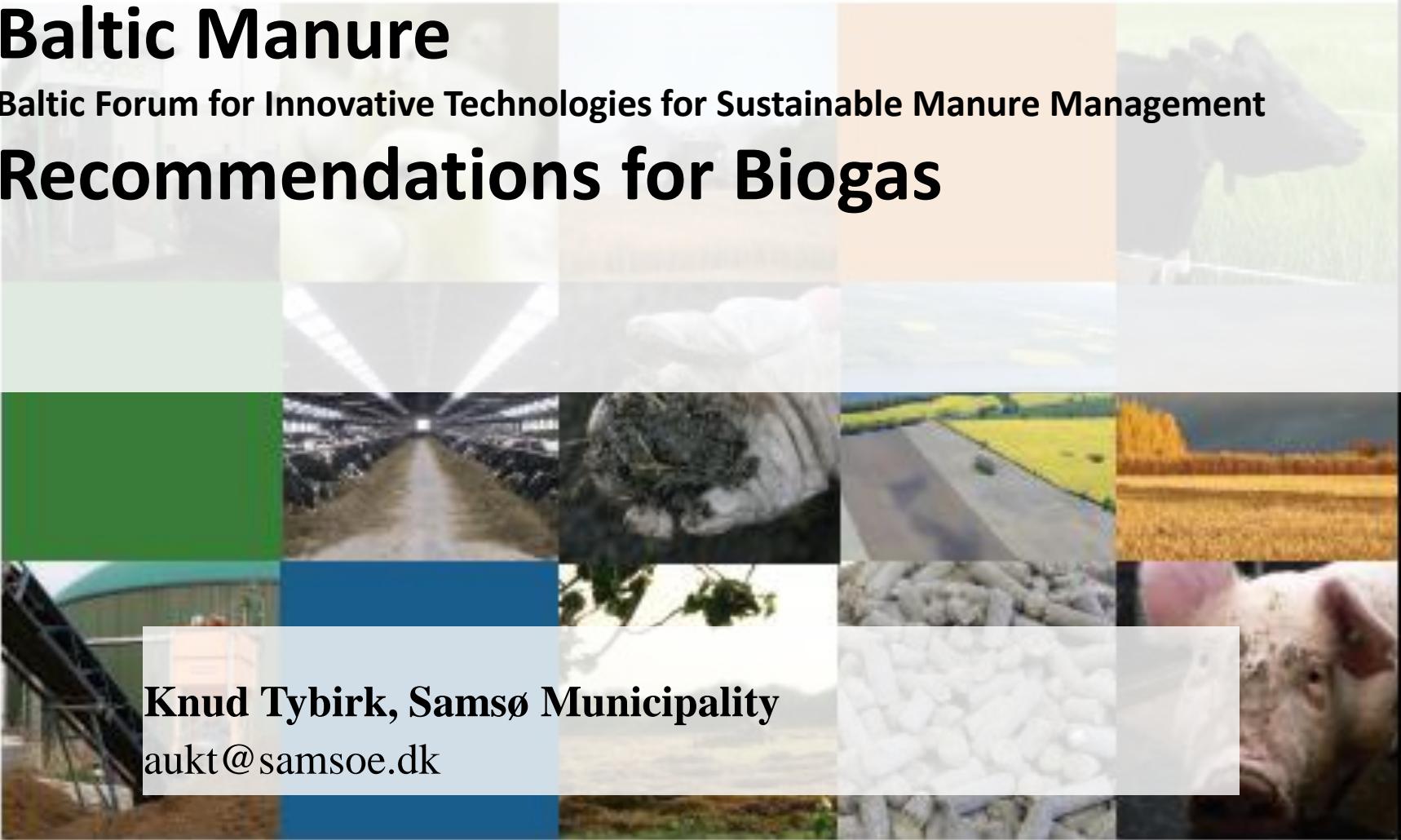


# Baltic Manure

Baltic Forum for Innovative Technologies for Sustainable Manure Management

## Recommendations for Biogas



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Pre-Basic Biogas, Malmö

8-11-2016

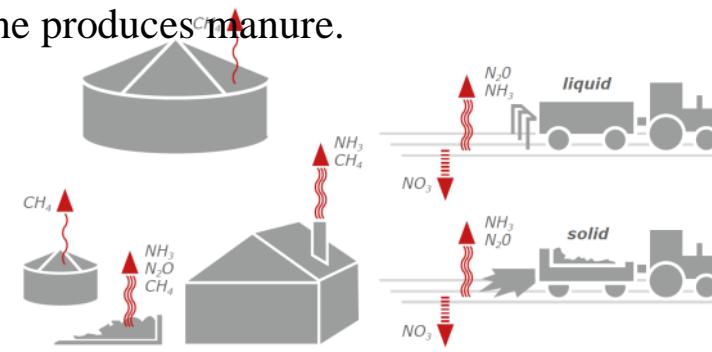
# Content

- Baltic Manure results & Recommendations from 2013
  - [http://www.inbiom.dk/Files//Files/Publikationer/Projektbrochure\\_baltic\\_manure\\_2013.pdf](http://www.inbiom.dk/Files//Files/Publikationer/Projektbrochure_baltic_manure_2013.pdf)
- Danish biogas results from 2016 on manure co-substrates



# Top ten recommendations...

1. Optimize animal feeding and reduce water use/spillage
2. Ensure sufficient capacity of covered, cold storage facilities
3. Analyse nutrient content of manure and
  - dose manure precisely to the needs of the crops and at the right time
4. Inject, incorporate immediately or acidify the manure when applying in the field
5. Generate energy from the manure if possible
