

Süsiniku kasvatus – jätkusuutlik 21. sajandi rohepõllumajandus

Tommy Biene, New Standard Oil, asutaja

Dr-Ing. Antoine Dalibard, FhG IGB Dr-

Ing. Robert Daschner, FhG UMS



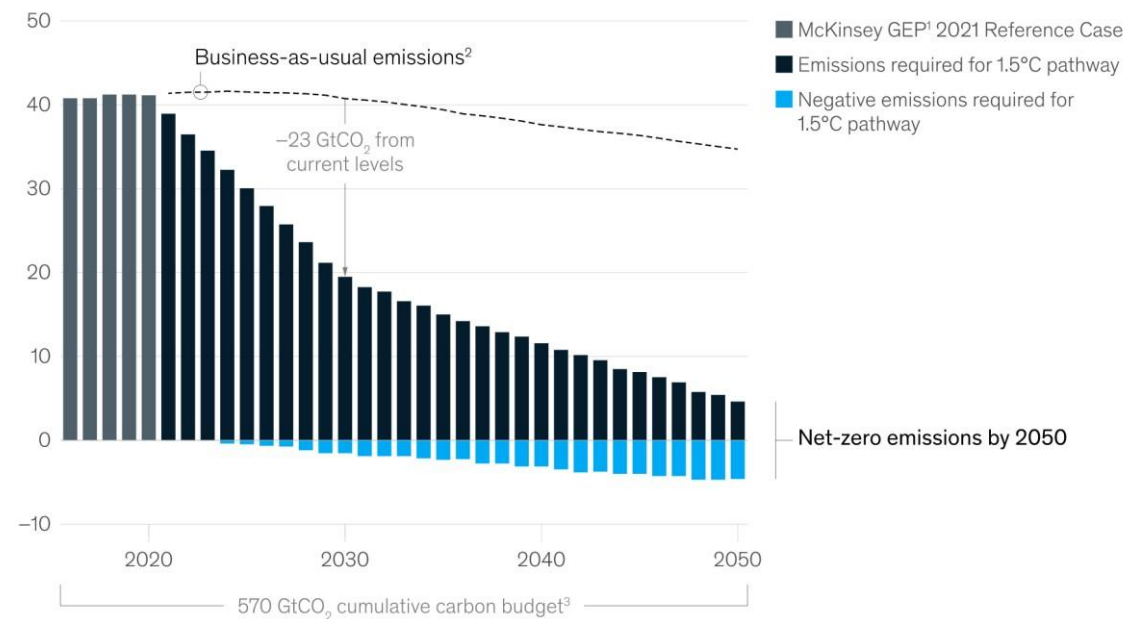
Euroopa Maaelu Arengu
Põllumajandusfond:
Euroopa investeeringud
maapiirkondadesse

Tegutseda mõõdetavate tulemuste nimel

- Laialt levitatud poliitiline eesmärk on kliima soojenemise kasvu pidurdamine
- Toetada saaks ja tuleks mõõdetavat CO₂ ringlusest eemaldamist, soovitatavalt naturaalsel meetodil

Reaching the 1.5-degree warming target could require a large quantity of negative emissions, including some generated using carbon credits.

Global carbon-dioxide emissions, gigatons (GtCO₂) per year



¹Global Energy Perspective.

²While emissions fell by a quarter at the peak of COVID-19-related lockdowns, daily emissions have rebounded to be only 5% lower than 2019 levels. Scenarios to 2050 remain the same. Forster et al., "Current and future global climate impacts resulting from COVID-19," *Nature Climate Change*, August 7, 2020, nature.com.

³Budget of 570 GtCO₂, emissions from 2018 onward offers a 66% chance of limiting global warming to 1.5°C, when assessing historical temperature increases from a blend of air and sea-surface temperatures. Source: Corinne Le Quéré et al., "Global Carbon Budget 2018," *Earth Systems Science Data*, 2018, Volume 10, Number 4, pp. 2141–94, doi.org; IPCC; McKinsey Global Energy Perspective 2021; McKinsey analysis

