



ADVANCEFUEL

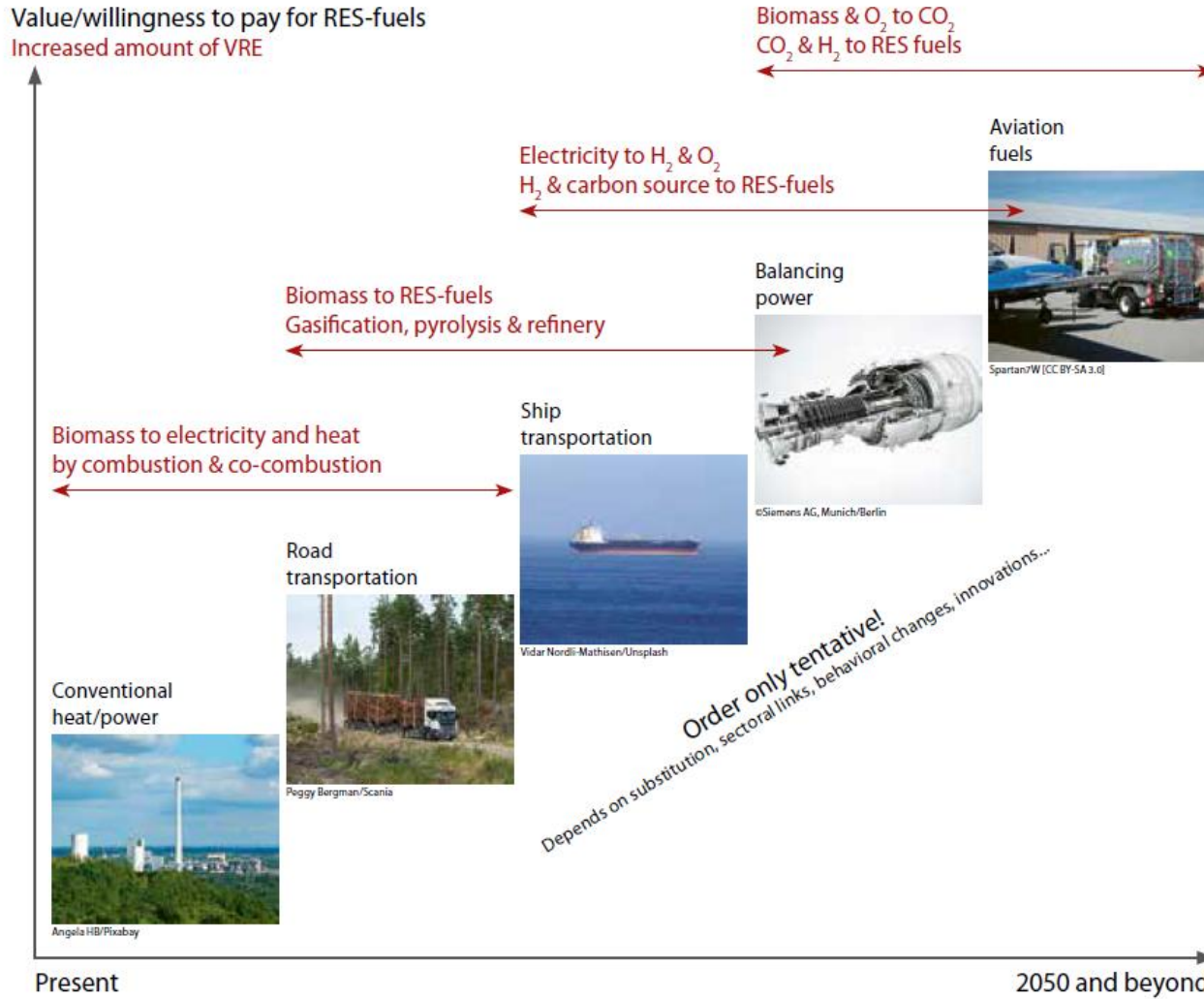
Commercialization of large scale biofuel production

- discussion on conditions and barriers

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Value of carbon based fuels ("RES-fuels") without net-emissions to the atmosphere



