

Generation Division

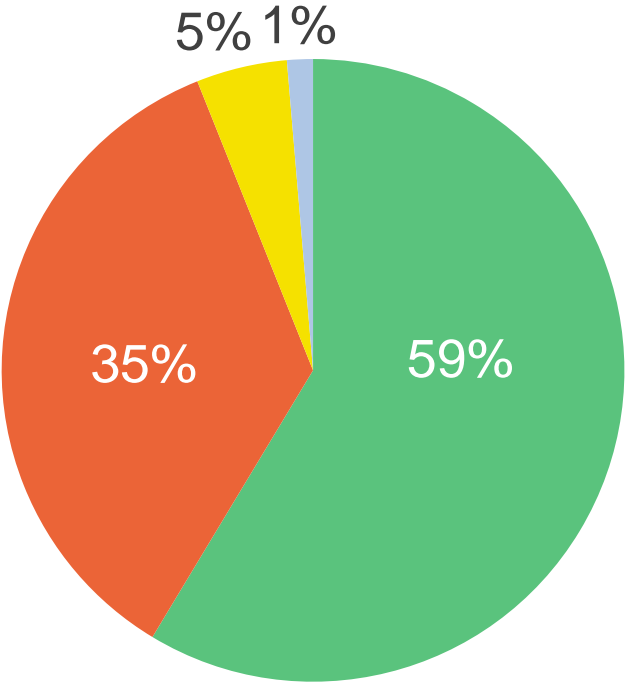
# Best-in-class CO<sub>2</sub>-free electricity producer

Tiina Tuomela, EVP – Generation Division

13 November 2018

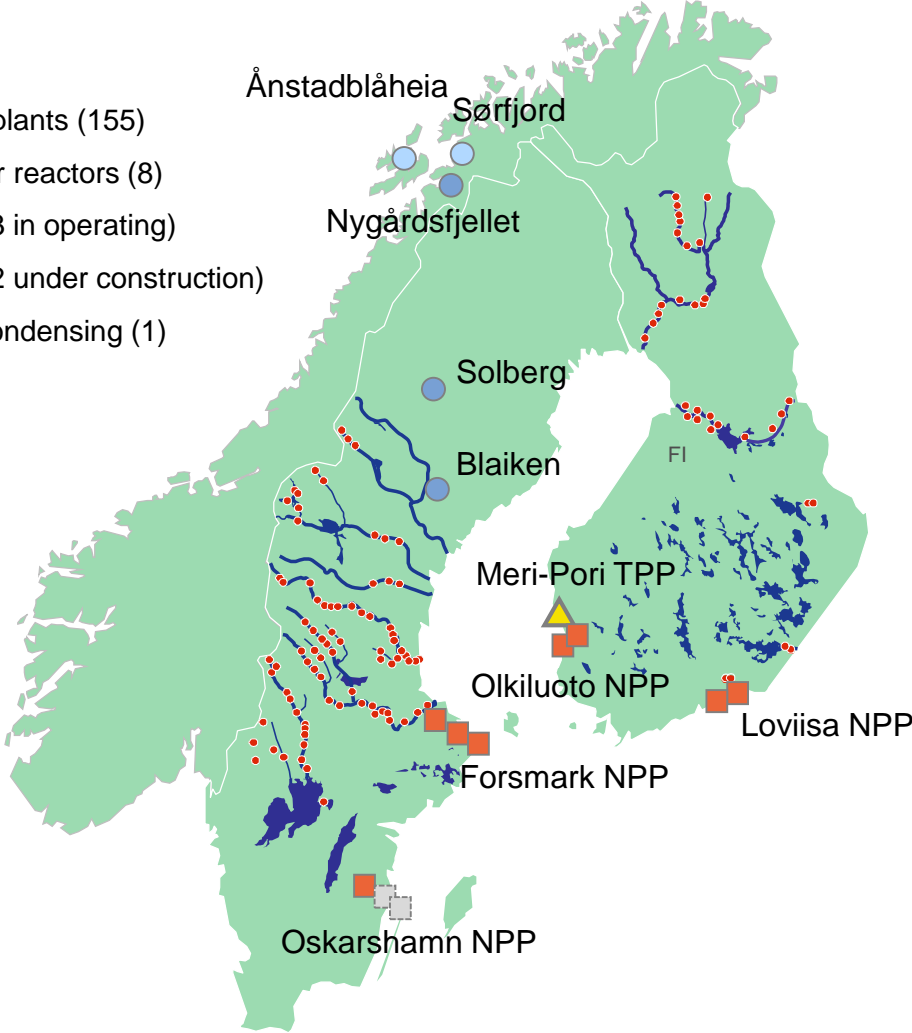
# Generation Division – a balanced Nordic portfolio of CO<sub>2</sub>-free hydro and nuclear

