

### OIL SHALE POWER AND POWER SYSTEM

Reserves of oil shale are widely distributed in the whole world. These resources are considered additional reserve of liquid fuel mainly, but oil shale processing is not in use widely so far. However, oil shale may be used in power plants through direct combustion in boilers of power plants. In Estonia more than 90% of electricity is produced by this way, the production being sufficient to meet the demand of the whole country. In 2005, the total electric power production in Estonia was 10.2 TWh, including 9.3 TWh from oil shale. Only in Estonia oil shale is used for electric power generation so widely.



The fuel and energy sector is a strategic infrastructure of the state which must ensure that Estonia gets an uninterrupted supply of high-quality fuel, electric energy and heat at optimal prices. It is confirmed by the Long-term Public Fuel and Energy Sector Development Plan until 2015. Some strategic objectives of the Estonian fuel and energy sector are the following:

- to ensure fuel and energy supply of the required quality and at optimal prices;
- to ensure the existence of local generating power to cover the domestic electricity consumption needs and the supply of liquid fuel in compliance with law;
- to ensure that, in the open market conditions, the competitiveness of the domestic market of oil shale production is preserved and its efficiency increased, and to apply modern technologies which reduce harmful environmental impact;
- to ensure compliance with the environmental requirements established by the state;
- to increase the efficiency of energy consumption in the heat, energy and fuel sector;

- to promote research development and innovation in energy conservation.

Estonian energy resources are mostly based on oil shale, and saving of this resource is one of the most important tasks for oil shale users. Let us remember that about 80% of oil shale is used for power production in Estonia. In spite of efforts made by the state to develop power production from renewable resources and by the co-generation scheme, oil shale power will prevail in Estonia for a long period. It means that further development of oil shale power production must take place in order to improve process efficiency, to decrease the environmental impact and to ensure the competitiveness of oil shale power in free market conditions. Also it means that further development and optimisation of the parallel work of oil shale power plants and electrical networks must continue.

There are some specific aspects related to the operation of oil shale-fuelled power plants, mainly because of oil shale characteristics. Start-up periods and load change characteristics of boilers and turbines are essential for parallel operation with power networks. These specific aspects of the operation of oil shale-fuelled power plants have to be taken into account also during planning, construction and operation of electrical networks. Consumers' load, weather conditions and several another factors that are changing continuously, directly influence the operation of electrical network, and that in turn – oil shale power plants. Working in an economical and environmentally safe way – the main requirement nowadays – is to be applied by all who deal with oil shale. It means that mining and transportation of oil shale, combustion for power production, power transmissions and distribution make up one and the same chain of value. In order to get the optimal final result, it is necessary to optimise each link of this chain. On the other hand, the capacity of wind generators is increasing rapidly in Estonia nowadays. Besides, it will influence operation of the power system and will require investments in power networks and power stations to ensure transmission, regulation and the necessary reserves of wind power.

These abovementioned aspects are considered in this issue. This is a special issue fully dedicated to electrical power engineering. The issue presents papers prepared by the scientists of Tallinn University of Technology, and also by the Latvian and Lithuanian scientists and specialists

Have an enjoyable reading!

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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.