Biogas eller flydende biobrændsler til tung trafik?

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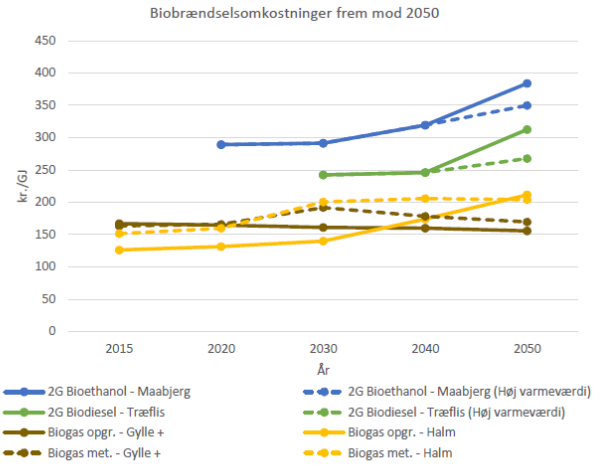
DAKOFA konference
Genanvendelse af organisk dagrenovation – indsamling, sortering, kvalitet og køretøjer

Tirsdag den 9. maj 2017 kl. 9.00-16.00
B!NGS' konferencesal Vesterbrogade 149, st., 1620 København V

Kriterier for bæredygtig bioenergi

1. Så billigt som muligt
2. Skab plads til vindkraft og solkraft: op til 250 – 300 PJ/år
3. Prioriter biomassen til de vigtigste formål
   1. Føde/foder
   2. Materialer/kemikalier
   3. Transportbrændstoffer
   4. Stand-by el ved underskud af vind/sol
4. Integrer brint
5. Udnyt procesvarme
   1. Fra biomasse konvertering
   2. Fra brintproduktion
   3. Fra brændstof produktion
6. Skab fleksibilitet – fx mellem brændstofproduktion og stand-by el produktion
7. Skab synergi med landbruget
   1. Afgrøde optimering og sam-produktion af foder/energi (græs/kløver raffinering)
   2. Co-substrat til gyllebiogas – undgå at miste gyllebiogas potentiale
   3. Returner næringssalte (N, P, K) og svært nedbrydeligt kulstof (C) til markjorden
8. Incitamentstruktur – centrale versus decentrale anlæg

Biogas er den billigste vej til fossilfri kulbrinter



Figur 17: Udvikling biobrændstofproduktionsomkostninger.

Key demands for carbon

- of the fossil free society

- Food & feed production – meat on the menu
- Balancing supply and demand of electricity, storable fuels
- Energy dense fuels for mobility purposes
- Some industrial processes – high temp/need for a flame
- Carbon feedstock for chemicals & materials

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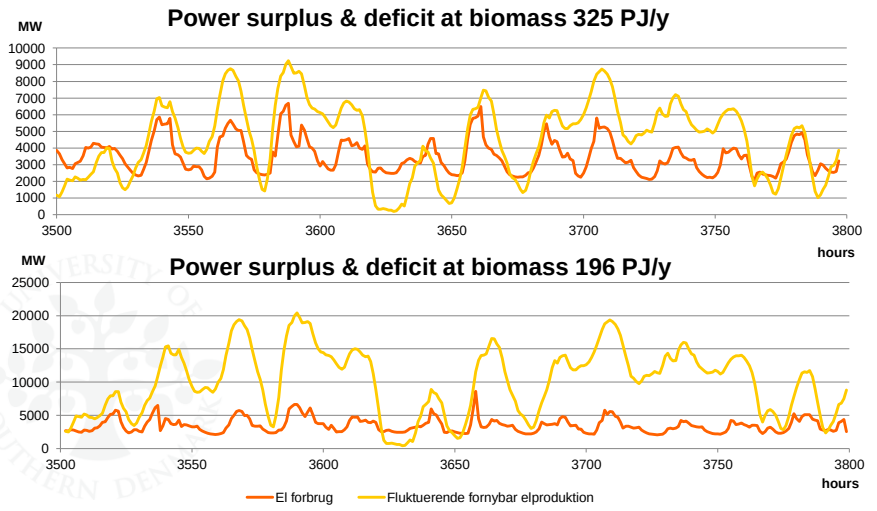
Electricity balancing

