



BioGas2020 

Konferencerapport

Nordic Biogas Conference
7-9 september 2016

Interreg

Öresund-Kattegat-Skagerrak
European Regional Development Fund



EUROPEAN UNION

Skrevet af:

Michael Stie Laugesen, NTU, Danmark



Vestre Havnepromenade 5, 4 sal.
P.O.Box 1111
DK-9000 Aalborg
Danmark

Tlf.: +45 99 30 00 30
E-mail: msl@ntu.eu

Delfinansierat av: Interreg ÖKS
<http://interreg-oks.eu>

Interreg
Öresund-Kattegat-Skagerrak
European Regional Development Fund



Nordic Biogas Conference – 7th – 9th of September 2016

Michael Stie Laugesen fra NTU deltog på Nordic Biogas Conference hvor han præsenterede Bio-gas2020 projektet under en session vedrørende biogas trends. Konferencen blev afholdt på Viking Grace som er sejer mellem Stockholm, SE og Turku, FI. Konferencen havde cirka 300 deltagere især fra de nordiske lande.

Programmet for konferencen var følgende:

Day 1 - 7th of September

Time	First morning
6:30	Breakfast starts
7:45	Cruise starts from Stockholm
Please note you need to be at the harbour 40 minutes before departure if boarding	

Time	Opening Session
8:00-8:10	Mike Laine (Finland), Welcome
8:10-9:20	Video Greeting by Sirpa Pietikäinen, European Circular Economy
9:20-9:45	Bruno Nielsen (Denmark), Biogas Situation in Nordic Countries
9:45-10:15	Anders Månsson, Malmberg 150 years of clean technology

Time		
10:15-10:45		
Henrik Jacobsen (Denmark)		
Biogas upgrading system with very good methane content (99 %) and low methane leaking		
10:45-11:15		
Matti Viikula (Sweden)		
The future of biogas production in the Nordic region		
15 minute break for resetting		
Biogas From agro biomass	Time	Biogas Upgrading and use
Erik Nordell (Sweden)	11:30-11:50	Torben Kvist (Denmark)
Is it possible to start-up a biogas plant from manure in only 4 months?		Methane slip from biogas plants and upgrading plants. A voluntary measurement / inspection scheme
Henrik B. Møller (Denmark)	11:50-12:10	Benny Bakker (Netherlands)
Recent development in biogas production from agro biomass in Denmark		Presentation of their latest invention, a combined upgrading and liquefaction process, with high pressure liquefaction making 0.5% CO2 possible
Niko Humalisto (Finland)	12:10-12:30	Mikaela Blom (Sweden)
Explaining the non-breakthrough of manure/biogas assemblages in the circular economy of Finland		Small scale upgrading - technical review, new innovative approaches and potentials for application at Swedish farmers

12:30-13:40 Lunch Buffet Aurora deck 10 + Poster session and Exhibition conference deck 9

Biogas from food waste	Time	Digestate as fertilizer - recycling of nutrients
Matti Viikula (Sweden) The future of biogas production in the Nordic region	13:40-14:00	Frank Scholwin Experiences and practical results of the "FoodToWasteToFood" project
Christoph Gareis (Finland) Partial flow digestion in municipal biowaste management and high efficiency product gas utilization	14:00-14:20	Reinhard Kohnleick New treatment method for digestate
Uwe Kikiljus (The Netherlands) Generating bio-methane & liquid CO2 from food and beverage waste - 5 years of biogas upgrading experience	14:20-14:40	Fredrik Svensson The impact of EU regulations on waste and fertilizers on the use of digestate as bio-fertilizer in the Nordic countries
Aino Raimulainen (Finland) The effects of biochar addition on dry digestion of biowaste	14:40-15:00	Torben Ravn Pedersen The environmental impact and the value as a fertilizer
Bjarne Bro (Denmark) The presentation will focus on setup, technologies and results from the brand new Billund BioRefinery in Denmark	15:00-15:20	EMPTY

15:20-15:50 Coffee break + Poster session and Exhibition conference deck 9

Time	Extra sessions
15:50	Igor Prodal Construction of mini factory for liquid biogas(LBG)

