



# Country update - Denmark

## *Three relevant cases*

September 2022

Sune Tjalfe Thomsen

UNIVERSITY OF  
COPENHAGEN



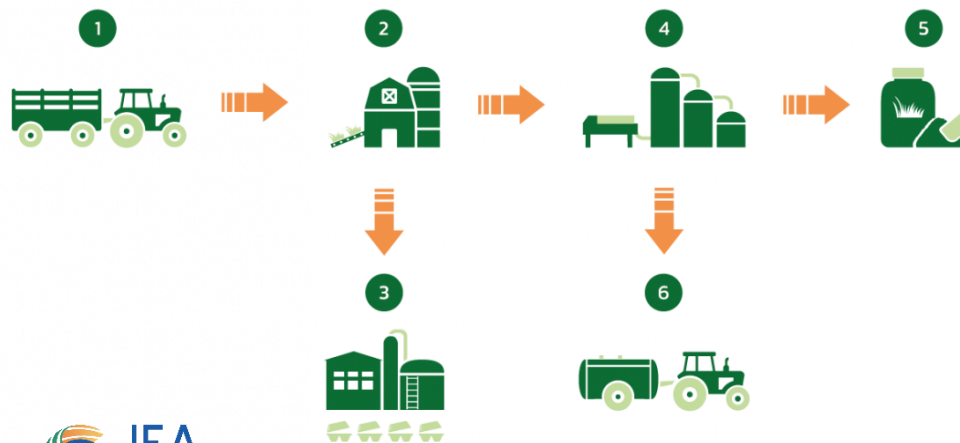
The IEA Bioenergy Technology Collaboration Programme (TCP) is organised under the auspices of the International Energy Agency (IEA) but is functionally and legally autonomous. Views, findings and publications of the IEA Bioenergy TCP do not necessarily represent the views or policies of the IEA Secretariat or its individual member countries.

# Trends - Green biorefining. New Plants.

## BiRefine

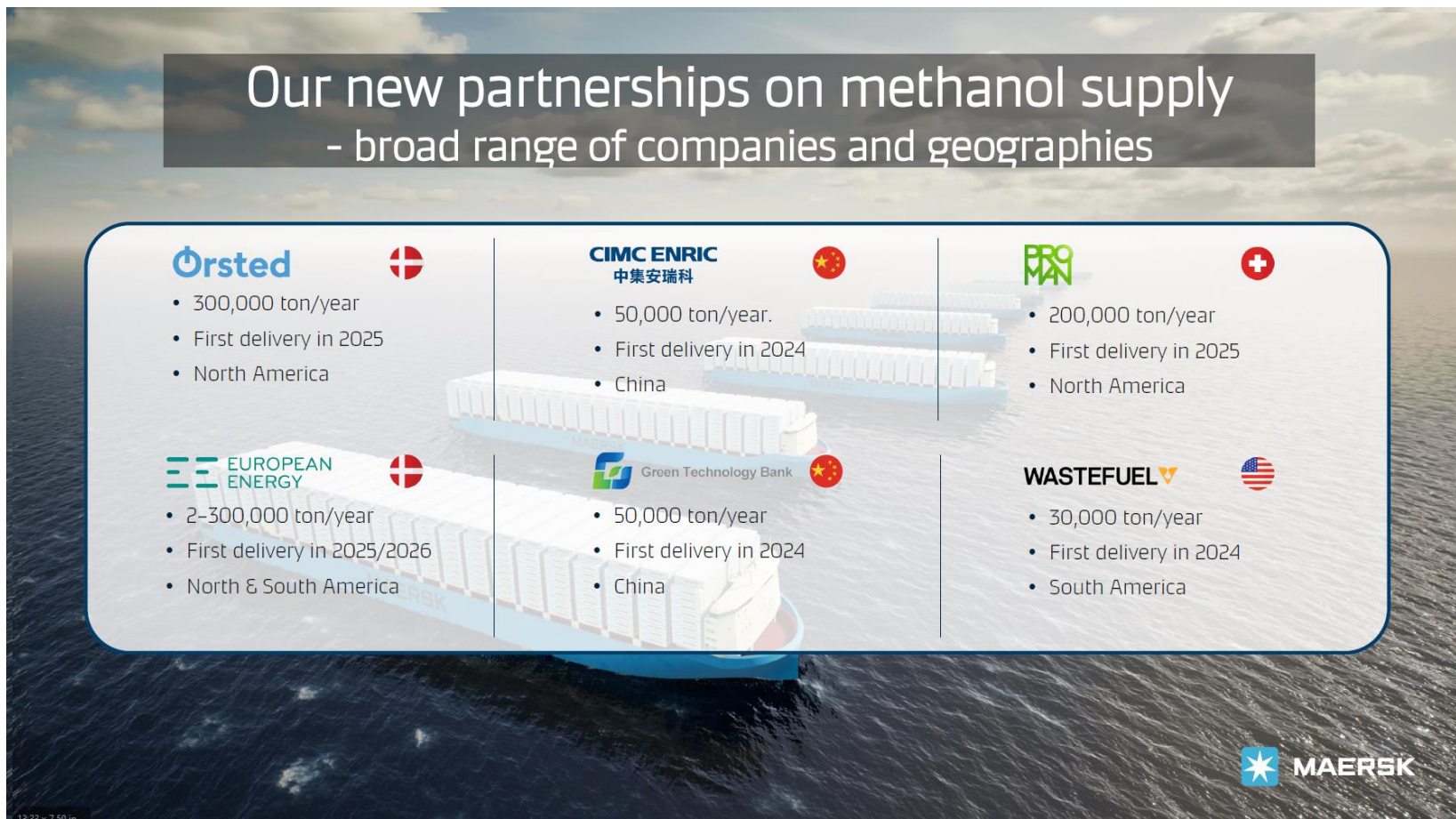
1. Raw materials (clover, grass and alfalfa) are sourced from 3000 ha within 30 km
2. At the biorefinery, the raw material is pressed into two separate streams. A green juice and a green fiber.

