Accelerating the Industrial Feedstock Transition

via biobased routes & circular solutions

Willem Sederel,
Chair Circular Biobased Delta
July 5, 2022

The global sustainability challenges

ZERO: CO2 by 2050; 55 by 2030 (EU)

Reduce CO_2 emissions

ZERO: WASTE

Responsible and sustainable handling of waste

ZERO: FOSSIL CARBON EXTRACTION

(Plastic) Circularity

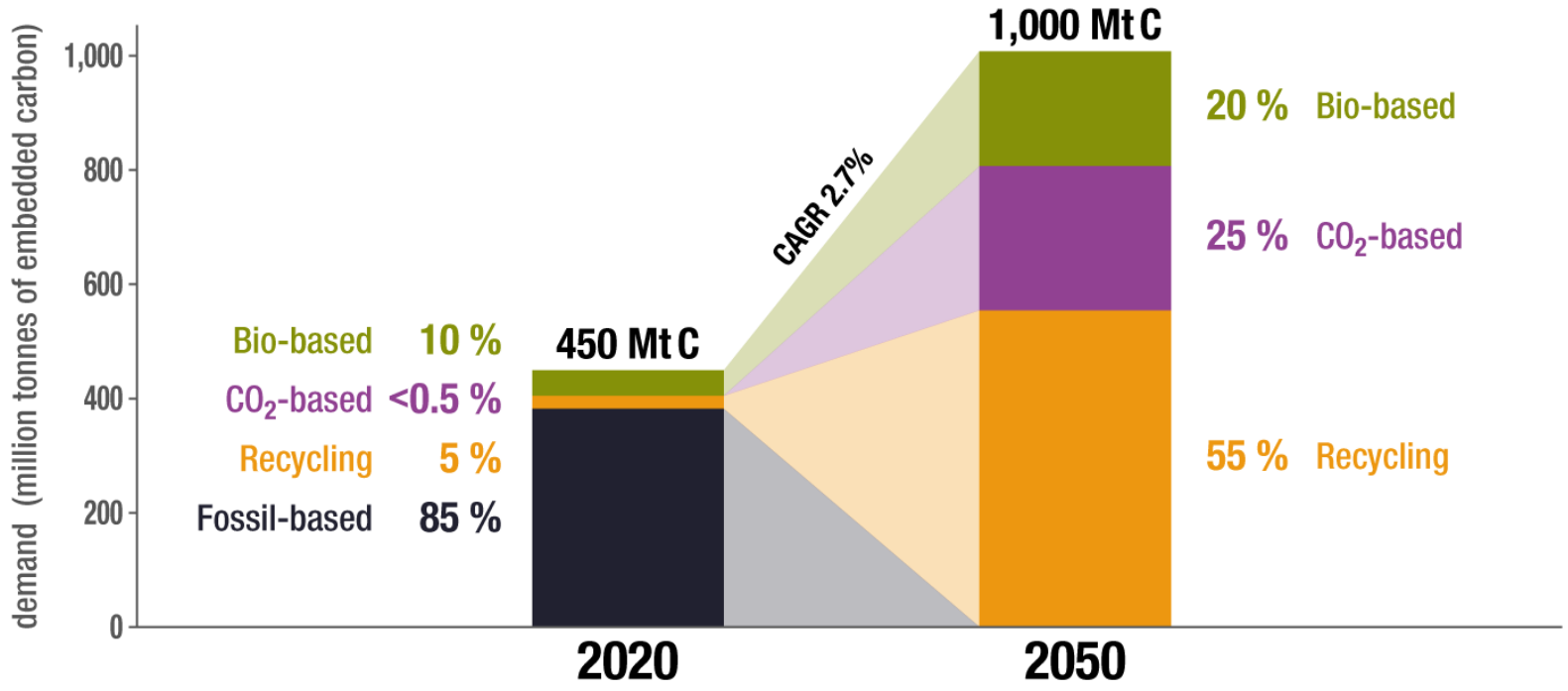
In line with most international initiatives:

RED II

ALLIANCE TO END PLASTIC WASTE

Global Carbon Demand for Chemicals and Derived Materials

in 2020 and Scenario for 2050 (in million tonnes of embedded carbon)

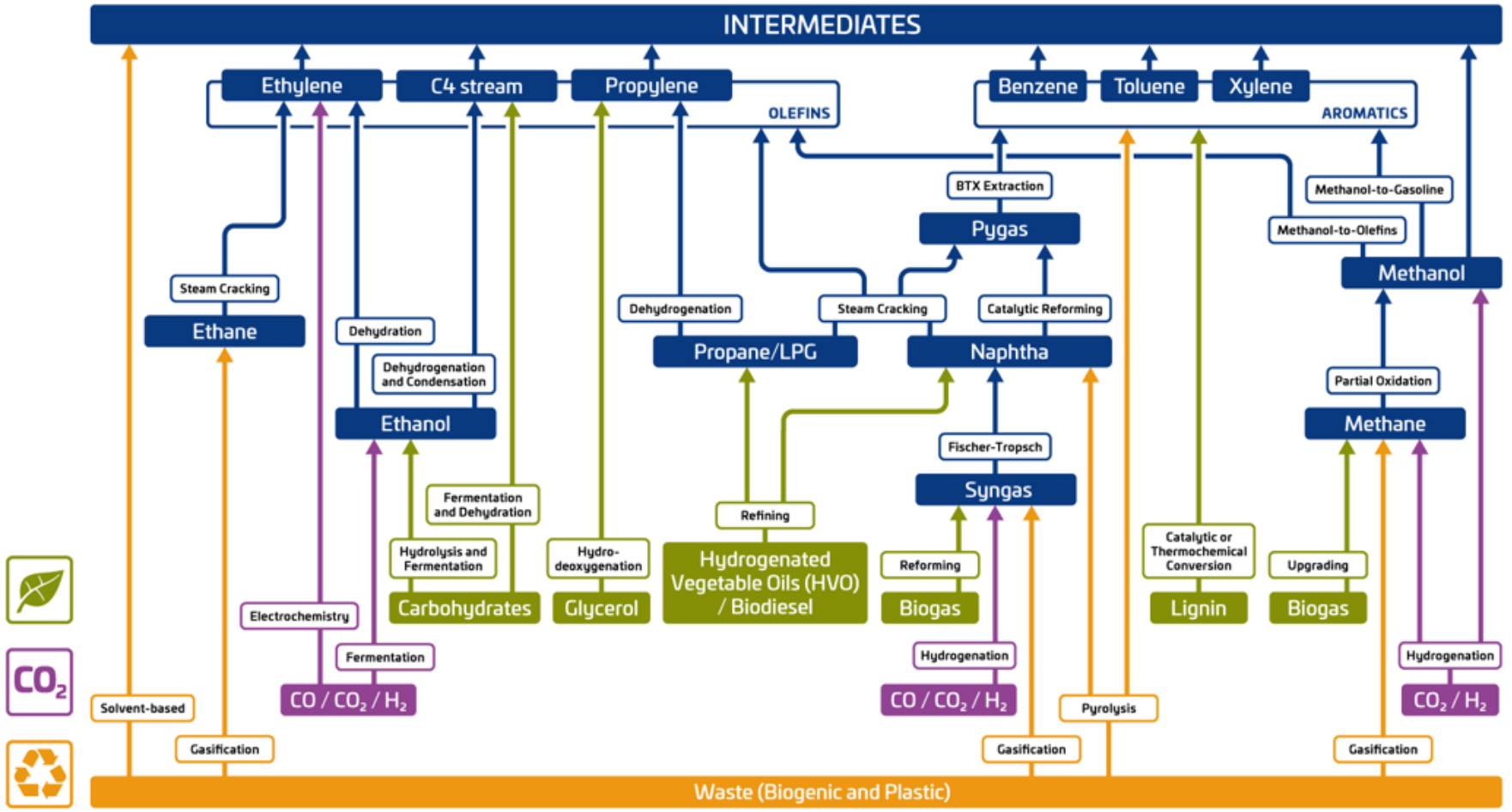


available at www.renewable-carbon.eu/graphics

circular biobased delta

Accelerating the Green Economy together

Renewable Carbon Refinery



available at www.renewable-carbon.eu/graphics

circular biobased delta

Accelerating the Green Economy together

Circular Biobased Delta Focus towards 2030

Biogenic routes

Green Chemistry

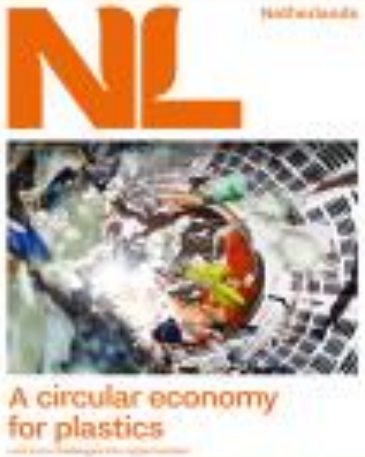
Programs

Biofeedstock

Bioprocessing

Biochemicals & Materials

Circular Solutions



Chemical recycling

Programs

Solvolysis

Depolymerisation

Pyrolysis

Gasification

Accelerating
the Green Economy
together

Examples of CBBD programs & projects

Four themes

Biofeedstock

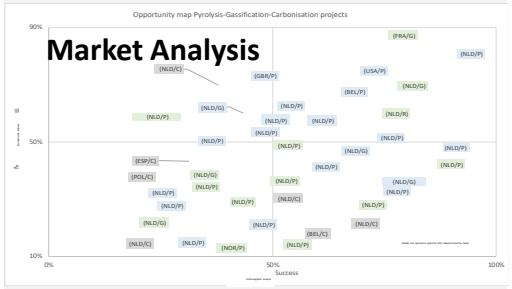
- Sugar Delta
- Biorefinery
- Chaplin

Green Chemistry

- Bioplastics
- Bio-aromatics
- Bioethanol

Chemical Recycling

- Pyrolysis
- Gasification
- Depolymerisation



Waste2Value

- CCU
- Agro Waste
- Mixed Waste

Key markets for biobased products

Building & Construction – infra- street furniture - coatings – sealants – adhesives