Day 2 - 8th of September

Swedish time

6:30	Ship arrives at Stockholm
7:45	Ship leaves Stockholm

7:45-9:00 Breakfast

Time	EU-roadmap for Biogas
9:00-09:40	Artzila Kovacs (European Biogas Association) Biomethane roadmap - challenges and solutions for future biogas and biomethane market (based on results from Green Gas Grids and Biosurf EU projects)
09:40-10:00	Igor Prodal Construction of mini factory for liquid biogas(LBG)

10:00-10:20 Coffee break + Poster session and Exhibition conference deck 9

Biogas from novel feedstocks	Time	New small scale solutions for biogas production
Mike Laine (Finland) Biogas from pulp mill sludge	10:20-10:40	Tiisto Retkin (Finland) New Generation Modular and Factory Made Biogas Plant Units Produce Biomethane and Organic Fertilizer Products from Waste
Olle Stenberg (Sweden) A new marine based substrate for biogas production	10:40-11:00	Kari Koppelmäki (Finland) Palopuro Agroecological Symbiosis: Local sustainable food and farming pilot based on anaerobic digestion of residues for energy and recyclable nutrients

11:00 Lunch & Is carte Oscar deck 11 + Poster session and Exhibition conference deck 9

Finnish time begins after lunch		
Eva-Maria Ekstrand (Sweden) High-rate anaerobic digestion of kraft mill fibre sludge by CSTRs with sludge recirculation	13:30-13:50	Oliver Jochum (Germany) Biological Methanation to improve the Efficiency and Flexibility of Biogas Plants
Rita Tozy (France) Modelling of a pilot scale anaerobic digester treating sugar beet vinasses	13:50-14:00	Rune Bakke (Norway) Cost-efficient small-scale high-rate manure digester

LBG for long haulage road transport	Time	Synthetic methane production and biogas for fuel cells
Benjamin Berg Economics of liquefied biomethane	14:00-14:20	Jörgen Held (Sweden) Small scale biomethane production through gasification and methanation of woody biomass
Johan Améen (Sweden) Biomethane powered vehicles from Scania with low emissions and high fuel efficiency	14:20-14:40	Cancelled Gasification for bio-Steel production adjacent to an existing forest industry (based on EE research)
Olli Nevalainen (Finland) Making LNG ja LBG available in the Nordic market	14:40-15:00	Tuomas Hakala (Finland) Clean energy from waste water by solid oxide fuel cells

15:00-15:30 Coffee break + Poster session and Exhibition conference deck 9

Time	Biogas trends
15:30-15:50	Johnny Stuen (Norway) Life Cycle based waste management
15:50-16:10	Michael Stie Laugesen (Denmark) Biogas 2020 project
16:10-16:50	Mirja Mutikainen Growth perspectives for biogas in Finland - potential of business ecosystems

3. dagen var afsat til studiebesøg i Finland. Grundet andre møder samme dag, deltog NTU ikke i studiebesøgene.

NTU har i sine analyser især fokus på slutbrugeren herunder især transportsektoren. Denne korte konferencerapport vil have sit fokus på de løsninger, som henvender sig mod slutbrugeren. Rapporten præsenterer kort en række af de præsentationer, der var ekstra interessante set fra et arbejdsparke 5 perspektiv.

Følgende temaer blev præsenteret på konferencen.

- Opening Session (Bruno Nielsen and Anders Månsson)
- New Small Scale Solutions for Biogas Production
- Attila Kovacs and Igor Prodai
- Biogas From Agro Biomass
- Biogas from Food Waste
- Biogas from novel feedstock
- Biogas upgrading and use
- Digestate as fertilizer
- LBG for long haulage
- Synthetic Methane production
- Biogas Trends

Alle præsentationer fra konferencen kan downloades via følgende link:

https://www.dropbox.com/sh/nbkjxas5jq0m5b0/AABK41M_tE0aYHRZUk2ErgBVa?dl=0



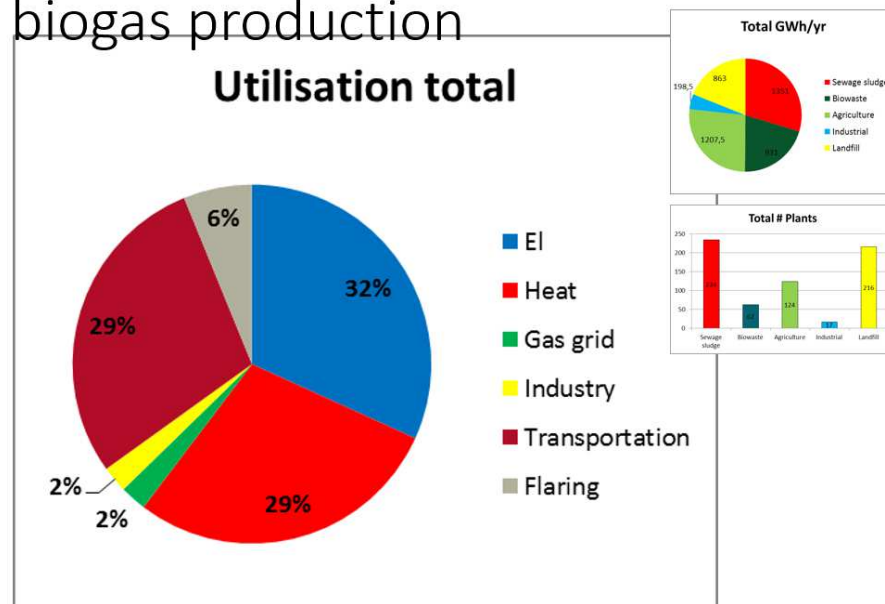
Figur 1: Panorama fra skibets agter



Figur 2: Konferencelokalet ombord på MS Viking Grace

Bruno Sander Nielsen fra Brancheforeningen for Biogas (i Danmark) præsenterede en status vedrørende biogas produktionen i de nordiske lande. Tallene er fra 2014 og det skal således tages i betragtning at der især i Danmark er sket en væsentlig forøgelse i biogas produktionen i de sidste to år. Den producerede biogas anvendes i høj grad i el og varme sektoren, hvor cirka 60% anvendes. Derudover er transportsektoren en stor aftager af biogassen. Værd er her især at bemærke, at Danmark til trods for en høj produktion af biogas stort set ikke anvender biogas til transportformål.