Berndes, G., Goldmann, M., Johnsson, F., Lindroth, A., Wijkman, A., Abt, B., Bergh, J., Cowie, A., Kalliokoski, T., Kurz, W., Luysaert, S., Nabuurs, G-J, Forests and the climate - Manage for maximum wood production or leave the forest as a carbon sink?, Kungl. Lantbruks- och skogsakademiens tidskrift, 6, 157, 2018, ISBN 978-91-88567-22-2





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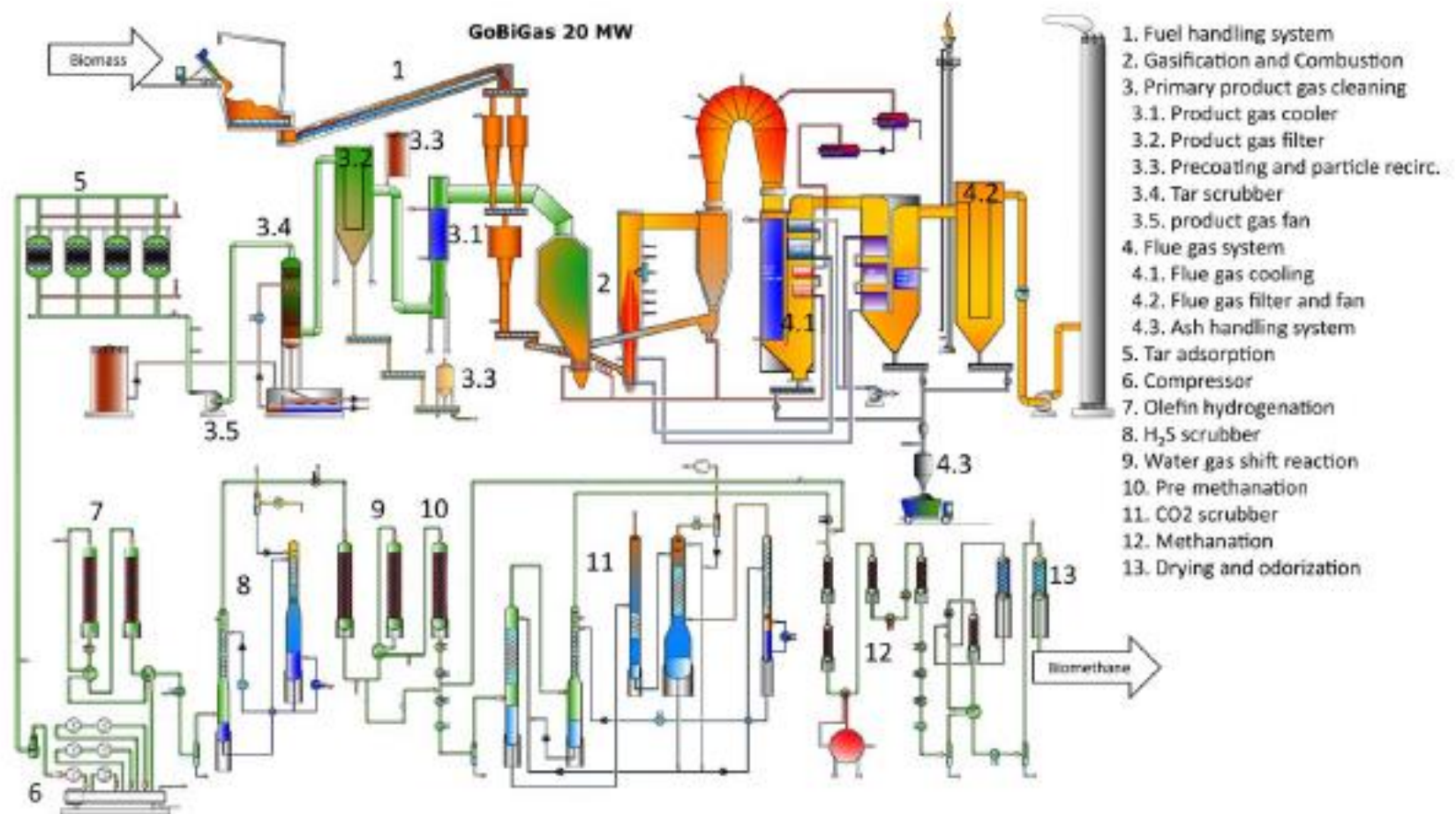
Example: 20 MW indirect gasifier for SNG production