Generation Division capacity with wind power  
7,968 MW in total at 30 September 2018



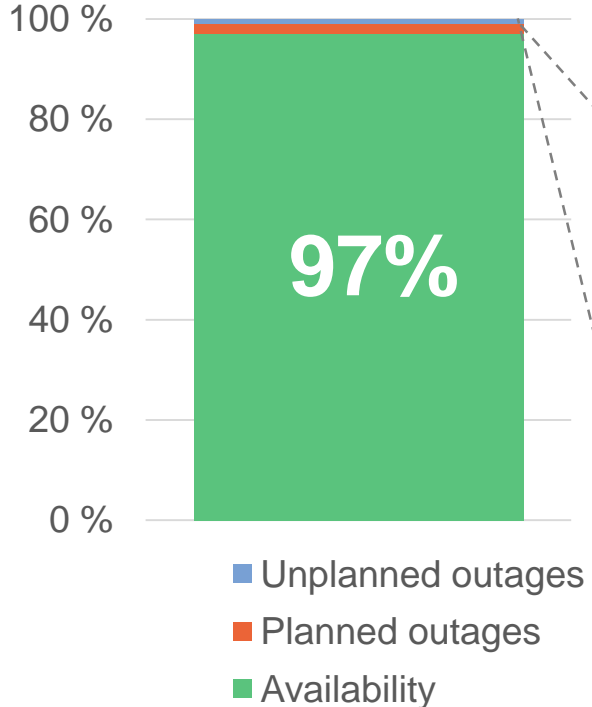
■ Hydro ■ Nuclear ■ Coal condensing ■ Wind

- Hydro plants (155)
- Nuclear reactors (8)
- Wind (3 in operating)
- Wind (2 under construction)
- ▲ Coal condensing (1)



# Generation has best-in-class hydro power operations – both in plant availability and costs

## Hydro availability



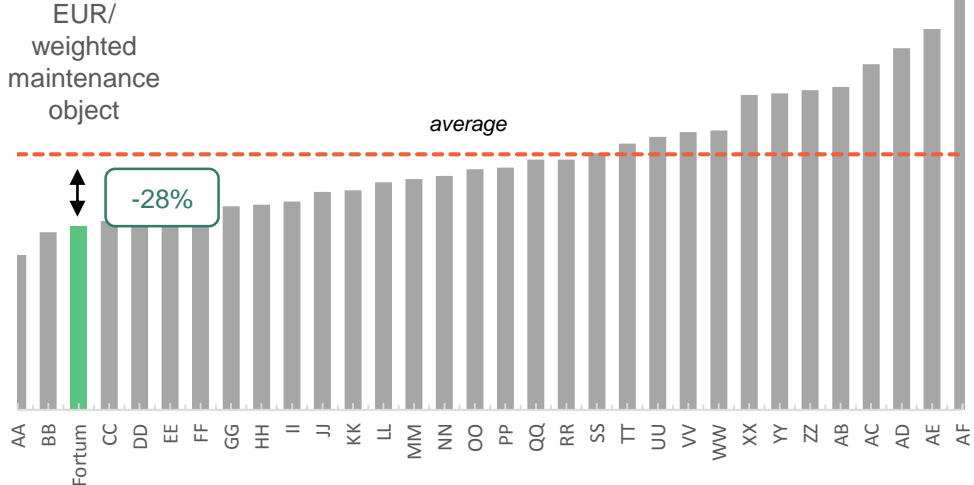
### Unplanned outages ~1%

- Efficient preventive maintenance strategy to minimise unplanned outages

### Planned outages ~2%

- Prioritised investments to retain high availability
- Optimised timing of outages based on plant and market conditions