3. Presently, the green fiber is used for biogas production. It is expected to be used for 2G eth., packaging, textiles and insulation etc.
4. The green juice is heated to precipitate the proteins. Centrifugation separates the proteins and the brown juice.
5. The proteins - in a form like moist coffee grounds are dried - ready for sale. The product can now be used for hens, chickens, pigs etc. replacing soy cake. Yearly capacity of 7000 metric tons.
6. The brown juice can be used as fertilizer, for biogas, or for further biorefining.



# Trends - alternative marine fuels

- Recent initiatives from Maersk (with slides from Maersk)



**Our new partnerships on methanol supply**  
- broad range of companies and geographies

|                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Orsted</b>  <ul style="list-style-type: none"> <li>• 300,000 ton/year</li> <li>• First delivery in 2025</li> <li>• North America</li> </ul>                             | <b>CIMC ENRIC</b> <br>中集安瑞科 <ul style="list-style-type: none"> <li>• 50,000 ton/year</li> <li>• First delivery in 2024</li> <li>• China</li> </ul>   | <b>PRO</b>  <ul style="list-style-type: none"> <li>• 200,000 ton/year</li> <li>• First delivery in 2025</li> <li>• North America</li> </ul>      |
| <b>EUROPEAN ENERGY</b>  <ul style="list-style-type: none"> <li>• 2-300,000 ton/year</li> <li>• First delivery in 2025/2026</li> <li>• North &amp; South America</li> </ul> | <b>Green Technology Bank</b>  <ul style="list-style-type: none"> <li>• 50,000 ton/year</li> <li>• First delivery in 2024</li> <li>• China</li> </ul> | <b>WASTEFUEL</b>  <ul style="list-style-type: none"> <li>• 30,000 ton/year</li> <li>• First delivery in 2024</li> <li>• South America</li> </ul> |