  - biogas and sustainable co-substrates
6. Agree on norms and quality criteria for manure fertilizer products of different origin
7. Deploy a set of maximum P-limit at the EU level, depending of soil and crops needs
8. Change the status of certified composted or digestated manure from a waste into marketable products
9. Ensure that advisors and farmers are educated in manure handling technologies and related economic calculations
10. Remember that by consuming meat and dairy products one produces manure.



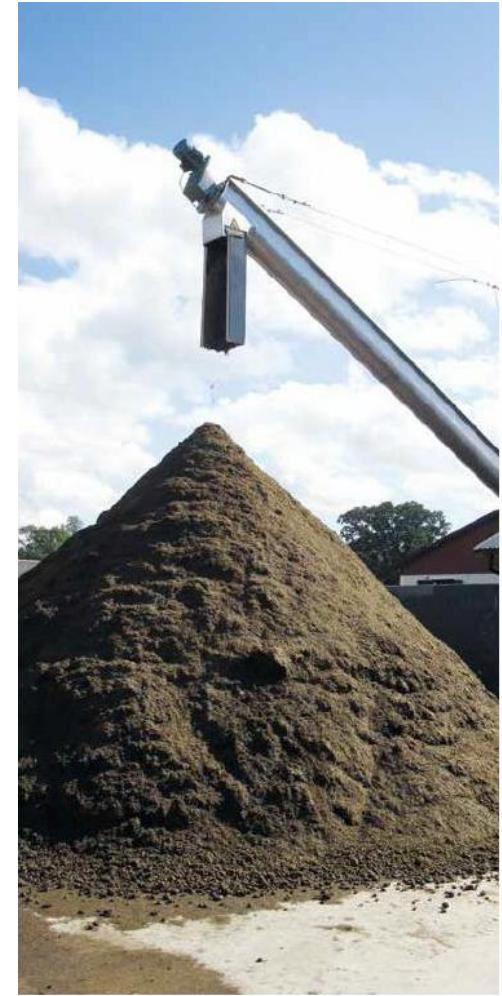
# Manure energy

- Biogas is a key recommendation
  - Thermic gasification of fibers can be possible.
- The digestate
  - should be post-digested,
  - stored in covered storages and
  - applied to the fields with proper methods and timing



# Co-substrates

- Co-substrates
  - chosen according to sustainability
  - solid manure/deep litter
  - agricultural and societal wastes and by-products
  - maize is not recommended.



