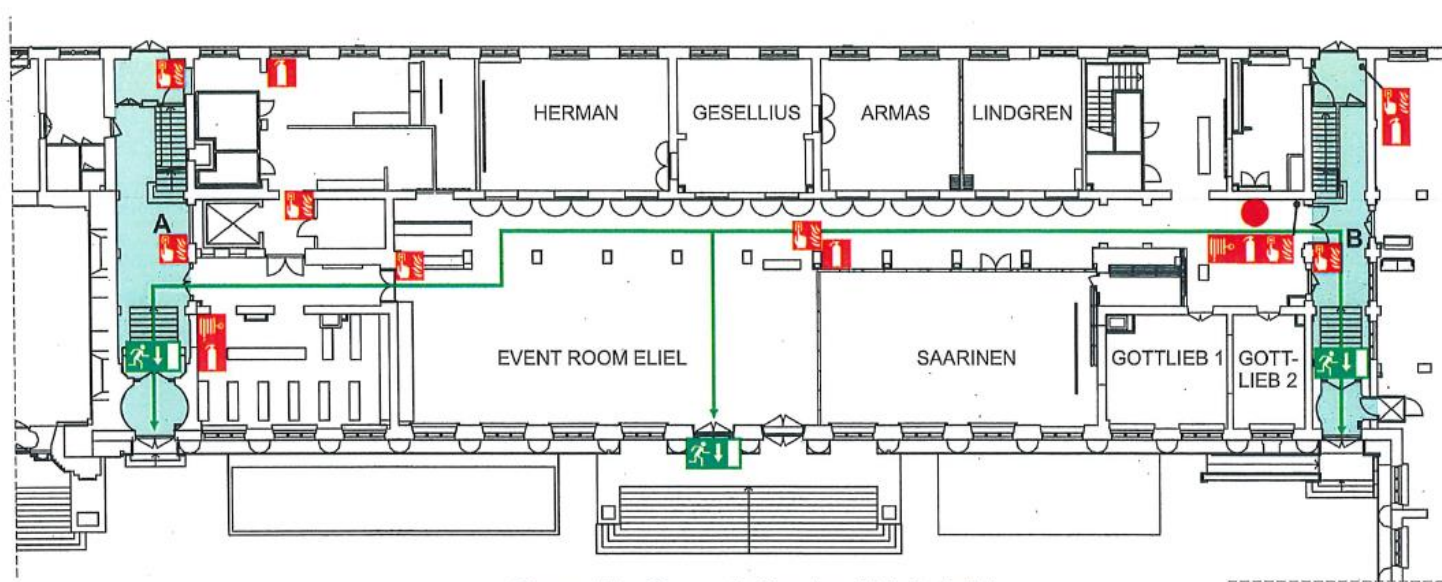
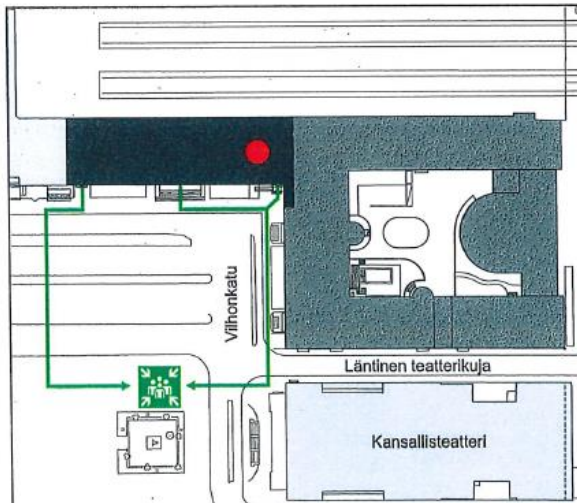


# **FORTUM DEVELOPS NEW NUCLEAR POWER**

as an option to meet future  
customer demand



**Scandic Grand Central Helsinki**  
**Vilhonkatu 13**  
**KERROS 1 - FLOOR 1**



## Palohälytystilanteessa

- Noudata kuulutusohjeita ja henkilökunnan ohjeita!

## Havaitessasi tulipalon

- Paina paloilmoituspainiketta
- Soita 112
- Ilmoita hotellin vastaanottoon

## Pelasta

- Pelasta vaarassa olevat

## Sammuta

- Käytä sammutinta tai pikapalopostia

## Poistu rakennuksesta

- Tarvittaessa poistu kokoontumispaikalle Aleksis Kiven patsaalle hotellin eteen

## In case of Fire Alarm

- Follow the instructions in announcements and given by the staff!

## If you notice any signs of fire

- Press the fire alarm button
- Call 112
- Inform hotel reception

## Rescue

- Anyone in danger

## Extinguish

- Use fire extinguisher or fire hose

## Leave the building

- If advised, proceed to assembly location at Aleksis Kivi statue in front of the hotel