- the influence on the power surplus/deficit ratio



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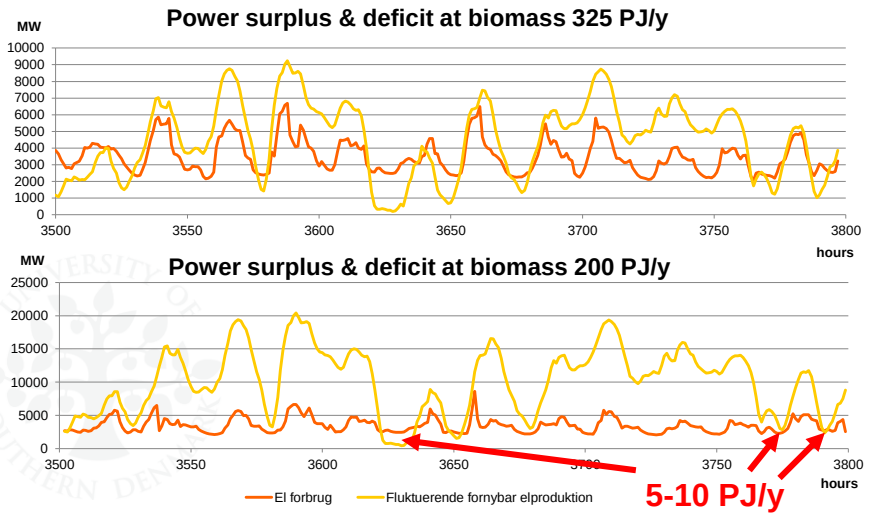

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Industrial processes and materials

- Industry today ≈ 80 PJ/year. About 75% can be electrified => 20 PJ/year demand for hydrocarbons
- Waste today = 42 PJ/year of which 30 % is plastic => 13 PJ/year demand for hydrocarbons for plastics without increased recycling => max 10 PJ/year including recycling

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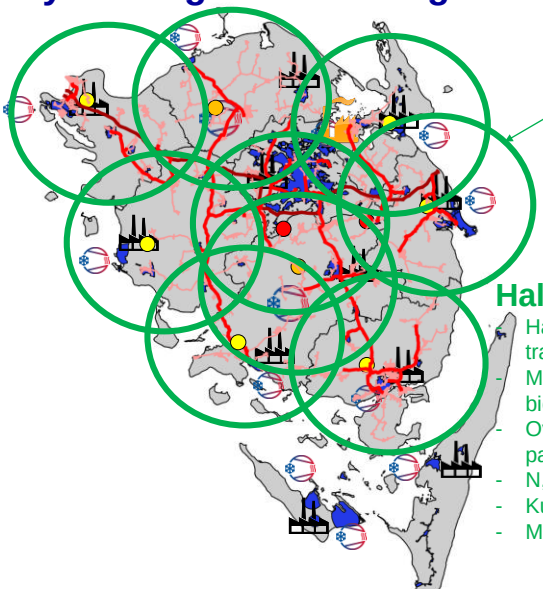
Energy dense fuels for mobility purposes

- Today: 200 PJ/y of which:
  - Light road transport 110 PJ/y, heavy road 50 PJ/y, aviation 30 PJ/y, rail 6 PJ/y, sea (domestic) 4 PJ/y
- In 2050 around 80-100 PJ/year:
  - Light road 5-10 PJ
  - Heavy road 30-40 PJ/y
  - Aviation 30-40 PJ/year
  - Rail 10 PJ/year
  - Sea 5 PJ/year

