



Green Hydrogen Perspectives at Neste

International Conference on European Energy Market

Lappeenranta June 6, 2023
Outi Ervasti, VP Renewable Hydrogen, Neste

Our purpose is to create a healthier planet for our children

<https://www.youtube.com/watch?v=Ovkgs-Qll6Y&t>

Driven by our purpose



We are

5,244

dedicated professionals
committed to our
purpose

In 2022, our customers reduced

11.1 Mt

greenhouse gas emissions with
our renewable products

In 2022, we reached

3,537 m€

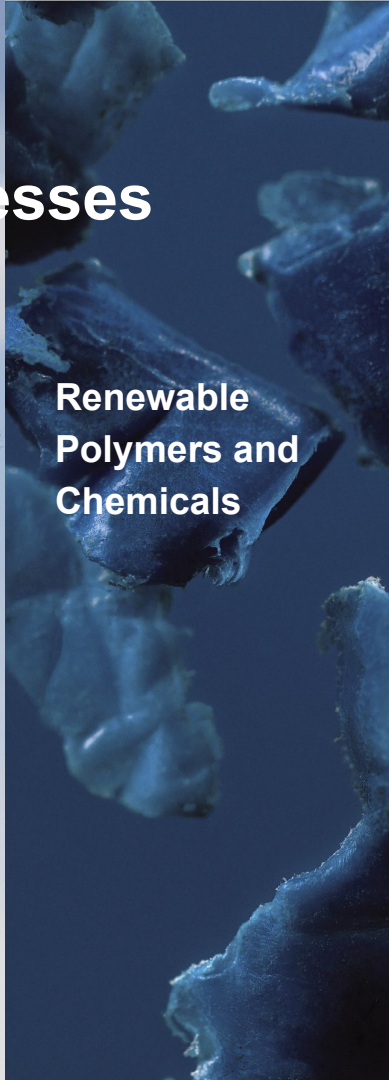
comparable EBITDA

Our businesses

Renewable
Aviation



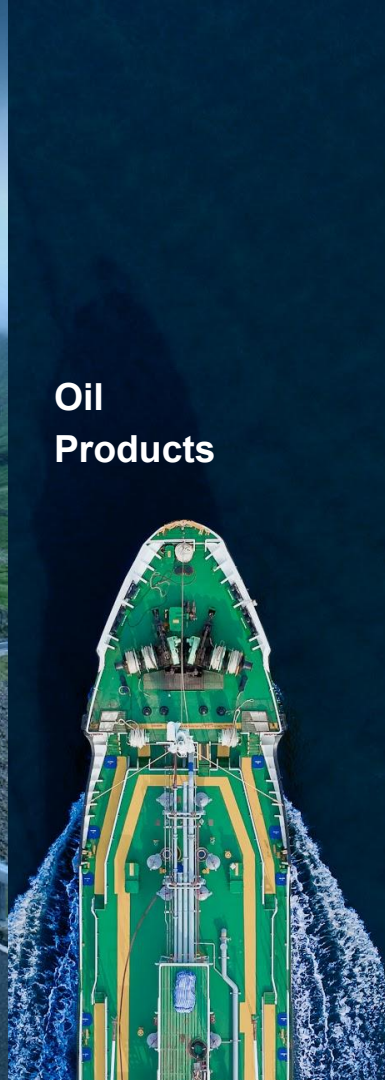
Renewable
Polymers and
Chemicals



Renewable
Road
Transportation



Oil
Products



Marketing &
Services



A strong global mindset with key markets in Europe and North America

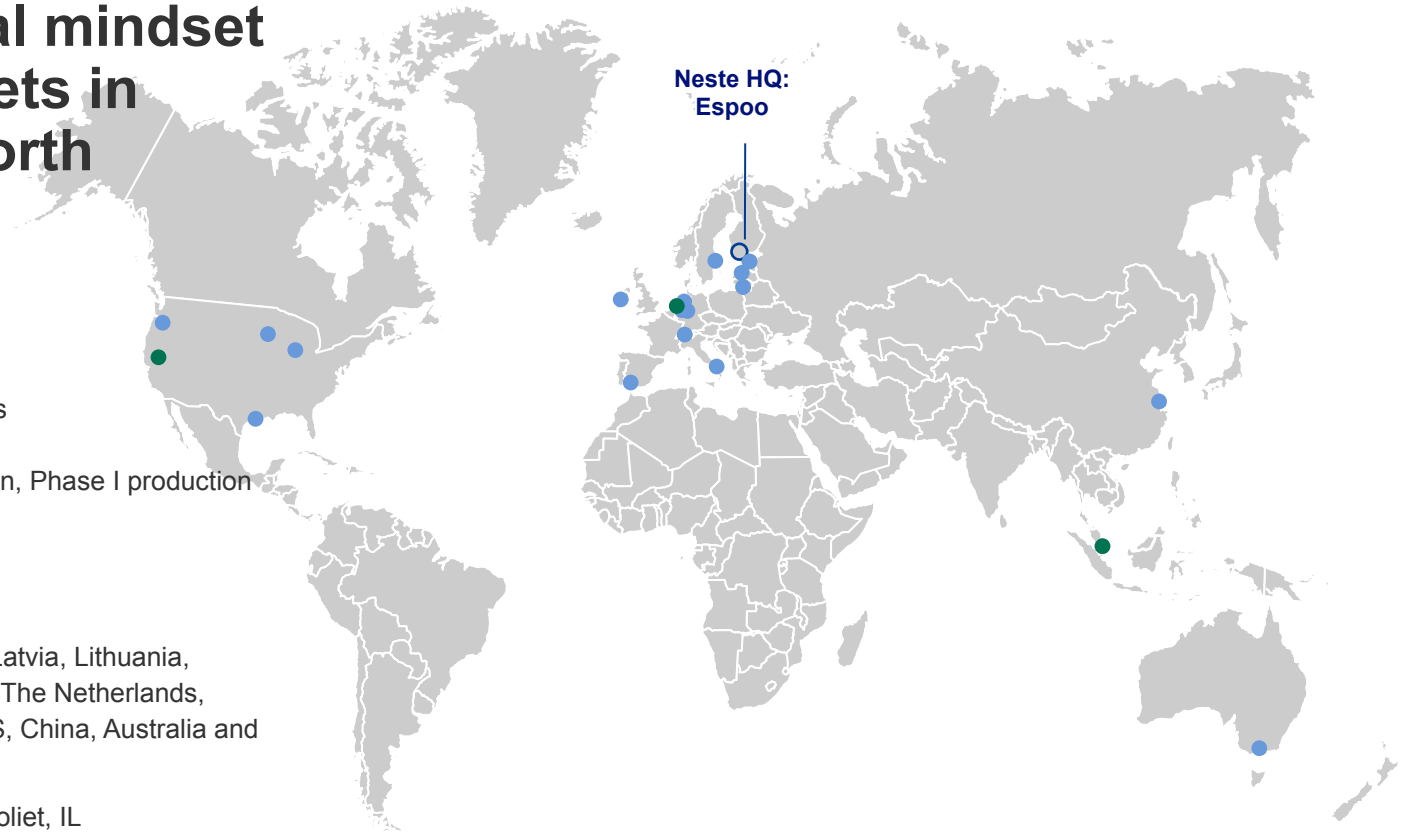
Production:

Porvoo, Finland
Rotterdam, The Netherlands
Singapore
Martinez, CA (Joint operation, Phase I production
has started)

Other locations:

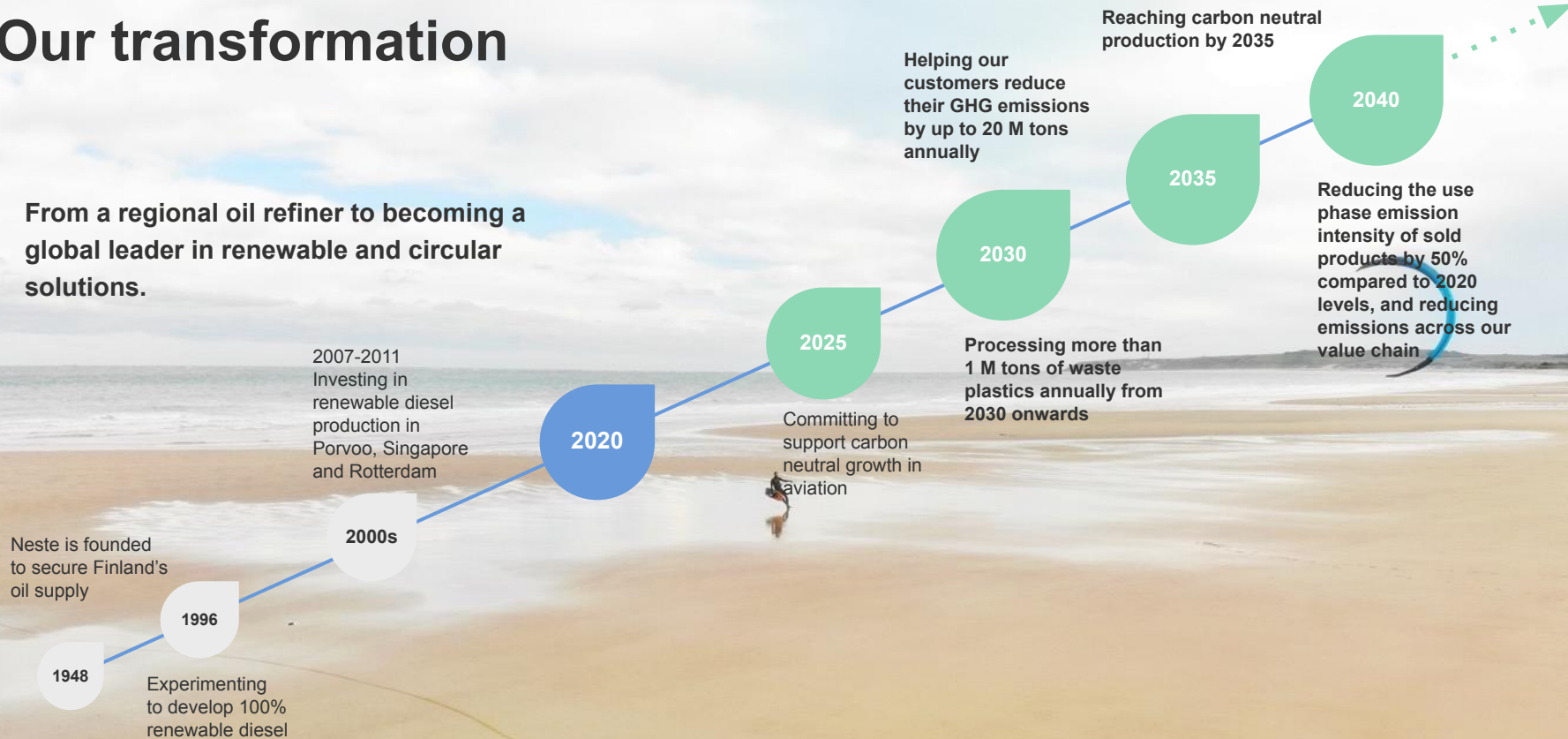
Finland, Sweden, Estonia, Latvia, Lithuania,
Belgium, Germany, Ireland, The Netherlands,
Switzerland, Italy, Spain, US, China, Australia and
Singapore

Mahoney Environmental - Joliet, IL
Agri Trading - Hutchinson, MN
SeSequential Environmental Services - Portland, OR



Our transformation

From a regional oil refiner to becoming a global leader in renewable and circular solutions.



* Comparable operating profit



We create our future through innovation

Neste has transformed itself from a local oil refining company to the world's largest provider of renewable solutions for transportation

In 2022, R&D expenditure

85 m€

Amount of granted patents

~2,000

25%

of personnel work with innovations

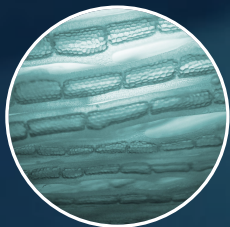
>1,300

professionals

Scalable solutions for the future



Renewable oils and fats



Algae



Novel Vegetable Oil



Lignocellulose



Waste plastics*



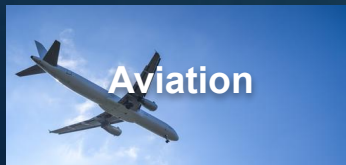
Municipal waste



Renewable H₂ & PtX

Now

Mid- to longer term options



*Used for polymers and chemicals industry only

Renewable hydrogen at Neste: Captive use to reach our sustainability targets

Porvoo

Green Hydrogen Project

- Basic engineering of 120 MW electrolyser at Porvoo refinery for captive use
- Initiating studies on additional capacity up to a total of 360 MW
- Developing renewable electricity supply solutions
- Developing sector integration opportunities

Rotterdam

MultiPLHY

- Validation of new technology: 2.6 MW SOEC* electrolyzer demo unit
- Commissioning taking place in H1/2023

Pathways for renewable H₂

- Investigating green hydrogen options for our refinery in Rotterdam

Singapore

Pathways for renewable H₂

- Investigating green hydrogen options for our refinery in Singapore

*Solid Oxide Electrolysis Cells

Study: transforming Neste's Porvoo refinery into a world-class site for renewable and circular solutions

