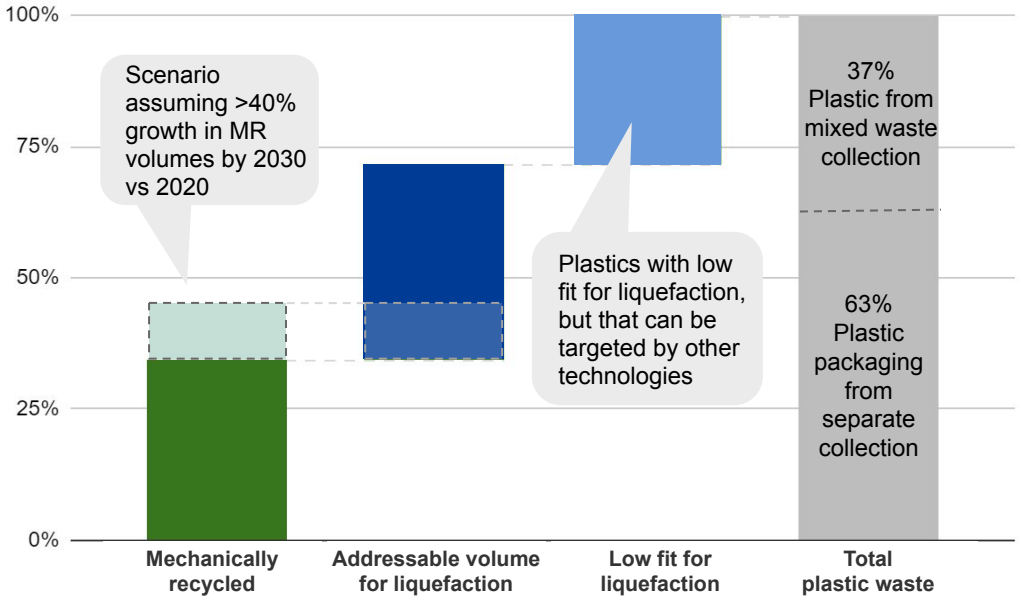
ALTERRA
Easy-to-deploy solution for hard-to-recycle plastics

Enginyers Industrials de Catalunya, 21.10.2025

Outi Teräs
Technology Commercialization, Chemical Recycling, Neste

Plastic waste fed into recycling could be doubled by implementing chemical recycling by liquefaction



Availability of plastic waste streams for liquefaction in Europe is **at least 7-9 Mton (~37%)** of plastic waste[1)] by 2030.

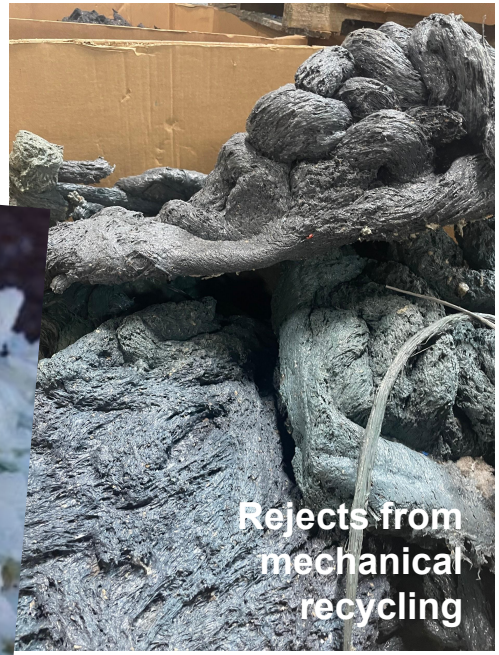
Targeted waste consists of:

- Plastics from mixed waste collection, with high level of impurities
- Mechanically unrecyclable plastic waste from separate collection, e.g. flexible multilayer packaging
- Rejects and residues from mechanical recyclers

[1)] Based on ambitious circularity development scenarios in only 9 biggest plastic waste producing countries in EU27+3, data from Plastics Europe; Eurostat; Bain Analysis

NESTE

We need easy-to-deploy solutions for hard-to-recycle plastics



Unique collaboration leveraging the expertise of three industry leaders

Alterra
SOLVING PLASTIC POLLUTION

Leading developer and operator of thermochemical liquefaction technology for advanced recycling of discarded plastics

NESTE

Leading global producer of sustainable aviation fuel, renewable diesel and a frontrunner in renewable and circular feeds for the petrochemical industry

T.EN TECHNIP ENERGIES

Leading global technology and engineering company for energy infrastructure and decarbonization

Alterra's technology journey

TRL 1-3

Technology basic principles and proof of concept - batch process

2009

TRL 5

Rotary kiln reactor validated in relevant environment

2013

TRL 8

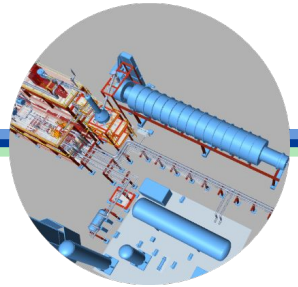
System proven in Akron in 24x7 operation at industrial scale with discarded PIR feedstock