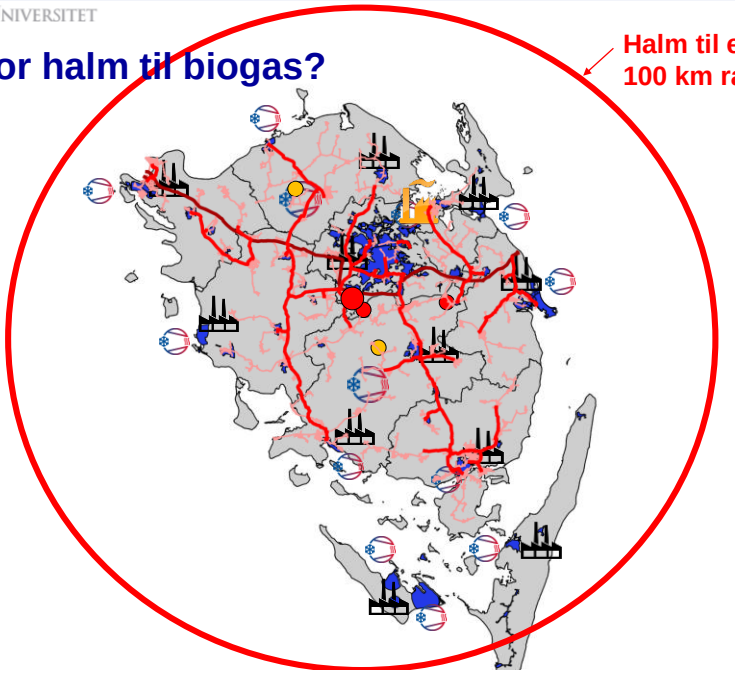
Energiplan Fyn – biogas har en nøglerolle



Halm til biogas
20 km radius

Halm til biogas
- Halmen kan blive på traktoren
- Max støtte til gylle-biogas
- Overskudsvarme passer til fjernvarme
- N, P, K tilbage til jord
- Kulstof tilbage til jord
- Max brint optag

Hvorfor halm til biogas?



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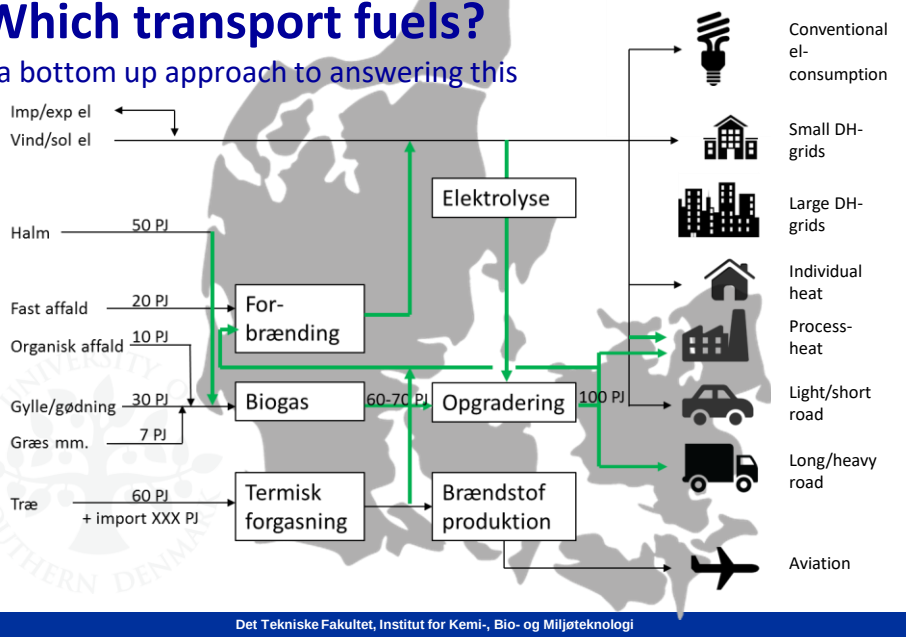
Kriterier for et bæredygtigt VE system

- sammenligning af ethanol og biogas

Systemintegration success criteria	Biogas	Ethanol
Pris	+	-
Vindkraft indpasning	+	-
Prioriter biomassen	+	(+)
Integrer brint	+	-
Udnyt procesvarme	+	-
Skab fleksibilitet – transportbrændstof – el – industri	+	-
Skab synergi med landbruget	+	-
- Afgrøde optimering (græs/kløver raffinering)	+	-
- N, P, K og C	+	-
- Co-substrat til gyllebiogas	+	-
GHG proces emissioner	-	+

Which transport fuels?

