Elering Emergency Reserve Power Plant located in Kiisa

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Project Purpose and Importance

This is an important project for the Estonian energy sector with a capacity of equal to one-sixth of Estonia’s peak demand.

In Emergency situation Kiisa ERRPs will be able to cover a Tallinn’s electricity consumption.

ERPP will be used as emergency reserve and for re-energizing of the power system under no-voltage conditions.

The advantage of this region is the strong connections from substation through HV lines to other substations in Estonia and abroad

COMPANY INFO

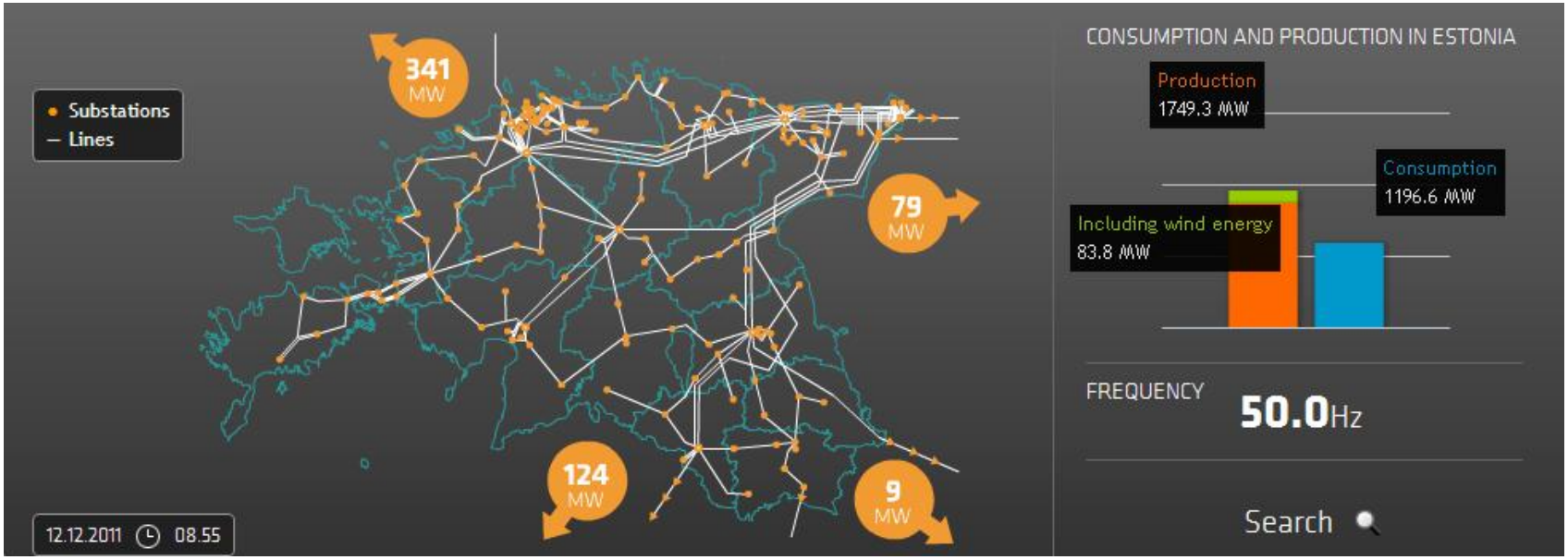
- Elering OÜ is Estonian transmission system operator. Using 110−330 kV high-voltage power lines, we unite Estonia's biggest power stations, distribution networks and corporate consumers in an integral energy system.
- **Our main functions are:**
  - Transmitting electricity at voltages of 6−330 kV to distribution networks and corporate consumers
  - Developing and operating a 110−330 kV electrical power network covering the whole of Estonia
  - Ensuring the reliability of Estonia's electrical power system in conjunction with the power systems of the neighbouring countries
  - Maintaining the capacity balance of the electrical power system and managing the power system across Estonia in real time
  - Ensuring the Estonian energy balance and operating the balance settlement for the balance providers.

