The journey to circular plastics – major milestones

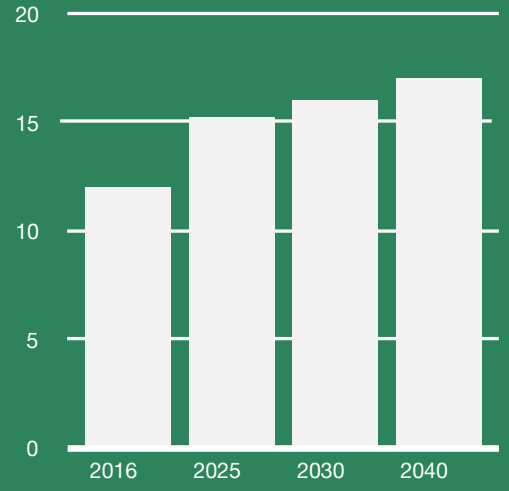
Frank Hendrickx| Head of Feedstock & Production Platform| 05.7.2022 | Biobased Acceleration Day, Rusthoeve

Neste in a nutshell

- We create **solutions for combating climate change and** accelerating a shift to a **circular economy**.
- We **refine waste, residues and innovative raw materials** into renewable fuels and sustainable feedstock for polymers and chemicals.
- We are the **world's leading producer of sustainable aviation fuel and renewable diesel, and renewable feedstock solutions for polymers and chemicals** industry uses. We are also developing chemical recycling to combat the plastic waste challenge.
- **We have committed to reaching carbon-neutral production by 2035.** Our ambition is to make the Porvoo refinery in Finland the most sustainable refinery in Europe by 2030. We are introducing renewable and recycled raw materials such as liquefied waste plastic as refinery raw materials..

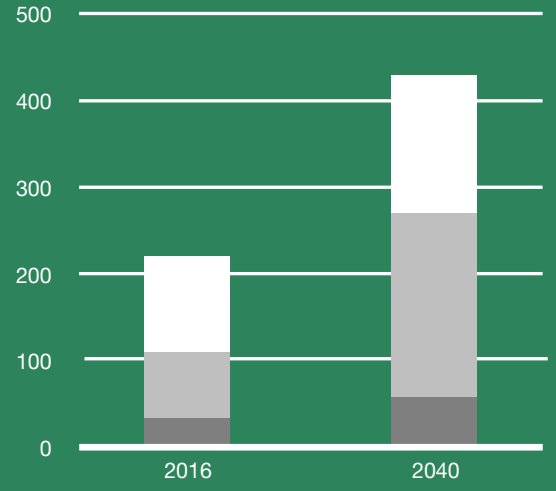
The chemical industry is in a pivotal position to create a circular economy

Global oil demand for petrochemicals production (Mbbl/d)



Source: International Energy Agency (2021), World Energy Outlook 2020, IEA, Paris

Plastic waste by treatment today and in business-as-usual scenario in 2040 (Mt/a)



Source: Ellen McArthur Foundation, Breaking the Plastic Wave

The petrochemical industry could account for roughly half of global oil demand growth until 2040.

Oil demand for petrochemicals can be reduced through increasing plastic waste recycling and use or renewable raw materials to produce polymers and chemicals.

Plastics are not created equal. A portfolio of solutions will be needed to reach circularity.

- Plastics landfill and leakage elimination potential
- Plastics incineration
- Recycled plastics

Chemical recycling of plastics combats climate change and accelerates circularity

