



FOSTER  WHEELER

EPC Repowering Project (2 x 215 MWe)
for AS Narva Elektriijaamad, Estonia

AS Narva Elektriijaamad

Key milestones

	Eesti plant		Balti plant	
Contract award	May	2001	May	2001
Full notice to proceed	September	2001	April	2002
Start of foundation work	October	2001	May	2002
Start of steel erection	March	2002	August	2002
Start of boiler erection	August	2002	February	2003
Start of hot commissioning	July	2003	January	2004
Power generation	February	2004	August	2004

Main subcontractors

Civil construction	FKSM AS
Turbine refurbishment	Energico Oy/Leningradsky Metallichesky Zavod (LMZ)
Generator refurbishment	Alstom Power Poland
Control and automation system	Metso Automation Oy
Flue gas precipitators	Alstom Finland Oy
Steel structures	PPTH – Norden Oy
Fuel handling systems	Raumaster Oy
Boiler manufacturing	Warkaus Works Oy, Nordic Boilers Oyj, Rafako SA, AS Energo Remont

Construction data

	Eesti	Balti
Building footprint	7 350 m ²	7 400 m ²
- of which new structures	4 700 m ²	4 600 m ²
Building volume	333 500 m ³	319 000 m ³
- of which new structures	245 700 m ³	236 000 m ³
Structural concrete	4 500 m ³	4 700 m ³
Steel structures	3 700 t	3 900 t



AS Narva Elektriijaamad, a subsidiary of Estonia's state-owned utility, Eesti Energia, awarded Foster Wheeler an approximately €250 million contract in May 2001 to repower two boiler islands at the world's largest oil shale-fired power plants – Eesti and Balti – with the latest CFB technology.

The three-year turnkey contract covers:

- supplying two new 215 MWe boiler islands, each incorporating two CFB boilers
- modernizing two existing 200 MWe turbine islands and upgrading them to 215 MWe. One of the turbines, at the Balti plant, will be converted from a condensing unit to a combined condensing/district heating unit, capable of supplying DH and process steam.
- replacing virtually all balance of plant equipment, and
- all construction and ancillary work.

When completed and generating electricity in 2004, the new units will mark a major step forward for cleaner energy generation in Estonia. They will bring enhanced net generating efficiency and fuel-related cost savings and – most importantly – significantly reduced emissions, benefiting Estonia and the eastern Gulf of Finland generally.





Performance data			
– Electrical output	215 MWe gross/unit	Fuel	Oil shale (as received data)
– District heating output	160 MWth (Balti only)	– Lower heating value	8.0 – 11.0 MJ/kg
– Steam data	12.7/2.4 MPa, 535/535 °C	– Total ash content	approx. 50%
– Steam flow	90/75.5 kg/s/boiler	– Moisture content	11 – 14%
– Cooling water	8 °C (Eesti), 10 °C (Balti)	– Volatiles	19 – 31%
– Plant net heat rate	9 480 kJ/kWh	– Sulfur	0.5 – 0.7%
		– Chlorine	0.2 – 0.3%
Emissions, guaranteed levels			
– SO _x	200 mg/Nm ³		
– NO _x	200 mg/ Nm ³		
– Particulates	30 mg/ Nm ³		
– Outdoor noise	+3 db(A) at the site boundary		

Efficient combustion

Foster Wheeler's CFB technology is ideal for firing hard-to-burn fuels, such as oil shale, while delivering high levels of efficiency and availability. Thanks to an extensively customized single reheat design, and the use of patented features such as Intrex™ superheaters and reheaters and Foster Wheeler's Spring Hammer rapping system, the new boilers will deliver state-of-the-art performance.

Reductions of some 95%, 97%, 55%, and 23% in emissions of SO₂, particulates, NO_x, and CO₂ respectively will be achieved compared to the old technology that is being replaced. Performance data already indicates that reductions will be even greater, in fact. Separate desulfurization or limestone injection will not be needed, thanks to the limestone present in the fuel and the low combustion temperature typical of CFB. Efficiency will also be increased, from 30% to 36.5%.

A turnkey expert

Foster Wheeler has extensive experience of turnkey deliveries, and has supplied plants to a wide range of customers. Drawing on our experience – and our advanced fluidized bed combustion know-how in particular – we work with our partners to develop the optimum solutions: in terms of technology, fuel use, environmental performance, plant efficiency, and reliability.



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FOSTER WHEELER

Foster Wheeler Power Group Europe is a specialist in turnkey power projects, advanced combustion technology, and associated service operations – supplying a wide range of utility and industrial customers across Europe, the Middle East and Africa, and South-East Asia.

Advanced fluidized bed boilers – and circulating fluidized bed (CFB) boilers in particular – lie at the heart of Foster Wheeler's know-how. Foster Wheeler's CFB boilers are capable of delivering high levels of efficiency and availability, and firing a wide variety of fuels with very low emissions.

More than 215 CFB units have been delivered worldwide, and Foster Wheeler has an approximately 40% share of the world market for this type of boiler.

Headquartered in Finland, Foster Wheeler Power Group Europe employs more than 1,200 people, and has annual net revenues of over €500 million. The group's parent company, Foster Wheeler Energia Oy, has subsidiaries in Germany, Poland, Spain, Sweden, Thailand, and Indonesia; and manufacturing facilities in Finland, Poland, and Spain.

Foster Wheeler Power Group Europe is part of Foster Wheeler Ltd., a global engineering and construction and energy equipment supplier.