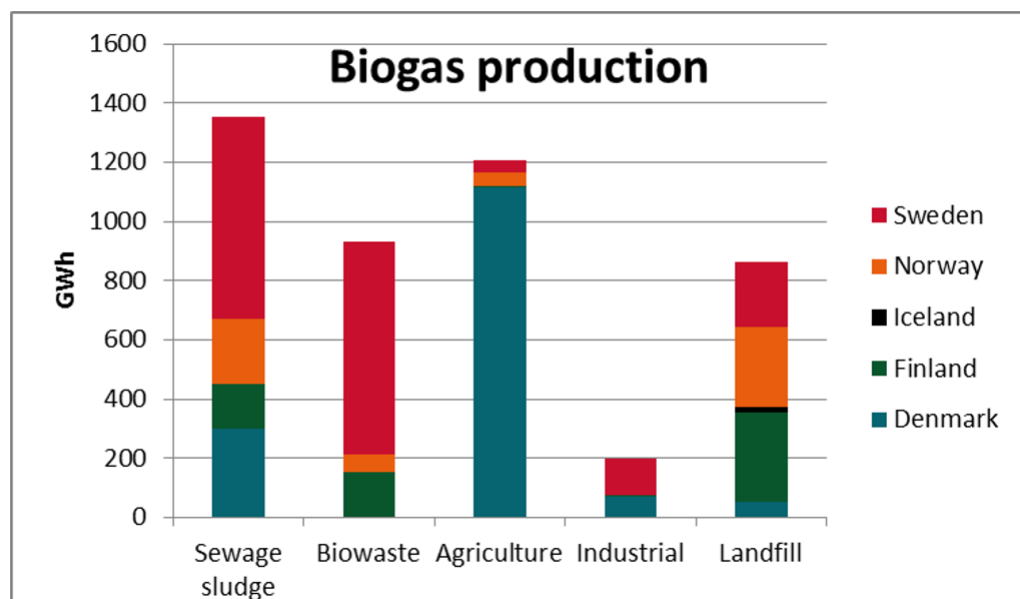
Nordic biogas production



Brancheforeningen for Biogas

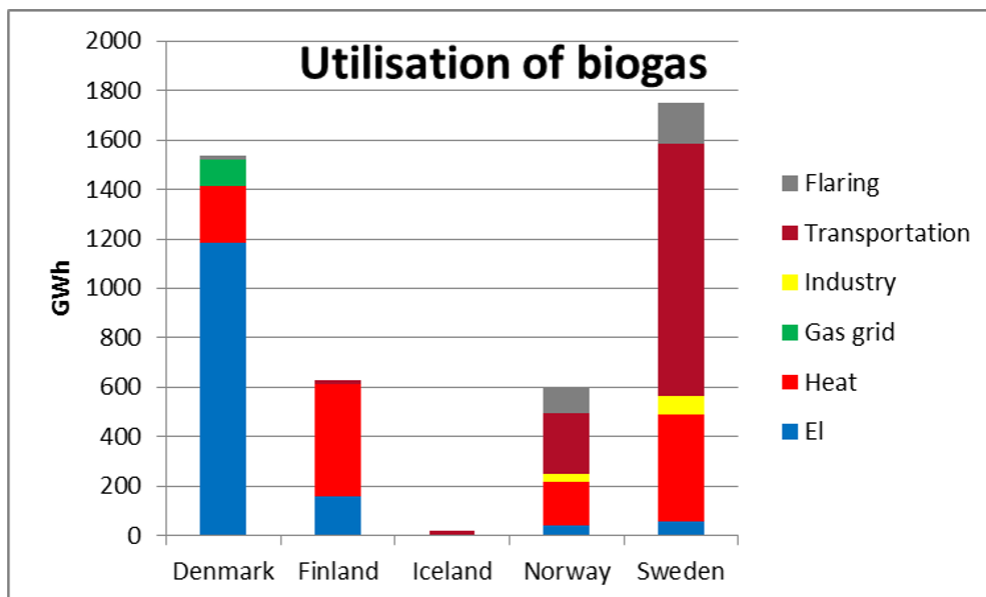
Figur 3: Samlet anvendelse af biogassen

Nordic countries



Figur 4: Overblik over hvor biomassen kommer fra

Nordic countries



Brancheforeningen for Biogas

Figur 5: Anvendelsen af biogassen fordelt på landene

Igor Prodai fra en unavngiven russisk producent af liquefaction teknologi, præsenterede hans synspunkter på, hvorfor biogas er en brugbar energi ressource og hvorfor især markedet for flydende biogas er hastigt voksende.



- Biogas and especially in a liquid form (LBG) is a very useful clean and green renewable energy source.
- Biogas can easily replace benzine or diesel
- To burn biogas for heat or electricity today is as ineffective as burning for heat benzine or diesel fuel.
- We want to support EU technological supremacy in clean and green energy.



Figur 6: Grunde til at anvende biogas

LBG:

- a good replacement for fossil fuels
- suits excellently to any engine
- nontoxic for humans, chemically inactive
- almost no CO₂ emission, no greenhouse effect on atmosphere (but any methane has to be collected)
- can enhance environment in the cities, decrease pollution
- a lot +++ more



BIOETHANE VIA UPGRADED BIOGAS
COMPRESSION & LIQUEFACTION
FROM "ENERGY FROM WOOD & WASTE" LTD

Figur 7: Grunde til at anvende flydende biogas

Attila Kovacs fra den europæiske biogas organisation (EBA) præsenterede en række spændende synspunkter vedrørende den politiske dimension, og hvorfor især transportsektoren er et meget spændende marked for biogassen.

Biomethane in transportation - estimated

	Total	Transport	Share
	M m ³	M m ³	transport
SE	130.3	101.6	78.0%
NL	68.3	27.3	40.0%
DE	914.0	27.4	3.0%
CH	16.6	5.5	33.0%
UK	70.0	2.8	4.0%
FI	4.0	1.7	43.0%
Other	14.1	1.4	10.0%
Total	1,217.3	167.8	13.8%