Customer

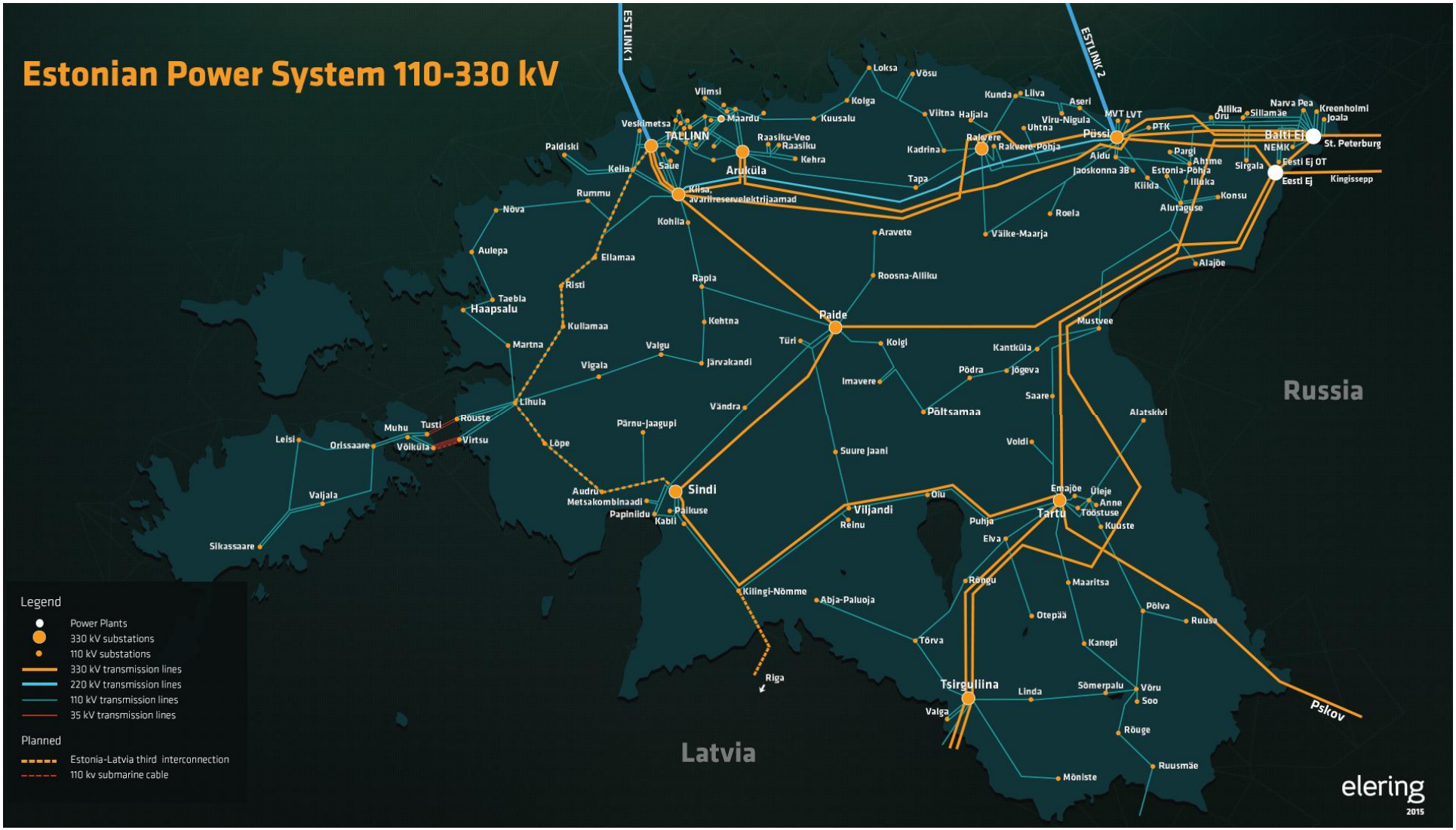
Elering AS

Elering is the only company in Estonia that provides an electricity transmission service as a Transmission System Operator or TSO.

