



Gasification Development at E.ON

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Contents

1. Background/Drivers
2. E.ON Gasification Development
3. Bio2G
4. Värnamo

EU Climate target 20/20/20 year 2020

- Carbon dioxide reduced by 20%
(compared to 1990 years level)
- Energy efficiency increased by 20%
- 20% energy production from renewable sources



Swedish Government policy

- Year 2020:
 - 50% of Swedish energy use be based on renewable sources
 - CO2 emission reduced by 40%
 - Energy efficiency increased by 20%
 - 10% renewable sources in transport sector
- Year 2030:
 - transport sector independent of fossil fuels
- Year 2050:
 - net contribution of CO2 shall be reduced to zero



Biogas in Sweden – today and tomorrow

- Production through fermentation amounts to approx 1,5 TWh
- Estimated potential – 15 TWh through fermentation
- Estimated potential – 59 TWh through gasification



Vision for Sweden

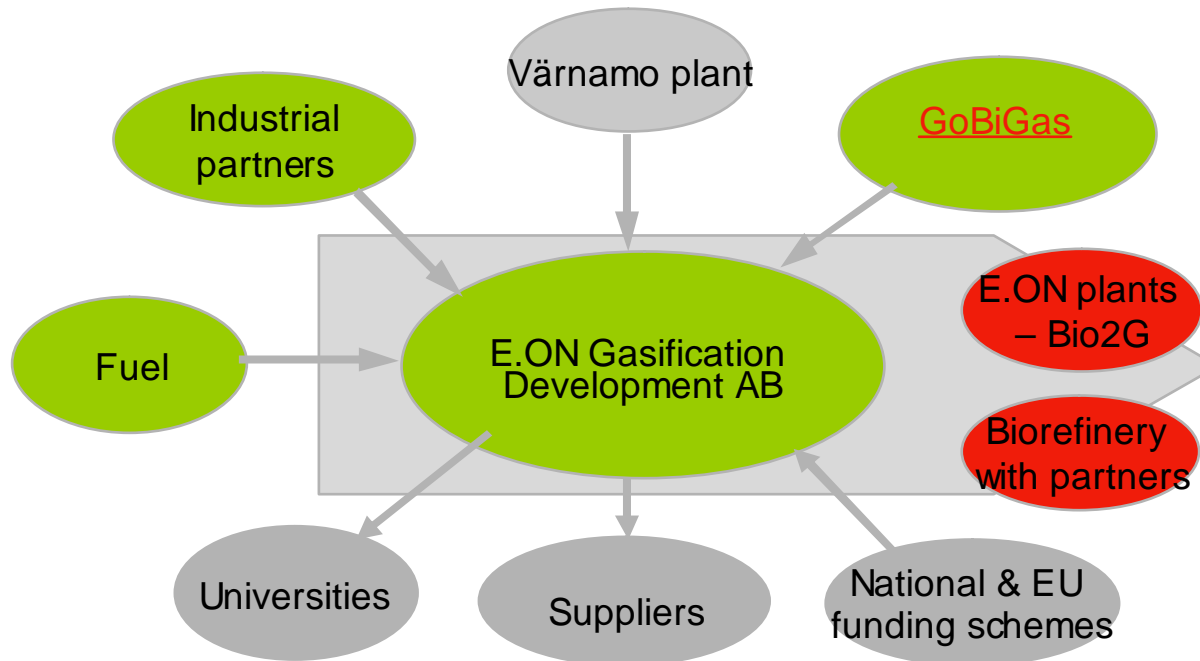
The **vision** until year 2020 is 20 TWh biogas

- 10 TWh fermentation
- 10 TWh gasification

How shall we reach the vision?

- More efficient fermentation plants – develop the technology
- Turn gasification into a commercial business
- Support R&D
- Make use of the R&D in E.ON Gasification Development AB
- Invest and build gasification plants – alone or with partners

E.ON Gasification Development AB



- Build knowledge
- Show suppliers – we are ready to invest
- Co-operation with others stake-holders
- Design and engineering of the first commercially sized plant – [Bio2G](#)
- Find viable business cases

Bio2G – Preliminary key parameters

- Fuel input ~325 MW_{th}
- Biogas production 200 MW, ~21 000 m³/h
- Biogas efficiency 62-63% (excl. ASU)
- Total efficiency 70-80%
- Power production ~10 MW (for internal use)
- Heat production ~50 MW (depend on fuel moist)