 **MAERSK**

## Meliora Bio - commercial production of 2G ethanol

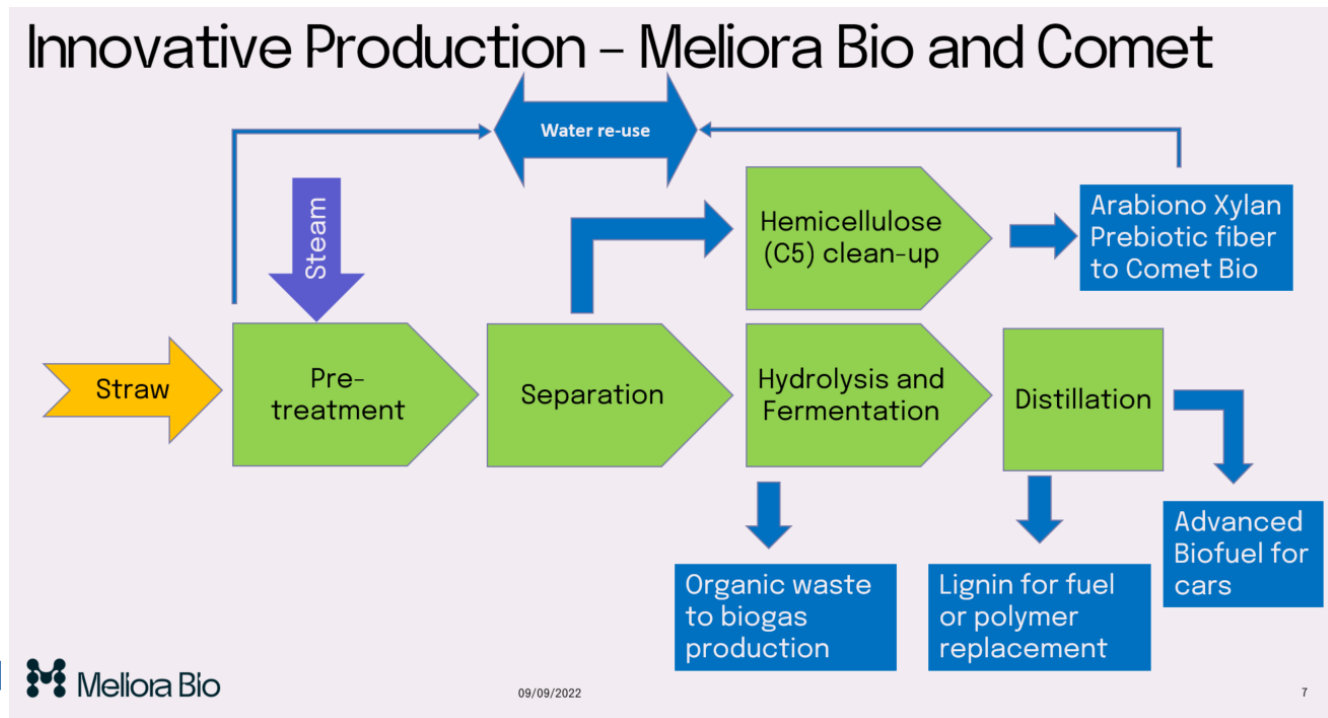
- The former DONG (now Ørsted) Inbicon 2G eth. pilot plant has got new owners and are opening this fall with commercial production of 2G eth. Known now as **Meliora Bio** (*pictures and information provided by the company*)
- In 2020 the plant was base for COVID 19 production of sanitary ethanol for the government. Totally the plant produce 2.5 mill. liters of ethanol for hospitals, schools nursery homes etc.
- Since late 2020 the plant has been under re-construction to fit to the new production
- The plant will start test period in September 2022



<https://meliora-bio.com/>

# Meliora Bio - commercial production of 2G ethanol

- *Meliora Bio* will produce:
  - Bio ethanol: CO<sub>2</sub> reduction in transport
  - Arabinoxylan: Pre-biotic fiber food ingredience in partnership with Canadian company **Comet Bio Inc.**
  - Lignin: Future use replacing polymers and bitumen
  - Biogas: Not processed “waste” goes to biogas production



Sune Tjalfe Thomsen, Associate Professor

University of Copenhagen

Department of Geosciences and Natural Resource Management

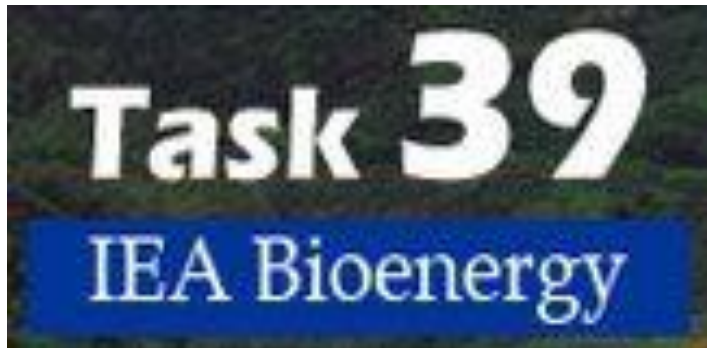
TEL +45 35 33 62 62

MOB +45 50 59 40 49

[stt@ign.ku.dk](mailto:stt@ign.ku.dk)

[www.ign.ku.dk](http://www.ign.ku.dk)

UNIVERSITY OF  
COPENHAGEN



**IEA Bioenergy**

*Technology Collaboration Programme*

[www.task39.ieabioenergy.com](http://www.task39.ieabioenergy.com)

[www.ieabioenergy.com](http://www.ieabioenergy.com)

**Technology Collaboration Programme**

by **iea**