



# Neste

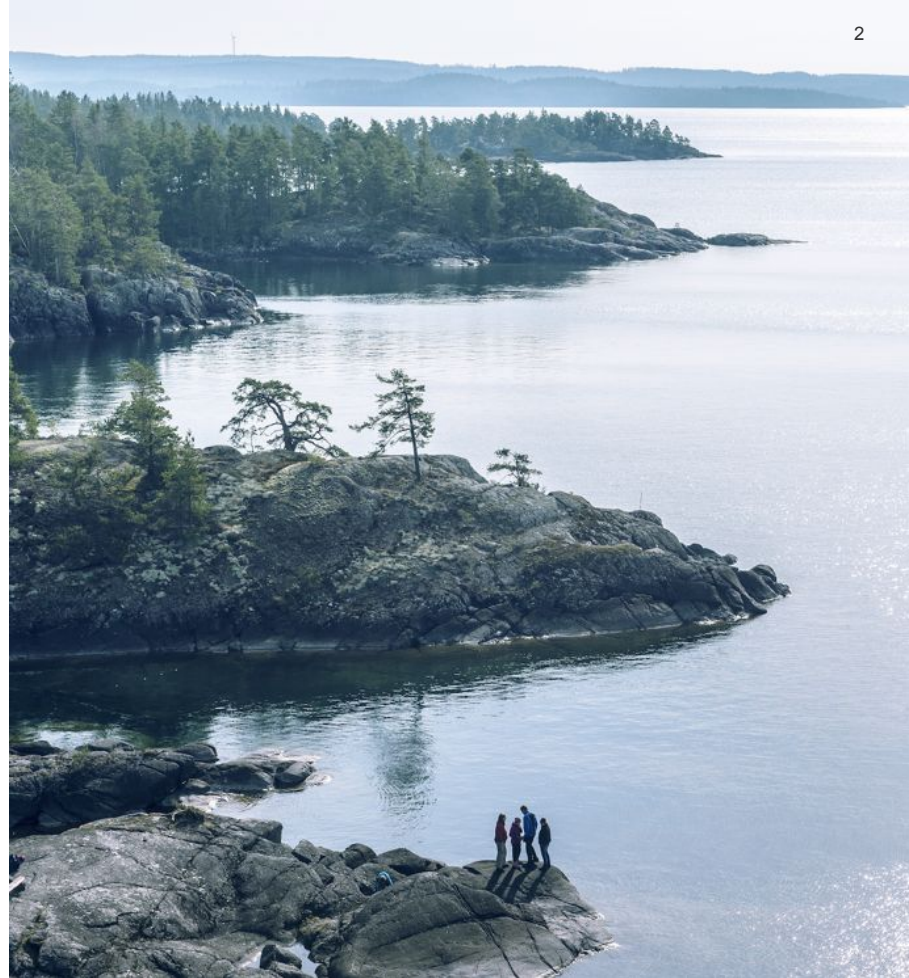
## Our approach to Power-to-X

Jukka Räsänen, Head of Business and Strategy Development, Power-to-X, Neste

Webinar: Carbon neutrality: Climate action in the industry sectors in the Nordics  
25 October 2022

# 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 plastics and other materials.
- We are the world's leading producer of renewable diesel and sustainable aviation fuel, developing chemical recycling to combat the plastic waste challenge.



# Driven by our purpose



We are

# 4,872

dedicated professionals  
committed to our  
purpose

In 2021, our customers reduced

# 10.9 Mt

**greenhouse gas emissions** with  
our renewable products


In 2021, we reached

# 1,342 m€

comparable operating profit

# Sustainability as a driver for strategy



An aerial photograph showing a winding, light-colored road that curves along a rugged, rocky coastline. The road is bordered by dark, jagged rock formations. To the right of the road, the dark blue ocean meets the shore, with white foam from waves visible. The overall scene is dramatic and scenic.

**We take the lead in transforming our value chains towards carbon neutrality, and setting ourselves aspirational targets for biodiversity, human rights, and our supply chain & raw materials.**

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# Innovation business platforms are aiming for commercial operations before 2030

We are systematically strengthening our partnerships and networks across technological and commercial value chains in all innovation business platforms.