- Personnel need 50-100 people

Further possibilities includes

- Possibility for coproduction of liquid N₂
- Inherent carbon dioxide removal of about 1/3 of the CO₂ – possible carbon negative plant
- Possibility for coproduction of H₂ and CO in biorefinery

Investigation of localisation

- Performed by SWECO during spring 2

Main criterias:

- Adjacent to the natural gas grid
- Fuel supply by ship, train and road transportation
- Industrial area
- District heating possibility

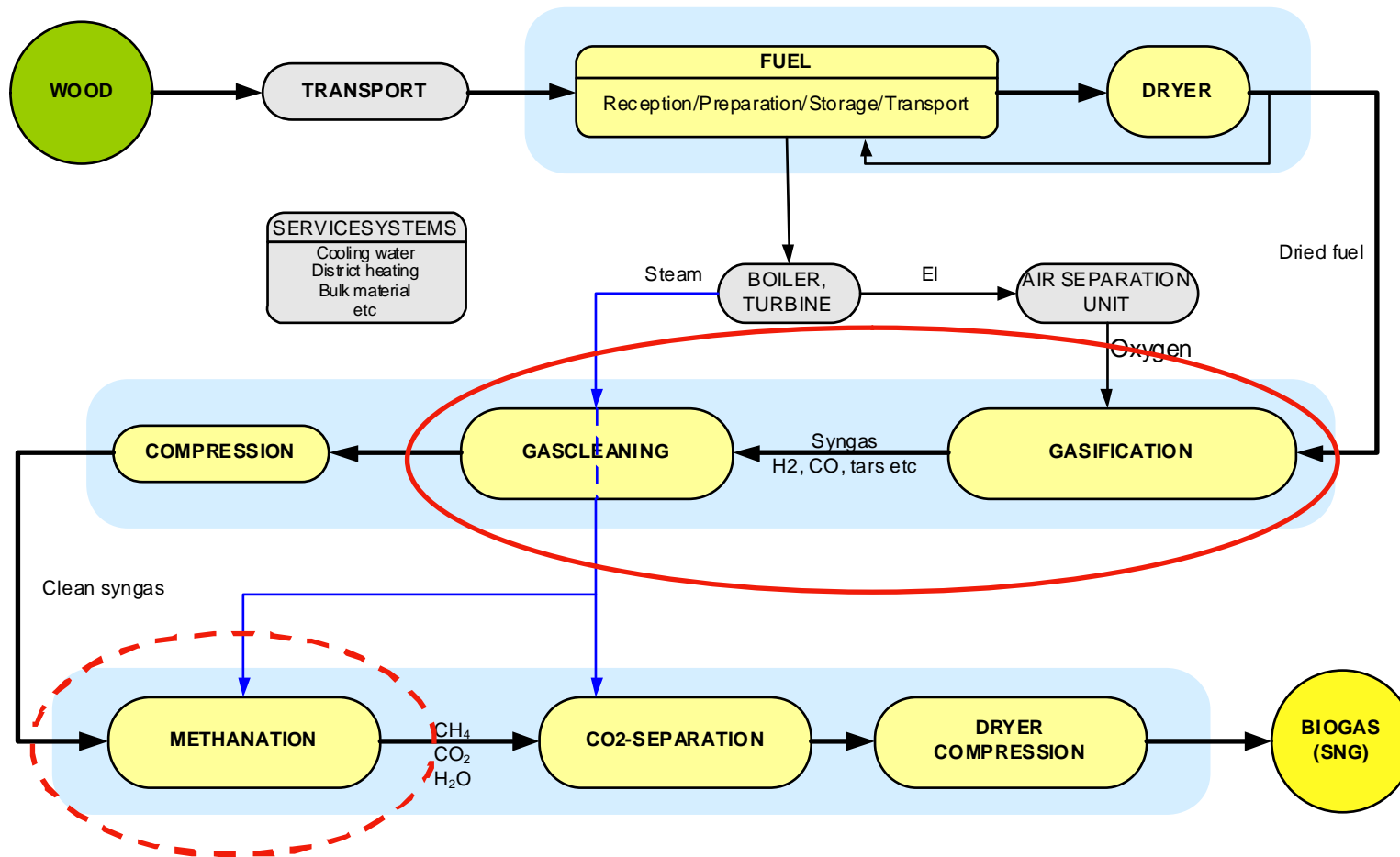
Results

6 sites were chosen as the most suitable.