Olet tässä



You are here

Uloskäynti



Exit

Poistumisreitti



Escape route

Pikapaloposti



Fire hose

Käsiammutin



Fire extinguisher

Paloilmoituspainike



Fire alarm button

Defibrillaattori on vastaanotossa



Defibrillator is located at hotel reception



# Our agenda for today

1

## **CLEAN TRANSITION IN THE NORDICS**

President and CEO Markus Rauramo

2

## **NUCLEAR ENERGY OUTLOOK**

EVP Nuclear Generation Petra Lundström

3

## **FORTUM NEW NUCLEAR FEASIBILITY STUDY**

VP New Nuclear Laurent Leveugle

4

## **Q&A**

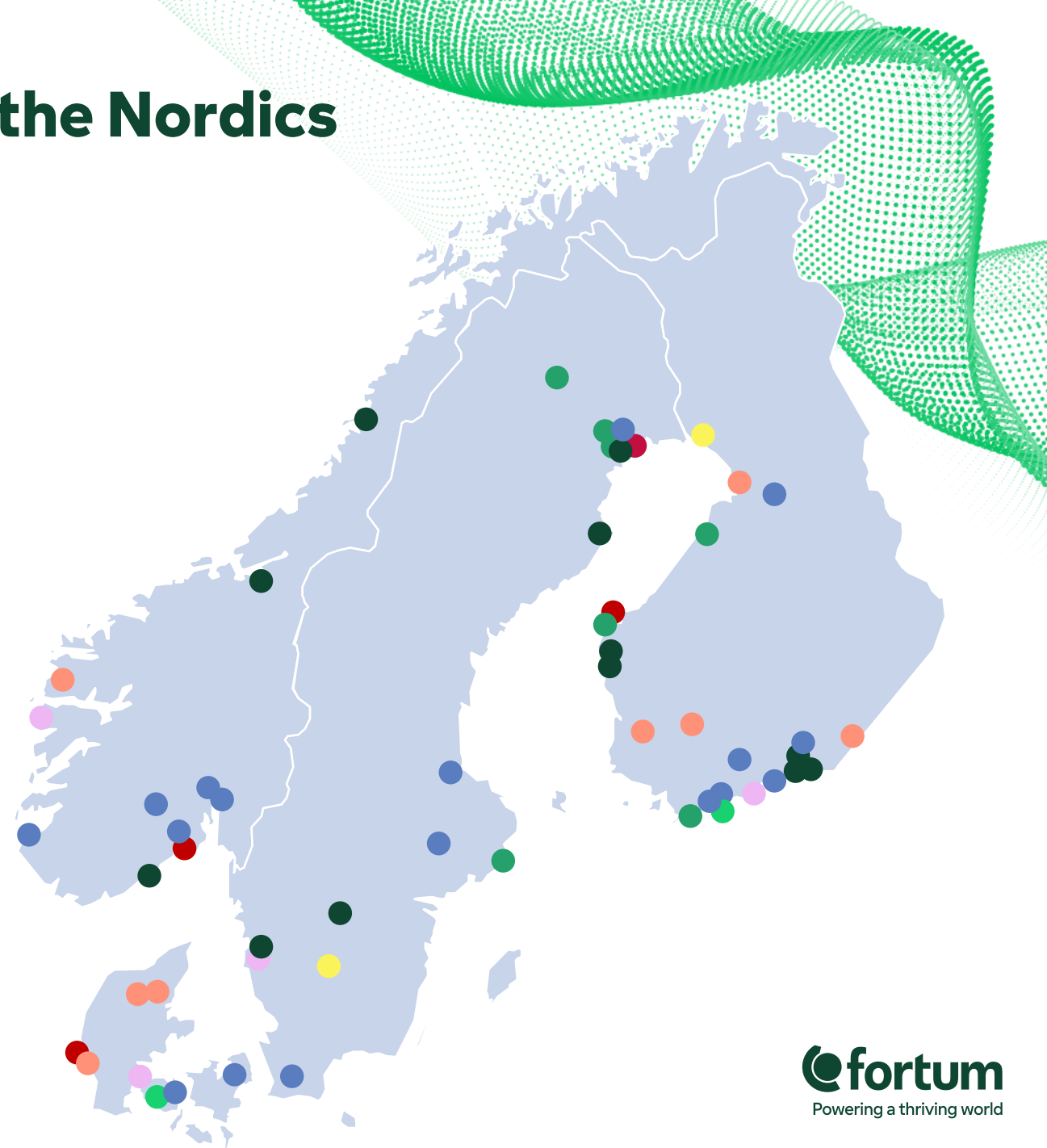


# CLEAN TRANSITION IN THE NORDICS

Markus Rauramo/CEO/Fortum

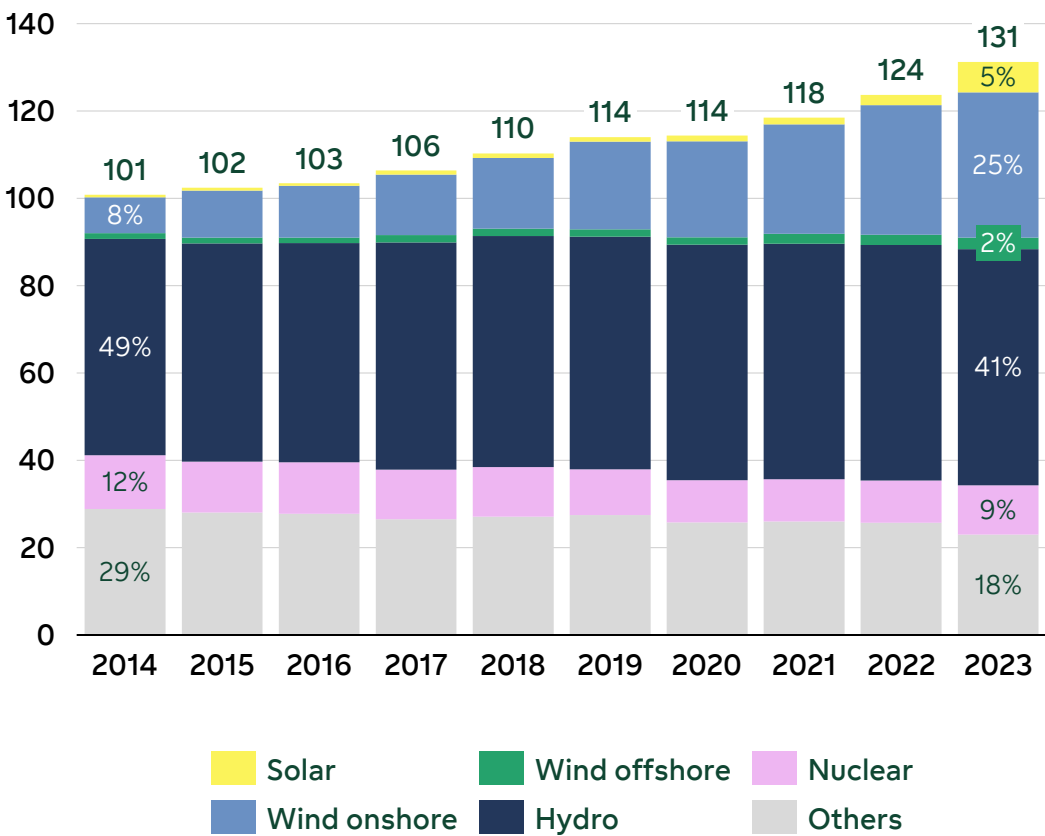
# Customer demand to grow in the Nordics

- Green metals
- Battery manufacturing
- Electrified district heating
- Ammonia and fertilisers
- Existing refineries
- P2X for industry and transport
- Pulp and paper
- Data centers

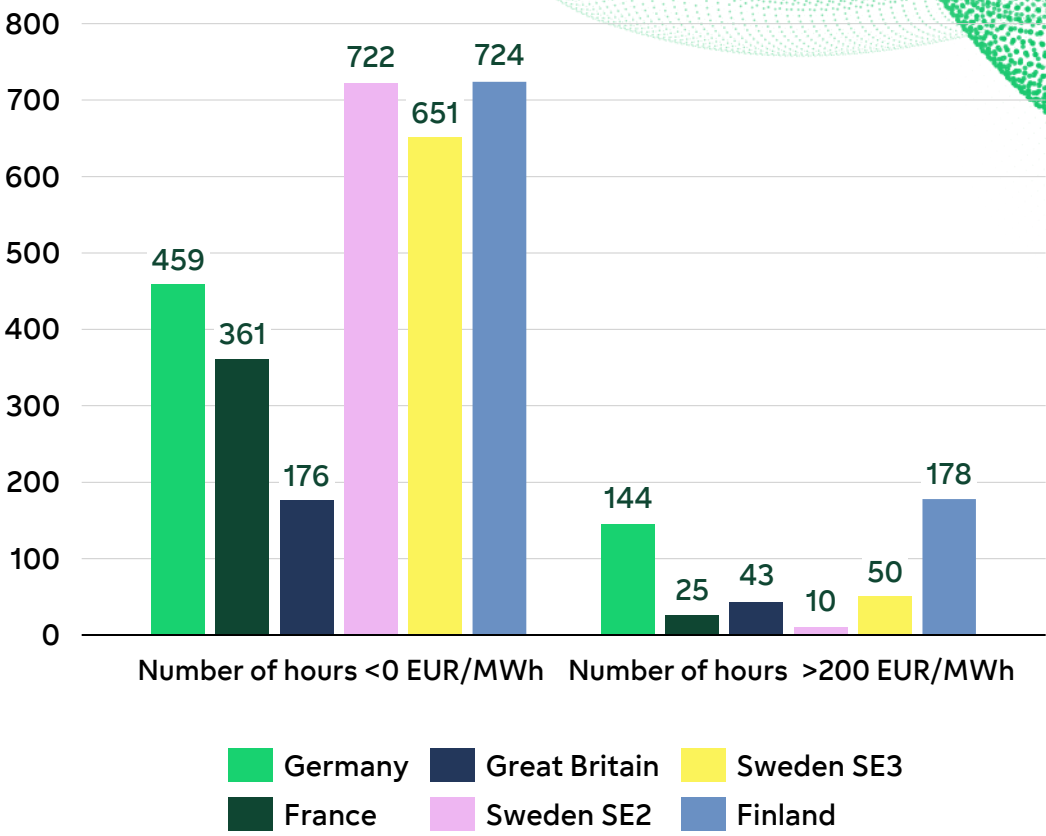


# Nordic power system is increasingly weather-dependent, resulting in highest price volatility in Europe

Installed power generation capacity in Nordics (GW)