**Renewable hydrogen**

Establish renewable hydrogen production capabilities and use in Neste's refineries

**Power-to-X**

Scalable production of fuels and chemicals detached from biomass

**Algae**

New NEXBTL feedstock from algae oil and high quality ingredients for health and nutrition

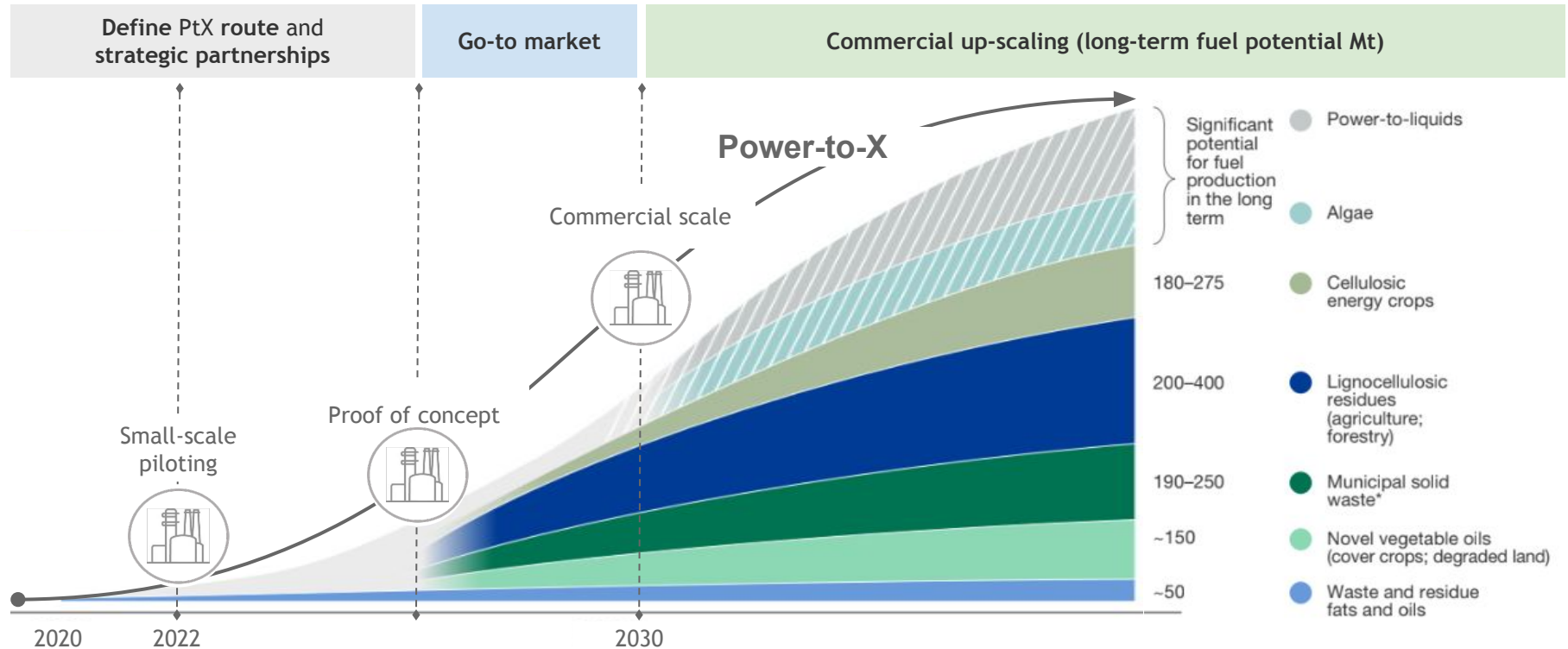
**Lignocellulosics**

New renewable and scalable feedstock for fuels with possible diversification into chemicals