Packaging – flexible packaging – rigid packaging – printing inks – adhesives



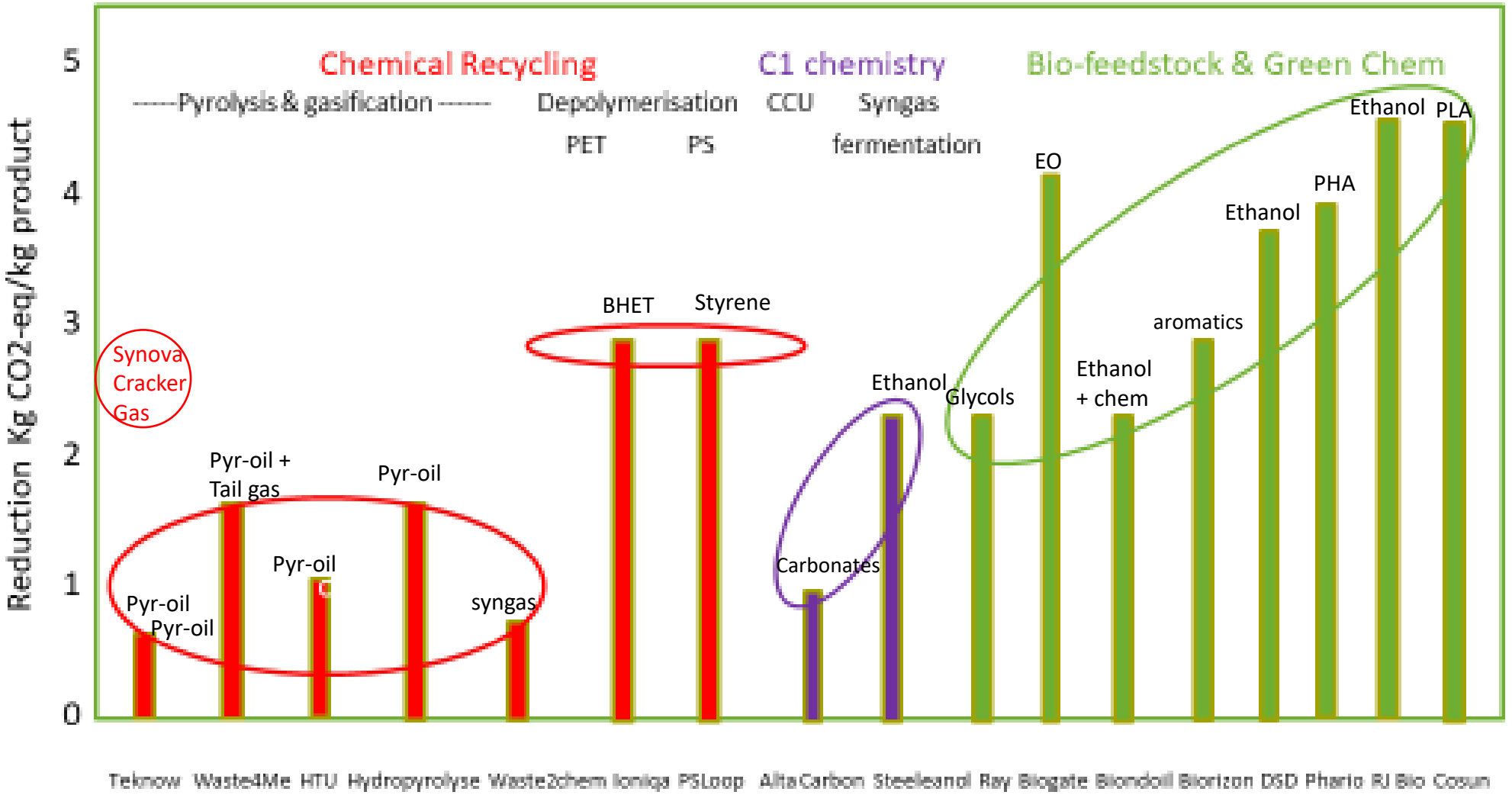
Textiles — Fiber Flax, Linen, Cellulosics – Yarn – Fabric – Colorants - Composites



Accelerating
the Green Economy
together

How effective are the various routes in terms of CO2-reduction?

Values on the basis of product comparison vs fossil route (CBBD Roadmap CE Delft)



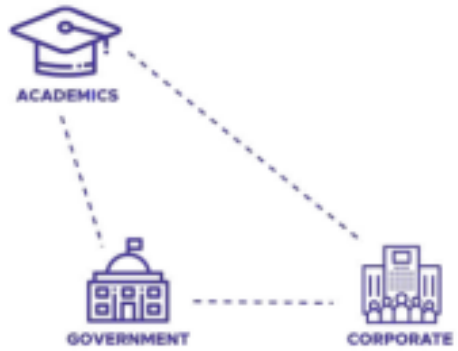
Accelerating the Green Economy together

Significant Challenges and barriers need to be overcome

- Technology scale-up
- Technology effectiveness
- Adoption of the technology *and even more* of the initiative(s)

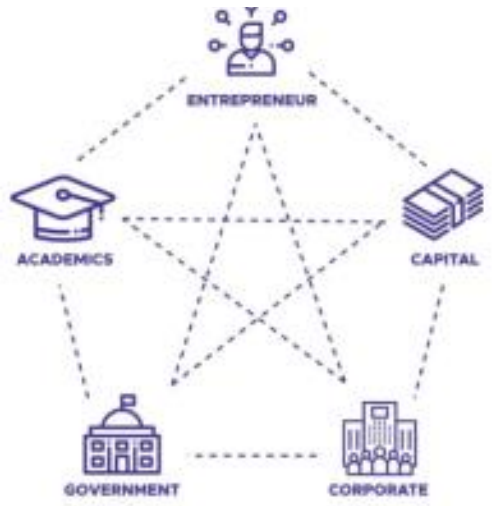
- Cross-sectoral and value chain development
- Developing deep insight into the market (pull)
- Financing of the initiatives and scale-ups with viable business case