# Anything New from Baltic Manure?

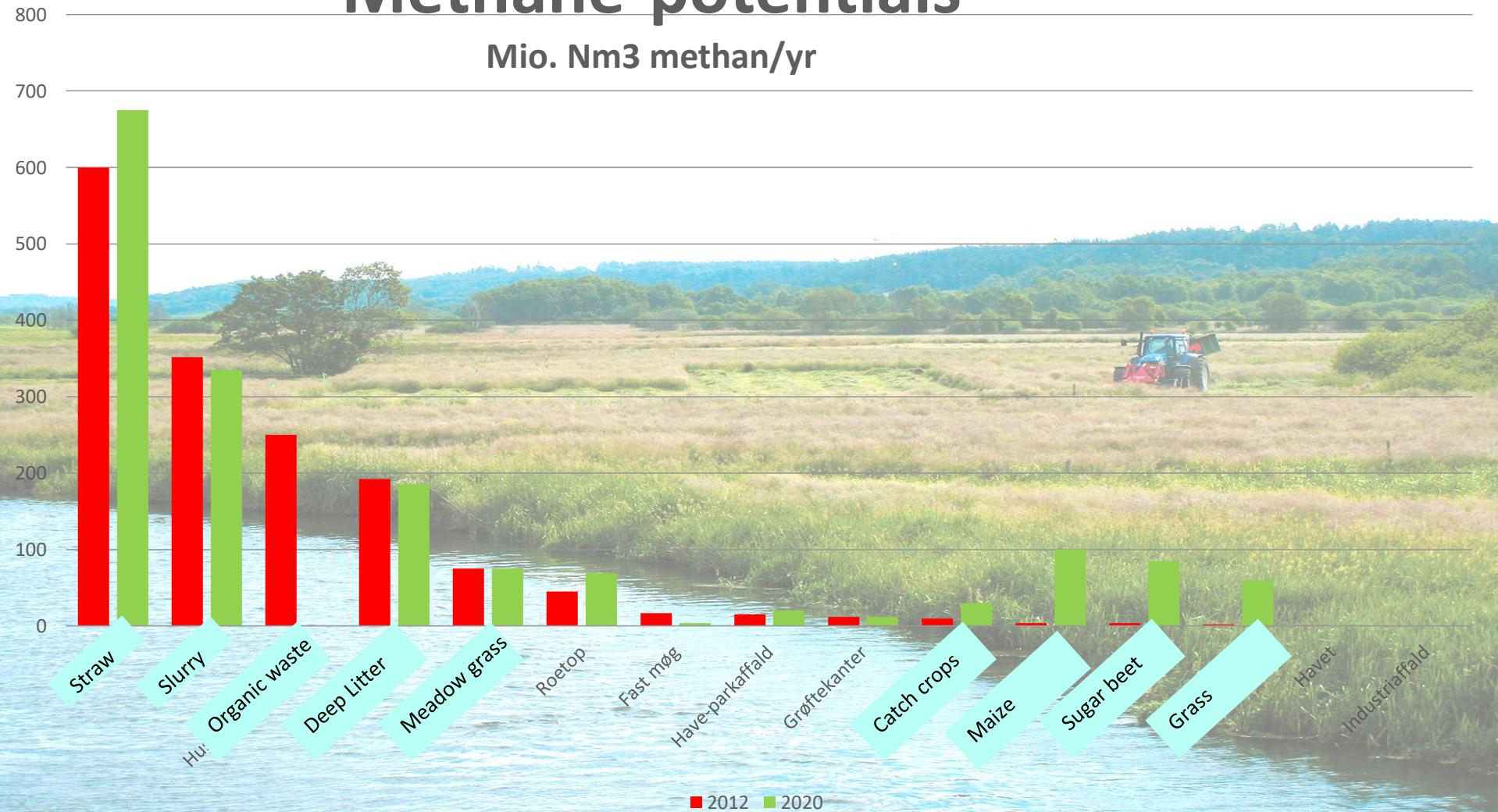
- Soy bean import is perhaps more important for the Baltic Sea pollution than manure handling.....
- Future livestock might be insect larvae, fish and rabbits!