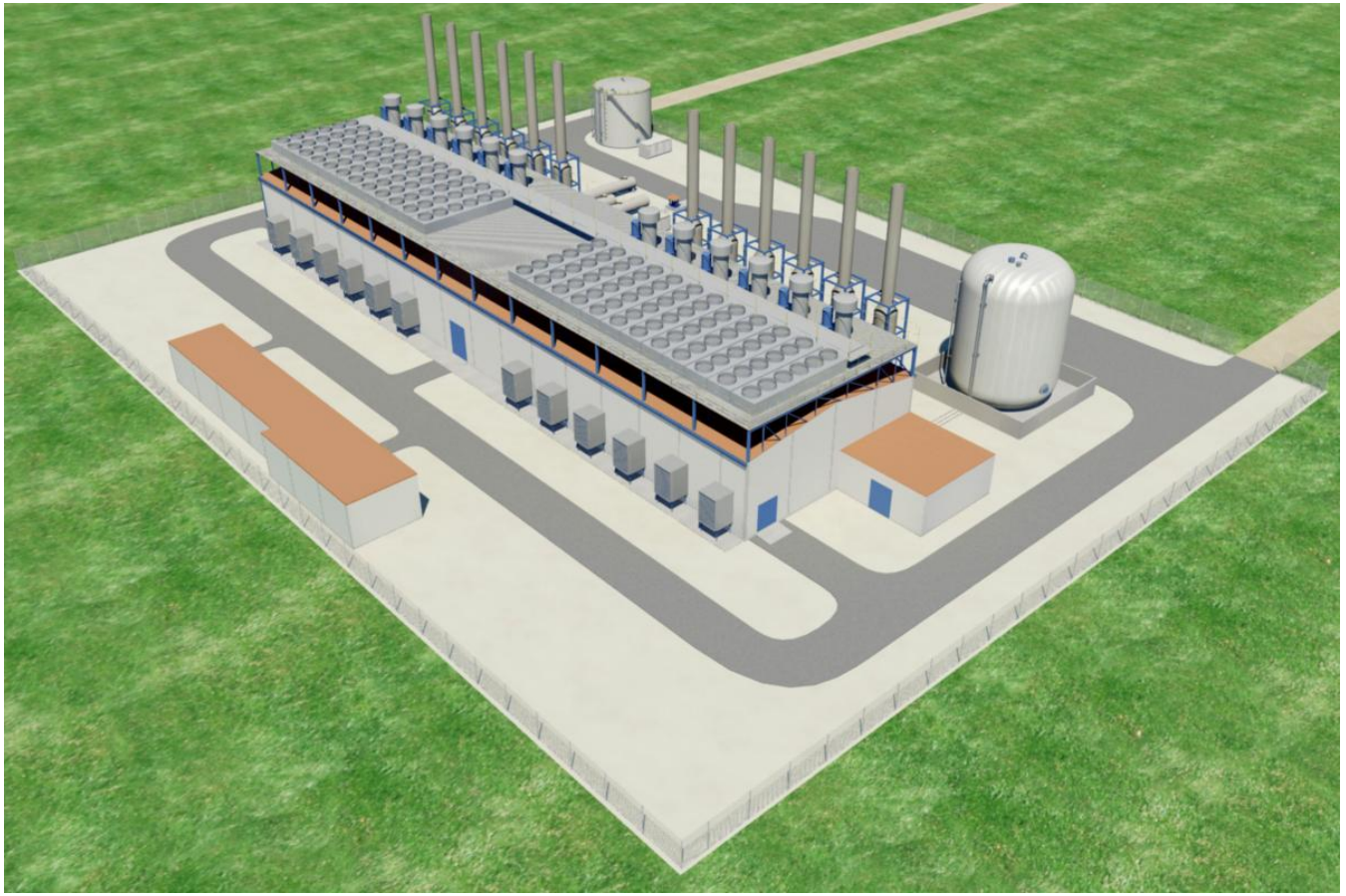
www.elering.ee/en



Estonia grid connection



Wärtsilä proposal for project 2010 December



PROJECT INFO 2010

- The purpose of the contract is the supply of Emergency Reserve Power Plant (ERPP) for Elering OÜ. Fuels for plant will be light oil and gas. Plant will be located near to Kiisa substation. ERPP will be ca 250 MW and will be used as Emergency Reserve and for start-up of grid in no powered situation. ERPP will be build in two stages. First stage will be ca 100 MW and will be connected with Kiisa Substation 110 kV switchyard. Second stage will be ca 150 MW and will be connected with Kiisa Substation 330 kV switchyard.
- The delivery shall include engineering, procurement of equipment and materials, construction and commissioning and taking over of a Emergency Reserve Power Plant with a capacity of 100 + 150 MWe (construction on a EPC - turn-key basis) according to the supply terms and conditions provided in the contract documents.
- Specification was been done for Gas Turbine.

Project info

- Deliveries:
  - • Section 1: 29.03.2013
  - • Section 2: 30.09.2014
- Technical specifications:
  - • 27 x W20V34DF engines (10MWm/engine) The engines are dual-fuel type, which means that plant can operate on natural gas or light fuel oil. DF engines can switch between fuels automatically without stopping the engine.
- **Natural Gas will be primary fuel.** Small amount of LFO is used to ignite the NG.
  - • Plant must reach the maximum power (250MW) in 10 minutes
  - Annual average operating hours around 200 h to 500 h (around 50 starts per year)
  - Full EPC (engineering, procurement and construction) turnkey project, the scope includes:

Main parameters

Tender price	T_P		M€
LTSA (Long Term Service Agreeme□t)	LTSA		M€
Auxiliary power consumption (standby mode)	Aux_SM		MW
Auxiliary power consumption (operation mode); (load point B, annex 7)	Aux_OM		MW
ERPP Net Electrical Efficiency (load point B, annex 7)	NEE		%

6.22 To find out most advantageous Tender, operating and maintenance costs are determined for a evaluation period of 30 years in prices as of the date of submission of the Tender:

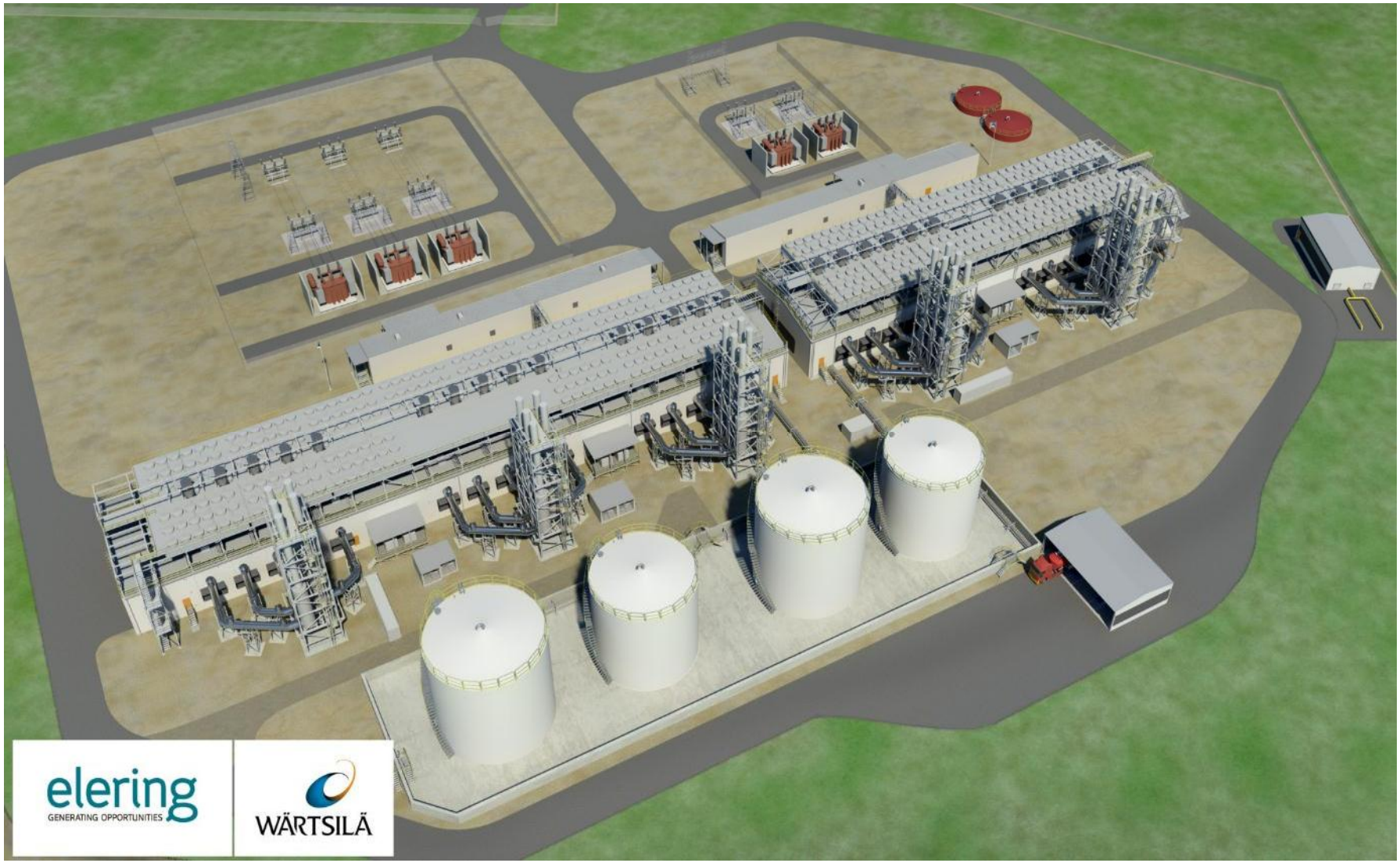
Competition

We would like to inform you that we have completed the prequalification evaluation for the procurement of 250 MW Emergency Reserve Power Plant.

1. Ansaldo Energia S.p.A. (Reg No: 00734630155)
2. Gama Güc Sistemleri Mühendislik ve Taahhüt A.S (Reg No: 35/835)
3. J&P-AVAX S.A. (Reg No: 14303/06/B/86/26)
4. Siemens OY Estonian (Reg No: 11712011) branch together with Siemens AG (Reg No: 10095349) and Siemens Industrial Turbomachinery (Reg No: 556606-6048)
5. Wood Group GTS – Power Solutions (Reg No: 76-0682078)
6. Wärtsila Finland OY (Reg No: 0773744-3)

Kiisa ERPP

KIISA ERPP



KIISA ERPP

Project Information

Kiisa ERPP (Emergency Reserve Power Plant) = 250MW

Built in two sections

Section 1 (Kiisa ERPP1) = 110MW
12 x W20V34DF, Generation at 15kV , Output 110kV

Section 2 (Kiisa ERPP2) = 140MW
15 x W20V34DF , Generation at 15kV , Output 330kV

Deliveries

29.03.2013 for Section 1

30.09.2014 for Section 2

Project Information

✓ Full EPC project

✓Scope includes

- ➢Building Permit
- ➢Environmental Permit
- ➢Civil Works (including Piling)
- ➢Design
- ➢Delivery of full mechanical and electrical equipment
- ➢Sub-stations and SCADA
- ➢Installation and commissioning

✓ endeavour to be built in the country under new EU regulations.

Special Features

- Stand by Emergency Reserve Power Plant
- Annual average operating hours ~ 200 h
- Number of starts in a year ~ 50 starts
- Control from **Remote Control Centre in Tallinn**
- Plant can reach/deliver the Maximum Power **(250MW)** in less than **10 minutes**
- Maximum stand by auxillary consumption for 250MW power plant is **198kW**
- Meets Estonian Grid code requirements including **FRT of 250ms**