**Municipal Solid Waste**

New circular feedstock and technology for producing fuels & chemicals

# Rapid deployment of new PtX technologies and feedstock mobilization required to supply sustainable fuel volumes 2030+





**Neste aim to be among the  
first companies bringing  
eFuel volumes to the market**



# The growth path of sustainable aviation fuels is based on continuously expanding raw material base

## Current



**Used cooking oil**  
Waste oil from food cooking



**Animal fat**  
Food industry waste



**Fish fat**  
Fish processing waste

## Near future 5 - 10 years



**Lignocellulosic**



**Municipal solid waste**

## Future 8-10 years



**Algae**



**Power-to-X**

# Regulation, incentives and voluntary markets for SAF are all needed to drive emission reductions in aviation

**Fuel supplier and producer incentives and mandates**

E.g. SAF mandates, opt-in incentives



**Airline obligations and voluntary schemes**

E.g. EU ETS, CORSIA, Science-Based Targets



**End-customers can accelerate SAF demand**

E.g. Science-Based Targets, private traveller SAF programs



# PtX is developing projects with global view

- Short-term focus
- Mid and long term focus

Global view for project development for 2030

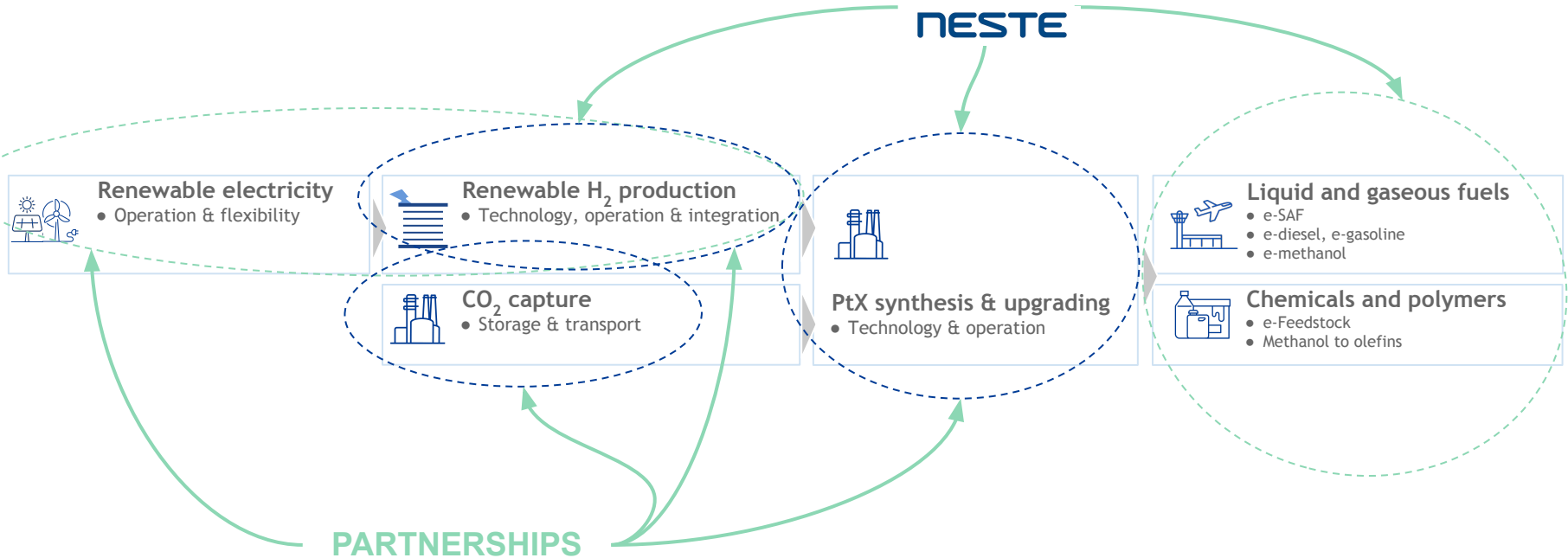
Small-scale high-efficiency Power-to-X concept piloting ongoing 2021-2023. Large-scale electrolysis project in Feasibility Study-Phase. Finland.

First Power-to-X volumes project targeted 2025-2030. Focus in Nordics

SOEC electrolyser piloting project in execution phase. Netherlands.

# Collaboration is required for scale-up

## Strengthening our partnership and networks across the value chain in the business platform Power-to-X





## Carbon neutral production by 2035

# Reforming current hydrogen production

Reducing CO<sub>2</sub> emissions from our Porvoo refinery in line with the targets in Paris agreement

# 50%

emission reduction by 2030.