# Danish manure based biogas

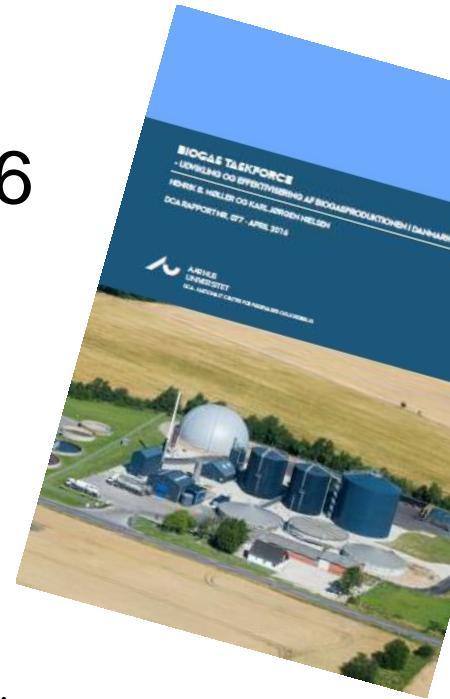
## Methane-potentials

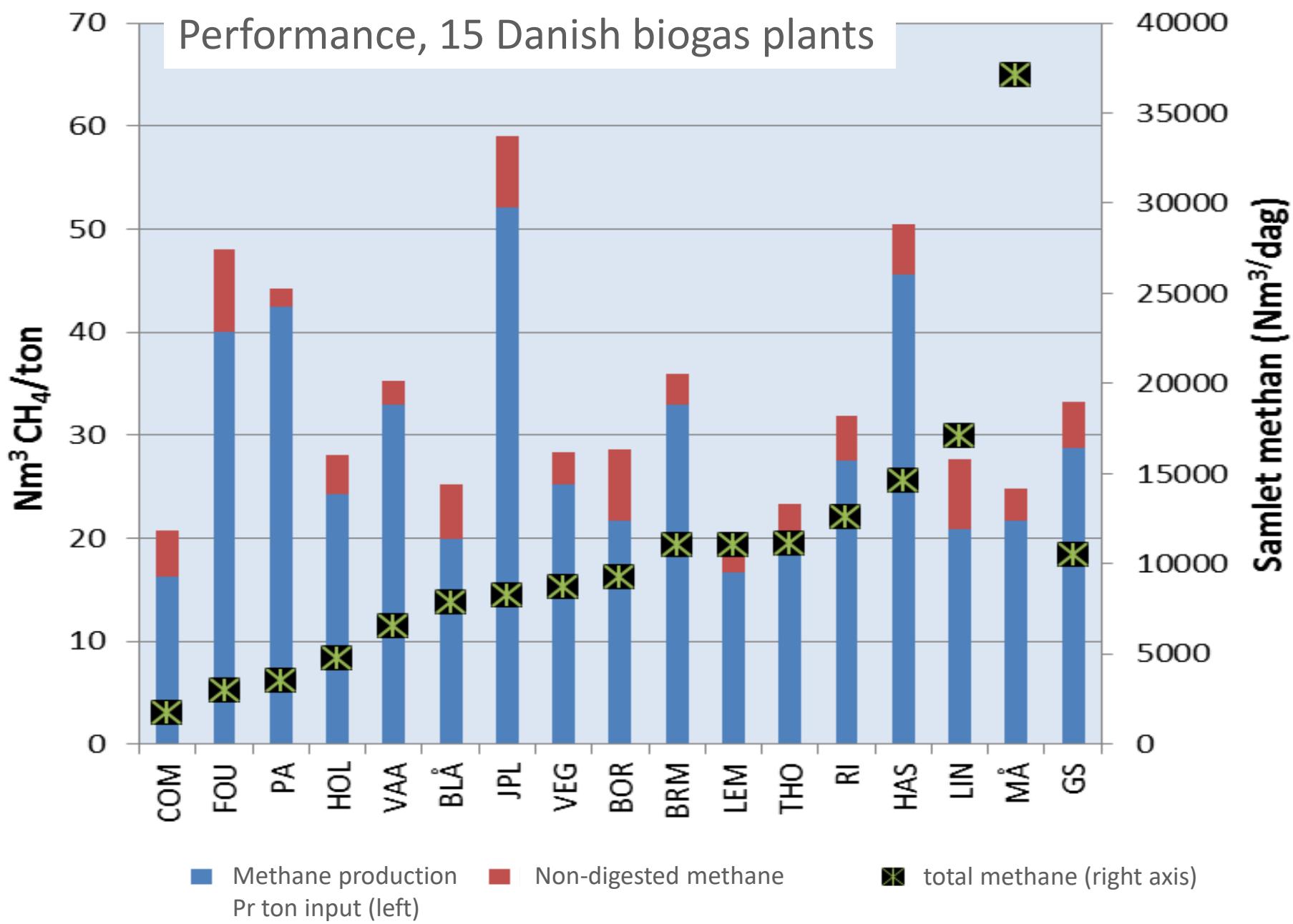
Mio. Nm<sup>3</sup> methan/yr



# Danish results/recommendations 2016

- Methane collection in pre- and mixer tanks is recommended
- Methane leakages should be stopped
- Need for innovation to remove sand (cattle and cast seaweed, beets)
- Ensure 100% sale of gas (no flaring)
- Inoculum is important for straw digestion (adapted culture)
- Load /unload and pretreat biomass in closed buildings with air cleaning
- Increase DM content – especially hay & straw
- Longer Hydraulic retention time is recommended, especially for straw (> 35 days-100 days)
  - Pretreatment of solid co-substrates important with < 35 days HRT
- Pretreatment of straw important for mixing