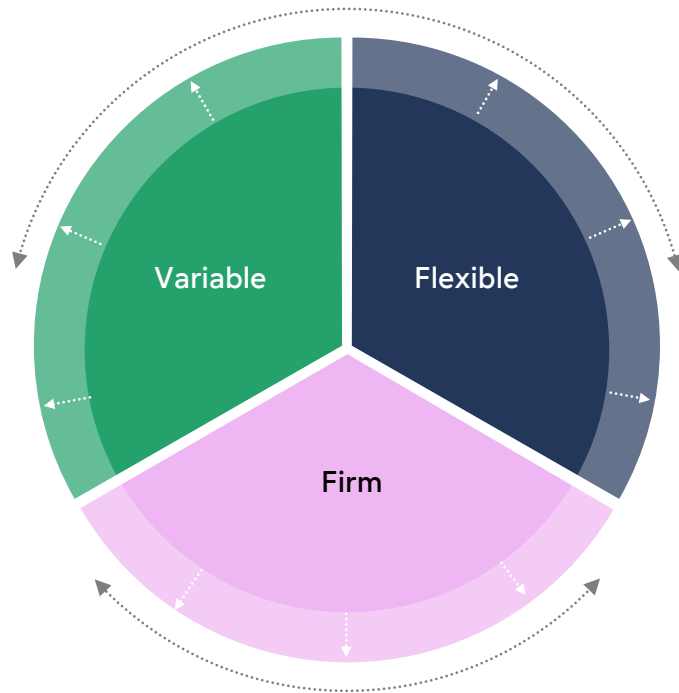
Number of extreme prices in selected price areas (h)





# Fortum is developing a fit-for-future clean power portfolio

The future clean power system needs to balance variable, flexible and firm generation



Fortum's development addresses the capabilities required by customers and a balanced power system

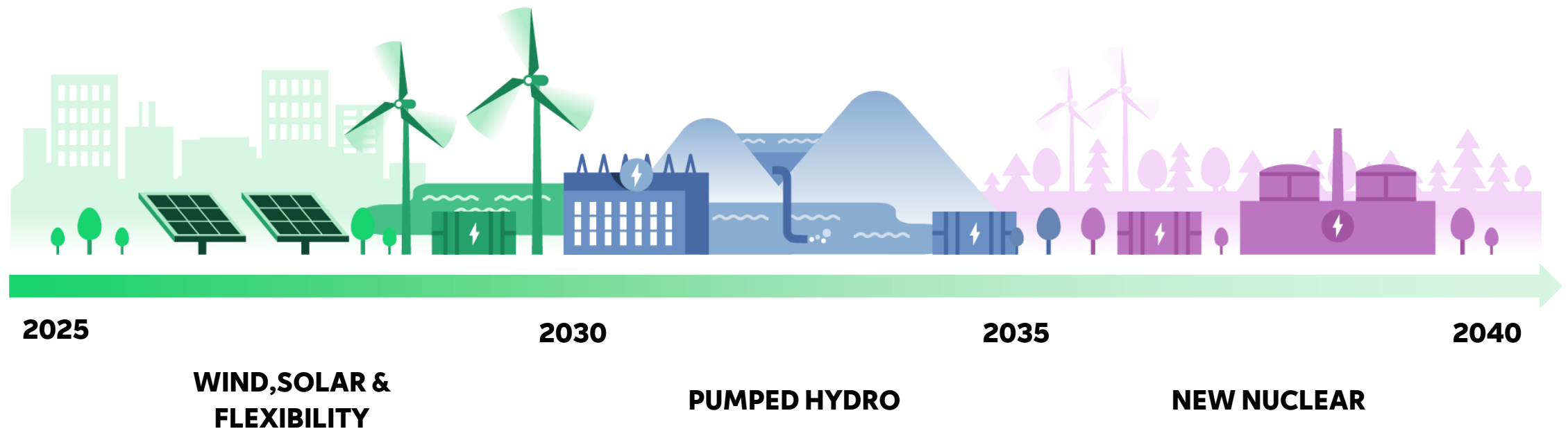
Onshore wind and solar

Flexibility and batteries

Pumped hydropower

Nuclear generation

# Our ambition is to deliver clean power needed for Nordic decarbonisation and growth





# NUCLEAR ENERGY OUTLOOK

Fortum's nuclear capabilities and operating  
environment in Europe

Petra Lundström, EVP Nuclear Generation

**Building prosperity and growth through electrification in the Nordics requires that we dare rethink the existing**

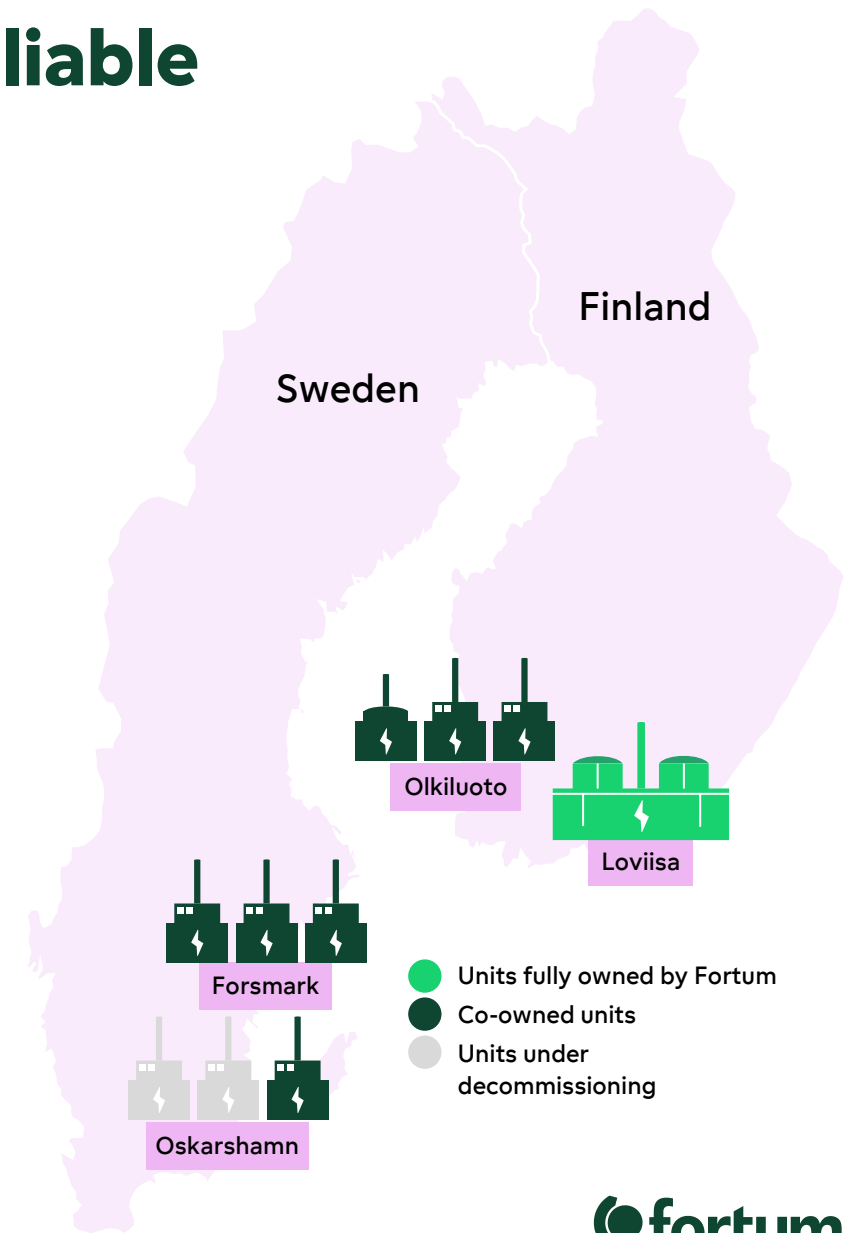
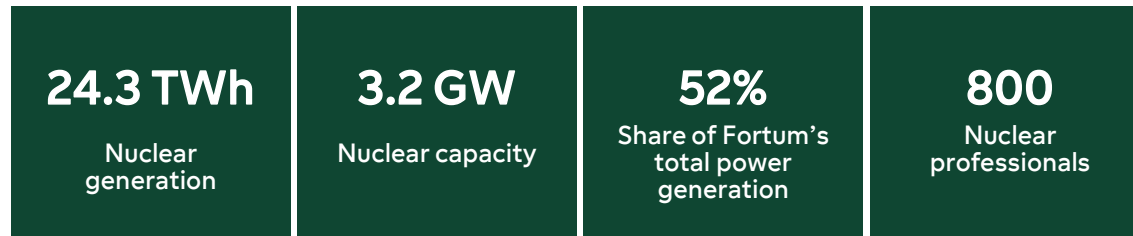
**OPTIMISE  
EXISTING  
ASSETS**

