Metsäbiojalostamo -yrityksen näkökulmia hemiselluloosan prosessointiin ja liiketoimintamahdollisuuksiin

HEMISELLULOOSAN TEHOKAS HYÖDYNTÄMINEN BIOJALOSTUKSESSA –HANKKEEN WEBINAARI

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Public

Advanced Biofuels Biorefinery – Industries Integration is the Key to Success

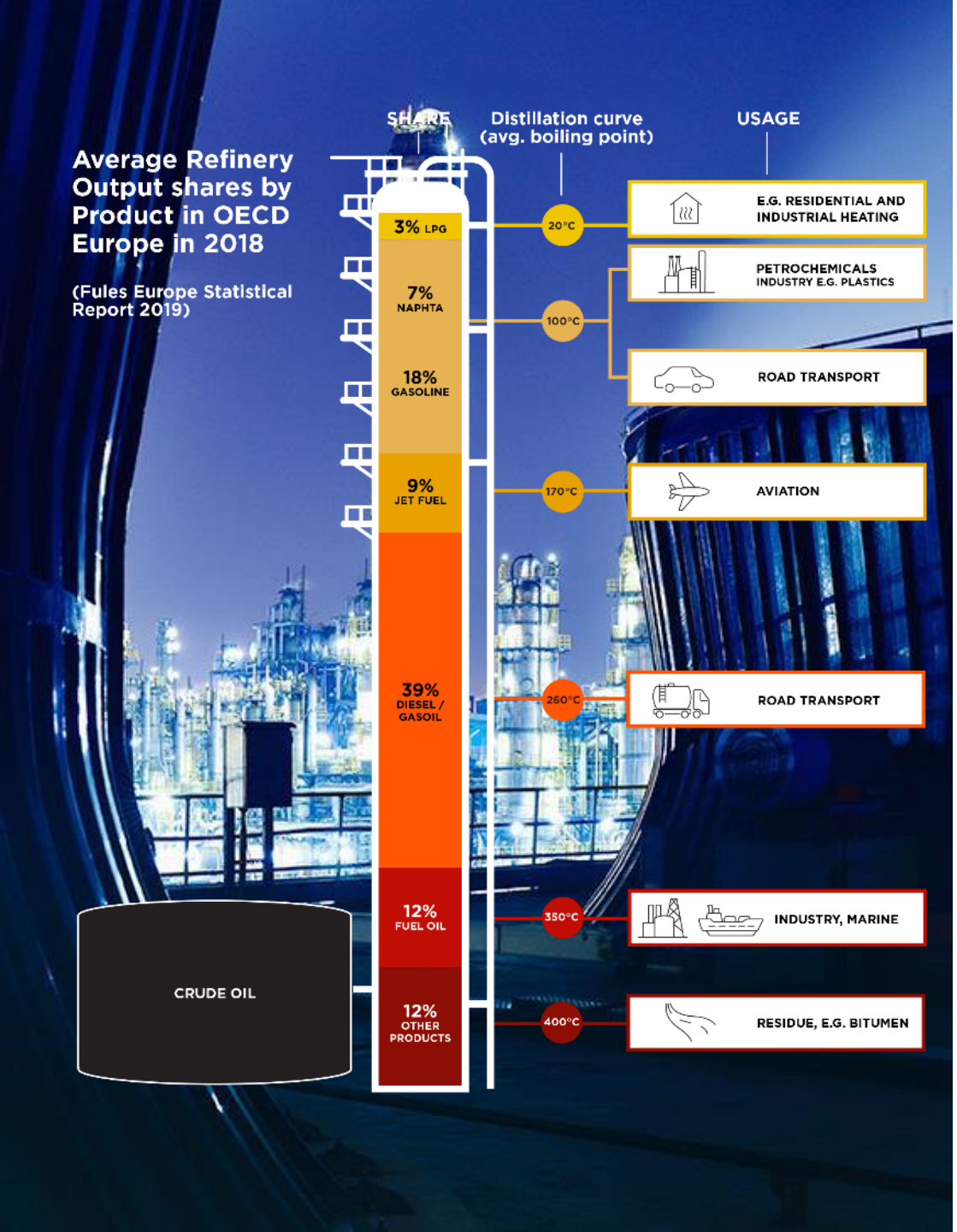
- Integration with feedstock industry to secure sustainable feedstock supply
- Partnership with technology development to secure reliable process
- Integration to bioproduct application markets