2020

NESTE

2024

TEN TECHNIP ENERGIES



2011

TRL 4

Technology validated at pilot scale

2016

TRL 6-7

System demonstrated in relevant operational environment: Commissioning

TRL 9

System proven in Akron in 24x365 operation with PCR feedstock

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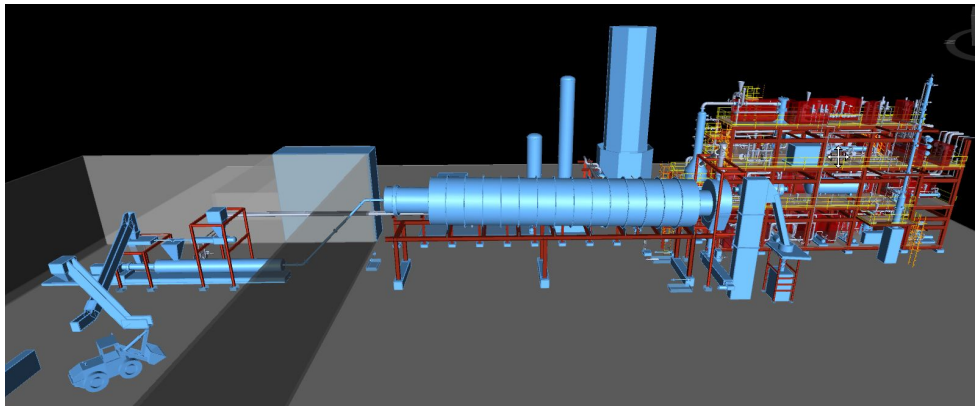
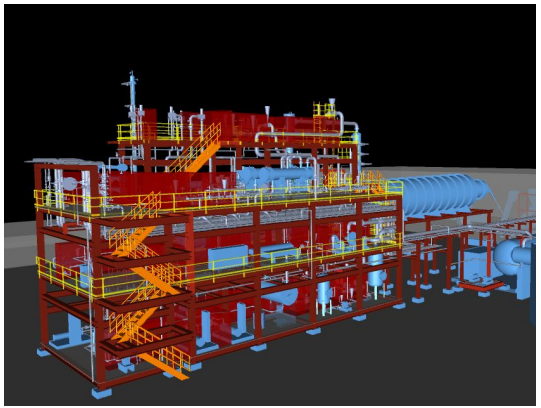
Standardized modular solution to build robust and reliable liquefaction capacity





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Technology development, licensing and operation

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Technology development and licensing in Europe

T.EN TECHNIP ENERGIES

Design, engineering and delivery of standardized plant solution

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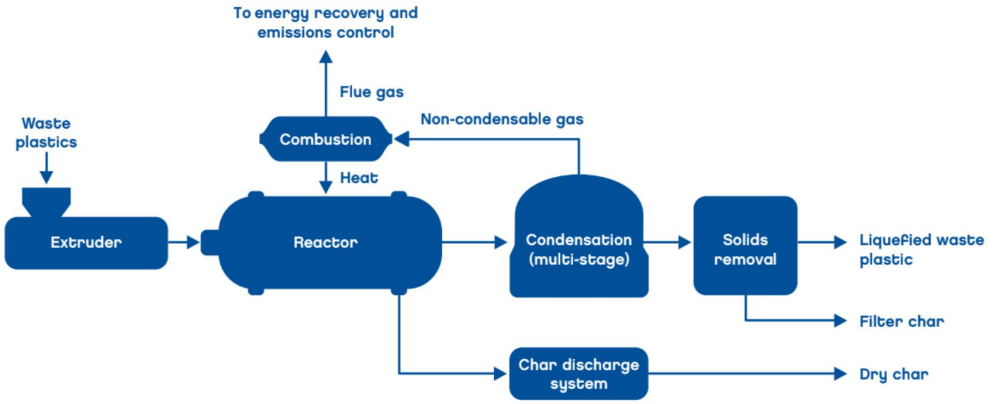
Alterra technology is a proven and future proof rotary kiln pyrolysis process

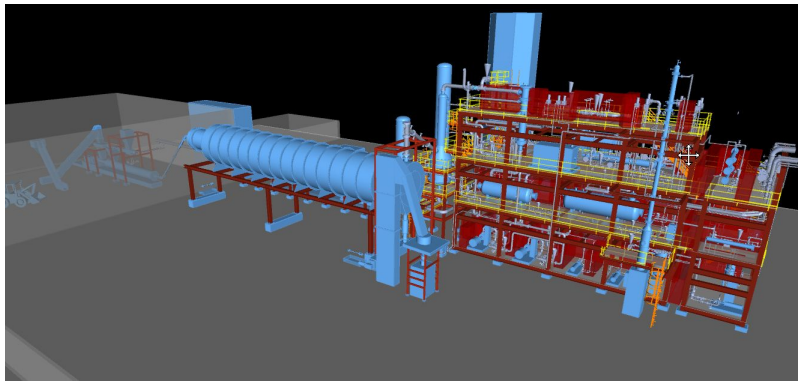
- **Maturity** | Proven in over 90 days' continuous commercial scale operation processing post-consumer plastics
- **Feedstock flexibility** | Robust and fouling resistant design enables valorization of mixed plastics that are not suitable for mechanical recycling
- **Energy efficiency** | Non-condensable gas as the primary energy source and flexible downstream heat recovery options
- **CAPEX efficiency** | Competitive cost per ton of feedstock processed thanks to scale advantage