**&**

**CREATE  
CONDITIONS  
ENABLING  
DEVELOPMENT  
OF NEW ASSETS**

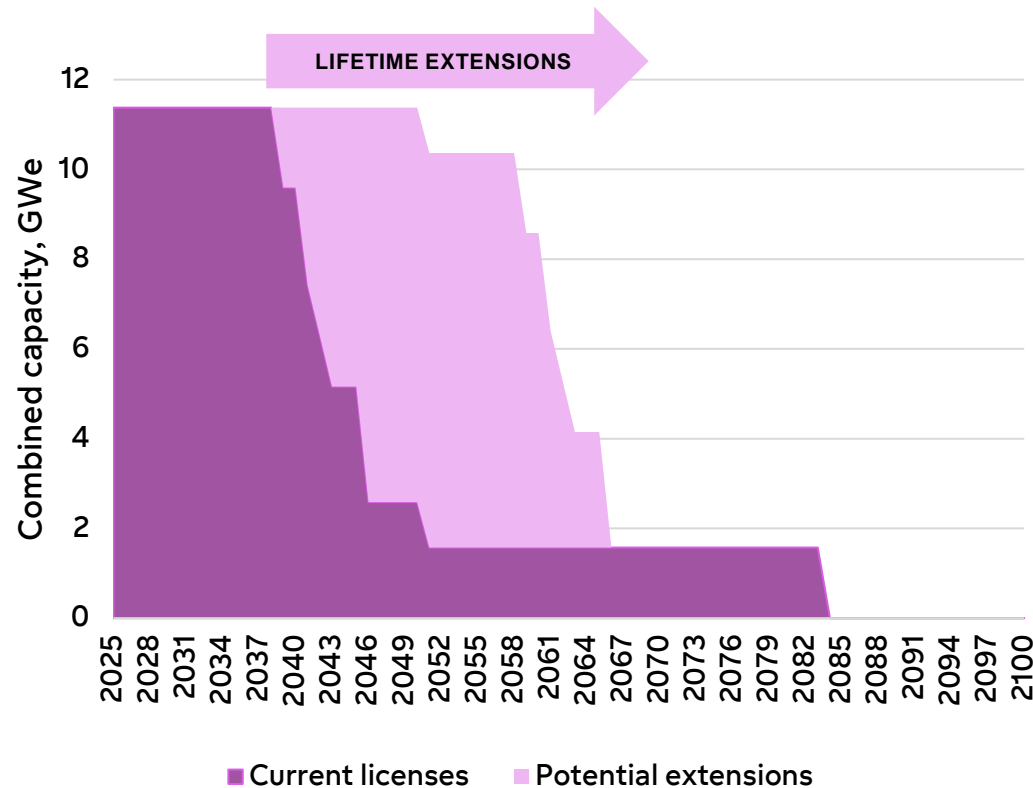
# Fortum has a 45-years track record of reliable nuclear operations

- Fully-owned nuclear power plant in Loviisa, Finland and ongoing life-time extension.
- Co-owned nuclear power plants in Finland and Sweden, investigating extension of long-term operation.
- Forerunner in responsible waste management.
- Extensive in-house engineering and project competences.
- International service business and networks.
- Expertise from newbuild to decommissioning and final disposal of nuclear waste.



# Our perspective to nuclear power spans a century – lifetime extension of the current fleet are a priority

Capacity forecast of the current nuclear fleet in Finland and Sweden



- Nuclear power has been essential for industrialization and prosperity in the Nordics.
- Large part of the existing fleet will reach end of life cycle in 20 years, or a bit later if their lifetime is extended.
- Fortum wants to keep new nuclear as a future option, but it requires very long-term planning and ensuring that existing plants can be operated profitably.

Potential capacity increases are not included in graph.

Capacity data is based on publicly available information from IAEA Power Reactor Information System (PRIS): <https://pris.iaea.org/PRIS/home.aspx> . Information derived 6.2.2025.

The information on potential lifetime extensions are estimations based on public information on existing assets' owners' websites. Not all extensions are necessarily yet decided.

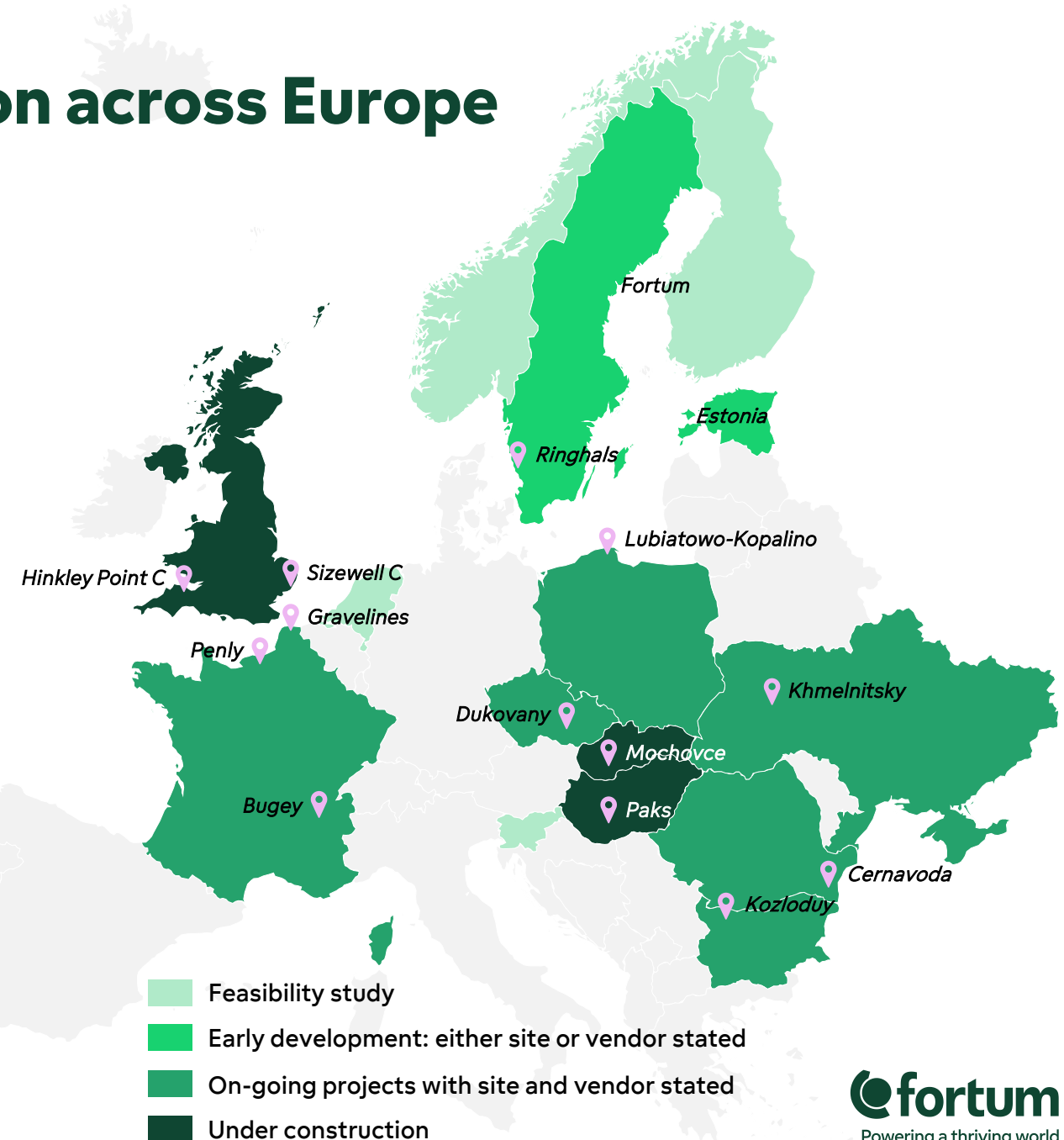
Information derived 6.2.2025.