Milestones for Kiisa ERPP1

- ✓ Contract – 29th June 2011
- ✓ Start design and application process for Building Permit and Environmental Permits – Beginning of Aug 2011
- ✓ Building Permit ready – 6th Dec 2011
- ✓ Site mobilisation – Beginning of Dec 2011
- ✓ Piling works – 15th Dec 2011 to 15th March 2012
- ✓ Building, foundations and other area civil works – Started March 2012
- ✓ Mechanical and Electrical installation – Started in June 2012
- ✓ Gensets delivey – Sep / Oct 2012
- ✓ Commissioning – Dec 2012 to Feb 2013
- ✓ Testing–March 2013

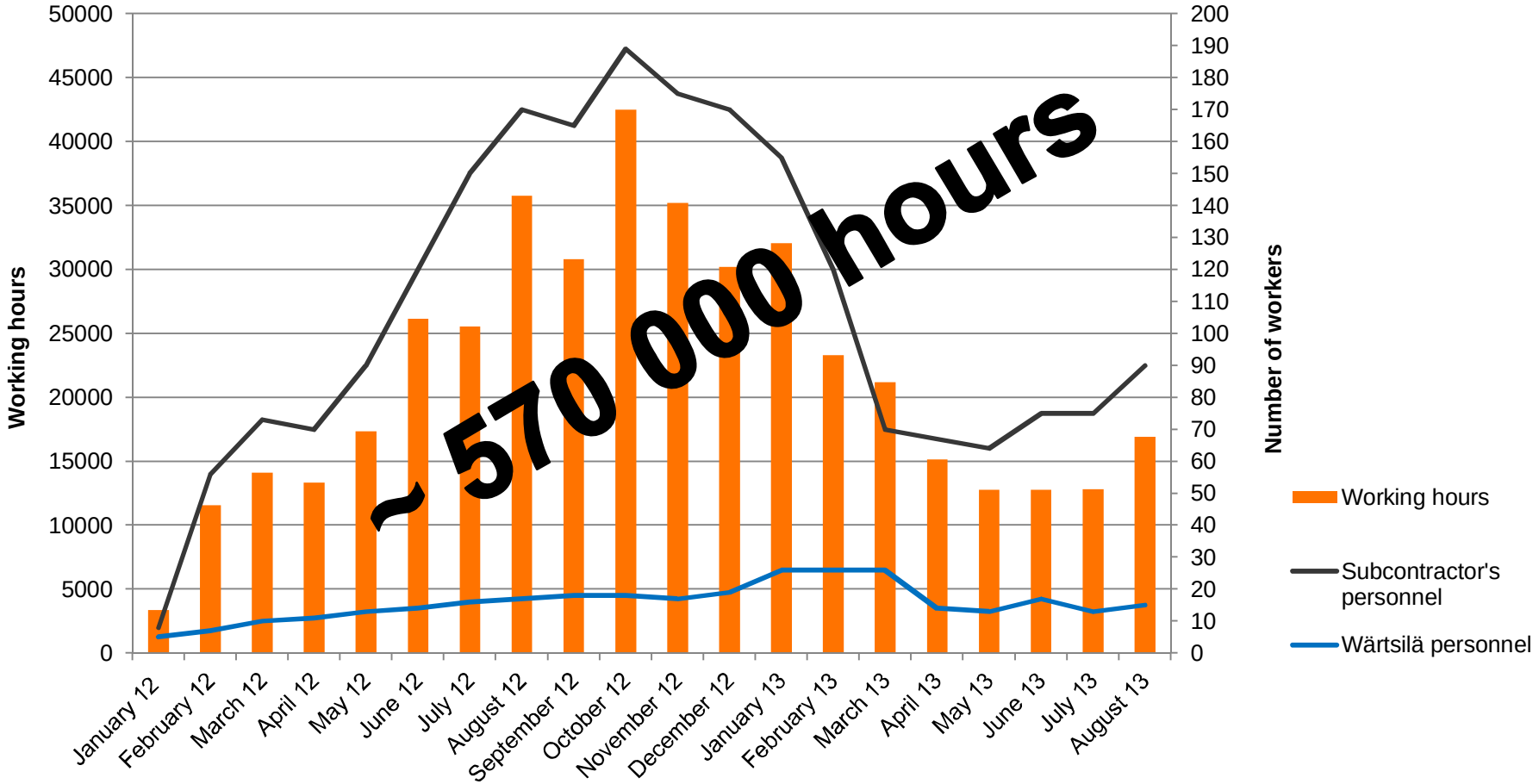
Milestones for Kiisa ERPP2

- ✓ Mechanical and Electrical installation – Started in June 2013
- ✓ Gensets delivery – Sep / Oct 2013
- ✓ Commissioning – Feb to May 2014
- ✓ Testing –June 2014