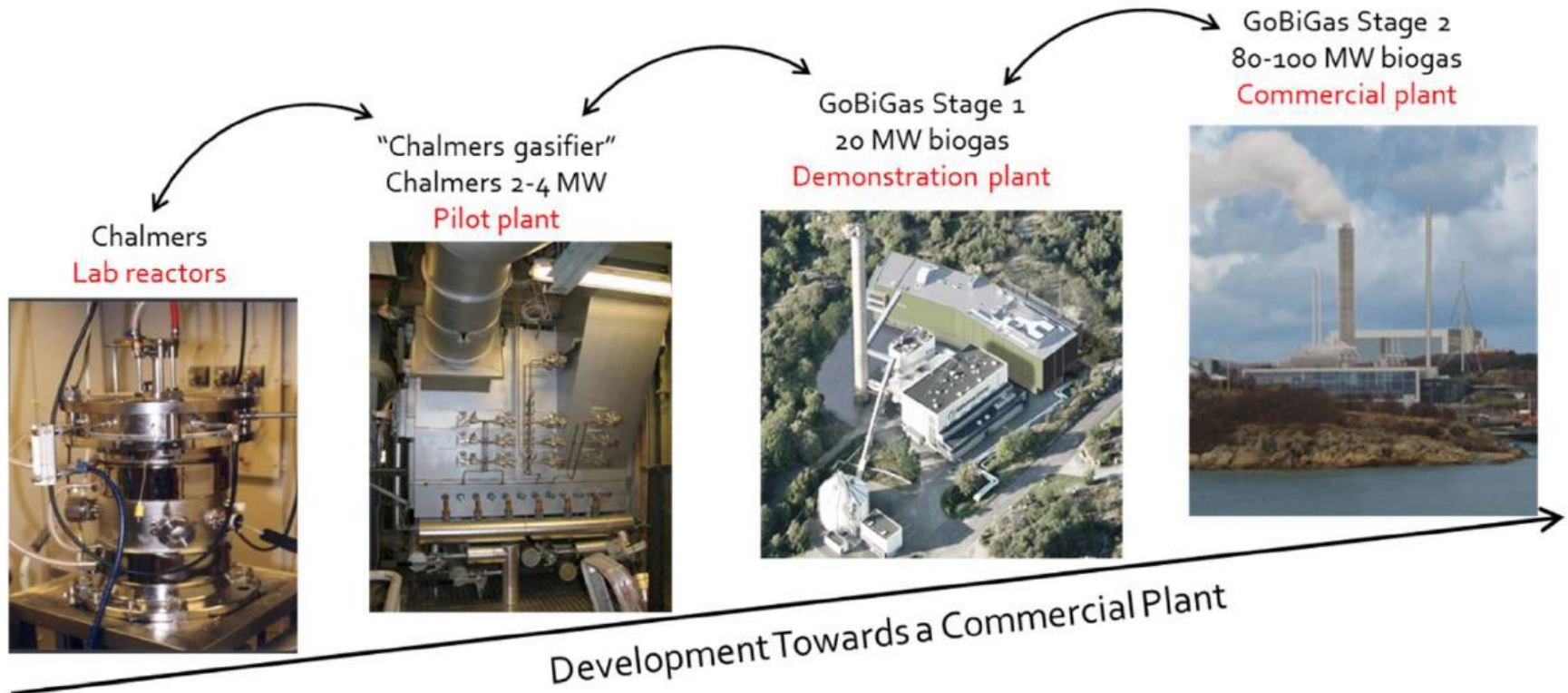
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N.° 764799.