# New nuclear is gaining traction across Europe

The EU is heading toward **150 GW of installed nuclear capacity by 2050<sup>1</sup>**, European policymakers must support this by:

- **Ensuring access to stable, low-carbon electricity for industry** requires full recognition of nuclear as a low-carbon energy source, especially for clean hydrogen production.
- **Streamlining and accelerating the State Aid process.** Public financing significantly lowers financing costs of new nuclear, benefitting the European consumer.
- **Mobilising the international financial institutions** like the European Investment Bank would speed up the construction of the new European nuclear fleet.
- **Guaranteeing equal access to EU funds and financing mechanisms.** Existing EU funds<sup>2</sup> must guarantee a level-playing field for all net-zero technologies.



1) Based on the National Energy and Climate Plans of member states.

2) E.g. the Just Transition Fund and InvestEU

# Fortum's feasibility study on new nuclear

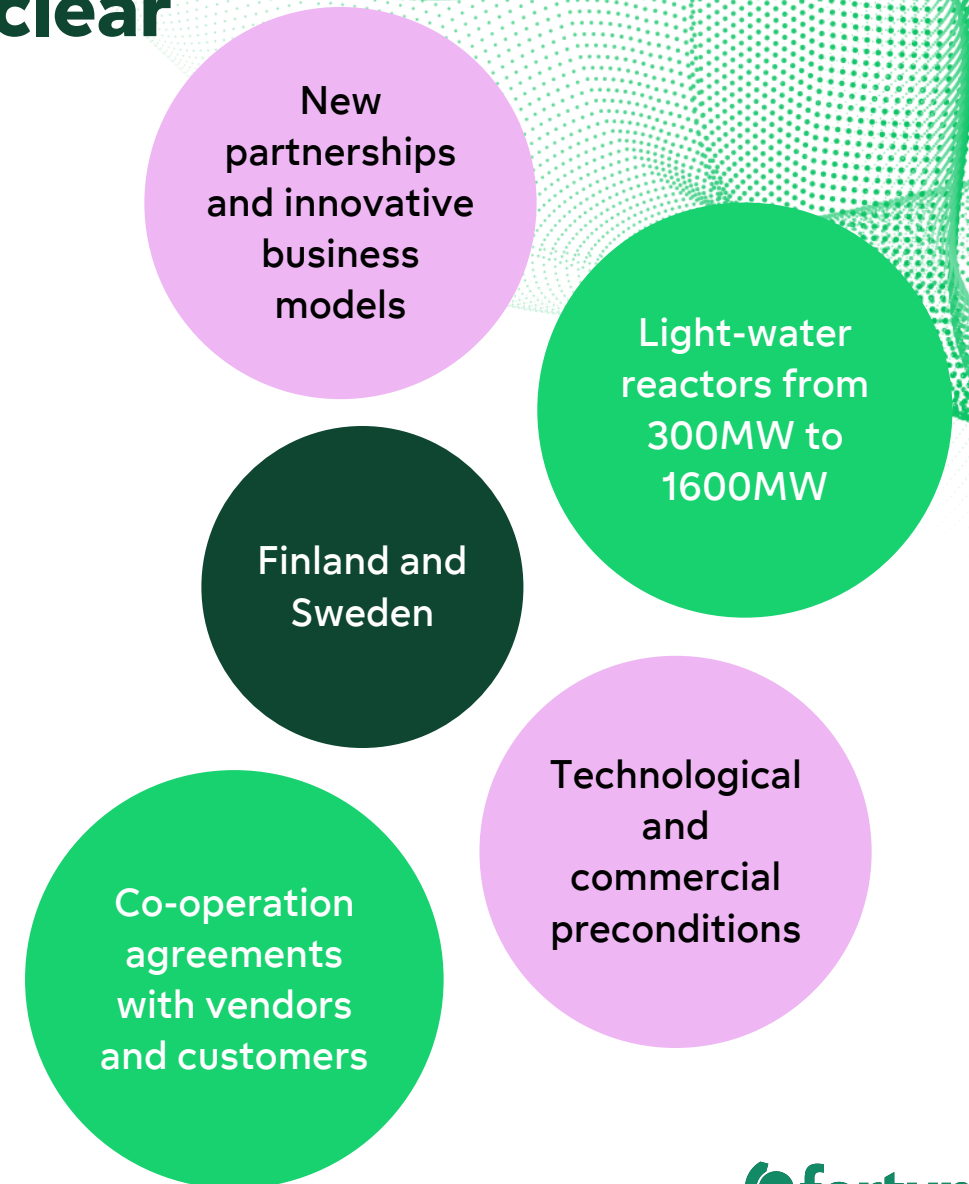
**Our goal was to explore the preconditions for growth in new nuclear in active dialogue with different stakeholders**

During the two-year study, we explored:

- commercial, technological, and societal, including political, legal, and regulatory conditions
- both for SMRs and large reactors (11 designs)

Also, as part of the study we:

- studied numerous past and ongoing projects, sites and technologies
- conducted site feasibility evaluations
- had active pre-licensing discussions



# FORTUM NEW NUCLEAR FEASIBILITY STUDY

Key conclusions and next steps

Laurent Leveugle, VP New Nuclear

# Key conclusions from the Feasibility Study phase

- **The business case:** New nuclear capacity will not be built on merchant basis in the Nordics in a near future due to moderate power price and increasing volatility.
- **The technologies:** Large reactors are mature whereas most of the SMR technologies are still under development. Designs cannot be country-specific to be competitive.
- **Fortum's strength:** Fortum has a competitive advantage in nuclear competence and operational experience but will need strong partners for future projects.
- Not all conditions are currently met for investing in a new nuclear project. However, **Fortum will continue to develop these opportunities.**

