

OIL SHALE POWER PREVAILS IN ESTONIA

The journal *Oil Shale* deals with geology, mining and utilization of oil shale and with other topics related to this mineral resource. This issue is a special one fully dedicated to electrical power engineering. Why? The reason is that in Estonia electrical power industry is very closely connected with oil shale.



Estonia possesses considerable reserves of oil shale, which makes it the main mineral resource of the country. About 80% of the mined oil shale is utilized for electricity generation, and the remaining 20% is used in chemical industry.

There is no other place in the world where oil shale is used for electricity generation so widely as in Estonia. The main power producer in Estonia – *AS Narva Elektriijaamad (Narva Power Plants)* - is the largest oil shale utilising power company in the world burning about 11–12 million tonnes oil shale yearly. There are two oil shale-fired power plants – Eesti Power Plant and Balti Power Plant belonging to *AS Narva Elektriijaamad*.

Narva power plants produce about 95% of the total amount of the electric power generated in Estonia. Eesti Power Plant produces 78% of the total amount of electrical power generated in Estonia, while Balti Power Plant produces about 17%. The amount of the power generated by these two power plants not only covers the power consumption of the whole Estonia but also exceeds it. Therefore, oil shale power production is a very important branch of industry in Estonia.

These two power plants are located at the eastern border of Estonia, near the town of Narva. This has influenced the formation and development of the Estonian power grid.

Oil shale is a solid fuel, characterized by low calorific value and high ash content. Power plants that utilize solid fuels are usually erected near mines in order to minimize transportation costs. On the other side, availability of inhabited areas and process water, railway and road connections, and conduits for network lines are important for power plant location. These factors were decisive when the location of the two power plants mentioned was being selected.

Positional relationship of power plants and load centers is of great concern when setting power grids and defining their configuration and parameters. Therefore, construction of the main generating facilities in this corner of Estonia has considerably influenced development of power grids affecting particularly the configuration of power transmission high-voltage lines of prevailing east-west direction.

There are some specific aspects related to operation of oil shale-fired power plants, mainly because of oil shale characteristics. This concerns mostly fuel handling, operation of boilers and turbines, ash handling and atmospheric emissions. Start-up periods and changes in load characteristics of boilers and turbines are essential for parallel operation of power plants and networks, for example, the characteristics mentioned above are important for determination of capacity reserves. Consequently, these specific aspects of operation of oil shale-fired power plants have to be taken into account during construction and operation of electrical networks.

Specialists of AS *Eesti Energia* and scientists of the Tallinn University of Technology have collaborated for many years to optimize the parallel work of oil shale power plants and electrical networks. Owing to the opening of near-power market this optimization will be of great demand. For example, introduction of wind generators into electrical networks will influence operation of both electrical networks and power plants.

This issue presents papers by scientists of the Tallinn University of Technology. Several aspects of optimization of power production and reliability of electrical networks are discussed. These problems are considered from both technical and economical points of view.

We hope this special issue of "Oil Shale" to be of interest not solely for specialists in power engineering, but also for our regular readers.

Have an enjoyable reading!

Rein TALUMAA,
General Director
AS Narva Elektriijaamad

The papers published in this issue have been discussed and approved by Editorial Board and presented for publication as the special issue of the journal. The papers have been prereviewed.

Prof. H. Tammoja, Director of the Department of Electrical Power Engineering of Tallinn University of Technology is the guest editor of this special issue.