KUALA LUMPUR 2012 WORLD GAS CONFERENCE

25th world gas conference

"Gas: Sustaining Future Global Growth"

How to integrate renewable power into the natural gas grid

How to convert fluctuating wind power and Biomass/biogas to biomethane – or "green" Natural Gas?

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June 5, 2012

Expert Forum 5 A

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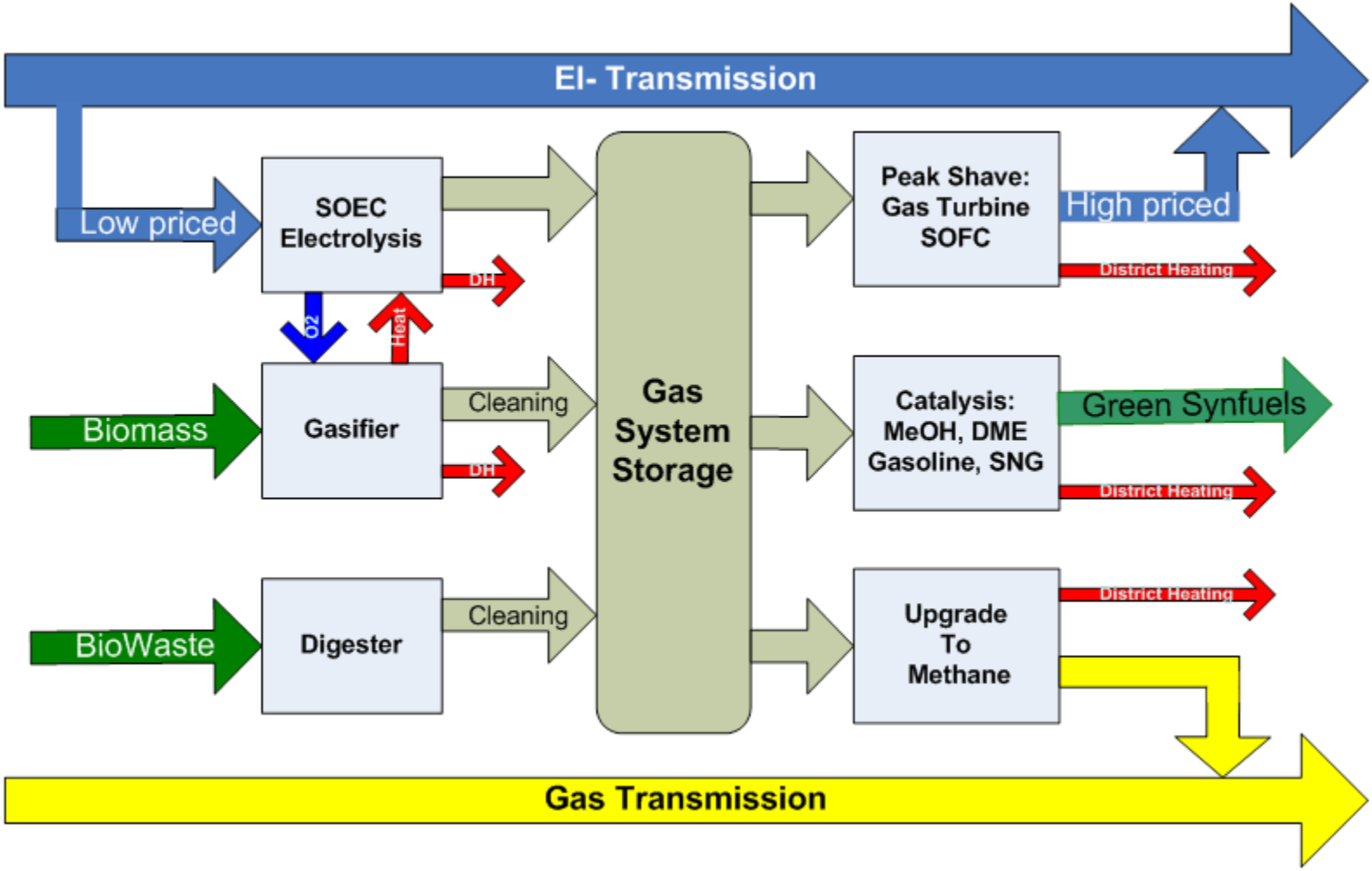
Background

- WOC5 - 5A addresses ways to retain gas as an important fuel for the residential, commercial, industrial and transport sector in a future without fossil natural gas.

- Many governments have strategies to reduce CO2. Many countries even plan zero – or close to zero - CO2 solution in 30 – 40 years. Energy will only be availiable from renewable solutions. What will then happen with the natural gas grid?

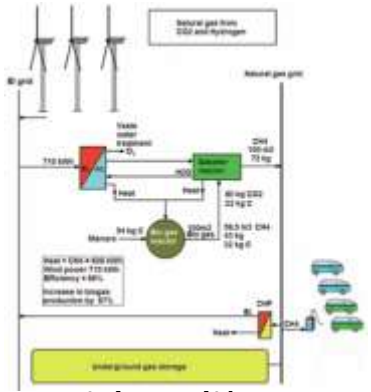
- The natural gas grid is established and do have advantages that can outrage disadvantages combined with fluctuating renewable energy. The natural gas grid can
    - absorb excess fluctuating renewable energy (as example wind power)
    - deliver ancillary services to the (renewable) power system
    - deliver storage (security of supply) for the renewable energy/- power

Integration of wind (power) into the gas grid



Production of "Green Natural Gas"

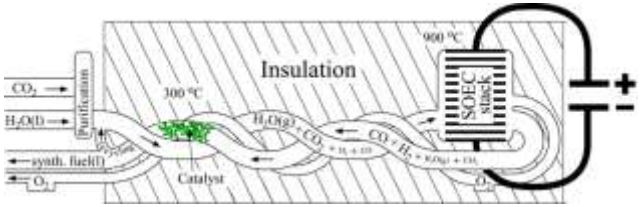
- "Green Natural Gas" or bio-methane can be produced through a range of different technologies. The most promising are:



- Technologies for upgrading of biogas to biomethane/"Green Natural Gas" through - removal - or re-use of CO_2 - already used in many countries

- The conversion of biomass to biomethane - under commercialization in some countries with excess biomass (primarily wood)

- Conversion of CO_2 and H_2 to biomethane through "methanization" - is still under development, but a very promising technology with a huge potential.



Papers presented at the Expert Forum 5 A

1. Introduction – how to covert fluctuating wind power and biomass to biomethane.

   Aksel Hauge Pedersen, DONG Energy

2. Status for technologies and cost for production of biomethane ("Green Natural gas") by use of the SOEC technology

   Mogens Mogensen, DTU/Risoe, Denmark

3. "Development of organic waste water methane fermentation process and bio-methane utilization system"

   Shojiro Osumi, Osaka Gas, Japan

4. " The suitable purification technology for utilizing biogas effectively"

   Tatsuo Kume, Osaka Gas, Japan

5. Direct production of bio-methane through biomass gasification

   Philippe Buchet, Gdf – Suez, France.

Panel discussion at Expert Forum 5 A

- Will - or should - “Green Natural Gas” be able fully to substitute fossil Natural Gas – when?
- Where will "Green Natural Gas" be introduced first ?
- Needed political conditions for “Green Natural Gas” to substitute fossil Natural Gas?
- At the panel will participate:

  Alexey Zorya, Gazprom, Russia

  Mohd-Fairos Roslan, Petronas Malaysia

  Nuno Moreira, Dourogas, Portugal

  + all speakers