- Subsidizing the right routes: bioenergy *vs* biomaterials
- Policies for biofeedstock and feedstock transition – e.g. end of waste
- Be good and tell so society can understand and support



Triple Helix
1990's – 2010's

Pentagon
2010's –



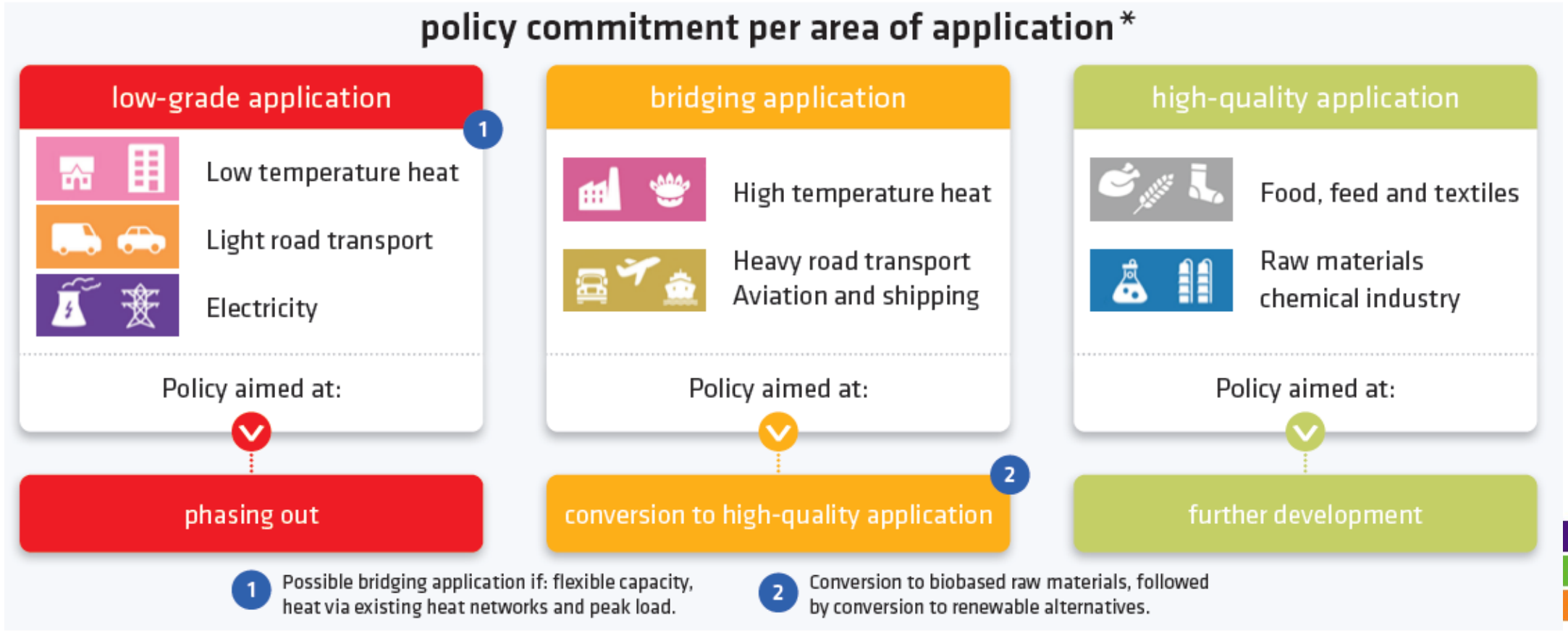
GROENE CHEMIE
NIEUWE ECONOMIE

Accelerating
the Green Economy
together

Policy Environment in The Netherlands

CHANGING POLICIES IN THE NETHERLANDS FOR BIOMASS VALORIZATION*

New valorization priorities for biomass



Accelerating the Green Economy together

Scaling Up Technology, example by DSD/IST– Biotech enabled