Figur 8: Andel af biogas som anvendes til transportformål

Liquefied Biomethane Offers Most



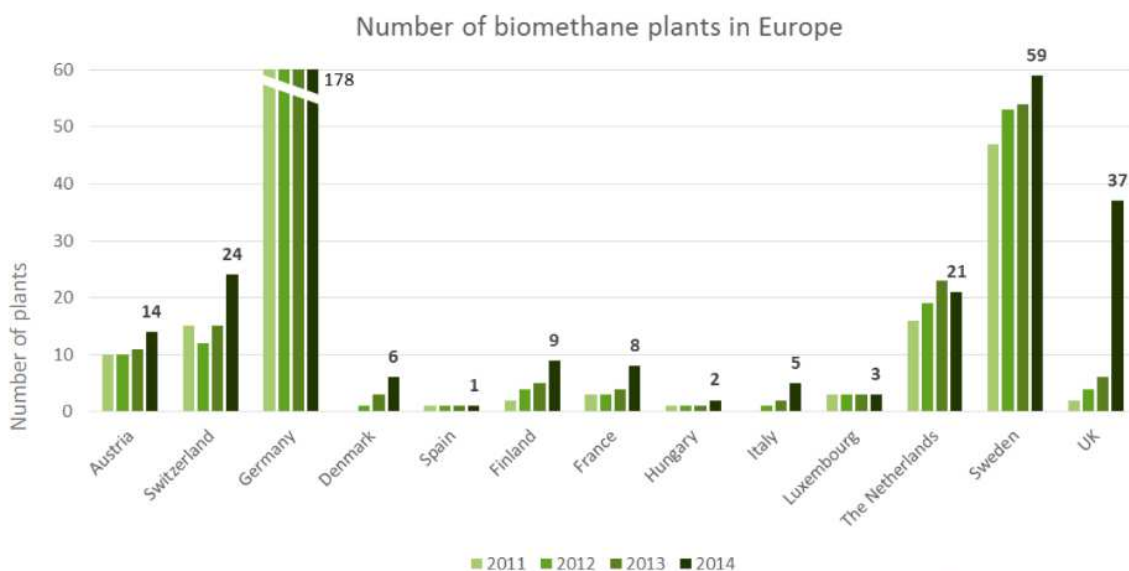
- **Targeting large consumption applications**
- **Sharing infrastructure (LNG imports)**
- **Replacing diesel and fuel oil (bunker fuel)**
 - Bunker fuel - up to 3.5% sulphur (2012, open ocean)



Figur 9: Primære anvendelsesområder

Mr. Kovacs havde især fokus på at LBG er et reelt alternativ til især MGO (Marine Gas Oil) til den maritime sektor, hvorfor der i forbindelse med de seneste krav fra IMO Marpol til maksimalt svovlindhold i brændstof til den maritime sektor, vil ske et stort skred over mod yderligere anvendelse af LNG (LBG) da dette drivmiddel opfylder alle nuværende og kommende krav (inklusiv ECA NOx krav gældende fra 2021).

Biomethane plants in Europe



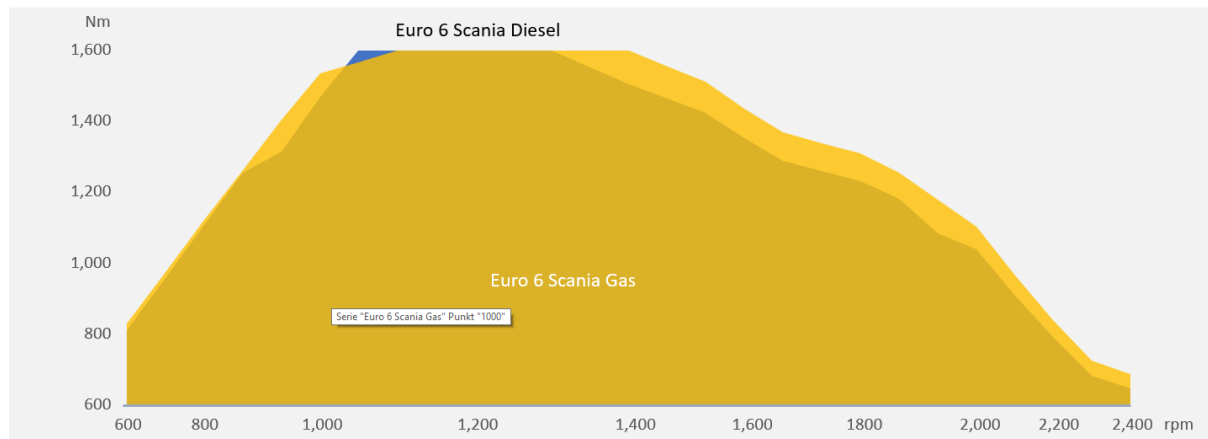
Figur 10: Biogas produktionsenheder i de europæiske lande

Især Tyskland og Sverige er langt fremme hvad angår antallet af biogasanlæg. Siden 2014 er der i Danmark etableret en række produktionsanlæg, som ikke er afspejlet i ovenstående grafik.