Dr Rathan Lal: 2% maast mahutab 100% antropogeenset CO₂

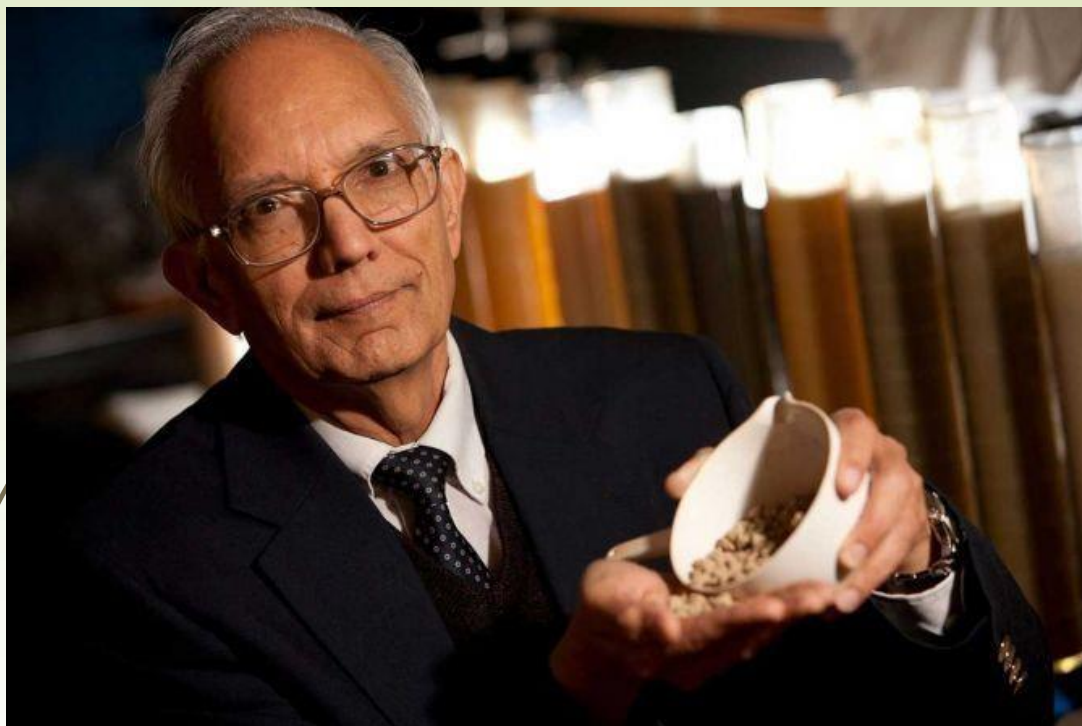


Foto: Dr Rattan Lal, Ohio Ülikool, 2020 World Food Prize laureaat. copyright: Kind courtesy Worldfoodprize.org

¹<https://www.iea.org/reports/direct-air-capture>

- Taimed juba seovad õhus asuvat CO₂, puudub vajadus kapitalimahuka Direct Air Capture¹ tehnoloogia järele
- Taimede söestamine ja seeläbi süsiniku mulda tagastamine parandab nii õhu kui ka mulla

kvaliteeti

Söestatud hein ja põhk mulda tagasi, miks ja kuidas?

- Mulla happesuse vähenemine aga kas on veel mingit kasu?
- Kui palju hektari kohta, kas 50 tonni on palju?
- EMÜ – AGRONOMIA 2018
- Lahaheina biomassist toodetud biosöe omadused, mõju mullale ja karjamaa raiheina biomassi saagile. lk 171
- Henn Raave, Jordi Escuer, Merrit Shanskiy