The disruptive technology avoids the beet-to-sugar refinery process

Conventional sugar to fermentation products

Grow, harvest & transport sugar beets → Washing & crushing → Sugar extraction-boiling process → Thick-juice/ molasses → Crystallization, centrifugation to white sugar & transport → Fermentation → Ethanol Lactic/citric acid Proteins

Betaprocess® avoids the beet-to-sugar refinery process

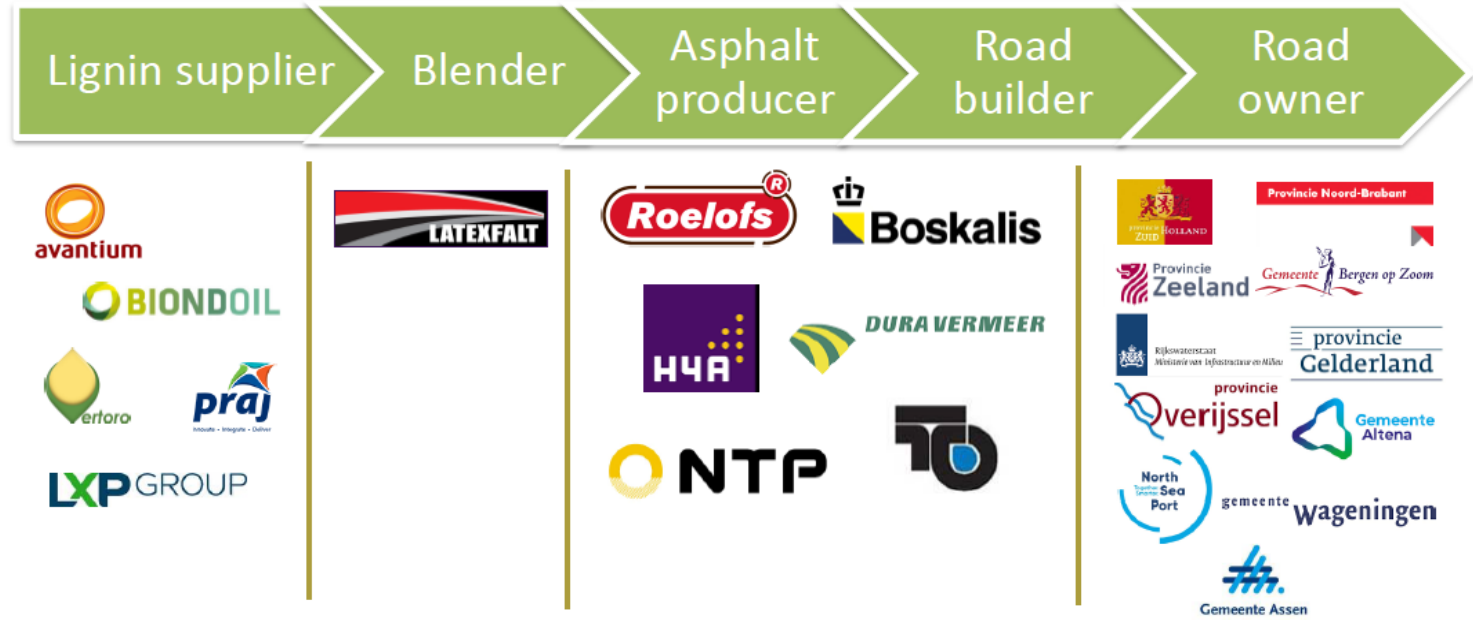
Grow, harvest & transport sugar beets → Washing & crushing → Release of the sugars by Betaprocess® → Fermentation → Ethanol Lactic/citric acid Proteins