- a bottom up approach to answering this



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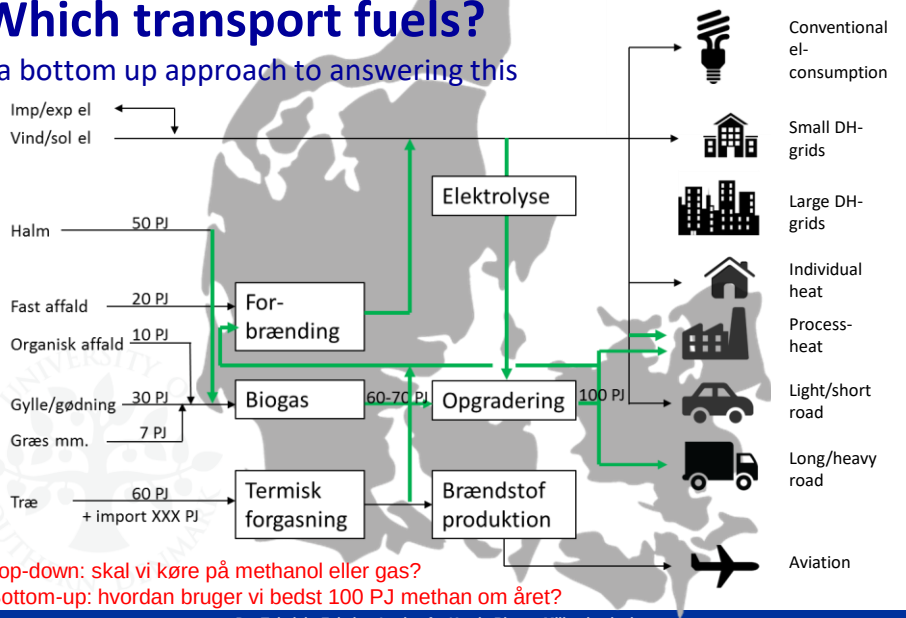

Top-down: skal vi køre på methanol eller gas?
Bottom-up: hvordan bruger vi bedst 100 PJ methan om året?

Det Tekniske Fakultet, Institut for Kemi-, Bio- og Miljøteknologi

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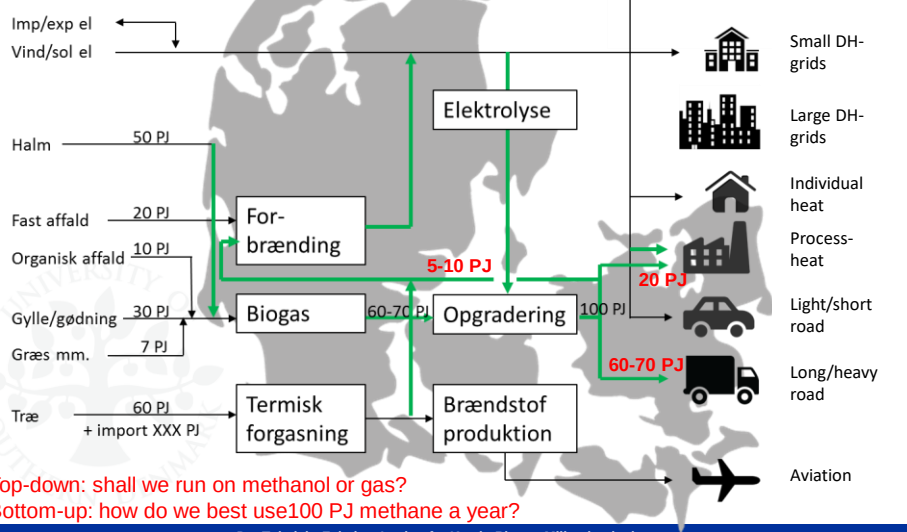

Top-down: shall we run on methanol or gas?
Bottom-up: how do we best use100 PJ methane a year?

Thank you for your attention