Example: 20 MW indirect gasifier for SNG production



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~ 10 years





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Example: 20 MW indirect gasifier for SNG production

Complex



Long lead times



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Production cost vs scale

Sufficient scale is important to reach high number of **Full-Load Hours** and lowering **operational costs** (personnel cost)

TABLE 5 Estimated total production cost (including investment costs) for biomethane, using forest residues for feedstock (170 SEK/MWh based on lower heating value of received fuel with 45% moisture), 8000 FLH, 20-year economic lifetime, and 70% plant efficiency

	Commercial plant 20 MW SEK/MWh	Commercial plant 100 MW SEK/MWh	Commercial plant 200 MW SEK/MWh
Capital cost, depreciation	430	199	145
Capital cost, interest (5%)	258	120	87
Development cost	43	20	15
Operation costs (excluding feedstock)	352	166	132
Feedstock cost	217	217	217
Total cost	1300	722	596

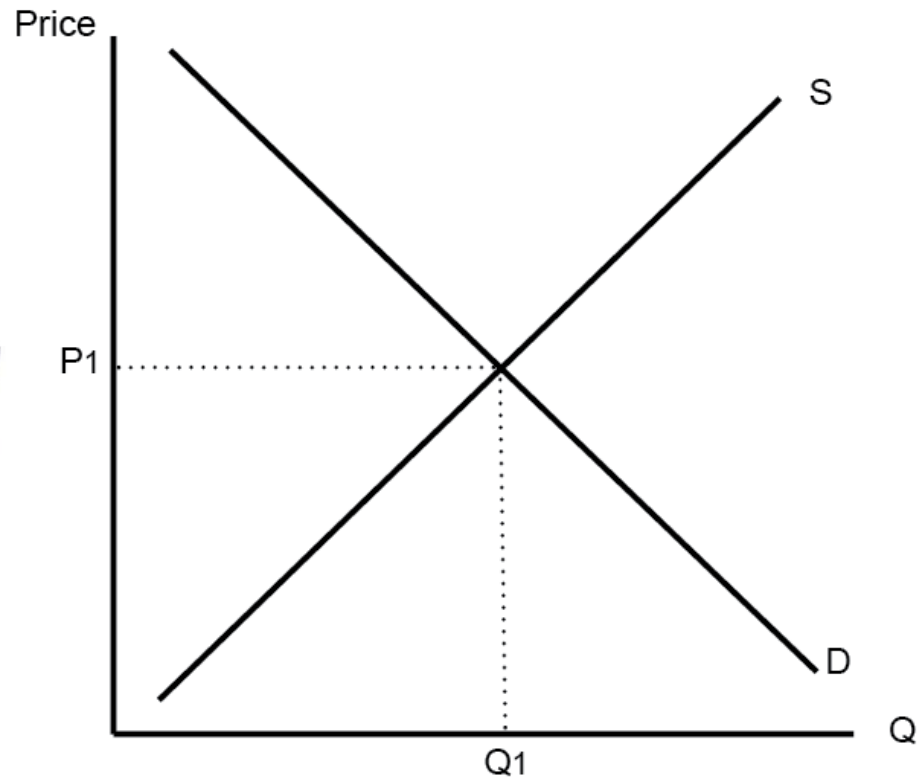
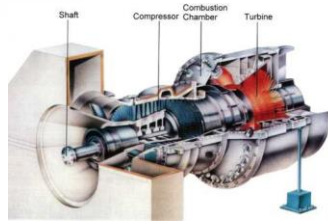
Corresponds to around 0.55 €/litre



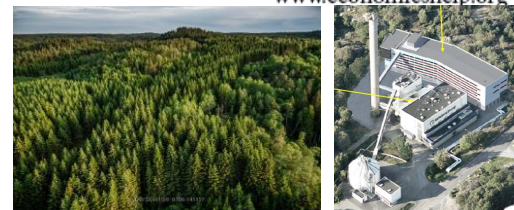


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Is there a sustainable market for the biofuel?