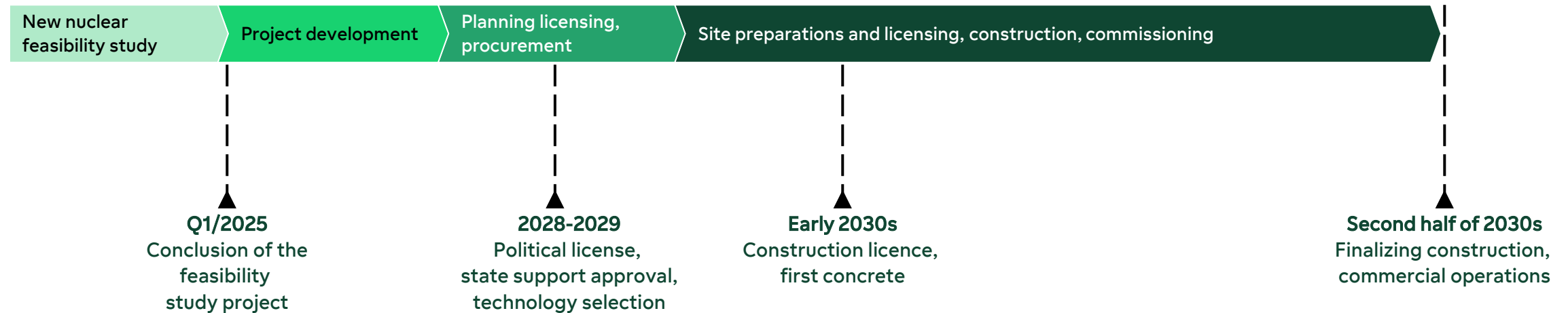
We will continue  
developing a long-term  
nuclear growth option for  
Fortum, cost-efficiently  
and creating value step by  
step to be ready when the  
conditions are right



# Developing new nuclear takes 10+ years including an extensive preparatory phase

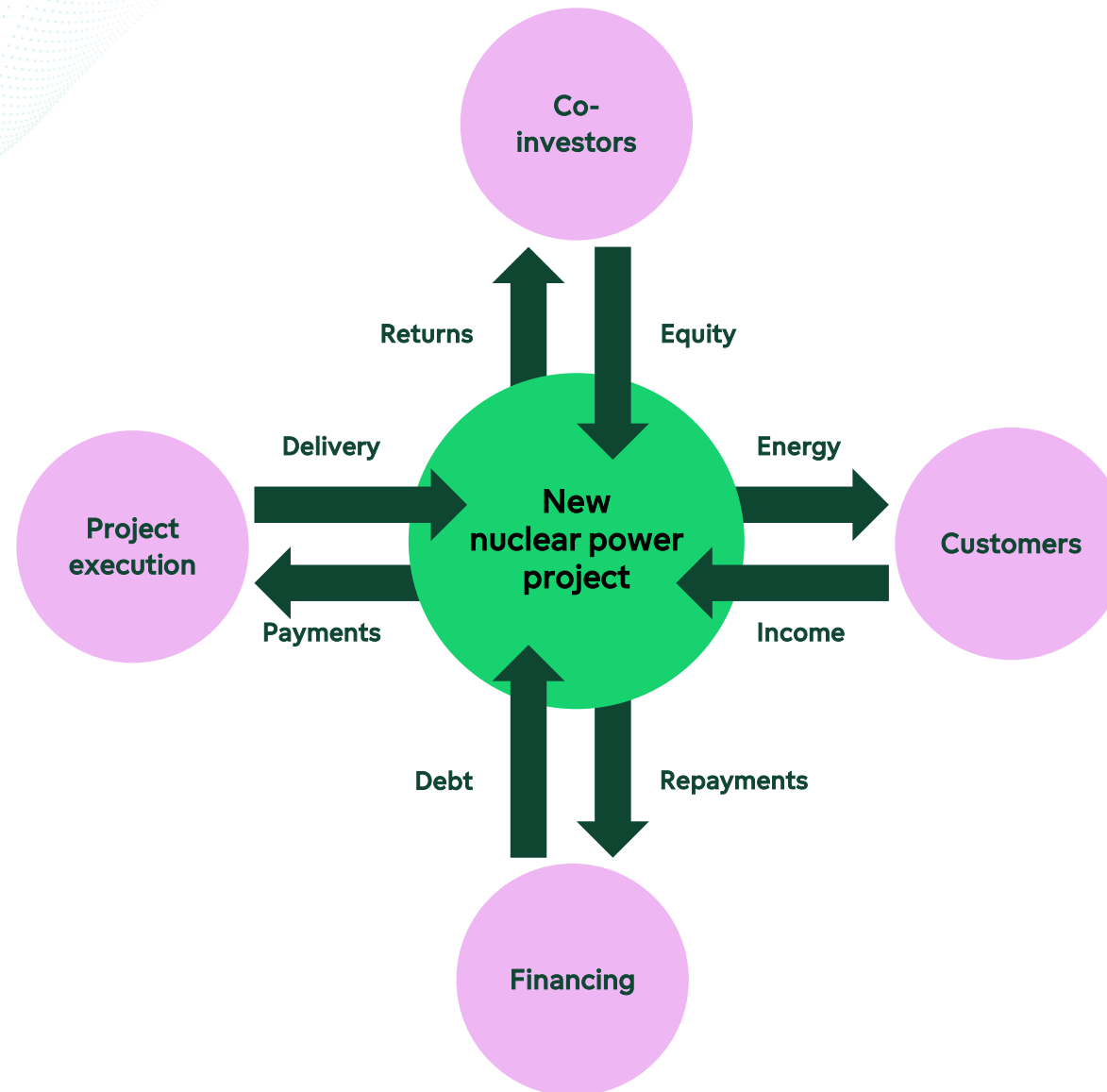
- Several gates must be passed before a final investment decision could be considered
- Fortum will now focus on identified key conditions of the New Nuclear Feasibility Study
- The development phase starts now and will take around two years

## Illustrative timeline of a potential project<sup>1</sup>



1) No decisions beyond immediate next steps in project development phase (2025-27) have been made

# Development will focus on four preconditions, which all must be filled



# New nuclear requires income visibility and demand growth

Customers

Financing

Co-  
investors

Project  
execution

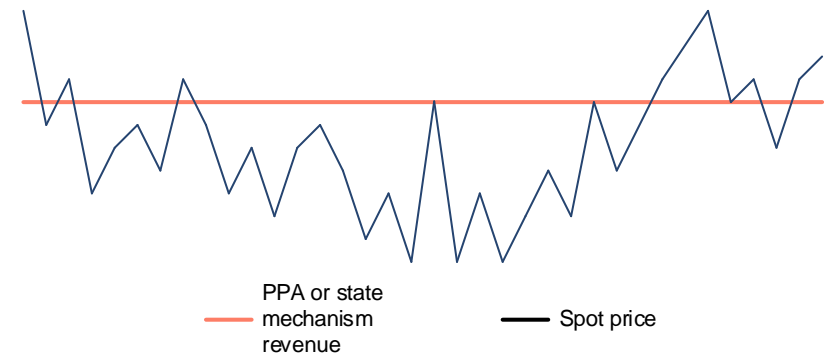
Building new nuclear power in the Nordics on a merchant basis only will be very challenging

A solid risk-sharing framework, connected with demand growth, is needed to provide visibility



The proposed risk-sharing framework in Sweden includes a contract-for-difference mechanism that would provide the required price stability and revenue visibility for a new nuclear project.