Maksimeerime süsiniku kogust - mineraalid ja toitaineid tagasi mulda

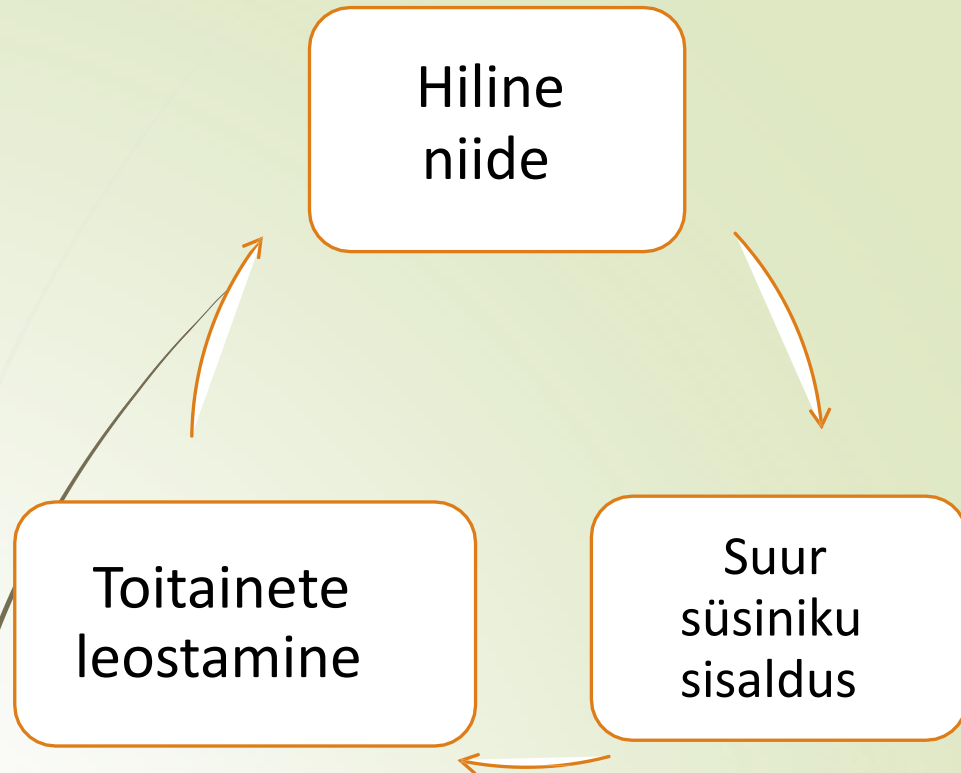


Foto: heina leostamise testimine, 2017 PRIA toetusega uuring. copyright: Leedi Talu, Taivo Roomann

Uniformer® - biogeense ainese rafineerimine

- Ainult taimse söe tootmisest ja CO₂ sidumise teenuse müügist ääriselt ei piisa
- Kaskaadtehnoloogia osad loodi kümme aastat tagasi Fraunhofer IGB-s ja UMSICHT-is
- 02-2023 käivitati edukalt, esimene tööstuslik prototüüp, 2024 esimene piloottehas



Foto: Uniformer MVP_1, copyright New Standard Oil

Fraunhofer-Gesellschaft

At a Glance

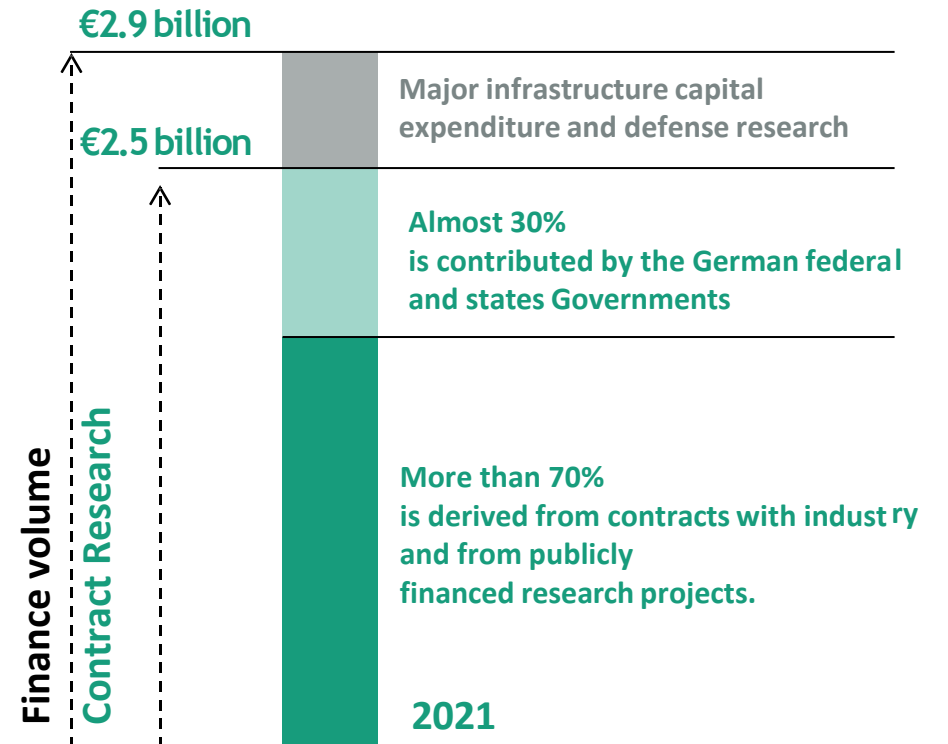
Applied research organization prioritizing key future-relevant technologies and commercializing its findings in business and industry. A trailblazer and trendsetter in innovative developments and research excellence.