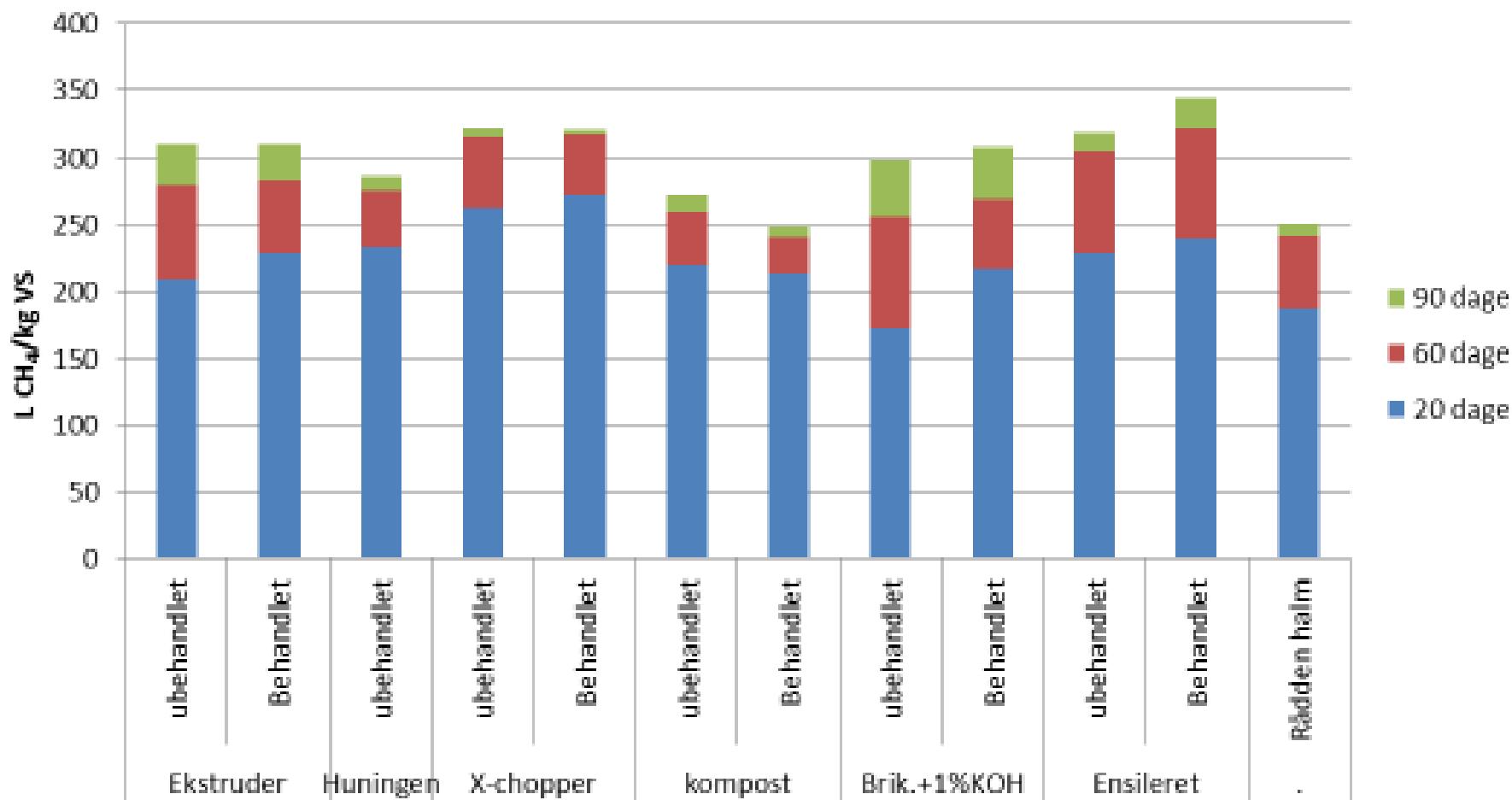


# Pretreatment of straw

Treated straw in water after 30 min



## Hvedehalm



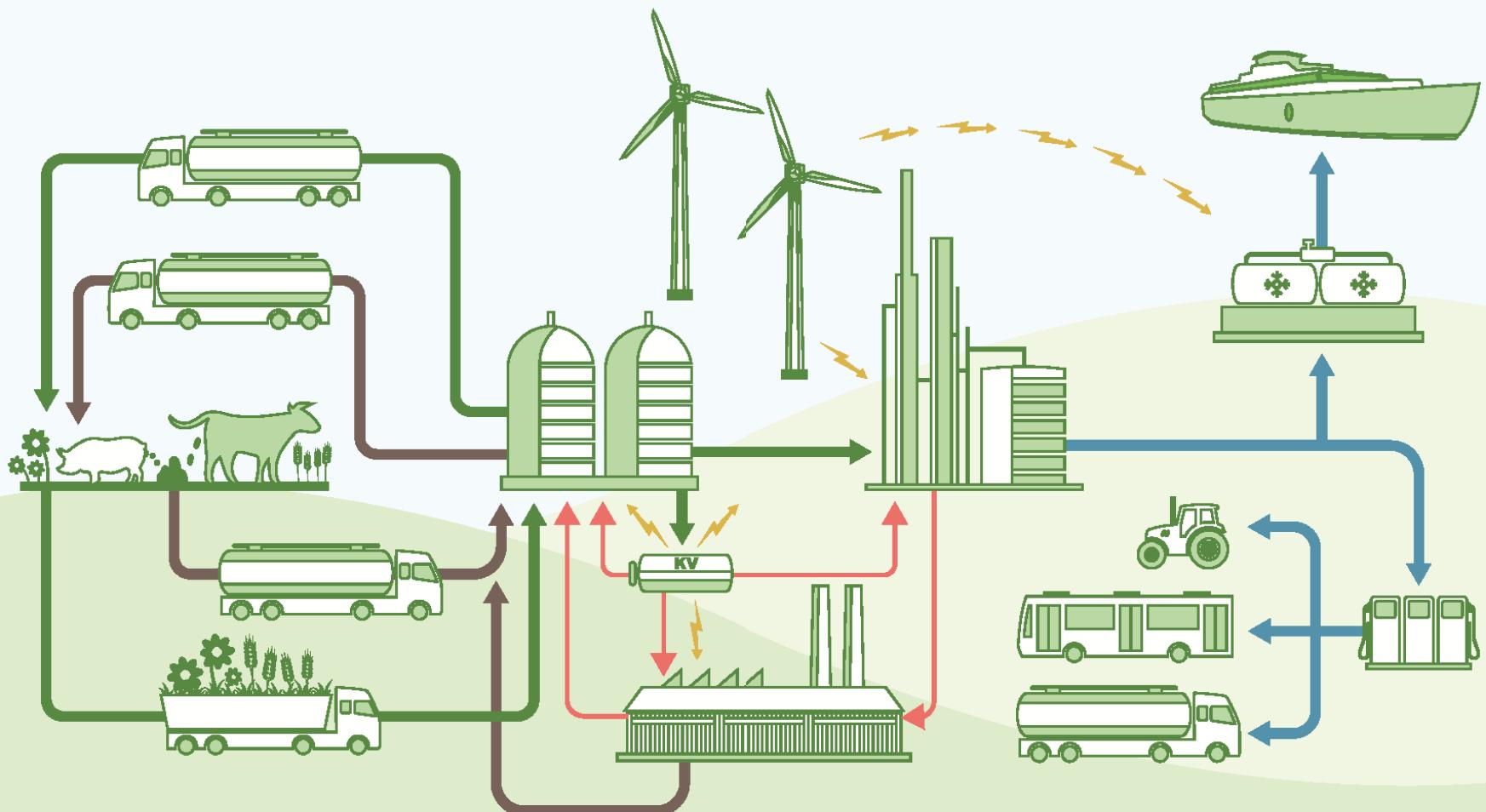
Figur 67. Gaspotentialer L CH<sub>4</sub> /kg VS før og efter forbehandling af halm. For Hüninge indgår kun det ubehandlede halm, da det ikke var muligt at behandle halm med udstyret, uden tilslætning af betydelige mængder majsen-silage