~ **2-4** Mt/a

Potential capacity of
renewable and
circular solutions
in Porvoo

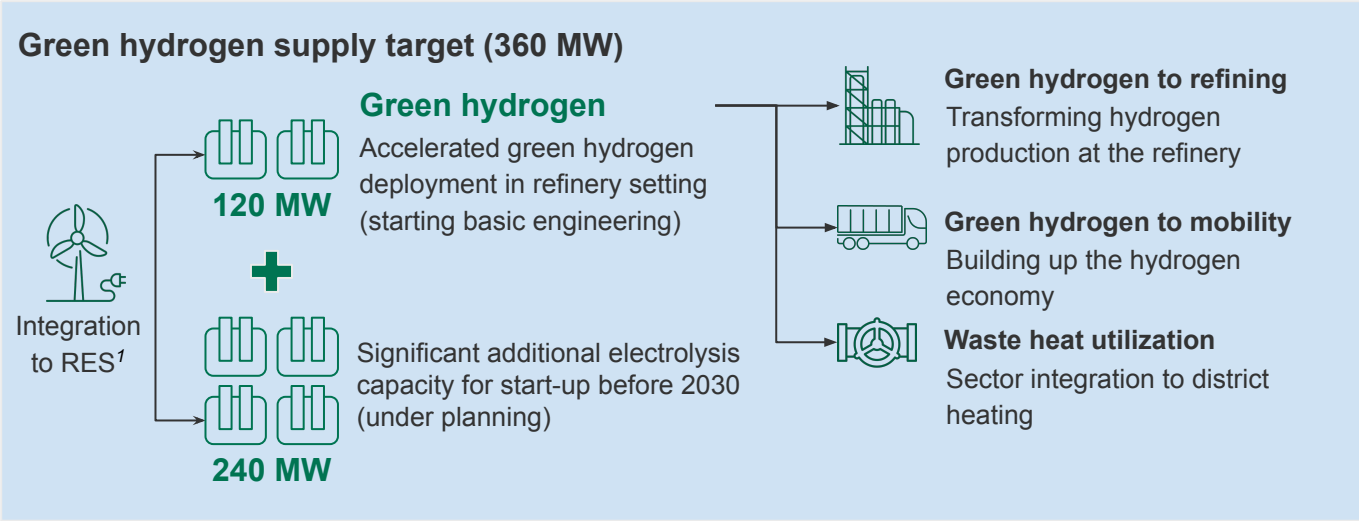
mid-**2030**s

Ending crude
oil refining

by **2035**

Carbon neutrality and
climate commitments
reached

Remarkable increase in the green hydrogen supply to Neste Porvoo refinery, Finland



¹RES = Renewable Energy Sources



Demonstrating green hydrogen to refining at Rotterdam refinery

We will demonstrate green hydrogen production at our Rotterdam refinery with CEA, Sunfire, Paul Wurth and Engie in an EU project MultiPLHY. The project aims at the installation and integration of the world's first multi-MW scale high-temperature electrolyser system into a refinery.



2.6 MW
nominal power input



60 kg/h
green hydrogen



16,000
operating hours

This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking under grant agreement No 875123. The Joint Undertaking receives support from the European Union's Horizon 2020 research and innovation programme, Hydrogen Europe and Hydrogen Europe research.

Leading the way in green transition: Key enablers for renewable hydrogen investments



Renewable electricity ramp-up

Massive investments to renewable power production and transmission capacity



New partnerships

Value chain development and cross sectoral integration between industry and utility sector



Infrastructure build-up

Power transmission and hydrogen storage & distribution infrastructure development



Regulation

Clear, enabling regulation to drive investments



Electrolysis

Electrolyzer manufacturing capacity is not meeting the demand - accelerated capacity ramp-up needed



Funding

Financial support to kick start the hydrogen economy

Critical factors to accelerate the hydrogen economy development in the EU



Regulation - Enabling investments in the EU

- **It is good that the rules for RFNBO hydrogen production have been published**
 - Sets the framework for production to proceed with investments
- **Dedicated mandates are needed for renewable hydrogen to incentivise investments**
 - Regulation mandating renewable hydrogen demand (e.g. RED III, ReFuelEU Aviation) and swift national implementation is essential
- **Needs of large-scale process industry have to be taken into account** (continuous hydrogen supply)
- **Hydrogen from non-fossil energy sources (incl. nuclear) needs to be incentivised**
 - Official status is needed for also other types of hydrogen than RFNBO



Renewable electricity - Massive ramp-up of power production and transmission capacity

- **Fast permitting processes needed for timely execution of projects**



Incentives based on straightforward and simple rules to catalyze the first investments (USA vs EU)



NESTE

Change runs on renewables