



nature
energy

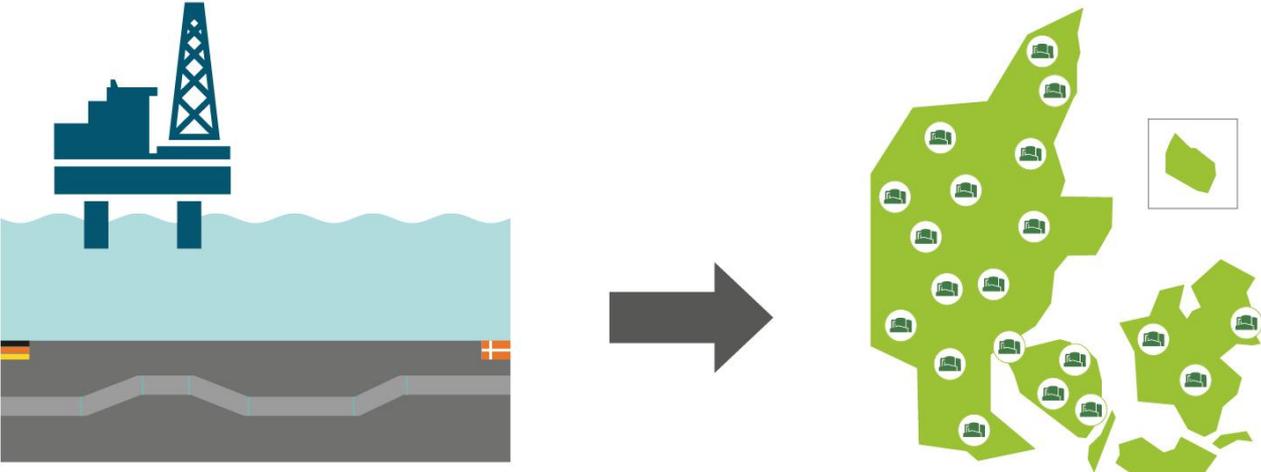
The Circular Economy and Biogas production

Jonas Svendsen, Nature Energy
Amsterdam, 13th May 2019

Jonathan Stern, The Oxford Institute For Energy Studies

“Failure of the gas community to create and deliver credible decarbonisation narratives is likely to result in the adoption of electrification rather than gas decarbonisation options.”

A green future for the Danish gas grid



Are there biomasses enough?

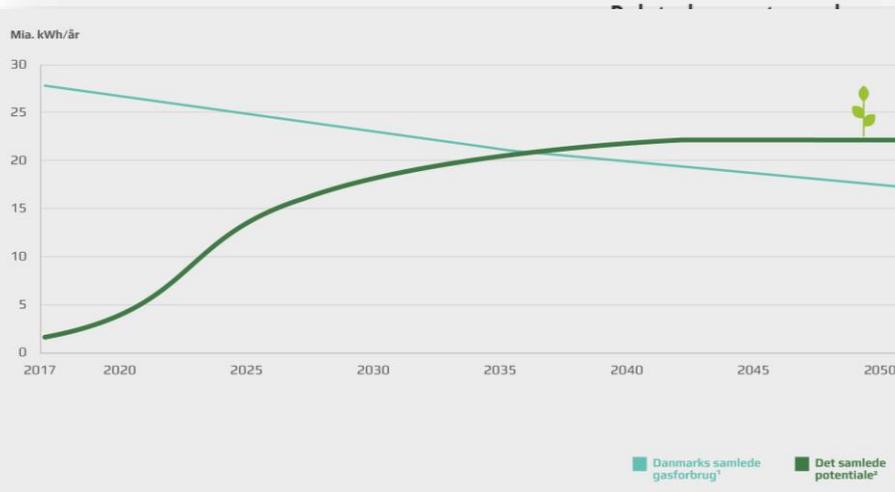
THE DANISH GAS GRID COULD BE FILLED WITH GREEN GAS IN 2035

According to a memorandum published by Green Gas Denmark on the 14th of November, Denmark's gas grid could be running entirely on green gas in 2035. Thus, Denmark could become independent of natural gas and cover their consumption entirely with green gas produced from industrial waste and agricultural by-products.