St1 solving global energy challenges

St1 Vision is to be the leading producer and seller of CO_2-aware energy

In the spirit of our vision, we research, develop, produce and invest to be able to provide our customers with CO_2-aware energy while creating positive societal impact

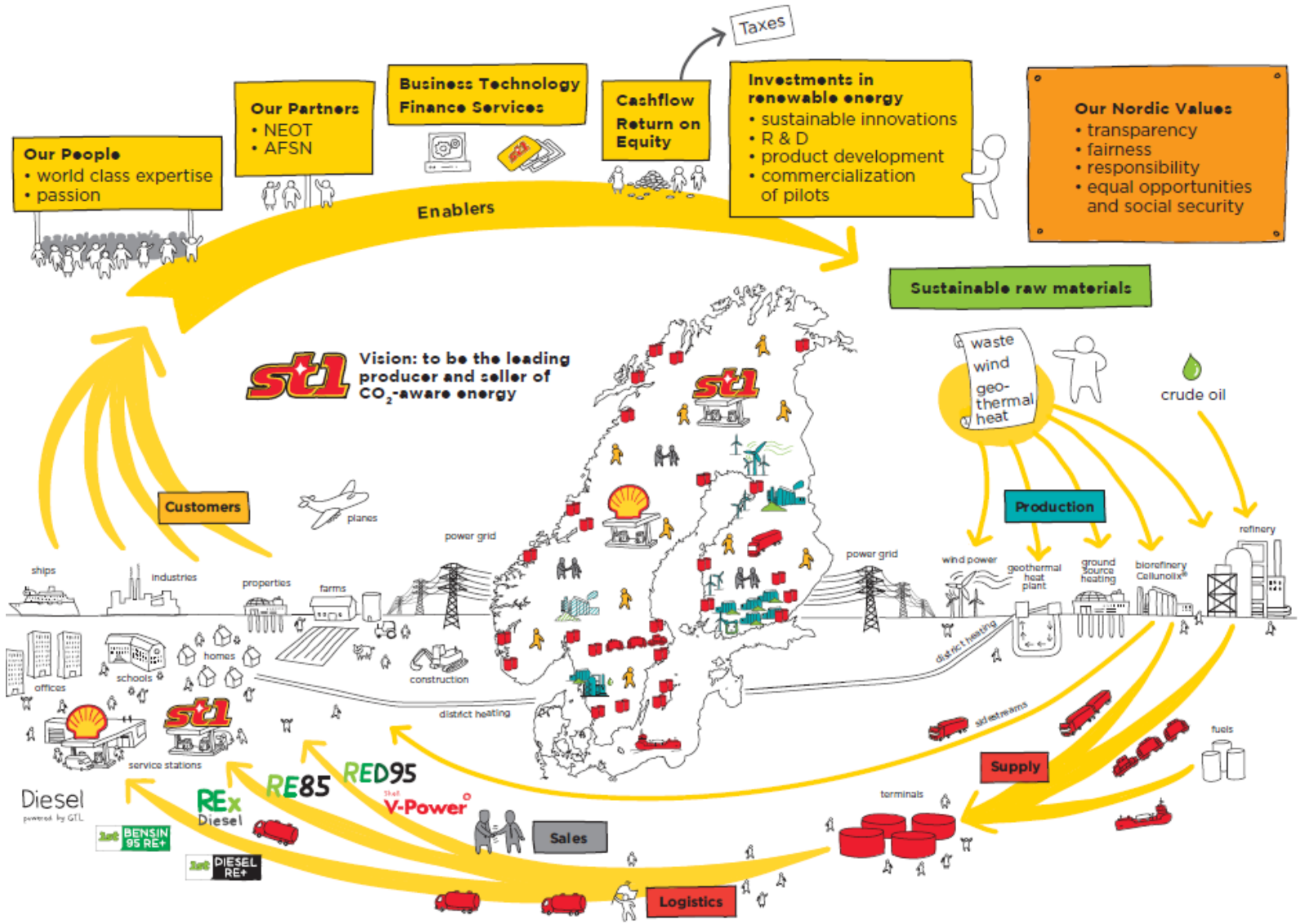
Our operations are strengthened by strategic long-term partnerships in various areas



