Fortum’s Knowledge Transfer concept

Power plant operations and maintenance performance

Asset Management

Antti Malve
Area Director, Europe, Africa and Russia
Fortum eNext
Fortum Group in brief
We are an active player along the Power Value Chain

Our core
Energy from Waste, Hydro, Nuclear, Bio, Solar and Wind
Circular economy

Largest electricity retailer in the Nordics with 2.4 million Customers
Pioneer in electric vehicle charging

Decades of experience in providing expert services for power plant performance

Driving the change in energy market transformation

61% of all power generation is CO₂ free, 96% in Europe

Forerunner in Clean energy

Key figures 2018
Sales EUR 5.2 bn
Comparable operating profit EUR 1.0 bn
Balance sheet EUR 22 bn
Finnish State ownership 50,8%

8,300 professionals in the Nordics, the Baltics, Russia, Poland and India
Fortum's power and heat production by source

**Fortum's power generation in 2018**

- **Total generation**: 74.6 TWh
- **Nuclear power**: 30%
- **Hydropower**: 26%
- **Natural gas**: 38%
- **Solar**: 0.5%
- **Waste**: 0.5%
- **Wind**: 1%
- **Biomass**: 1%
- **Coal**: 3%

**Total power generation capacity**: 13,724 MW

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**Fortum's heat production in 2018**

- **Total production**: 29.8 TWh
- **Natural gas**: 64%
- **Others**: 1%
- **Peat**: 1%
- **Heat pumps, electricity**: 3%
- **Waste**: 7%
- **Biomass**: 8%
- **Coal**: 16%

**Total heat production capacity**: 15,009 MW
Fortum has best-in-class hydro power operations – both in plant availability and costs

Hydro availability

Unplanned outages ~1%
Planned outages ~2%
97%

Normalised hydro maintenance costs

Early mover in digitalization
Optimized production
4th generation systems

Innovative operating models
Remote operations
Local partnerships

Benchmark asset development
New capacity
Optimized refurbishments

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

Sample of 32 European hydro power generators
Source: external benchmark study, 2016 (PA Management consulting)

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Helping power plants to improve their operations and reduce negative impact to environment

- **Best-in-class** reliability and availability
- **Safety and environment** always in the forefront
- **Economical asset** life cycle management
- **Operational excellence** knowledge transfer
Knowledge transfer – adoption of Fortum’s best practices

- Fortum on-site
- Fortum off-site Support

- Long term support along the plant’s life cycle
- Operational Transformation

- Competence and Succession planning
- Train & develop
- Train & coach
- Recruit

Best practices into a culture
- Business Management and Processes
- Environment, Health, Safety & Quality
- Integrated Management System
- State of the art IT Tools for O&M
- Maintenance & spares strategy, long term improvements

Construction & Commissioning
Operations
Next or Rehabilitated power plant
Full-scope asset management for power plant owners and investors

Decades of experience in plant perfection & Turn-around

Hydro power plants

Energy from waste plants

Geothermal with a strategic partner

Biomass Coal power plants

Gas turbine power plants

Turbine and generator services

OUR TASK IS TO HELP YOU RUN YOUR PLANT AND ENERGY BUSINESS WITH THE INDUSTRY’S BEST KNOWLEDGE AND TECHNOLOGY
EHSQ as the corner stone for plant lifetime profitability

All our operations are certificated – Yours can be as well

- Quality
  ISO 9000

- Environment
  ISO 14000

- Health & Safety
  OHSAS 18001

- Asset Management
  ISO 55000

Integrated Management System (IMS)
Fortum hydro and thermal fleet in Europe

**Bio-CHP**
- Joensuu: Woodchips, peat + pyrolysis plant 52 MW_e, 180 MW_h
- Järvenpää: Woodchips, horse manure & SRF 23 MW_e, 45 MW_h
- Jelgava: Woodchips 23 MW_e, 45 MW_h
- Pärnu: Woodchips 24 MW_e, 48 MW_h
- Tartu: Woodchips, peat 25 MW_e, 50 MW_h
- Värtan KVV8, Brista 1: Woodchips 130 MW_e, 280 MW_h
- Hässelby: Wood pellets 75 MW_e, 200 MW_h

**Multifuel-CHP**
- Częstochowa: Coal, woodchips 68 MW_e, 129 MW_h
- Zabrze: Coal, waste 63 MW_e, 174 MW_h
- Zabrze: Biomass, coal 75 MW_e, 145 MW_h
- Tartu: Woodchips, peat 25 MW_e, 50 MW_h

**Waste-CHP**
- Riihimäki: Hazardous waste MSW+ ICW, material recovery 0.34 Mt/a, 18 MW_e, 90 MW_h
- Kumla: Hazardous waste ICW + MSW 0.14 Mt/a, 7.8 MW_h
- Nyborg: Hazardous waste 0.2 Mt/a, 16 MW_e, 54 MW_h
- Klaipėda: MSW, RDF, woodchips 0.25 Mt/a, 20 MW_e, 64 MW_h
- Klemetsrud: MSW, ICW, RDF 0.4 Mt/a, 16 MW_e, 54 MW_h
- Högdalen: MSW, ICW, RDF 0.7 Mt/a, 67 MW_e, 259 MW_h
- Värtan, old units: Coal, oil
- Brista 2: MSW, ICW, RDF 0.24 Mt/a, 20 MW_e, 60 MW_h

**Coal/gas-CHP**
- Espoo: Coal, natural gas 350 MW_e, 600 MW_h
- Bytom: Coal 55 MW_e, 214 MW_h

**Hydro**
- Finland in total 1,548 MW
- Sweden in total 3,124 MW

**Co-owned and consolidated companies**
- Zabrze: Biomass, coal 75 MW_e, 145 MW_h

**Associated companies**
- Klaipėda: MSW, RDF, woodchips 0.25 Mt/a, 20 MW_e, 64 MW_h
- Klemetsrud: MSW, ICW, RDF 0.4 Mt/a, 16 MW_e, 54 MW_h
- Högdalen: MSW, ICW, RDF 0.7 Mt/a, 67 MW_e, 259 MW_h
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Fortum eNext has extensive experience in providing Operation and Maintenance to external customers.
Tell us your challenges, we can help
Thank you!

Antti Malve, Area Director, Europe, Russia and Africa | +358405032531 | antti.malve@fortum.com
Steve Hawes, General Manager, Business Development Africa | +44 7795 545658 | steve.hawes@fortum.com