Best-in-class CO$_2$-free electricity producer

Tiina Tuomela, EVP – Generation Division
13 November 2018
Generation Division – a balanced Nordic portfolio of CO\textsubscript{2}-free hydro and nuclear

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

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

Hydro, Nuclear, Coal condensing, Wind
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

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

Normalised hydro maintenance costs

Sample of 32 European hydro power generators
Source: external benchmark study, 2016
World class nuclear power plant in Loviisa in availability, safety, and costs

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

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.

Load factor (%)

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

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

TVO, OKG, FKA average

Source: external benchmark study, 2017

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

PWR global mean

EUR in PPP/MWh

-36%

Lovisa 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.

- **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.

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* = Nuclear, hydro and wind
** = Weighted average price of SE2, SE3 and FI
Fortum creates value by utilising asset and customer flexibility in volatile energy markets

Fortum’s generation assets → Physical and financial optimisation → Fortum’s B2C and B2B customers

Energy market exchanges and TSOs

Fortum's generation assets

Physical and financial optimisation

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