Sub-Contracting

- **CIVIL**
  - Piling - **Forte Ehitus**
  - Foundations, roads and complete area finishing – **Merko Ehitus**
  - Building - **E-Betoonelement**
  - Bore well - **Balrock**
- **Mechanical**
  - Tanks - **Kohimo**
  - Mechanical installation, piping, ducting etc – **Scanweld**
  - Fire fighting system (below ground) – **Firetek**
  - Fire fighting and detection system (above ground) – **Antifire**
  - Heat Pump – **Saku Tehno**
- **Electrical**
  - Earthing below zero level – **Merko Infra**
  - Overhead lines and installation of electrical equipment – **Merko Infra**

Kiisa ERPP 1&2, Site manning hours + personnel



Elering – Wärtsilä 250 MW Power Plant Highlights

250 MW grid stability plant

- Turnkey contract, value 129 M€
  - Phase 1: 100MW ready 3/2013
  - Phase 2: 150MW ready 9/2014
- Technology from Wärtsilä - Construction from Estonia - According to EU requirements
  - 27 pcs of Wärtsilä 20V34DF engines, to be built in Wärtsilä Vaasa factory in Finland
  - Significant opportunities for construction companies in Estonia

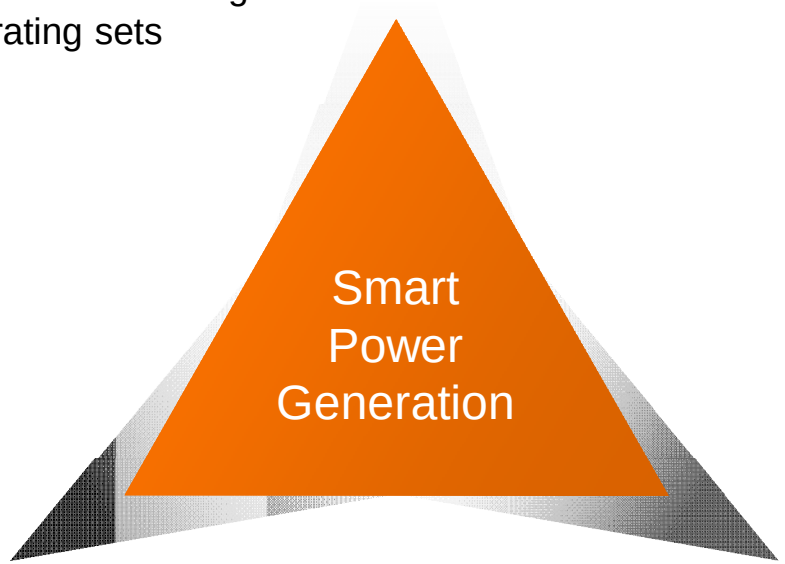
Wärtsilä Smart Power Generation

- Unrivalled operational flexibility,
- State of the art simple cycle efficiency
- Dual fuel capability
- Smart power generation is the all in one solution for enabling EU to meet it's targets for 2020 and beyond
- Active balancing power, which enables widespread use of windpower and maximise the baseload generation efficiency

Wärtsilä Smart power generation to Estonia

Energy Efficiency

- →State of the art simple cycle electrical efficiency (>42%)
- →High efficiency in wide window of varying ambient conditions (cold – hot)
- →High plant efficiency over a wide load range due to multiple generating sets



Operational Excellence

- →10 minute starting 0 – 100% plant output
- →Fulfill EU Grid code requirements
- →500h running hours/year

Fuel Flexibility

- →Natural gas as main fuel
- →Light fuel oil as secondary fuel