Alterra’s Akron, OH reference plant

Standardized design enables projects with predictable investment cost and accelerated implementation

- **Improved investment predictability** | High accuracy cost estimate available already at an early stage of the project
- **Minimal pre-FID cost** | No customer cost for engineering the liquefaction process
- **Accelerated project delivery** | Minimized engineering schedule shortens time-to-revenue
- **Easy-to-deploy** | EPF (Engineering, Procurement, Fabrication) delivery by renowned and reliable engineering partner Technip Energies



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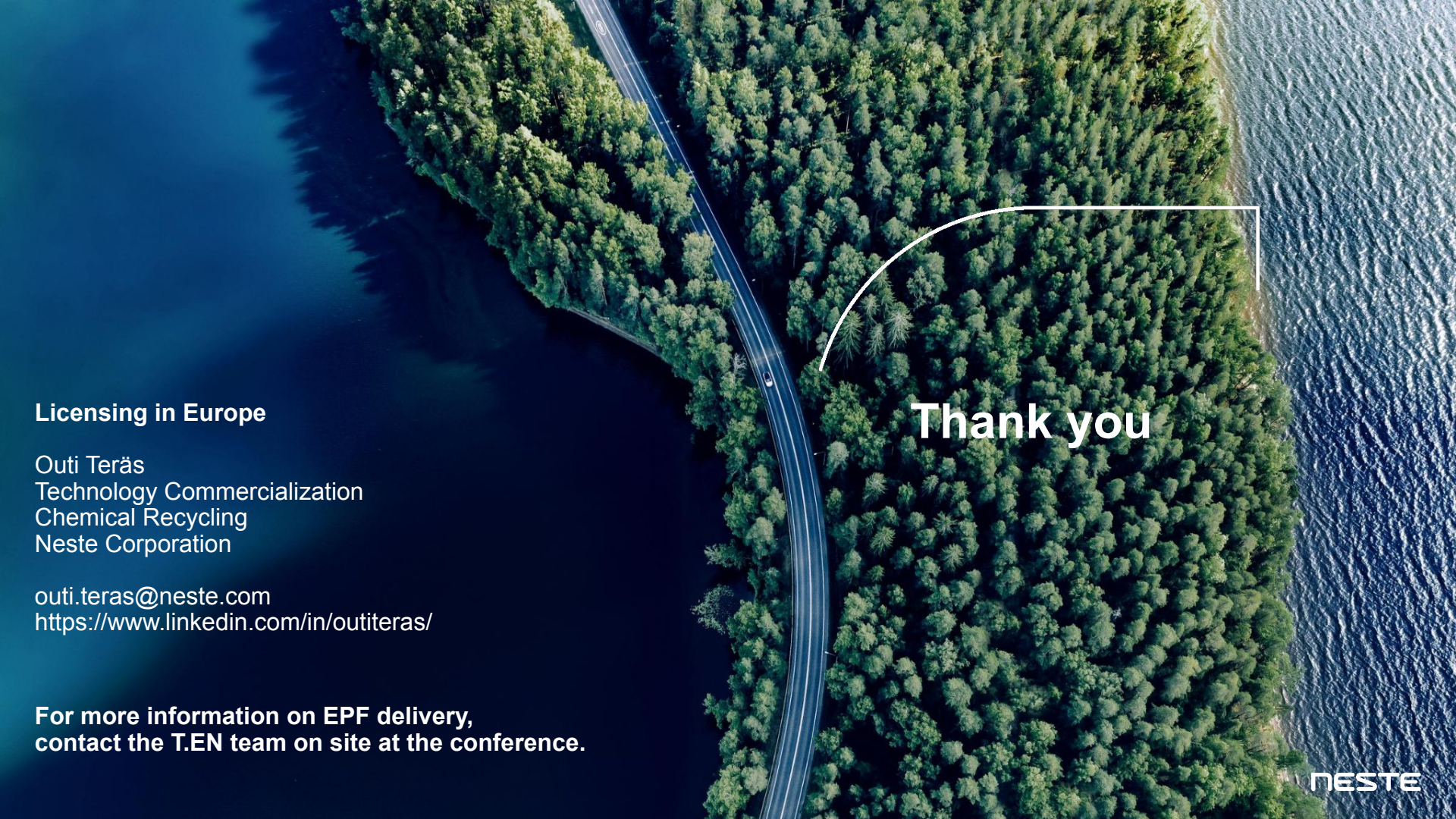
The right time to engage in discussions is now

- **Project status** | Standardized design expected to be completed by the end of 2025
- **Validation** | Information for technology due diligence is available and visits to the Akron plant can be arranged already now
- **First-movers** | First licensing discussions for the concept are already proceeding



Thank you

Licensing in Europe

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For more information on EPF delivery, contact the T.EN team on site at the conference.