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ENERGY SECURITY AS A TARGET OF ENERGY POLICY PLANNING

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GENERAL REMARKS

Up to resent years the methology of energy planning at the national and local level has been mainly based on economical criteria taking into account environmental restrictions, e.g. computer code WASP. But at present the energy security aspects become more and more significant.

Energy security implies the availability of energy, in its different forms and at all times, to users in sufficient quantities and at reasonable prices during normal period as well as in required quantities for overcoming consequences of environmental and technical emergencies. Additionally involves debarment of serious accidents in energy system itself.

New threats to energy security have appeared in resent decades: unpredictable grows of world and local oil and gas prices, large scale disruptions of electricity supply, deregulation of energy systems in some countries et al.

Energy security should be considered at many levels: global, regional (e.g. EC, NIS, Baltic countries), national, local. At the national level energy security is a shared issue for both energy importing and exporting countries.

METHOLOGY

There are some approaches to investigate the energy security. In some counries (Russia, Belarus, Lithuania, Moldova) the estimation of energy security state is based on the indicatitive analysis that guessed the forming the system of energy security indicators (ESI).

The work of devising of the most general energy indicators in the context of sustainable development was undertaken by IAEA with contributions with IEA and other international organizations (2005). There were determined total 30 energy indicators of sustainable development (EISD) classified into three dimensions (social, economic and enviromental). The ESIs include the part of EISDs and others: the share of domestic power and fuel resources, energy use efficiency, reserve of power capacity, diversity of supply, volume of fuel storages, sufficiency of power transmission and fuel transportation system, level of reliability of energy equipment, risk of diversion and sabotage etc.

Depending on its magnitude each ESI can be found in normal, subcritical or critical zone. A country implementing the ESI may choose to use an alternative definition for particular indicators as well as the boundaries between zones that better correspond to each country specific circumstances.

RESULTS

Using this methology the analysis of energy security state of the Republic of Belarus was carried out at the national level. There were determined the main trends and concrete

measures on upgrading of energy security. These results were put into the base of the Concept of Energy Security of the Republic of Belarus up to 2020 and State Complex Program on Modernization of the Belarus Energy System, Energy Saving and Increasing of the Share of Domestic Fuel and Power Resources in 2006-2010, which were approved by the President of the Republic of Belarus in 2005 and then were modified in 2007. 

The 12 indicators were determined to investigate the state-of-art of energy security of the Republic of Belarus. In 2005 one of them was found within critical zone, eight – subcritical and three – normal. The goal for 2020 to reach ten indicators to normal position and others to subcritical ones is indicated by the Concept.

Generally there are following four main trends of enhancing of energy security:

1. Increasing of the share of domestic fuel and power resources (energy independency);
2. Alternatives for fuel and power supply (diversification);
3. Upgrading of reliability of energy system;
4. Improving of energy efficiency (energy saving).

The number of concrete measures in those directions were determined in the Concept. In direction 1 it is planning to increase the share of domestic fuel and power resources from 16 % in 2005 to 25 % in 2020 including the following grows of consumption:

- wood biomass as a fuel.....from 1 to 2.2 Mtoe;
- peat as a fuel..... .from 0.4 to 0.8 Mtoe;
- new Hydro PP.....200 MW;
- new CHP with use wood chips...260 MW.

In direction 2 the main goal is to decrease the share of natural gas as a fuel in electricity production from 96 % to 83 %. It will be achieved by construction of Nuclear PP with capacity of 2000 MW and Coal PP with capacity of 700 MW up to 2020 year.

In direction 3 it is planning the modernization of existing CHP on the basic of the combined cycle technology, reconstruction of electricity grids, substations, *etc.*

It was estimated the total energy saving potential in direction 4 up to 2020 consists of 6700 Mtoe, *i.e.* about 30 % of present annual primary energy consumption. is Apart from mentioned above there are other effective measures of enhancing of energy security:

- international co-operation;
- liberalization of energy market;
- promotion of investments *etc*.

For medium-term prediction of the energy security of a country new method of stochastic prediction is developed. This method is based on the econophysics approach; as the basic variables such parameters are used: total population, gross domestic product and energy consumption. This model takes into account only stochastic fluctuations of the energy consumption. For one of scenario of the development of the Republic Belarus results of solution of the Fokker – Planck equation by moment method are presented.