As an example: The Distillation Curve Challenge

The demand on one oil product cannot be met without producing the others

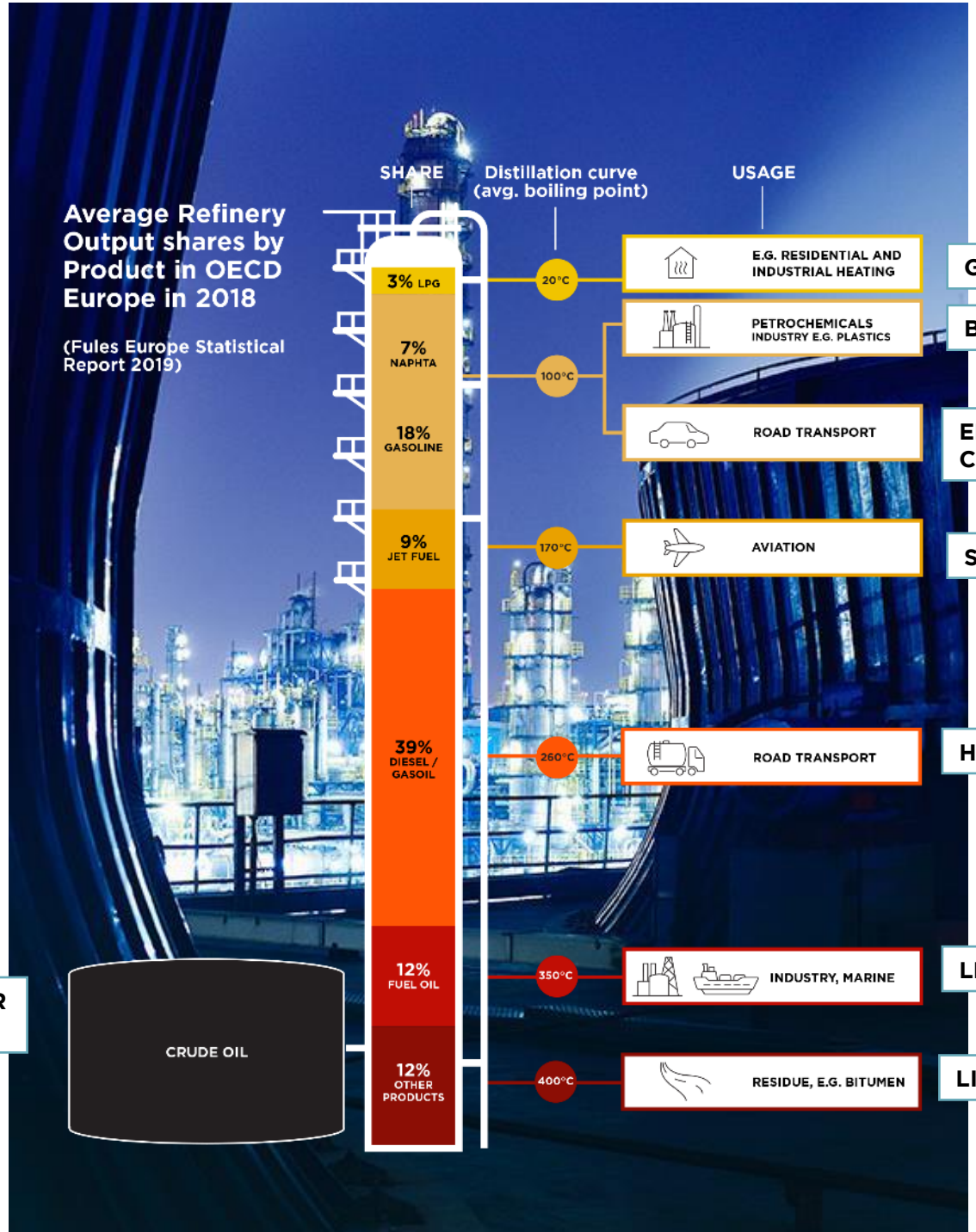
GROUP STRATEGY: st1 VALUE CHAIN



Watch the video

St1 Biorefining

Replacing of crude oil or all products



BIOCRUDE OR E-CRUDE

GEOTHERMAL HEAT

BIO NAPHTHA

ELECTRIC CARS, BIOETHANOL AS BLENDING COMPONENT

SUSTAINABLE AVIATON FUELS

HVO AND RENEWABLE DIESEL

LBG AND BIO OILS

LIGNIN

Renewable Diesel

- We are constructing a biorefinery at the St1 refinery in Gothenburg
  - Biorefinery will repurpose a wide range of raw materials with a yearly capacity of 200 kilotonnes
  - Production of renewable liquid fuels consists of HVO, JET, Naphtha and bio-LPG will start in 2023