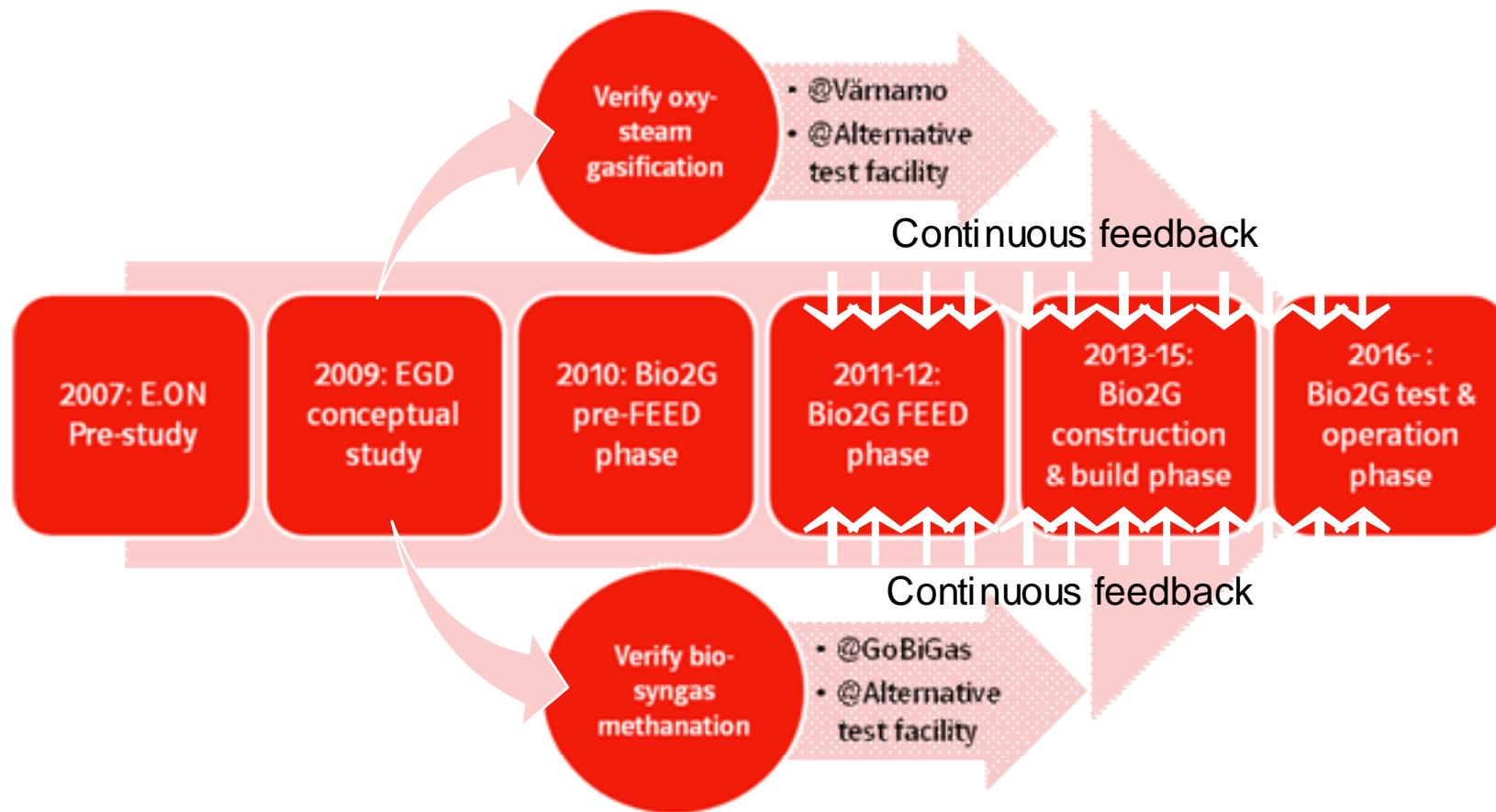
4 of them in the Öresund region.
Final decision will be taken during the autumn