Fortum will continue the dialogue on risk-sharing with potential customers and both the Swedish and Finnish states



# New nuclear requires competitive cost of capital

Customers

Financing

Co-  
investors

Project  
execution

Cost of capital is a key driver for production costs

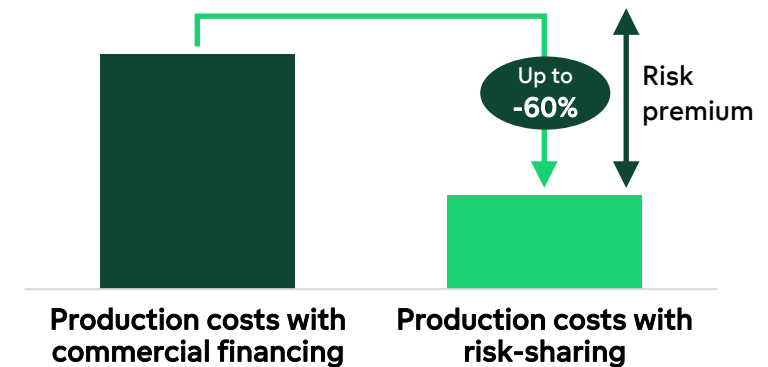
Securing a cost-efficient financing is a key condition for making new nuclear competitive in the Nordics



State construction loan or loan guarantees reduce cost of capital of the project and thus, lower the production costs. The proposed risk-sharing framework in Sweden includes state construction loan.

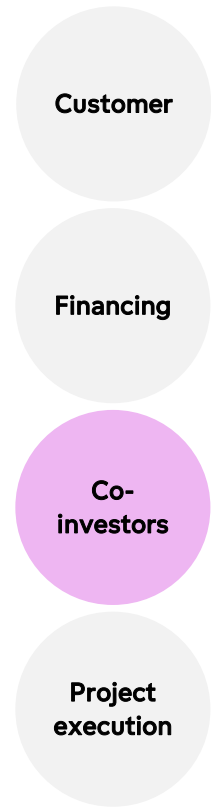
Fortum will continue the dialogue on financing mechanisms with both the Swedish and Finnish states

Fortum will investigate further other options such as investment banks (e.g. EIB) and export banks



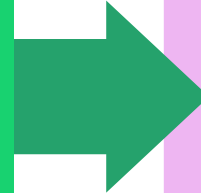


# Fortum needs to partner with co-investors to build a strong owner's organization



New nuclear projects are substantial investments and cannot be carried out by Fortum alone

Strong co-investors are needed to build a competent owner's organization

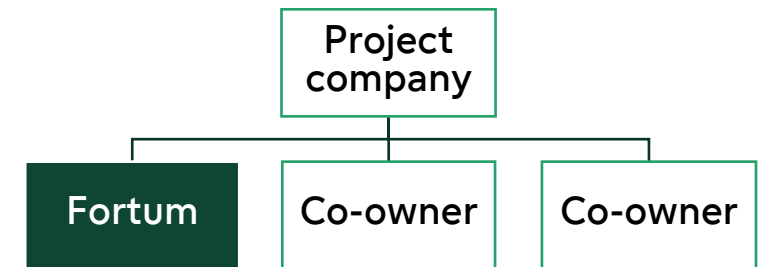


Fortum seeks potential partners to co-develop new nuclear in Finland and Sweden

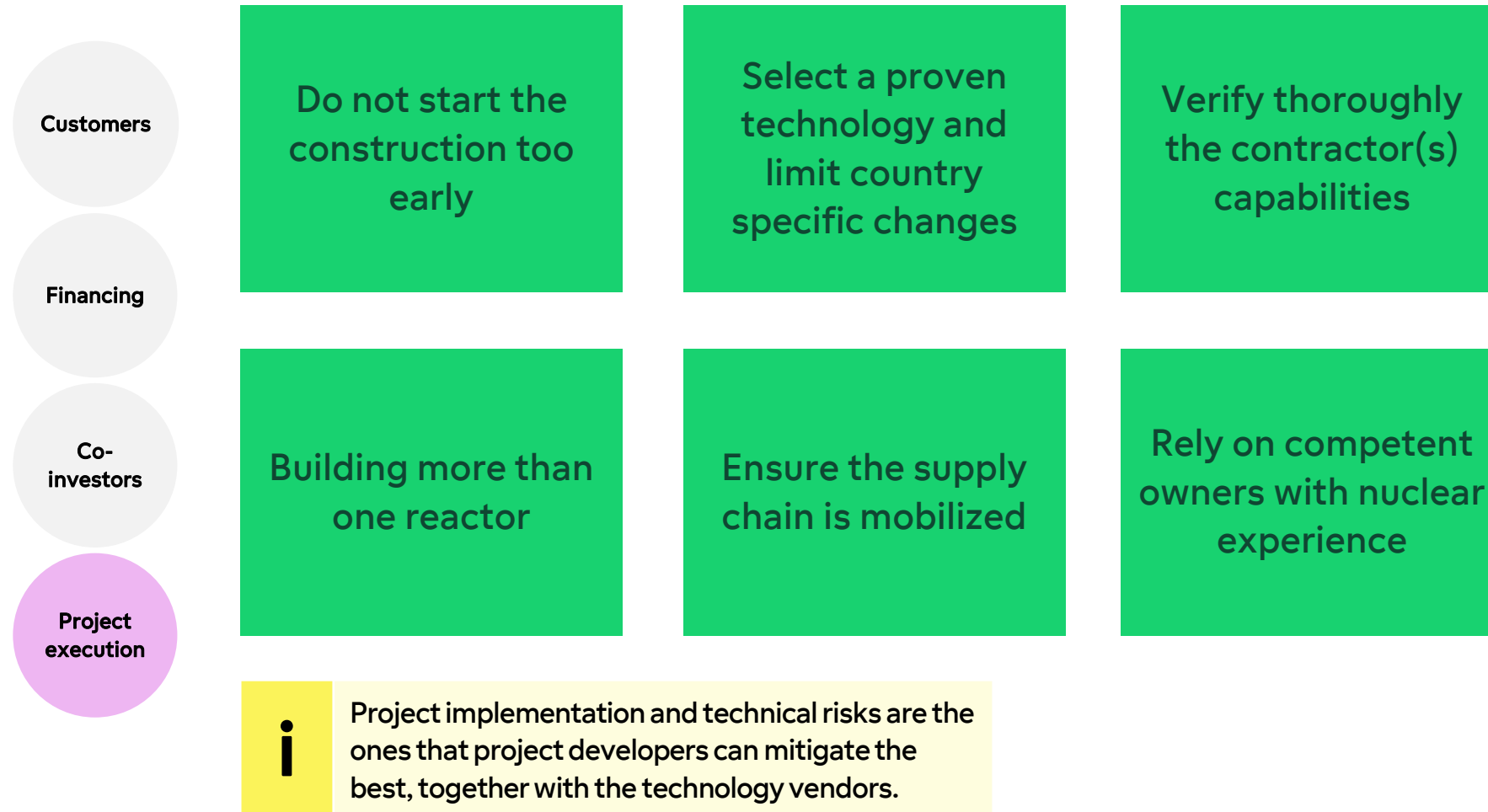


There is an interest from certain industries and other utilities to co-develop new nuclear. The Swedish state is also considering co-investment in new nuclear projects in Sweden.

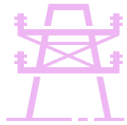
Illustrative ownership structure



# Recipe for a good project execution

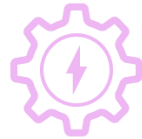


# Nuclear energy serves many purposes – both conventional reactors and SMRs can play a role



## GRID ELECTRICITY

- **Large reactors** are most competitive for large baseload generation due to their intrinsic economy of scale.
- **SMRs** can provide baseload electricity but the cost of production per unit is higher unless a large fleet is built.



## ON-SITE CONNECTIONS

- **SMRs** have an advantage for direct connections to critical infrastructure because they have potential for being located closer to industrial areas.
- **Large reactors** can provide direct connections, but their remote locations might reduce the potential for such setups.



## INDUSTRIAL HEAT PRODUCTION

- **Gen IV reactors (not in scope)** are better suited for industrial heat production as they can reach a higher level of temperature.
- (Light water) **large reactors** and **SMRs** are limited in temperature but could be used to improve e.g. hydrogen production in the future.