Advanced Ethanol

- We produce advanced ethanol fuel in our biorefineries in Finland and Sweden
- 100 % of our feedstock is waste, such as biowaste and sawdust
- We develop new advanced biorefining technologies with a strong focus on ligno-cellulosic feedstocks

Biogas

- In Sweden we are a leading biogas player with c. 30% market share in traffic segment
  - Six biogas production and upgrading units and also import and export
- In Norway we are building biogas infrastructure
  - In cooperation with Nor-log Gruppen and Knapphus Energi
- In Finland we are establishing a joint venture with food company Valio to produce biogas from dairy farm manure
  - Targeting up to 1 TWh by 2030

ST1 BIOREFINING BUSINESS DEVELOPMENT

BIOREFINING VALUE CHAIN

- Forest industry waste and residues
- Compliance with RED II Annex 9A

FEEDSTOCKS

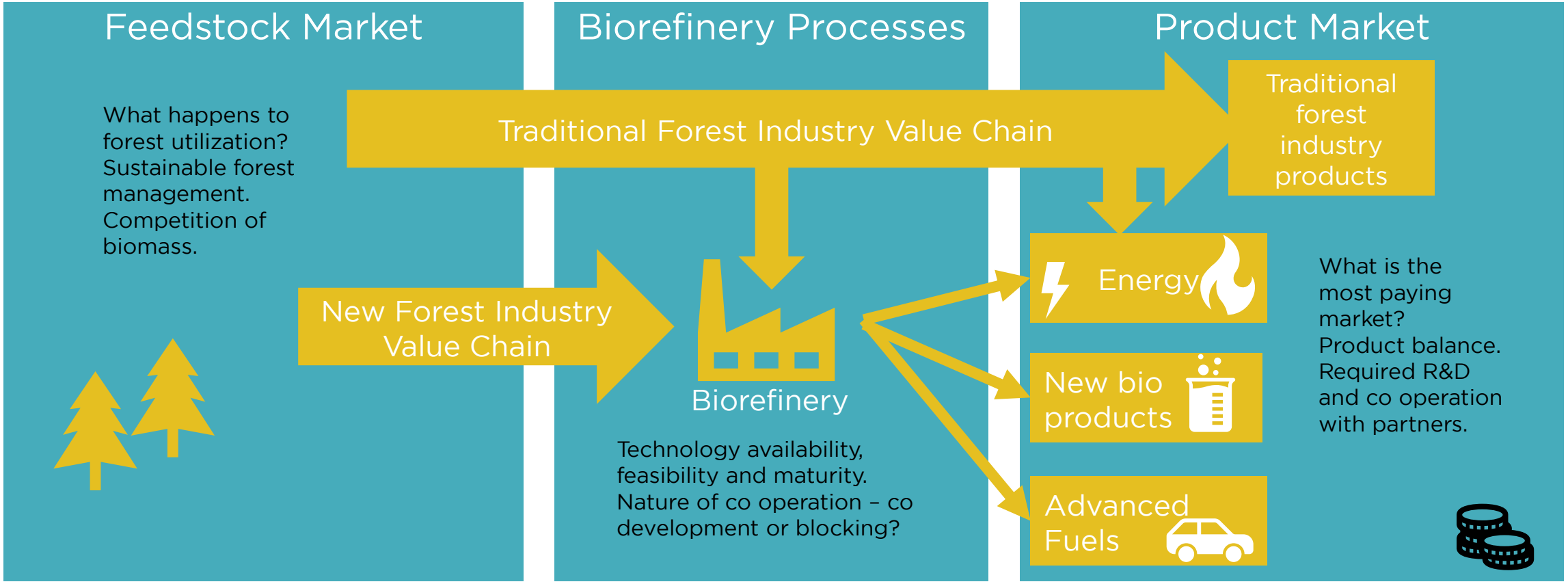
- Biochemical processes
- Thermochemical processes