30 000 staff



76 institutes and research units



A satellite view of the Earth from space, showing a large, swirling cyclone over the Indian Ocean. The cyclone's eye is clearly visible, surrounded by dense, white clouds. The surrounding landmasses, including parts of Africa, the Middle East, and Asia, are visible in shades of green and brown. The ocean is a deep blue, and the sky is black.

Fraunhofer UMSICHT - Pioneer for a sustainable world

Concepts and technologies for shaping the energy and raw materials transition.

The Thermo Catalytic Reforming Technology (TCR)

Patented Conversion of biogenic residues into sustainable products

Use cases and outcome

- Utilization of biogenic residues (no food vs. fuel discussion)
- Decentralised application possible (regional added value)
- Products with near-zero carbon footprint possible

Products

- Syngas with up to 50 % green hydrogen
- Oil with high thermal stability for processing into standard fuels
- Coal for soil application / storage / energetic use



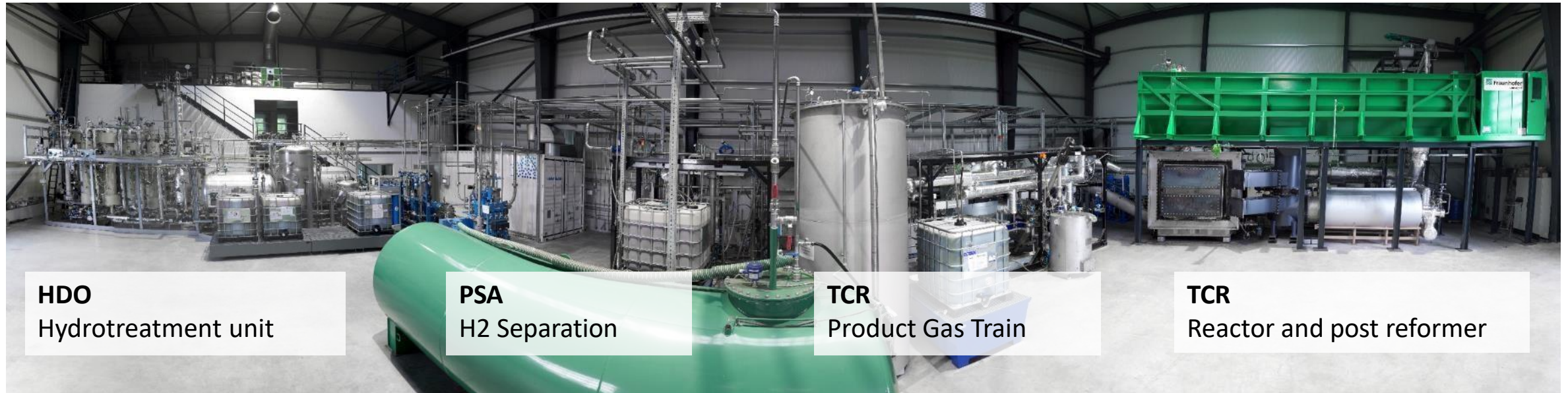
TCR-technology

Demonstration site for waste-to-fuel



TCR-technology

Demonstration site for waste-to-fuel



- Pre-commercial demonstrator in Hohenburg, Bavaria, Germany
- Value chain from feedstock via conversion unit (TCR), separation of Hydrogen from synthesis gas (PSA) and upgrading of bio-oil to fuel quality (HDO)





Research
for a **better**
tomorrow



Fraunhofer Institute for Interfacial
Engineering and Biotechnology IGB

We
combine **Biology**
and **Engineering**

Superheated steam at atmospheric pressure

Working principle

Commissioning

Heating the air inside the chamber to the desired operational temperature;

Creating the atmosphere superheated steam through the evaporation of fine water droplets (or injection of saturated steam);