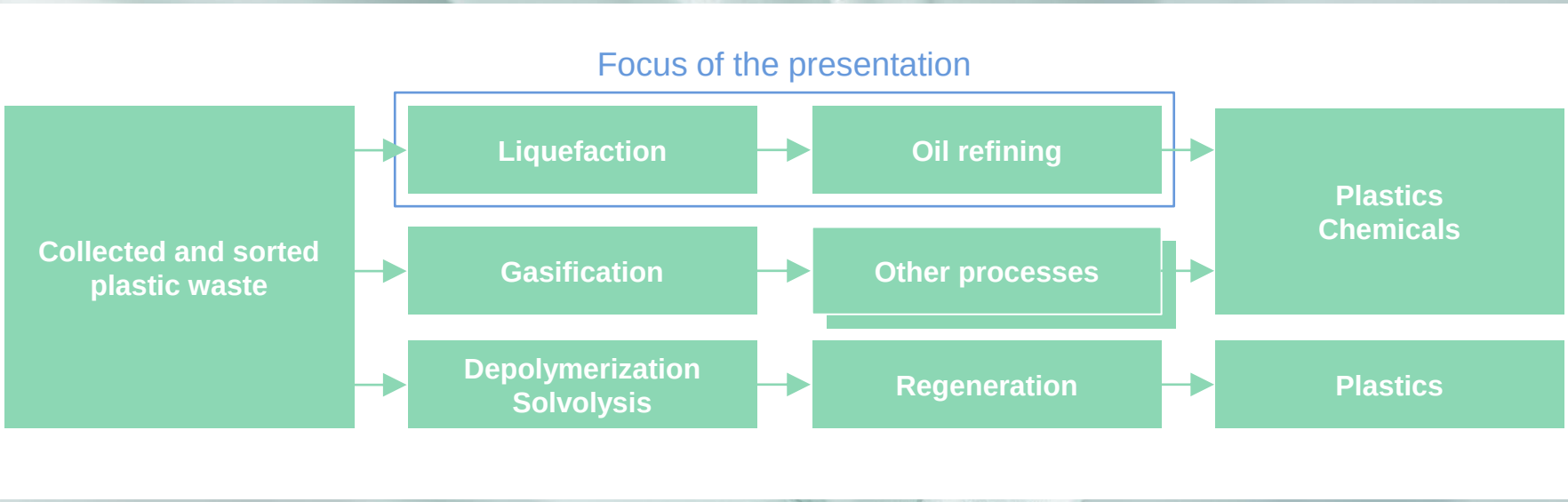
Making hard-to-recycle plastic packaging recyclable and creating **more sustainable plastic solutions**.

Identical quality to conventional plastics. Suitable for food contact packaging, toys, medical applications

Helps to **reduce crude oil dependency** by introducing recycled content into end product.

Develop circularity of plastics to reduce landfilling and incineration. Prevent plastics from entering the environment as litter.

Portfolio of solutions is needed, Neste's focus is on liquefaction route



Towards a global solution together – what will it take?