## Normalised hydro maintenance costs

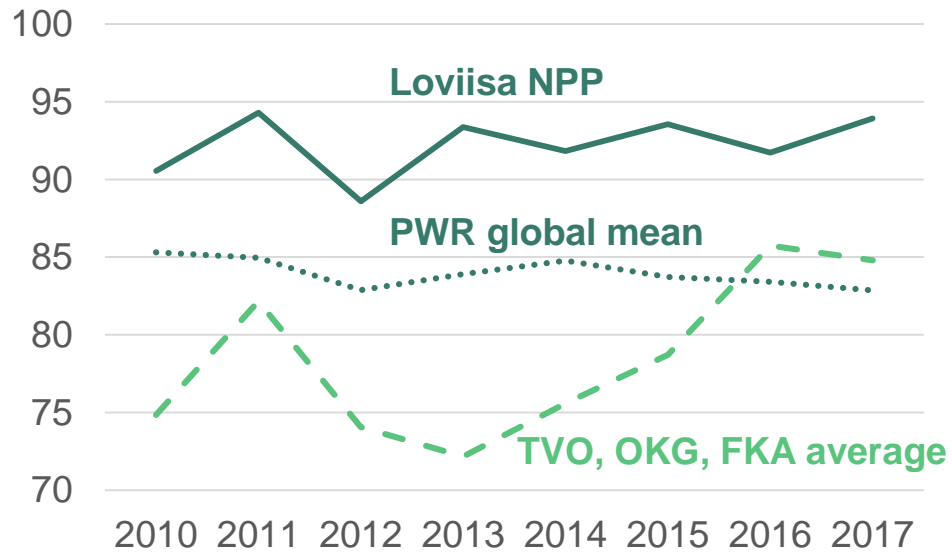


Sample of 32 European hydro power generators  
Source: external benchmark study, 2016

Consistent work to maximise hydro availability with tight control of maintenance costs

# World class nuclear power plant in Loviisa in availability, safety, and costs

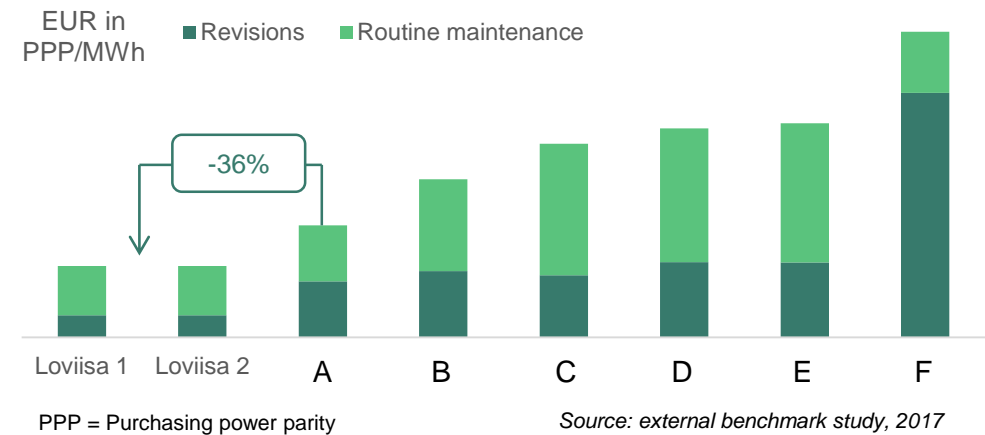
Load factor (%)



Loviisa NPP 100% owned by Fortum  
TVO, OKG and FKA are co-owned

PWR = Pressurised Water Reactor  
TVO = Teollisuuden Voima, Finland  
OKG = Oskarshamn, Sweden  
FKA = Forsmark, Sweden

Normalised maintenance cost (2014-2016 average)  
– comparison for PWR reactors of Loviisa size

