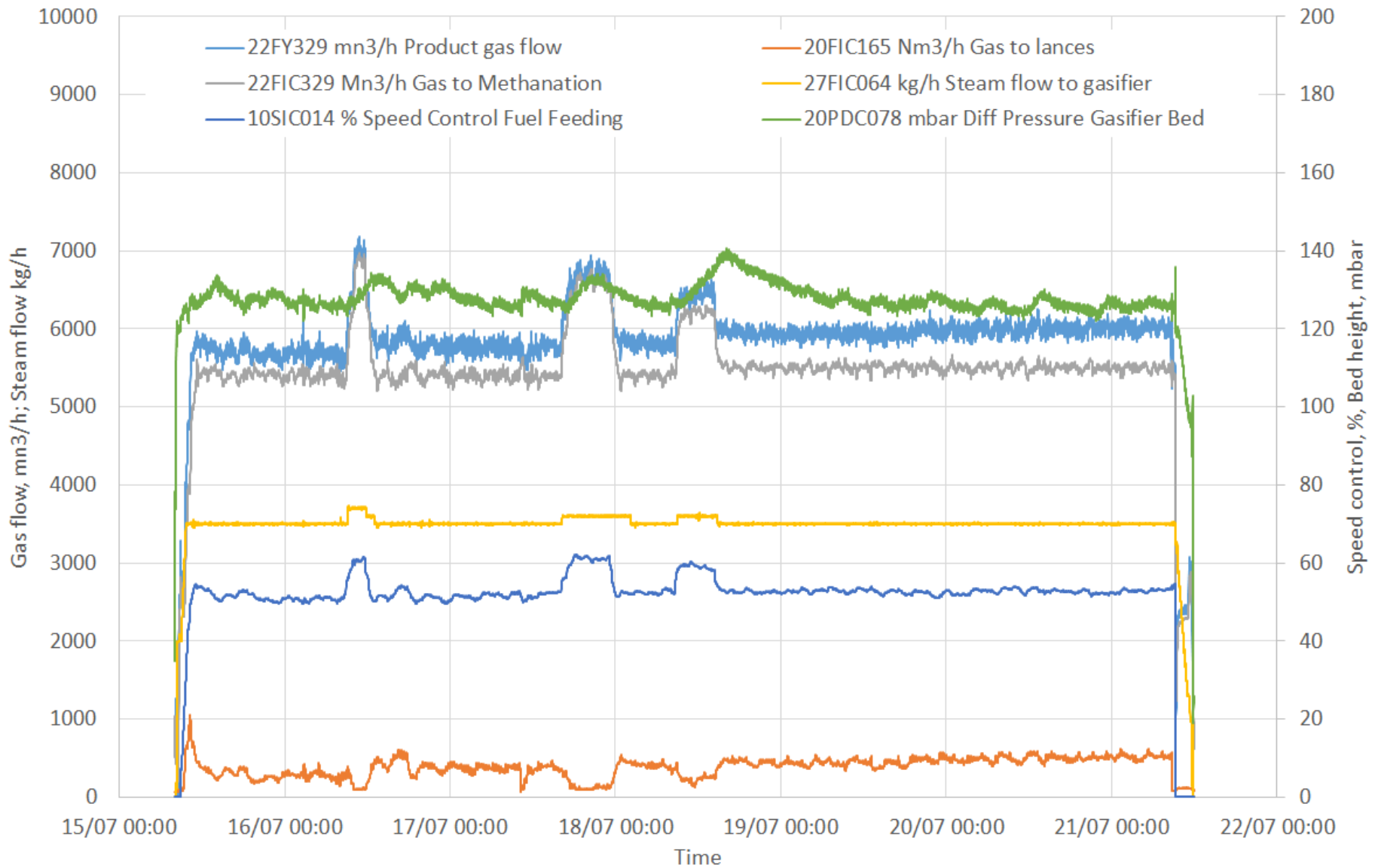
Gas composition



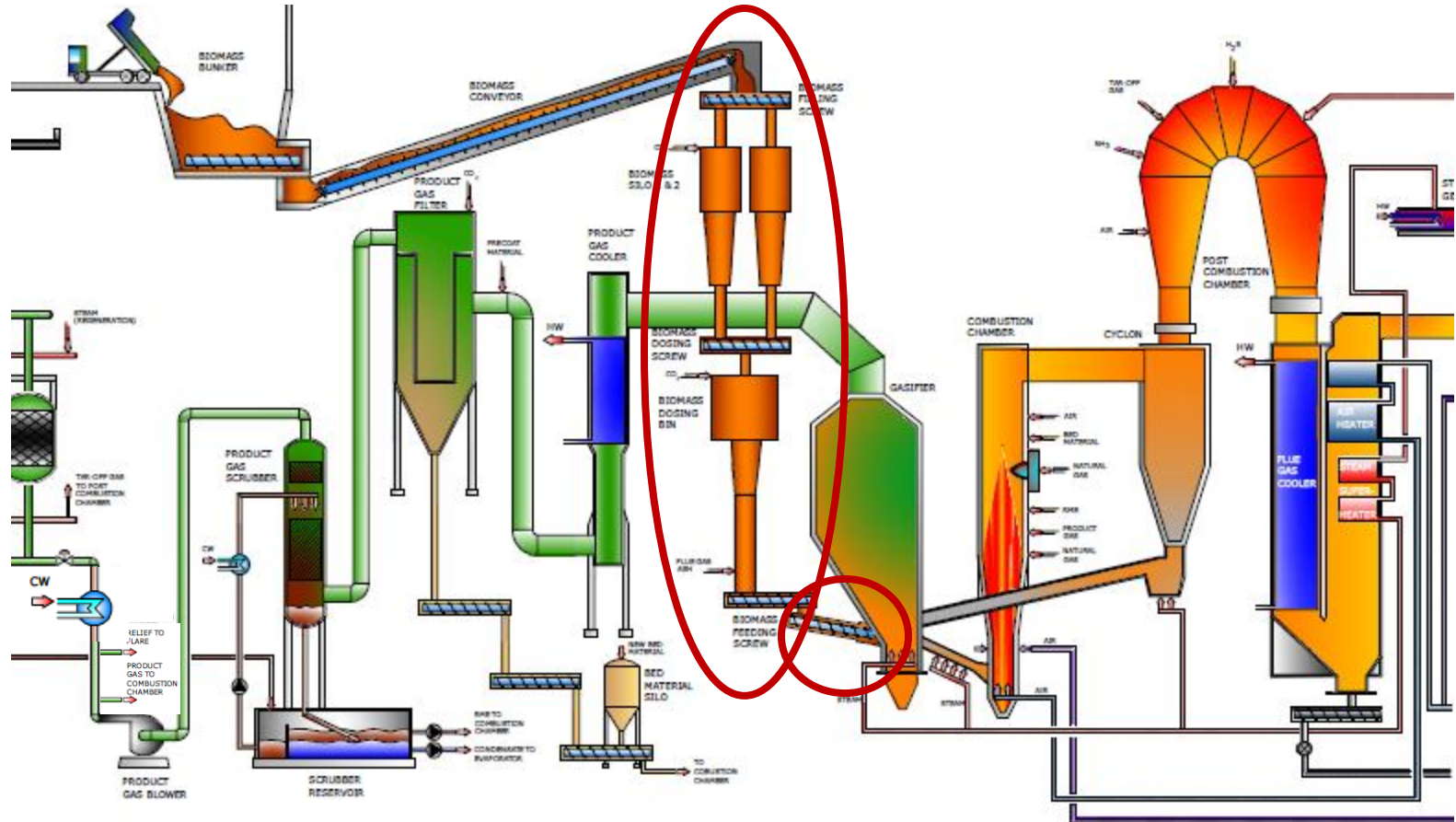
Product gas cooler



Gas production

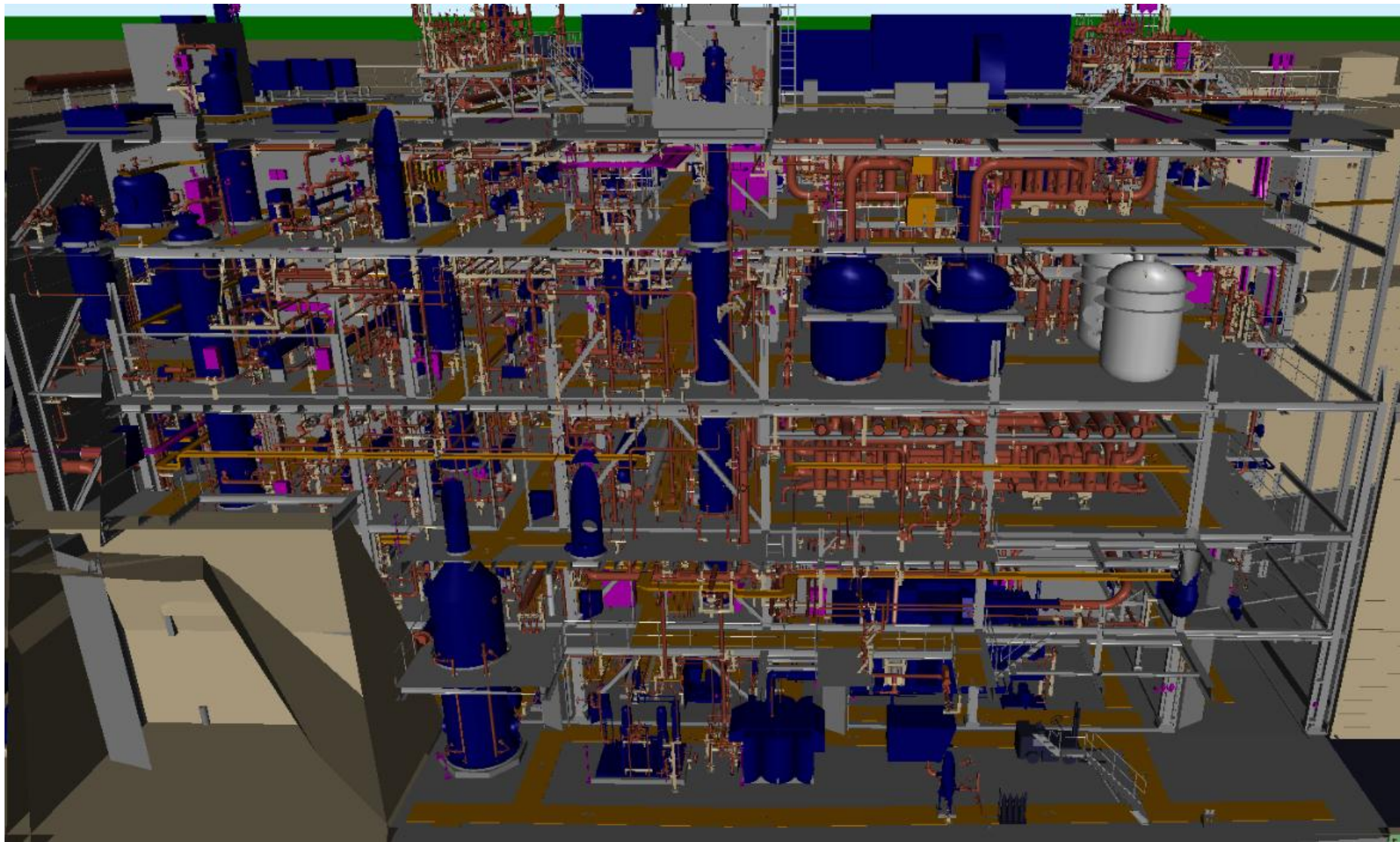


Gasification





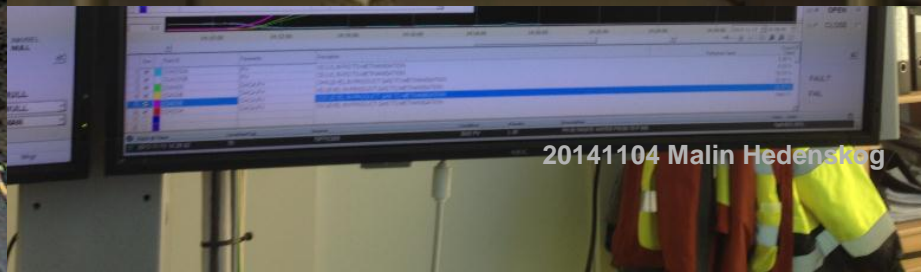




Evaluation of GoBiGas Phase 1

- Evaluation during 7 years – until 2020
- Cooperation between Göteborg Energi AB/ GoBiGas and the main suppliers. Contact: Ingemar Gunnarsson (ingemar.gunnarsson@goteborgenergi.se)
- Purpose to learn from the demonstration plant to –enable scaling up to 100 MW in phase 2
- Evaluation of the following parameters:
 - ✓ Product quality
 - ✓ Plant performance – efficiency etc.
 - ✓ Plant availability
 - ✓ Environmental footprint
 - ✓ Maintenance needs
 - ✓ Operating costs

Commissioning ongoing...



20141104 Malin Hedenstam



Thank you for your attention!

www.goteborgenergi.se

www.gobigas.se