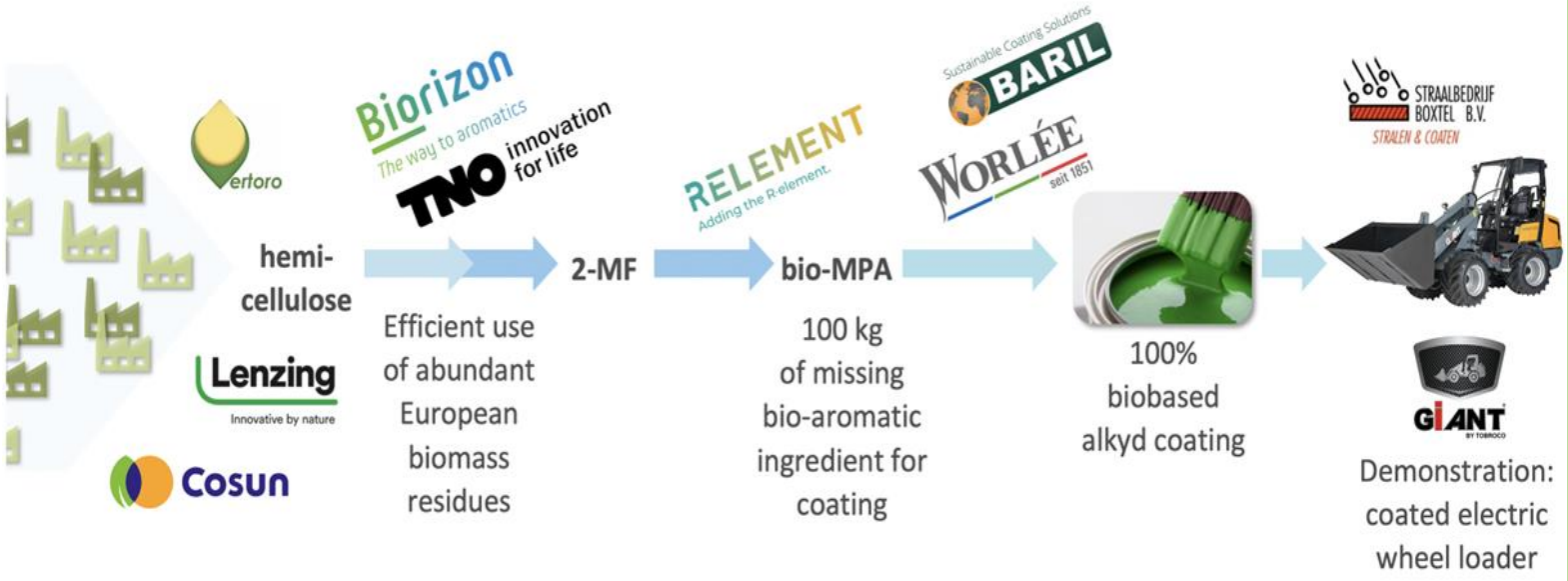
Accelerating the Green Economy together

Chaplin

Creating new valuechains

Bioaromatics





Take Aways

Feedstock

Not limited to one type, waste recycling, **biomass** and CO2 are needed for **rC**
Carbohydrates, oils and fatty acids, glycerol, biomethane, lignin and biogenic waste

Technology

There is not a single winning technology, but biorefining of biomass, pyrolysis of mixed plastic waste and gasification of biogenic waste are key and ***f(feedstock)***

Business Case

High fossil feedstock cost and CO2 pricing are needed. Scaling-up and climbing the experience curve brings cost down. Subsidies help with f.o.k. plant coupled with a better Policy environment

Accelerating
the Green Economy
together

circular biobased delta

Accelerating the Green Economy together

Bedankt voor jullie aandacht

Willem Sederel

E: willem.sederel@biobaseddelta.nl
E: circular@biobaseddelta.nl

www.circularbiobaseddelta.nl

Accelerating
the Green Economy
together