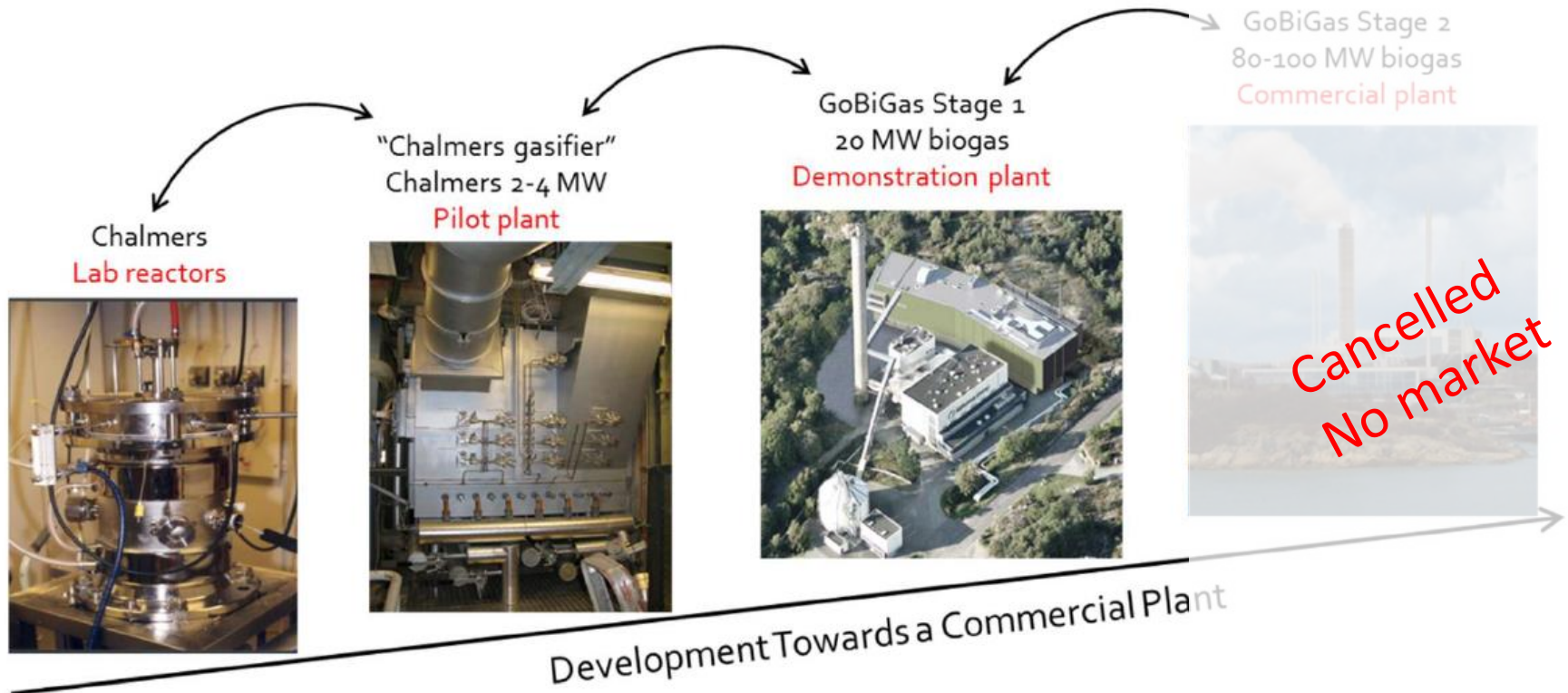


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Example: 20 MW indirect gasifier for SNG production



~ 10 years



Biorefineries for large scale biofuel production - summary

- Must be implemented at a **large industrial scale** if to be able to **bring down cost** to reasonable levels, since then already commercially available technology at mature levels can be used for most of the process steps
- High capital cost = **high financial risk**
- **Limited technical learning** with respect to investment cost can be expected
 - To ensure high full-load hours important – require experience
 - Major **reductions investment costs** which can be expected lie not in the capital cost but in **“assembling” of plants**
- **Feedstock cost** is a large share of total production cost – important implications on policy measures
 - Increased use of biomass in several sectors will drive up biomass prices
 - The cost to use fossil fuels must be higher than the cost to use biofuels
- Increasing debate over **biomass/forests and climate** – important with criteria for sustainable biomass – implications on financial risk





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Thank you for your attention

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