Johan Améen fra Scania Trucks præsenterede Scanias seneste serie af biogasdrevne køretøjer. Hovedpunkterne i præsentationen er at Scanias gasmotorer nu er fuldt ud konkurrencedygtige med Scanias dieselmotorer hvad angår trækraft (moment)

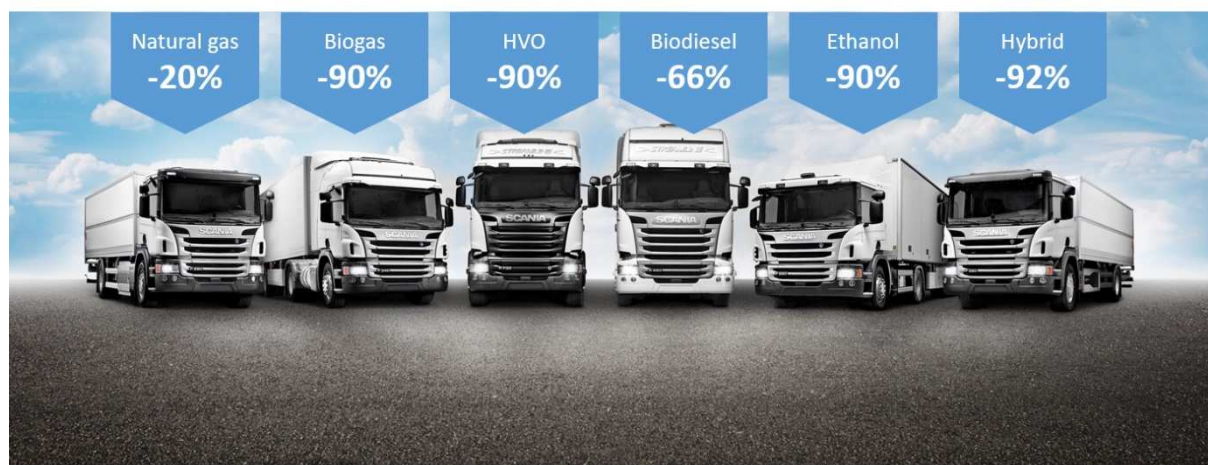
Paradigm shift – Scania Gas Engines

Power development



Figur 11: Trækraft for Scanias EURO 6 model

The CO₂ targets can be reached here and now

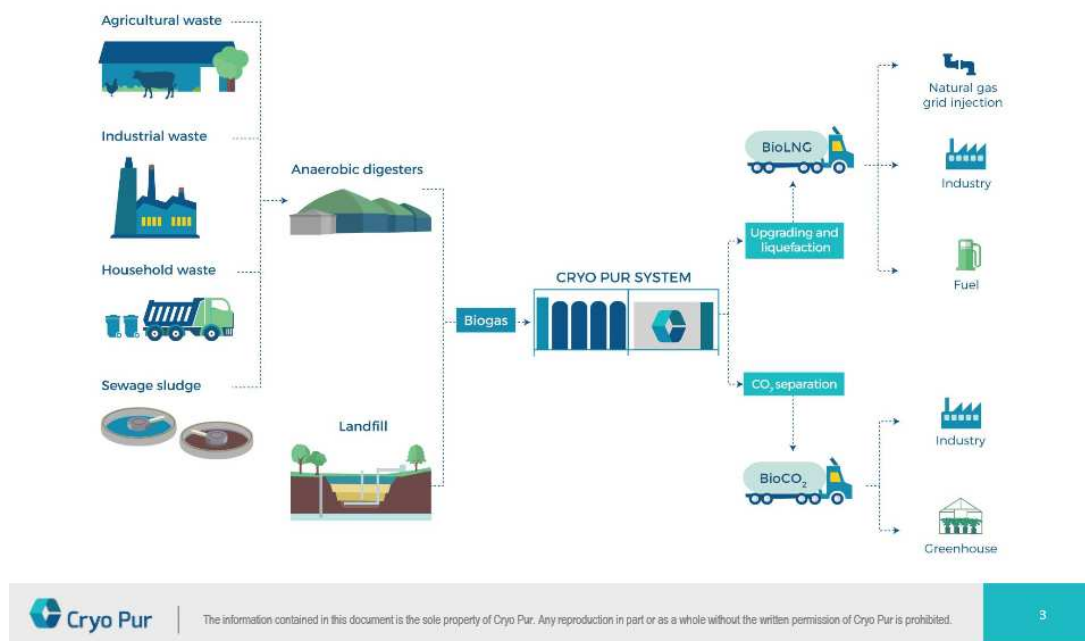


Figur 12: Scanias udvalg af alternativt drevne køretøjer.