TECHNOLOGIES

- Advanced biofuels: ethanol, renewable diesel, SAF
- Bioproducts: lignin, biochemicals, biochar

PRODUCTS

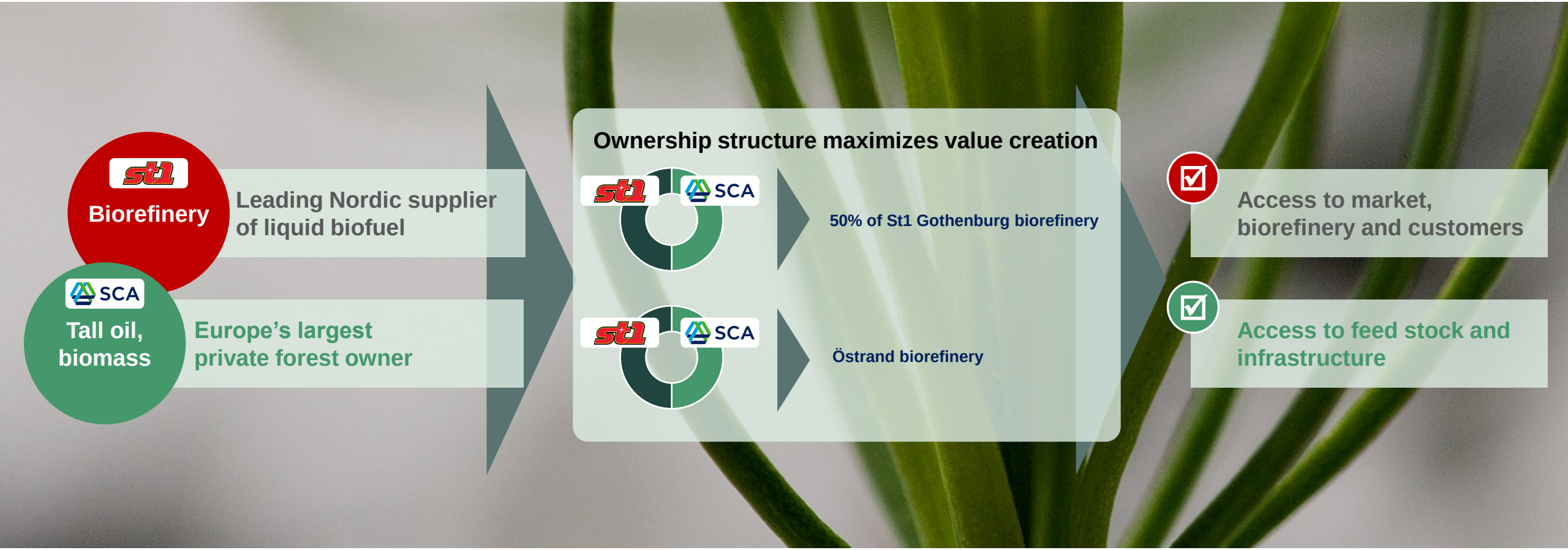
Biorefining landscape in Nordics



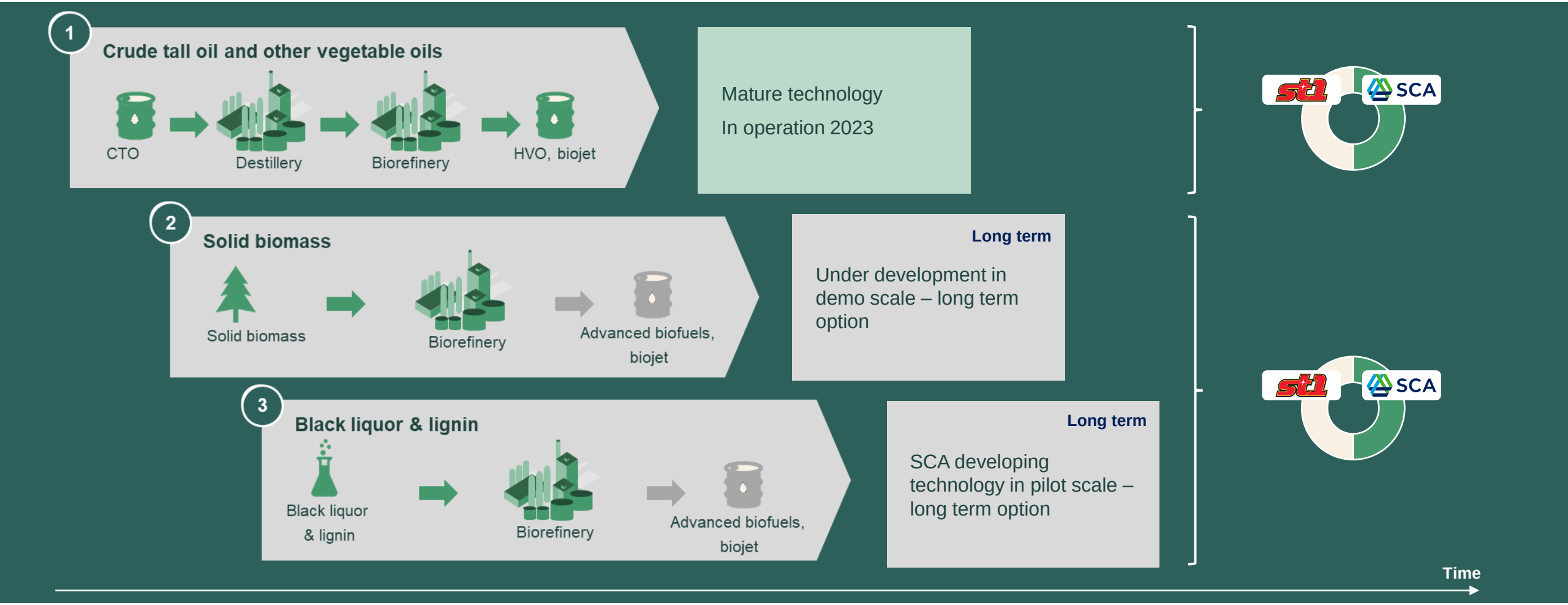
FEEDSTOCK MARKET INTEGRATION

Joint venture to produce and develop liquid biofuels

SCA and St1 creating two companies – from forest to fuel station



Three potential feedstocks with different technology maturity



PROCESS

Biorefinery

CELLUNOLIX® BIOREFINERY

SUGARS

PRE-TREATMENT → ENZYMATIC HYDROLYSIS → FERMENTATION → DISTILLATION → DEHYDRATION

SOFTWOOD SAWDUST
- Forest industry residues

CELLUNOLIX® BIOREFINERY

ADVANCED ETHANOL & BIOGAS (LBG)
- Transportation fuel
- RED II/III compliance

BIOPRODUCTS
- Lignin
- Bio-chemicals
- Organic fertilizer
- CO2

BIOPRODUCT MARKET INTEGRATION

Co Development
to produce and develop bioproducts

Possibilities of lignin

- Lignin utilization in material applications is crucial from biorefinery profitability point of view
- Emission reduction possibilities in different sectors
- Possibilities to replace multiple products from distillation curve
- Carbon binding possibilities, when lignin is used in application with long life cycle

Lignin as a replacer for fossil products

- 1/3 of wood biomass is lignin
- Lignin works as natural glue in all wood biomass
- Lignin is suitable to replace fossil components in many applications
  - Replacing bitumen in asphalt applications
  - Biocomposite applications to replace fossil plastic
  - Resin applications
  - Other fine chemical applications