Enablers:

- 100 % **renewable electricity**
- **Energy efficiency** improvements
- Reforming **hydrogen** production

Targeting to reduce

# ~400 kt/a CO<sub>2</sub>e

emissions by 2025 onwards.

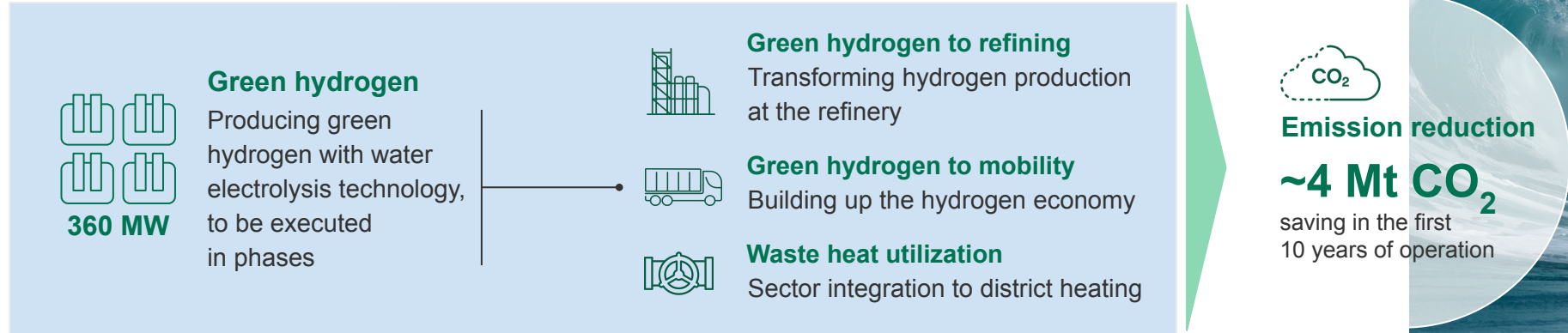
Renewable hydrogen enables production of **low emission fuels** and other refined products.

Renewable hydrogen builds also a foundation for **PtL production**

## Project SHARC:

# Neste develops large-scale green hydrogen supply to Porvoo refinery

Neste's SHARC project is a clean hydrogen project focusing on investing in production capacity of green hydrogen and reducing emissions from hydrogen production at the Porvoo refinery. The project is currently in the feasibility phase and the target is to start the first phase of operations (120 MW) around mid 2020s. Funding from the EU Innovation Fund\*.



# European Commission has granted IPCEI status for Porvoo refinery hydrogen projects

Porvoo refinery to become integral part of European hydrogen and PtX value chains

Collaboration and partnerships

Developing sustainable solutions for transport and industry

# 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



## Infrastructure build-up

Power transmission and hydrogen storage & distribution infrastructure development



## Electrolysis

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



## New partnerships

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



## Regulation

Clear, enabling regulation to drive investments



## Funding

Financial support to kick start the hydrogen economy



# Faster, bolder and together

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**Scaling up our  
renewable and  
circular solutions.**