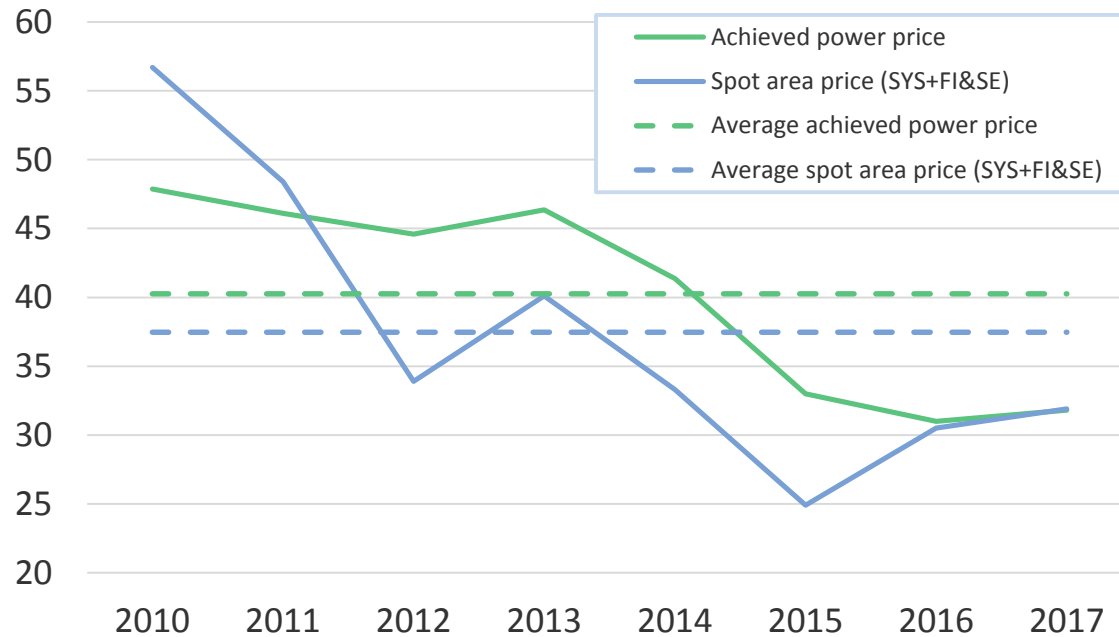


Loviisa manages routine maintenance and revisions with 36% lower cost compared to the second best benchmark study participant in the cluster of similar size reactors

Loviisa NPP has maintained world class load factor while at the same time achieved very low maintenance cost

# Trading and asset optimisation is a crucial contributor to capture the maximum value of assets and customer portfolios

Achieved power price vs. spot area price (EUR/MWh)



\* = Nuclear, hydro and wind

\*\* = Weighted average price of SE2, SE3 and FI

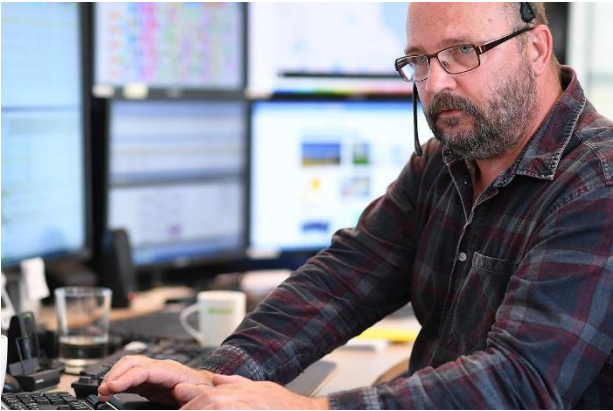
- **Increasing market volatility** increases the role of trading and asset optimisation
  - Fortum hedges a major part of its outright production\* prior to delivery to increase **predictability of cash flow**
  - Fortum allocates all its production volumes to **various physical market places**
- **Solid track record**: achieved power price 2.8 EUR/MWh higher than spot average\*\* in 2010-2017

# Fortum creates value by utilising asset and customer flexibility in volatile energy markets

Fortum's generation assets



Physical and financial optimisation



Energy market exchanges and TSOs



Fortum's B2C and B2B customers



# Generation strategic priorities – optimise asset portfolio for sustainable profits

## Pursue operational excellence and increased flexibility

- Maintain competitive production cost level
- Outage and maintenance capex optimisation
- Optimise market risk exposures in volatile energy markets
- Increase flexibility in hydro, batteries, customer demand response

## Ensure value creation from investments and portfolio optimisation

- Utilise asset and customer flexibility in volatile energy markets
- Continuous review and development of asset portfolio
  - Hydro power capacity upgrades
  - Loviisa nuclear power plant lifetime assessment
  - Decommissioning of the Inkoo coal condensing plant

## Drive focused growth in the power value chain

- Assess opportunistic hydro growth options
- Leverage strong nuclear competences in growth for Nuclear Services
- Aim for industrial scale wind platform in the Nordics
  - Operational capacity 107 MW
  - Under construction 157 MW
  - Construct projects in pipeline
  - Asset-light capital structure for growth with limited own investments (“capital recycling”)

# Position Fortum for the decade of electricity

- Balanced and competitive asset portfolio
- Benchmark operations
- Continuous development to capture future value of volatility