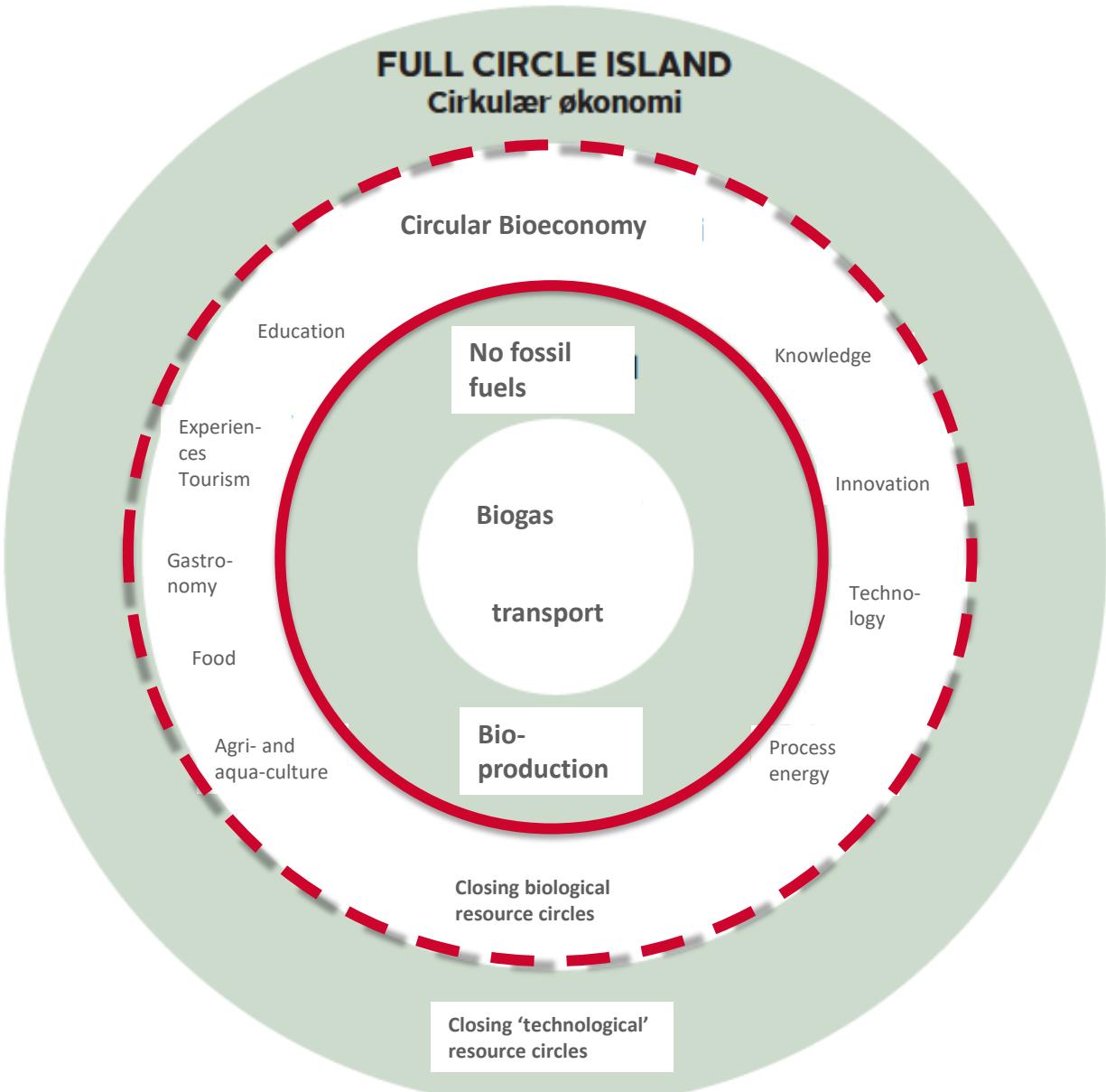
# Remarks

- Energy consumption for speeding up versus HRT
- Tear and wear/ OPEX
- Mixing within tank/ floating layer/ DM max



# Samsoe Feasibility study





Feed proteins  
Fertilizers  
Nutrient recycling  
(N P C)  
More Organic farming  
New crops  
Paludi-culture  
Aqua-culture



# Thank you for your attention!

- And welcome to Samsoe! ☺



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