**Increasing innovation  
in extensive  
collaboration with  
research and value  
chain partners.**

**Establishing  
mutually beneficial  
partnerships with  
commitment to  
sustainability.**

# NESTE

Change runs on renewables

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IVL webinar

25 October 2022

Brevik CCS

Per Brevik, Public Affairs Brevik CCS

# Concrete is essential for building a sustainable society

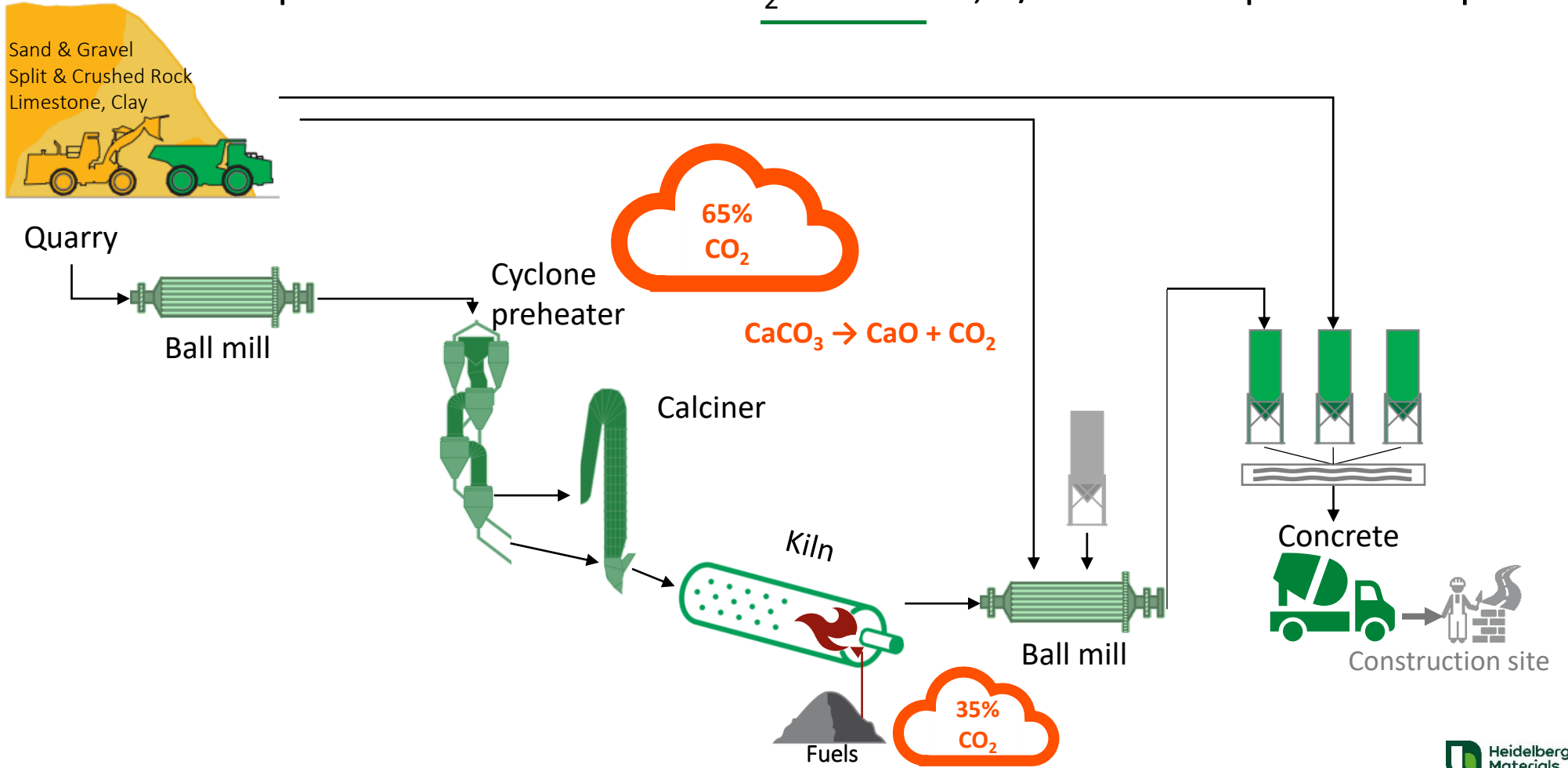




The main challenge for the concrete-industry is the production of cement

- ❑ 2 Gt CO<sub>2</sub> / year
- ❑ 6 – 8 % of the total CO<sub>2</sub>-emissions

# Cement represent 6 – 8% of total CO<sub>2</sub> emissions; 2/3 from the production process



# Climate actions in the cement industry



Alternative fuels

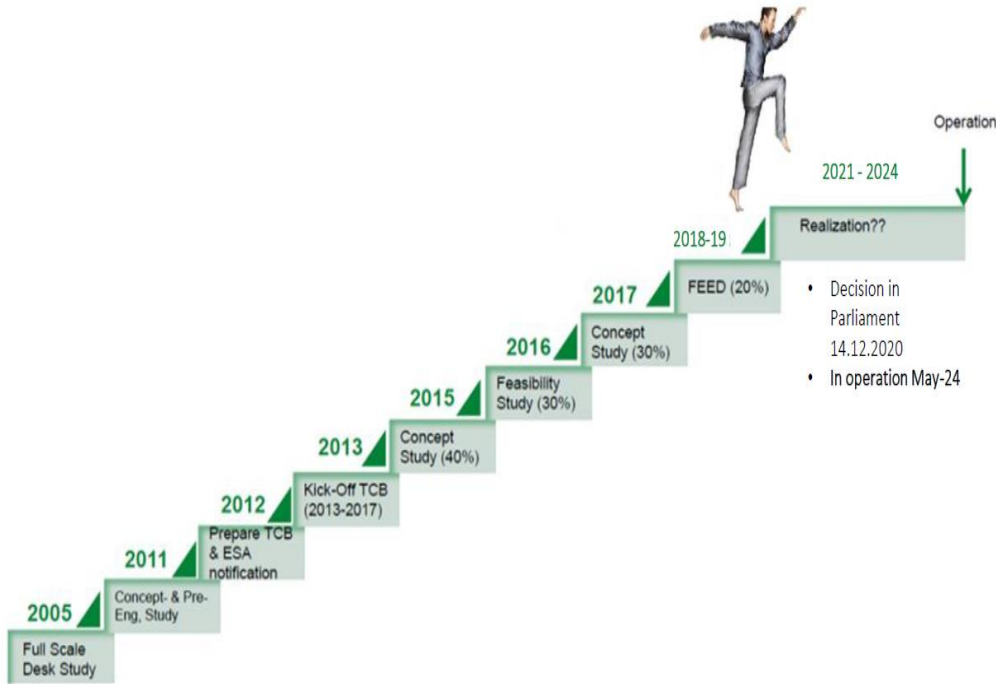


Alternative raw materials



Carbon capture

# CCS in Norcem



- First internal desk studies in co-operation with Regional Technical college. R&D-project.
- Received in 2010 economic support (100 k€) from ECRA to develop an application for Gassnova funding
- The test-project 2013 – 17 key for developing carbon capture at Norcem Brevik. The project is still the basis for our work. First results presented at the CCS-seminar in Langesund in May 2015.
- From 2015 part of Norwegian Carbon capture Development project (Feasibility, Concept and FEED studies)
- Longship launched 21 September 2020



# Longship today

Equinor, Total and Shell ("Northern Lights")  
Responsible for CO<sub>2</sub> transport and storage



Onshore terminal in  
Øygarden, Hordaland

- Onshore terminal with buffer storage, pump and heater
- 110 km pipeline, 12 inches
- Two injection wells



Hafslund Oslo Celsio AS  
Waste-to-energy plant



Norcem AS, Brevik  
Cement plant



- Transport by 1 or 2 ships
- 700 km distance
- Liquefied state (15 barg, -26°C)

- Capture of 400 kt/y at Norcem and Hafslund Oslo Celsio each
- Amine technology incl. CO<sub>2</sub> cleaning, liquefaction and buffer storage (4 days)