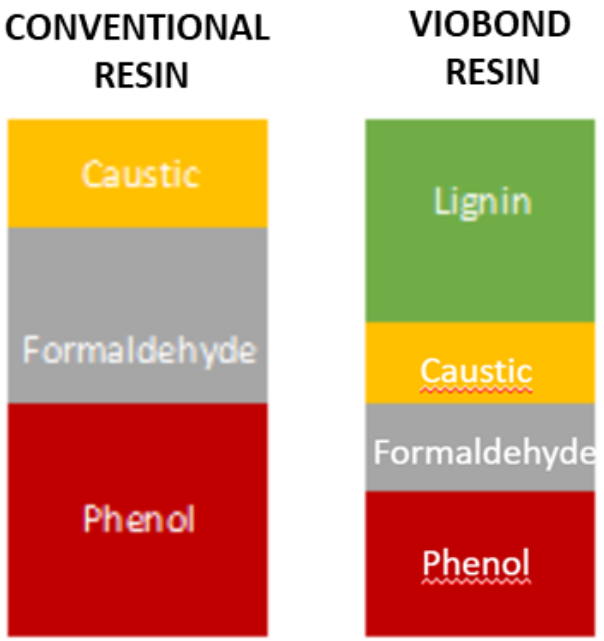
Lignin as replacer for bitumen

- Several years of R&D and experimental by Wageningen University & Research Center (WUR)
- Test areas made with PEAB in Finland 2021
- Up to 50 % of bitumen could be replaced, R&D needed to replace 100 %

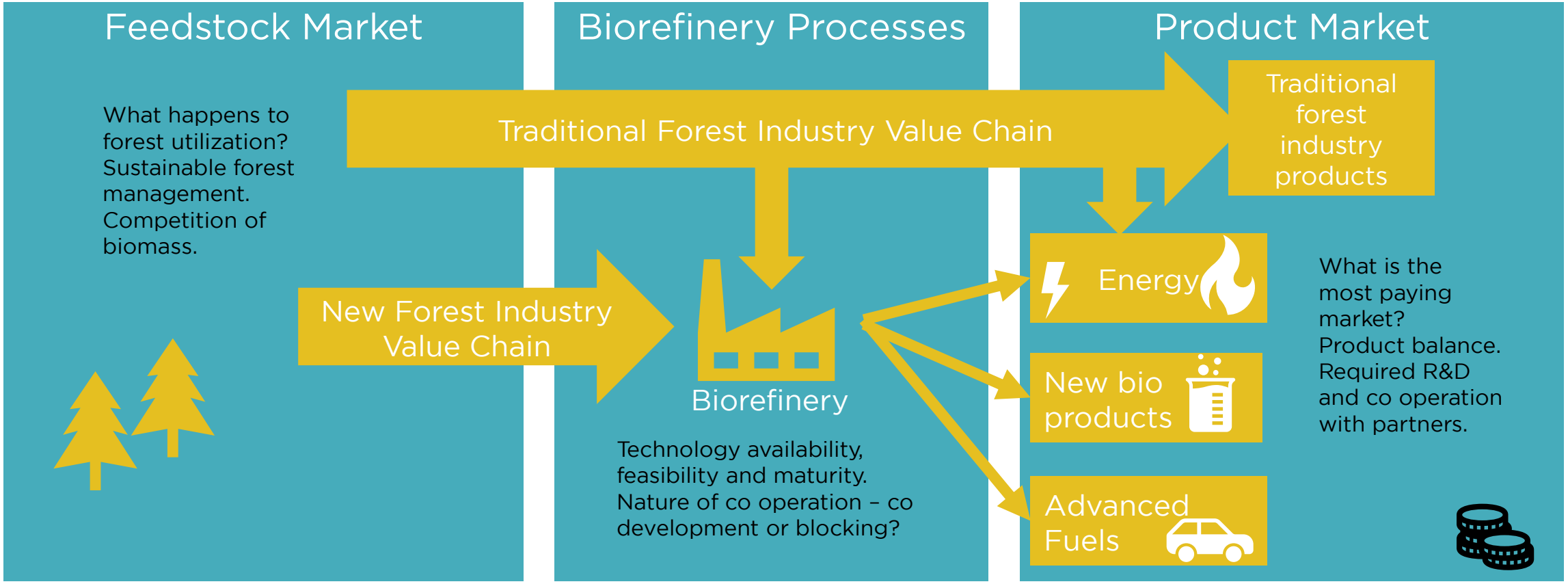
Source: https://www.biobasedpress.eu/2019/07/bio-bitumen-for-the-roads-of-the-future/

VIOBOND project – Lignin PF resins for various applications

- Biobased Industries Joint Undertaking (BBI JU) funded Flagship project
  - 5-year project starting on September 2021
  - 9 partners from 5 EU member states
- Total project budget 35 M Euro; St1 budget 1 M € (50% EU support)
- Aiming to commercialize lignin based Viobond resin
  - Bio-based resin plant will be built in Latvia
  - Biorefinery lignins as raw materials



Biorefining landscape in Nordics




Thank you!