Continuous operation

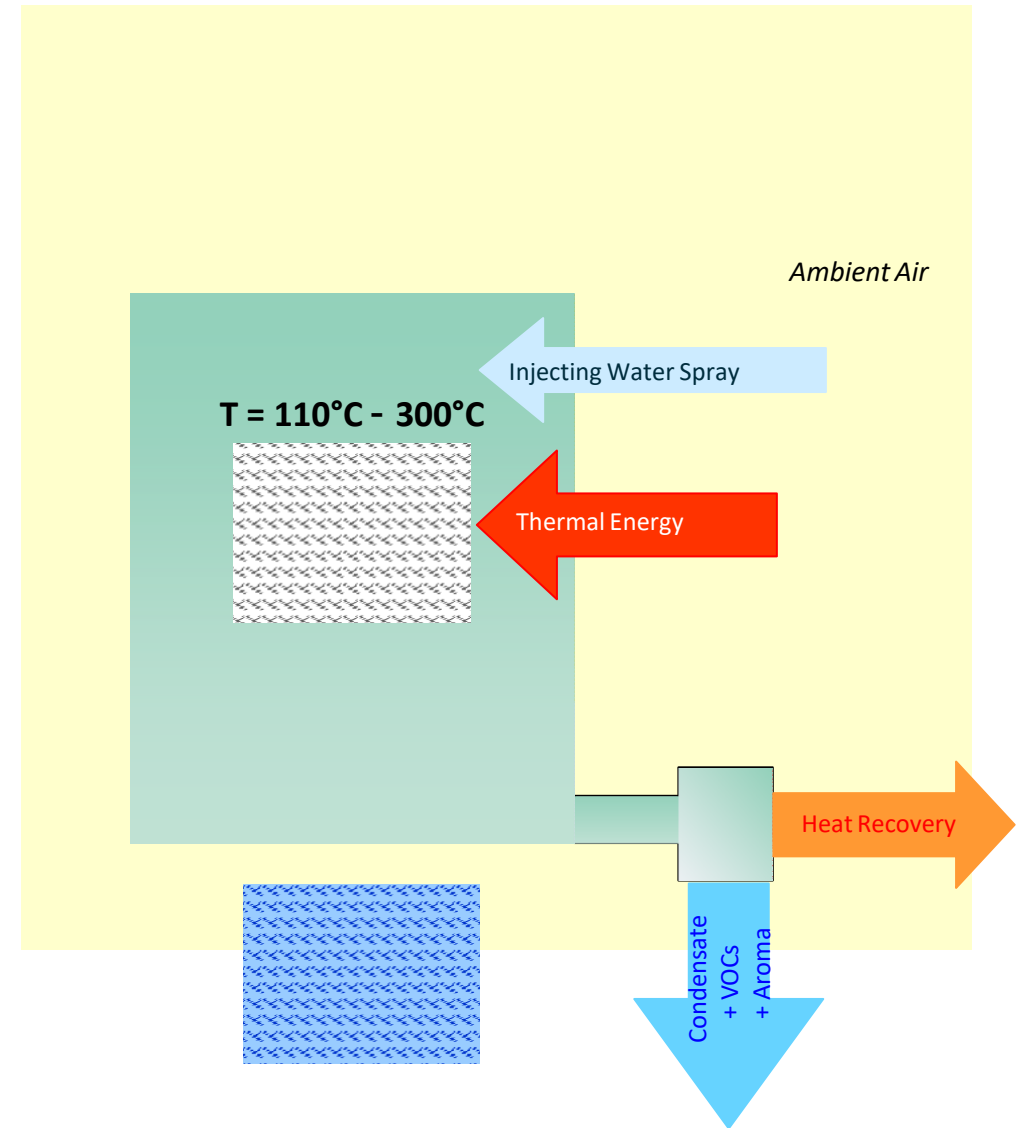
Loading material into the chamber;

Volume expansion of superheated steam due to carried-off vapour

→ excess steam;

→ recovery of heat and VOCs;

Take out the dried material and recharge again.