## CO<sub>2</sub> capture Brevik

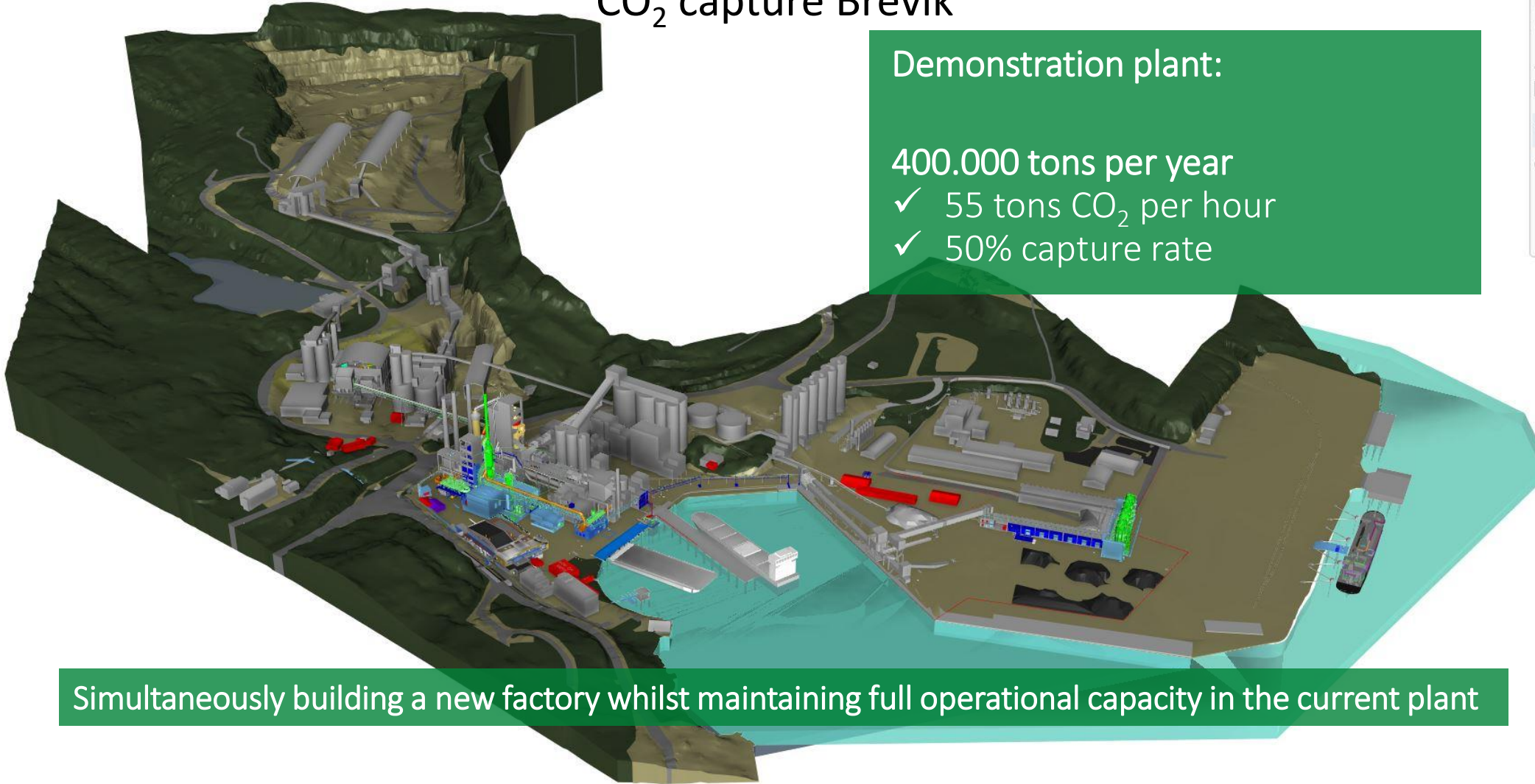
Demonstration plant:


400.000 tons per year

✓ 55 tons CO<sub>2</sub> per hour

✓ 50% capture rate

Simultaneously building a new factory whilst maintaining full operational capacity in the current plant



A 3D architectural rendering of a large industrial facility, likely a carbon capture plant, situated in a valley. The plant features a complex network of pipes, towers, and storage tanks. A prominent vertical green chimney stands in the center. A long yellow pipe runs horizontally across the middle of the site. In the foreground, there are several large industrial buildings with grey roofs and blue accents. To the right, a blue dam or barrier is visible. The background shows dark, rocky hills under a clear sky. A red-bordered box on the left contains project milestones.

Installation of WHRU's started  
in May 2022.

The remaining of the CCS plant  
(all the **green**) will be installed  
in 2023.

Contractual Mechanical  
Completion 15<sup>th</sup> of Feb 2024

First ship load  
1<sup>st</sup> of July 2024

Acceptance test  
31<sup>st</sup> of August 2024

# We are on the way towards 2024

Started  
2021

Current status

2024



Demolition phase

Building phase

Testing phase

Estimated view July 2024



Project progress the next years



Pictures from last week



Pictures from last week



## Public interest is high / Many prominent guests

### Stakeholders

- Government / Ministry / Politicians
- EU / EEA
- Norcem/HeidelbergCement
- Academia – R&D
- Neighbours/Community

### Huge responsibility

- «Norwegian tax payers' money»
- “Open door”-policy
- Public procurement

### Benefits realization

- Responsibility as a big emitter
- Control regarding progress and costs
- «Lessons learnt» - sharing experiences for contribute to further CCS deployment



