

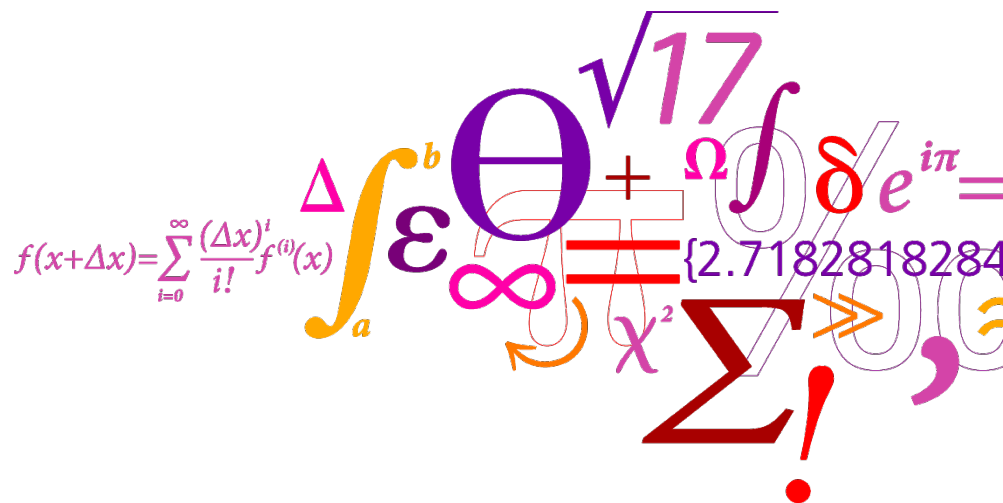


FutureGas

- Welcome to the Annual meeting 2018

Professor Poul Erik Morthorst
Systems Analysis Division

DTU Management Engineering
Department of Management Engineering



Highlights from around us

New EU directive on Renewable Energy

- **Renewables to cover 32% of EU's gross energy consumption by 2030**
 - Not distributed on member states (Previously 27%)
 - Technology neutral or Technology specific auctions
 - Possibility for Cross-border support systems (open to other EU-countries)
- **Transport 14% renewables in 2030**
 - Max 7% conventional biofuels (food related sources)
 - 3,5% advanced biofuels by 2030, also addressing biogas and hydrogen
 - Electricity: Roadx4, Railx1,5

More Highlights from around us

New Energy Agreement in Denmark

- Renewables to cover 55% of energy consumption by 2030
- New gas strategy to be developed
- Task force on energy, including biogas

World record on biogas in Denmark

- Biogas covered 18,6% of gas consumption in July 2018
- Increase of 50% compared to July 2017

Highlights from FutureGas

Our PhD-students have won three awards in the past year!!

- Rasmus Bramstoft has won two awards: The GERG Young Researchers Award for an innovative project and for the best presentation at European Biomass Conference and exhibition
- Tara Sabbagh Amirkhizi for the best poster at European Biomass Conference and exhibition

More Highlights

- **First preliminary results are showing up!!**
 - I will give you a few glimps in a moment
- **We have contributed with inputs to the new Danish Energy Agreement**
 - Further involvement is still to be decided - a new gas strategy is to be developed in Denmark
- **We have partly organised and participated in the gas course "Gasakademin" in Sweden**
 - Upgraded to a PhD-course on DTU
- **We have organised and participated in a number of work shops**
 - Modelling gas in the energy system at DTU
- **Supported by Energinet we have organised two succesfull events at Folkemødet on Bornholm**

Some Preliminary Results from FutureGas



- **Upgrading to natural gas quality is more cost-efficient than utilizing biogas directly**
 - Flexibility through the grid
 - Biogas to CHP requires base load
 - Direct utilization of biogas can be interesting in certain industrial processes
- **Results are very sensitive towards the gas price**
 - High gas prices promote the production of renewable gases
 - ... especially it promotes metanising gas
- **The first laboratory tests show that gas boilers can handle quite a wide spectrum of gas qualities**
 - Valuable contribution to EU harmonisation
- **A new support system for biogas has been developed**
 - .. especially to facilitate that green gas is valued in export and by the consumers

What do we still need?

- **Is renewable gas a necessity in the future energy system?**
 - Renewable gases are still expensive - doubtful if they can compete without a dedicated role for gas?
 - We still need some model results, however we are getting closer...

- **Can we supply and consume gas without excessive green house gas emissions?**
 - Important work is going on in determining methane emissions

- **If gas is needed in the energy system, where and how should we produce and utilize the gas?**
 - Back-up for power and heat supply
 - Individual heating - what is the potential in hybrid solutions
 - Industrial processes
 - Heavy transport
 - Power-to-gas, biogas and/or gasification

- **How should we utilize the gas grid?**
 - Not as dedicated or separated grids

Programme day one

DAY 1:

11th September [Room 7]	
09.45-10.15	Registration in front of Room 7 / Coffee-tea buffet in "Library"
10.15-10.30	Welcome & Highlights – Poul Erik Morthorst
10.30-10.55	The new energy agreement in Denmark <i>Jane Glinvad Kristensen, Head of Division, Danish Energy Agency</i>
10.55-11.20	Green Gas Denmark <i>Peter Kristensen, Head of Energy Development & Energy Savings Area, HMN Naturgas</i>
11.20-11.40	Short coffee break
11.40-12.05	Hydrogen in the future energy system <i>Morten Stryg, Senior Consultant, Danish Energy</i>
12.05-12.30	Alternative roads using the gas system in production of renewable fuels <i>Anders Bavnhøj Hansen, Chief Engineer, Energinet</i>
12.30-13.30	Lunch
13.30-15.00	Short status from WP 1 to 3 and discussion. <ul style="list-style-type: none"> • WP1: Gas Conditioning and Grid Operation; Torben Kvist • WP2: Quality Requirements for End-use; Jean Schweitzer • WP3: Gas for Transport; Erik Ahlgren
15.00-15.30	Coffee break
15.30-17.00	Short status from WP 4 to 6 and discussion. <ul style="list-style-type: none"> • WP4: Gas in the Integrated Energy System; Marie Münster • WP5: Advanced Mathematical Modelling; David Pisinger • WP6: Markets and regulation; Poul Erik Morthorst
17.00-17.30	Walk to boat (approx.. 10-15 min walk)
17.30-18.30	Boat tour and welcome drink on Furesø (1 hour tour)
19.00-22.00	Dinner and "hygge"

Programme day two

DAY 2:

	12th September [Room 7]
6.30-8.45	<i>Breakfast in restaurant (remember hotel check out no later than 10 am)</i>
08.15-08.45	<i>Arrival / Coffee-tea buffet</i>
08.45-09.00	Introduction before group-session – Poul Erik Morthorst [Room 7]
09.00-12.30	WP Group Sessions
09.00-10.30	WP1: Gas conditioning and grid operation [room 17, max 12. pers.] WP4: Gas in the integrated energy system [room 7] WP6: Markets and regulations [room 6, max 20 pers.]
10.30-11.00	<i>Coffee break</i>
11.00-12.30	WP2: Gas quality requirement [room 6, max 20. pers.] WP3: Gas for transport [room 7] WP5: Advanced Mathematical Modelling [room17, max 12 pers.]
12.30-13.30	Lunch
13.30-15.00	Future plans - cross cutting activities <i>14:00 Coffee and cake in the corridor</i>
	<i>End of FutureGas Annual Meeting 2018</i>