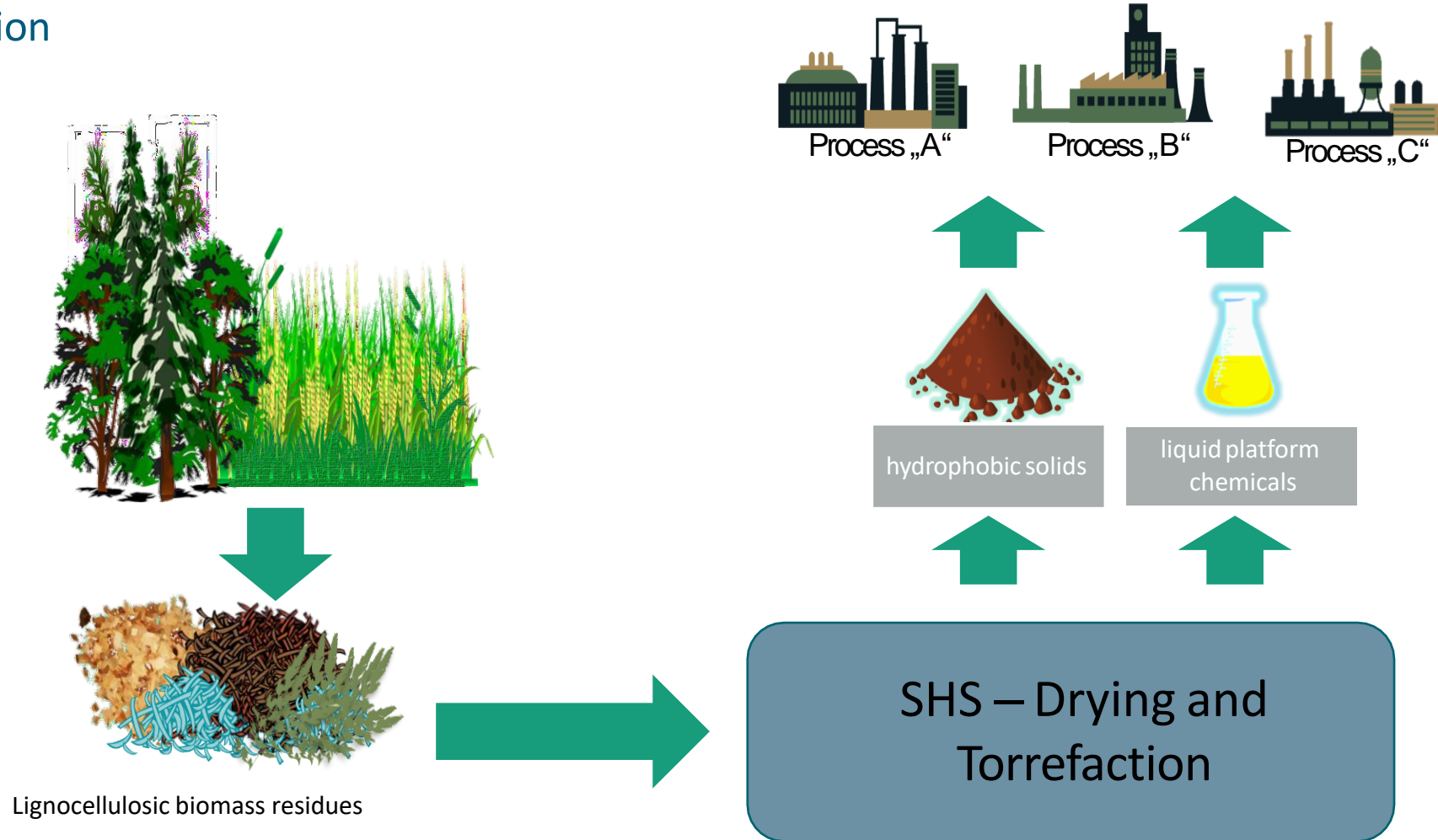
Superheated steam at atmospheric pressure

Advantages of superheated steam (SHS) drying/torrefaction

- Increased heat transfer due to thermodynamic properties of SHS
- Free choice of conveying principles due to operation at atmospheric pressure
- High energy efficiency ⑦ Up to 90% of supplied energy recoverable
- No oxidative reactions and explosion risks (oxygen-free atmosphere)
- Varying the operational temperature above 120°C allows a range of product treatments from mild drying up to roasting/torrefaction.
- Recovery of condensate as demineralised water at 90°C to 95°C and flavours/aroma compounds (e.g. essential oils) or VOCs
- Recovery of valuable chemicals is possible when operating at torrefaction conditions (200-300°C)
- No harmful emissions and odour nuisances

Superheated steam at atmospheric pressure

Possible Application





Täname!

Lisainformatsioon: info@newstandardoil.eu