Demonstrate

First industrial production

Quality of waste processed

Critical plastic applications

Upgrading

LCA & sustainability

Institutionalize

Regulatory commitment

Recycling & recyclability

Chain of custody

Commitment to circularity

End-of-Waste

Globalize

Recycled plastic as a resource

Cost reduction

Quality standards for intermediates

Proven technologies

Upgrading capacity

Expand

Product design and esthetics

Fillers

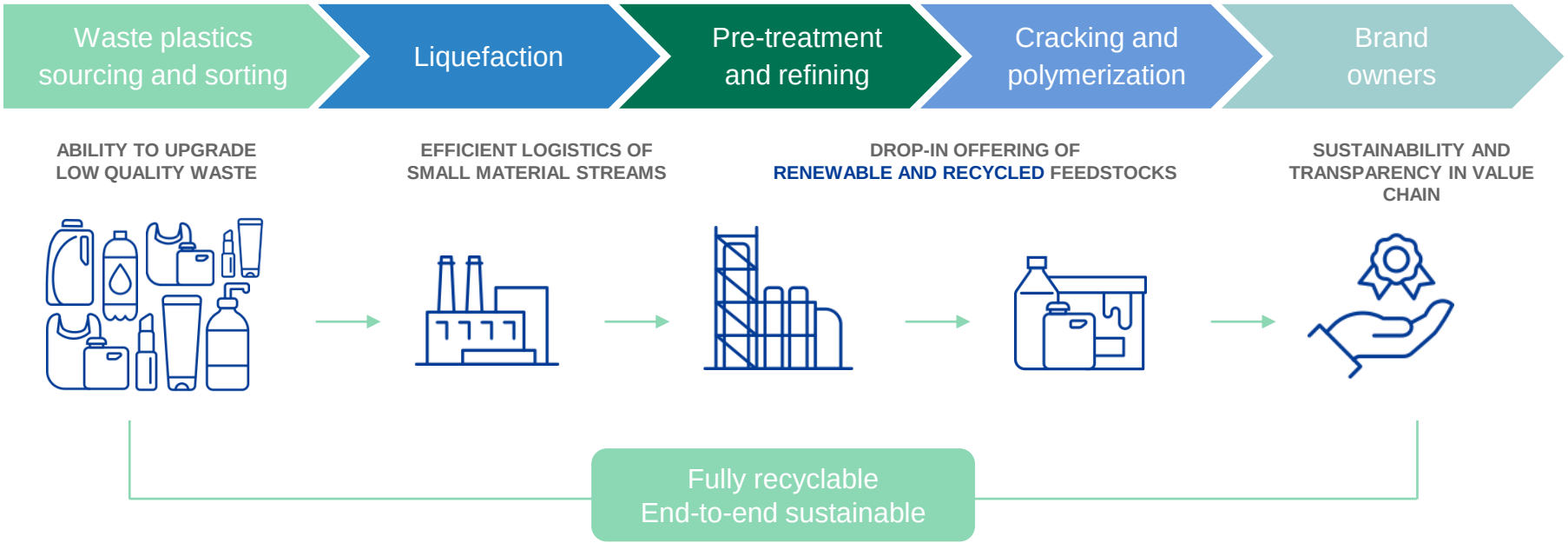
Surfactants

Colors / inks

Consumer awareness & preference

NESTE

Neste is working to enable our partners throughout the value chain to scale up faster and bolder



Investing in industry development

Investment and joint development to commercialize chemical recycling technology

Neste acquired a minority stake in liquefaction technology developer Alterra Energy in December 2020.

Collaboration between Neste and Alterra will include joint technology development, global technology licensing, and jointly working towards commercializing Alterra's proprietary liquefaction technology with strong initial focus on Europe.

"The Neste-Alterra partnership will unlock the full potential of the circular economy, bringing our technology to more partners around the world, creating a cleaner planet."

FREDERIC SCHMUCK, CEO, ALTERRA ENERGY

Advancing commercialization of chemical recycling

Partnership to build capacity in chemical recycling

In October 2021, Neste and Ravago announced their plan to set up a joint venture and build an industrial liquefaction facility in the Netherlands.

Neste started collaborating with Ravago in 2019 with the target to build chemical recycling capacities of more than 200,000 tons per year by 2030. The companies are now planning to build an industrial facility for chemical recycling in Vlissingen (NL) with an estimated capacity of 55,000 tons. The liquefaction technology for the site will be provided by Alterra Energy.

"We are truly excited about the progress of our joint project work. Together with Neste, we have the necessary ingredients for a successful recipe to create scalable solutions, converting non-recyclable waste streams into valuable end products."

THEO ROUSSIS, CEO, RAVAGO

Replacing crude oil with circular feeds

Processing liquefied waste plastic at industrial scale

Neste successfully completed its first industrial-scale processing run with liquefied waste plastic at its refinery in Finland during Autumn 2020.

To date, Neste has refined 800 tons of liquefied waste plastic to petrochemical feedstocks.

By processing liquefied packaging and mixed plastic waste to high-quality recycled feedstock for petrochemical industry uses, Neste has proven the concept of closing the loop in the plastics value chain and making circularity a reality.

"With the latest trial runs in Porvoo, we are laying the foundation for replacing crude oil based raw materials with liquefied waste plastic and strengthening circularity together with our customers. Based on the successful trials, we can conclude that liquefied waste plastic is a viable alternative to fossil raw material.

MARKKU KORVENRANTA, EVP, OIL PRODUCTS, NESTE

Creating demand for liquefied waste plastic

New pretreatment and upgrading capabilities in Porvoo, Finland

Neste is conducting a feasibility study for scaling up the processing of liquefied waste plastic at its refinery in Porvoo, Finland.

Neste is targeting pretreatment and upgrading capacity of 400,000 tons per year as the first step.

Following the feasibility study, investment decision readiness is targeted for 2023. Gradual implementation is expected to start in 2024.

To turn chemical recycling into a viable and industrial-scale feed source for our downstream partners in the polymers and chemicals value chain, we have to bridge the quality gap between unprocessed liquefied waste plastic oil and our customers' raw material requirements."

MERCEDES ALONSO, EVP, RENEWABLE POLYMERS AND CHEMICALS, NESTE

NESTE


NESTE
Change runs on renewables