Prime minister Erna Solberg. With two fellow cabinet members visiting Norcem in Oct. 2020



Former Prime Minister Jens Stoltenberg, now NATO Secretary General

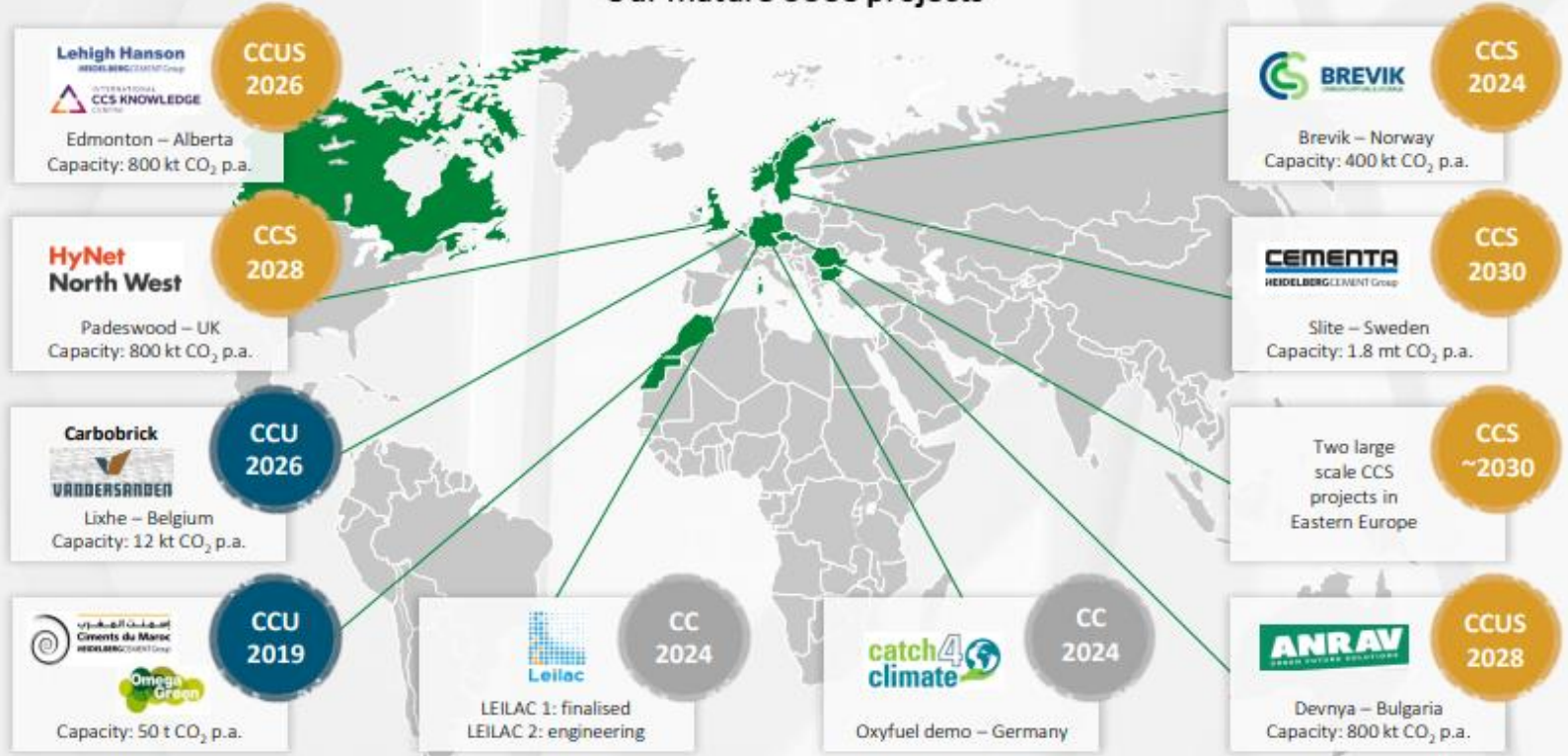


Crown Prince Haakon visiting Norcem 2020.



# Driving CCUS with extensive and most advanced project portfolio in the sector

## Our mature CCUS projects



Changing the future starts today!