Benjamin Berg fra Cryo Pur præsenterede en række spændende løsninger for biogassværdikæden, herunder hvordan den cirkulære økonomi indgår som et vigtigt element for produktion, distribution, anvendelse og anvendelse af restprodukter.



Cryo Pur in the biogas value chain



Figur 13: Cryo Purs placering i biogas leverancekæden

Olli Nevalainen fra Gasum præsenterede en række faktorer, der pådriver anvendelsen af LNG og LBG. Gasum som er en del af SkanGas gruppen, der driver en række LNG faciliteter i NO, SE og FI.



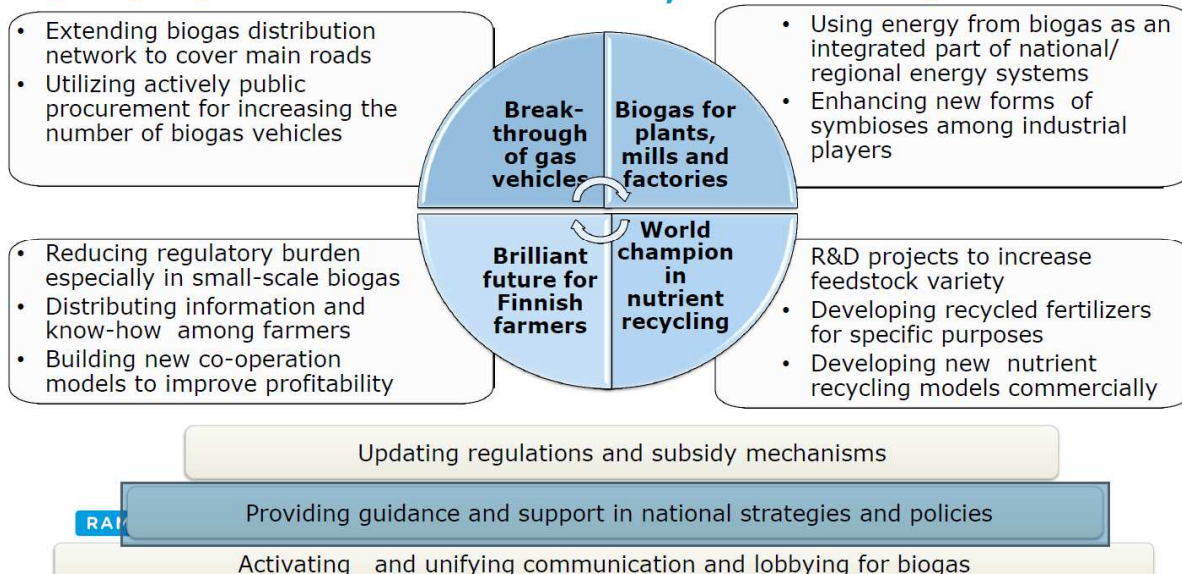
DRIVERS FOR LNG and lbg market growth

- Increasing emission regulation e.g. in the maritime sector in the Baltic Sea
- Targets for greenhouse gas emission reductions
- Targets for increasing the share of renewable fuels
- Corporate environmental responsibility
- Key segments:
 - Maritime
 - Industrial
 - Heavy duty vehicles

Figur 14: Drivere og markedsområder for biogas

Mirja Mutikainen fra Rambøll præsenterede et interessant studie for hvordan biogas kan vinde yderligere indpas som drivmiddel til transportsektoren samt i andre anvendelsesområder:

MORE THAN 80 FACILITATING OR ENABLING ACTIONS WERE IDENTIFIED, EXAMPLES



Udover en række spændende præsentationer og gode netværksmuligheder, var der ligeledes et interessant udstillingsområde.



Figur 15: Udstillingsområde i forbindelse med konferencen