## URBAN HEAT PRODUCTION

- **SMRs or Heat Only Boilers (not in scope)** can decarbonize district heat production if they can be built in proximity to the consumer. **SMRs** would benefit economically from combined heat and power supply (CHP).
- **Large reactors** can also provide urban heat but require longer heat pipes due to their remote locations.

# We plan to deepen collaboration with three technology providers



## AP1000

- Six units in commercial operation in US (Vogtle 3&4) and China
- Twelve units under construction in China by SPIC, CNNC and CGN
- Several projects in planning phase, including three units in Poland and two units in Bulgaria.
- Compact design based on passive safety features and modularity



## EPR

- Three units in commercial operation in Finland (Olkiluoto 3) and China. Flamanville 3 (France) connected to the grid in 2024
- Two units under construction at Hinkley Point C in the UK
- Several projects in planning phase, including two units in Sizewell C (UK)
- Design already built in Europe according to European codes and standards



## BWRX-300

- First units in Darlington, Canada planned to be commercially operational in 2029. Construction license expected in 2025
- Several projects in planning phase
- Design based on existing BWR experience, closest to actual deployment of all western SMRs



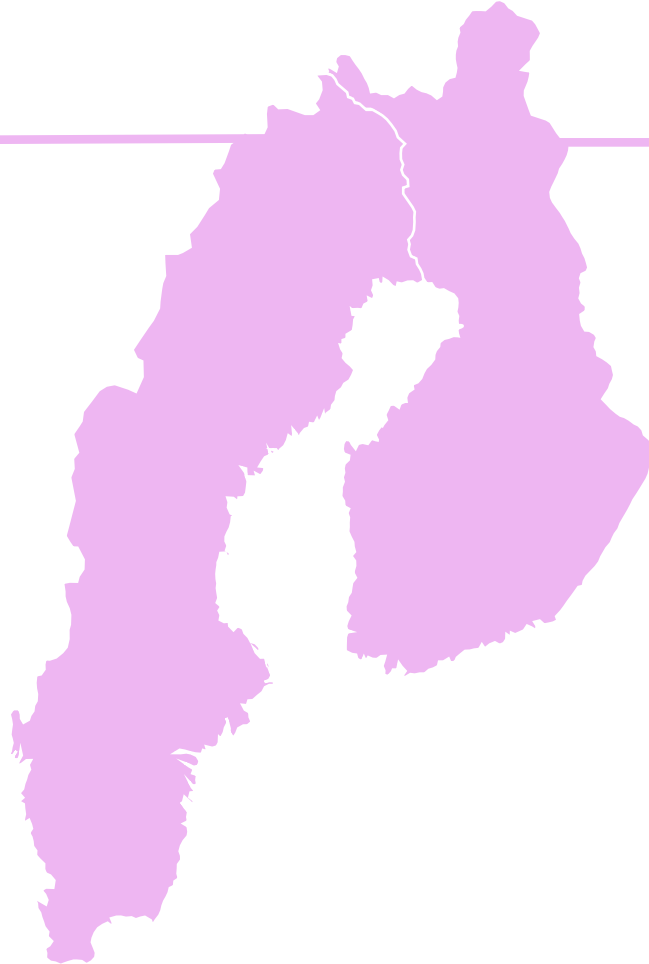


# A suitable site is a prerequisite for new nuclear

## SWEDEN

Fortum will continue screening for potential sites in Sweden

A site must be flexible on plant configuration, both large reactors and SMRs



## FINLAND

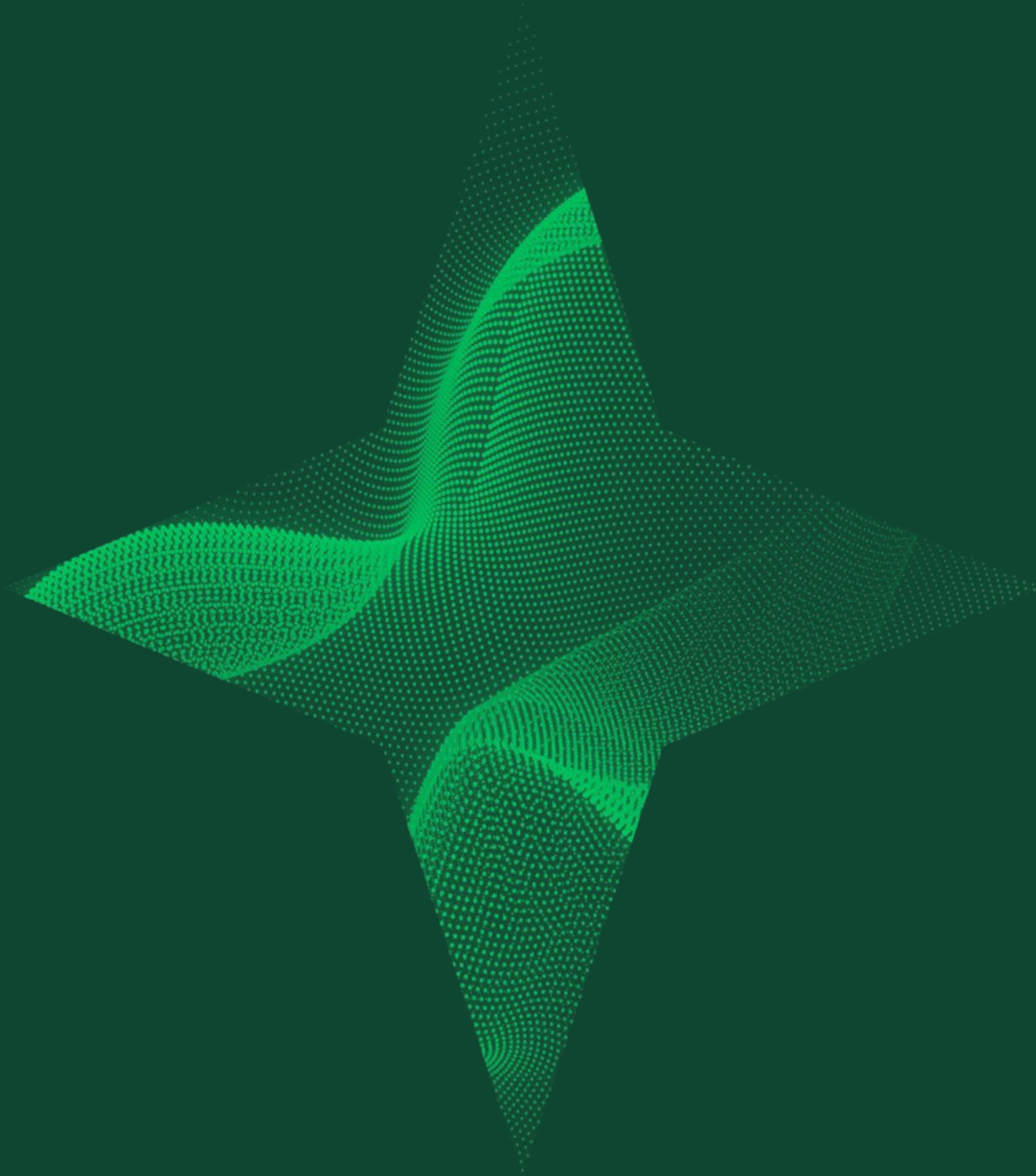
Fortum is collaborating with the city of Loviisa acquiring more land close to Loviisa nuclear power plant

This area has strategic benefits with existing infrastructures, that could host new nuclear or a possible other clean industrial projects with a significant impact on local and regional employment.

# We want to make new nuclear a viable option to meet future customer demand and replace existing units at end of lifetime



# Q&A





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