By State of Green, 2017.11.16

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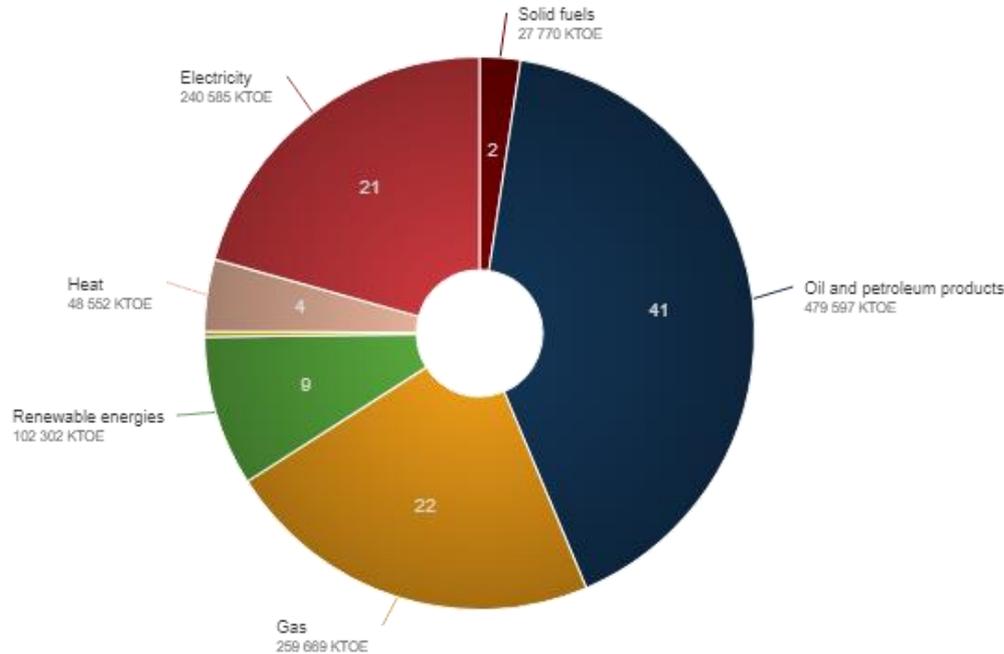
Are we able to reduce cost?

- Economy of scale with large plants
- Standardisation
- R&D
- Increased revenue from other channels than biogas



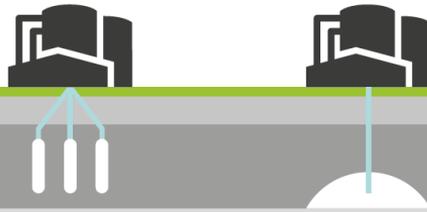
Is electricity the answer to everything?

Fuels going into Final consumption
European Union (28 countries) 2017



Source: Eurostat

Denmark has two gas storages that are 85.000 times larger than the Tesla battery in South Australia



1/3 Af Danmarks
årlige elforbrug

How do we produce biomethane?



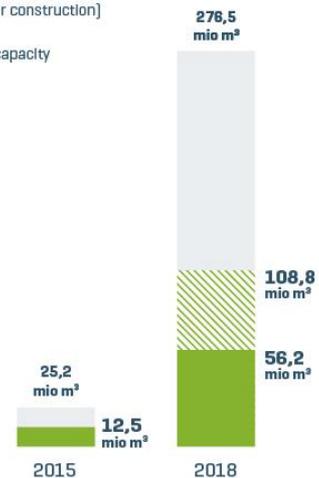
Our concept:

Build, own & operate

● Green gas on grid in Denmark

▨ Production capacity
(plants under construction)

● Production capacity





Holsted

Production: 12,5 (20,7) million m³ pr. year
Biomass capacity: 400.000 (600.000) tonnes