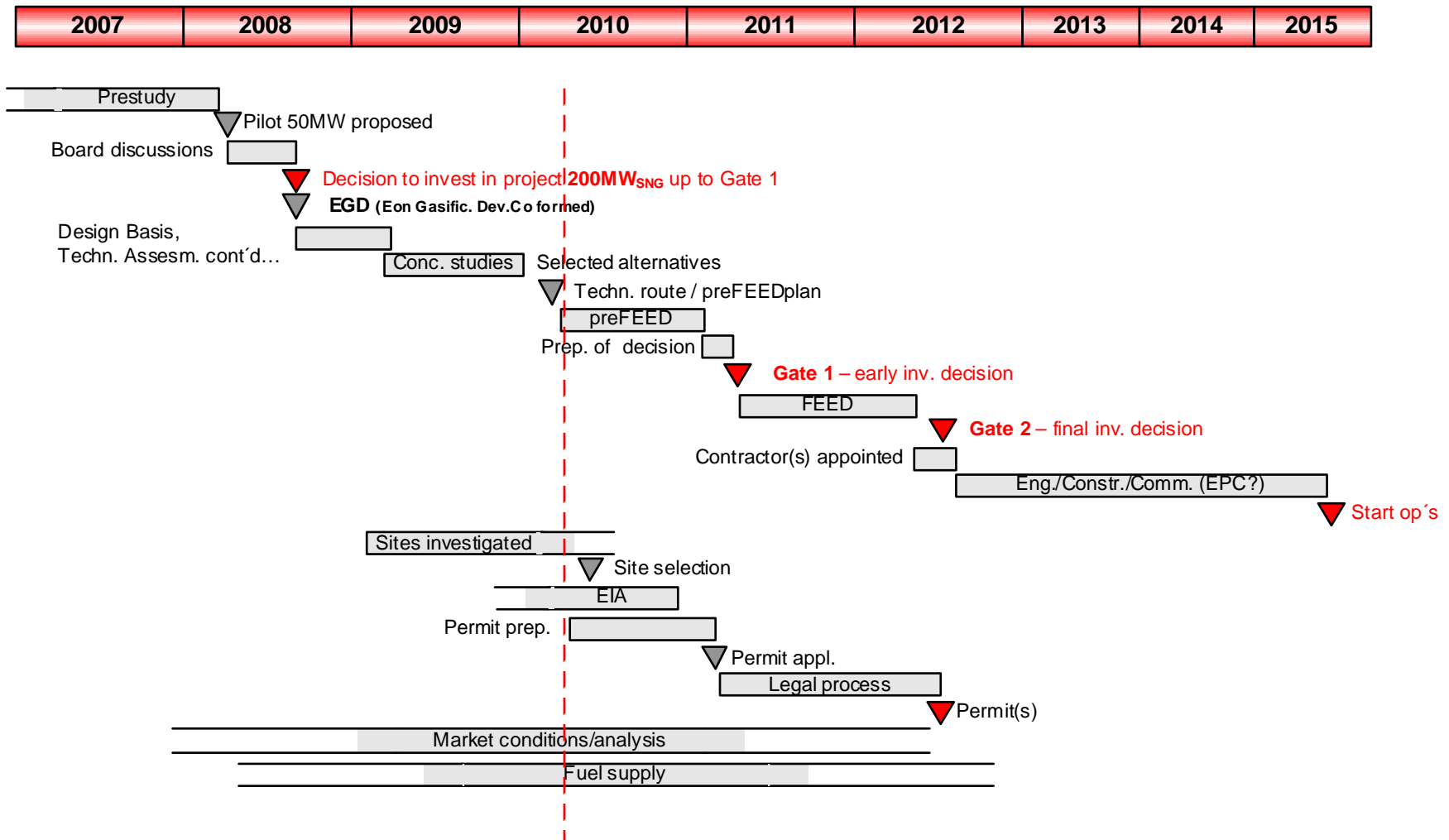
Schematic process diagram - Bio2G



Roadmap Bio2G



Time schedule, simplified – Bio2G



Värnamo Plant - E.ON has already demonstrated gasification through the Värnamo Plant (6 MW_e, 9 MW_{heat})

- Test program concluded 1999
- >3600 hours operation in IGCC (with gas turbine operating with syngas)
- ~8500 hours of testing in total
- No negative effects to be seen on gas turbine, neither on filter or gasifier

➤ Results show that gasification works – now a 2nd generation tests is planned



Värnamo Plant – A new project is being started

- The **Industrial partners** and **Växjö Värnamo Biomass Gasification Centre (VBGC)** have started a project with the main objective to rebuild the existing gasification plant to produce a synthesis gas from biomass suitable for the production of a number of different **energy carriers**, for **electricity production** and **renewable transport fuels**.
- The rebuild of the plant is planned to be finished in the end of 2012.
- After the rebuild of the plant there will be a two-year testing program where the technology and developed processes will be demonstrated and validated.
- The plant will be owned by the state but the Industrial Partners will determine the test program and steer the project

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Thank you!