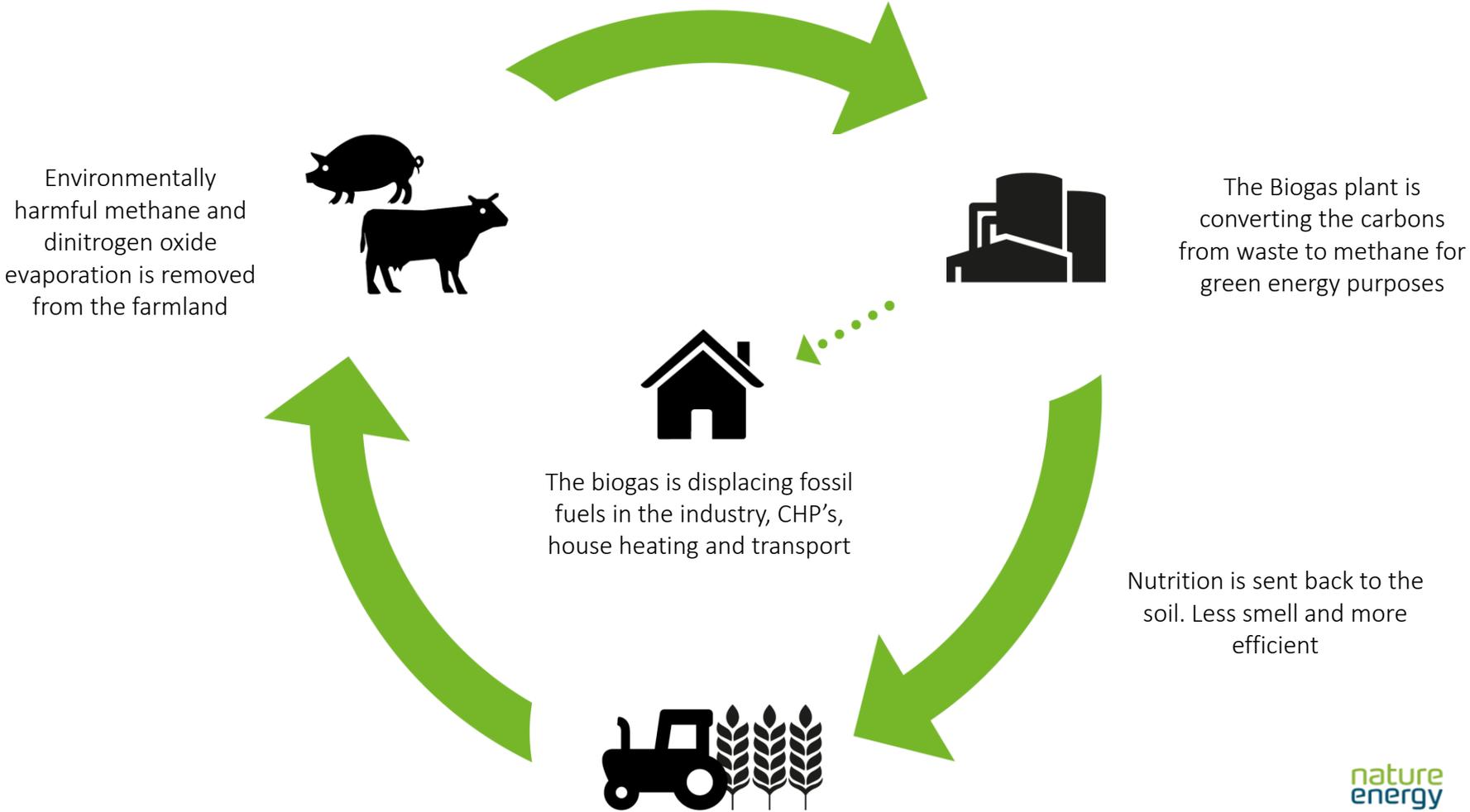


Korskro

Production: 36,1 million m³ pr. year
Biomass capacity: 1.050.000 tonnes



A more circular future?



Environmentally harmful methane and dinitrogen oxide evaporation is removed from the farmland

The Biogas plant is converting the carbons from waste to methane for green energy purposes

The biogas is displacing fossil fuels in the industry, CHP's, house heating and transport

Nutrition is sent back to the soil. Less smell and more efficient

PENGE

Gyllebobler i øl og sodavand

CO₂ fra verdens største biogasanlæg skal genbruges i fødevarerindustrien, hvor den udskældte drivhusgas er en mangelvare. Men bare rolig: du slipper for lugten.



Danish CO₂ from agriculture becomes bubbles in your soda

Nature Energy and Strandmøllen A/S have entered into a partnership under which excess CO₂ from one of the world's largest biogas plants in Esbjerg will be recycled as, for example, bubbles in your soda. Under the partnership, Strandmøllen will have easy access to necessary CO₂, which is otherwise in short supply throughout Europe, and, in addition, CO₂ emissions from the biogas plant will be reduced by 70% compared with an ordinary biogas plant.

KLIMA

Nu skal husdyrene fodres med dansk-dyrkede mikroalger

Et testforsøg skal vise, om bæredygtige mikroalger kan erstatte importeret sojaprotein, der i dag er landbrugets foretrukne foder.



In the future livestock could be fed with Danish-grown microalgae
A test attempt will show whether sustainable microalgae can replace imported soy protein, which is today the preferred feed of agriculture.

The algae grows in water and receives nutrition and CO₂ from the biogas production. The water can be recycled again and again.

Dit køkkenaffald skal i fremtiden være flybrændstof

Nature Energy vil i et samarbejde med DTU og SDU forsøge at lave brændstof til fly ud af biogas.



Jet fuels based on biogas

Nature Energy is part of a research project together with SAS, the University of Southern Denmark (SDU), and the Technical University of Denmark (DTU)

The purpose is to develop biofuels for heavy transport such as the flight industry.

An offer you can't refuse:

Together we can create the good story about gas.

We are here to help you. We can deliver green and CO2-neutral gas.

You must take ownership out in the field where the end customers are.

Thank you