Regional Peculiar Features Pertaining to the Use of Renewable Energy Sources

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The current stage of development in economics presupposes constant monitoring of costs with the purpose to ensure efficient management of enterprises. According to the global tendency concerning increase of energy consumption and simultaneous increase of price for all types of energy resources it is necessary to work for reduction of energy consumption rate in total/aggregate expenses of the enterprise. First of all, reduction of energy output ratio is ensured by energy saving measures. The energy saving problem is considered as an actual one practically for all civilized countries in the world. As for the Republic of Belarus, this problem is rather important and actual because the country does not have its own reserves and deposits of mineral raw materials, and it entirely depends on suppliers. The increase in natural gas prices has recently entailed increase in expenses of gas-supply companies, price of natural gas for consumers in the Republic, tariffs in energy, and as result of it prices on the products of power-consuming enterprises of the Republic have been also increased. Therefore, one of the main tasks of the country at this moment and for the future is to solve problem pertaining to energy saving. The strategic goal of the energy saving for the period up to 2015 is to reduce energy consumption of Gross Domestic Product (GDP) of the Republic of Belarus by 50% in relation to the level of 2005 and increase ratio of local and renewable energy sources (RES) in the fuel balance.

The main types of local fossil fuels in the Republic of Belarus are peat, lignite/brown coal, oil shale. From the point of view of today's situation when the country annually recovers approximately 2 million tons of oil its oil security is estimated for the period of 35 years. Annual production of dissolved gas is about 500 million m3. It is necessary to point out the fact that in accordance with the predictive assessment of 1998 the initial total recovered oil resources constitute 355.6 million tons, 48% of the oil resources are transferred in industrial sector. The structure of the energy balance can include residues of oil processing, so-called cracking residues.

There are about 9,000 deposits with total peat reserves of nearly 5.5 billion tons on the territory of the Republic of Belarus. However, many deposits are located either on agricultural areas or in natural reserves that reduces the possibility of peat digging up to 100-130 million tons.

Earth interior of the Republic of Belarus contains about 11 billion tons of oil shale, its calorific value is within the range from 4.19 to 6.7 MJ / kg and its ash content is from 61 to 82%. According to the calculations of Belarusian scientists, replacement of natural gas with shale oil at the condensation power plants will give an effect which is equal to 6 US dollars per every generated MWh of electric power.

While estimating resource saving potential in the Republic of Belarus it is necessary to pay a special attention to the use of renewable energy sources. It is supposed that ratio of renewable energy sources (RES), local fuels and domestic energy resources in the energy balance of the Republic of Belarus will be increased up to 28% by 2012 and up to 32%by 2015, respectively. It is planned to construct 161 local stations using fuel wood by 2015. Such approach will permit to replace about 500 million m^3 of natural gas. According to estimations of the UNECE experts (the organization is implementing a large-scale project on the CIS territory which is to develop renewable power generation) Belarus possesses a great potential for energy production from biomass. Today ratio of biomass in the RES balance is close to 50%. Provision is made for construction of biogas complexes using agricultural wastes production; such complexes will be also constructed in the network of housing and utilities infrastructure while using sludge deposits of sewage treatment plants and gas extracted from solid municipal waste dumps. 39 biogas complexes should be put into operation in 2012. It is expected to construct more 146 similar plants within period of 2013-2015that will allow to replace nearly 400 thousand tons of standard oil.

The problem pertaining to reduction of dependence on supplied fuel resources is rather actually for a great number of countries, including Vietnam as well. Vietnam has various renewable energy sources such as solar energy, wind energy, small hydro energy, geothermal energy, biomass and biogas energy and ocean energy (tides, ocean waves, course etc.). The potential of renewable energy sources in Vietnam is rather significant but at the present moment the ratio of RES usage is low due to some reasons such as: low technological level, insufficiently accurate estimation of potential, absence of the stimulation component for energy saving, high self-cost of power generation using renewable energy sources, poor competiveness in comparison with conventional energy sources.

The recent data have shown that power generation from renewable energy sources constitutes about 1.8% of total electric-power production in Vietnam.

Vietnam is a country that has a great potential for the use of solar energy. However, the terrain is complicated so there is no possibility to use this energy to the full extent. The national average index of solar energy radiation is 4-5 kWh/m^2 per day. Nowadays solar energy in Vietnam is used for various purposes but its main usage is to heat water. However due to climatic conditions the use of solar energy for electric-power generation is not very effective that results in high self-cost (US$ 0.6 /1kWh or 8000 Vietnam dong per 1 kWh).

Being located in the zone of the tropical monsoon climate, Vietnam is considered as a country with rather large potential of wind energy. According to the Meteorological World Organization total theoretical potential of wind energy in Vietnam is more than 100,000 MW (wind speed 7 m/s and more). The total capacity of wind power which is used at the present moment is about 30.8 MW. Today Vietnam has 42 wind power projects with a total capacity of 3.906MW and these projects are at various stages of development.

Vietnam is an agricultural country so it has a large potential of biomass energy. From the point of view of operational efficiency (ratio of the obtained capacity to potential) biomass is considered as the most used and efficient energy source in Vietnam (18.75%). Biomass energy in Vietnam can be obtained from secondary agricultural products (straw, rice hulls, bagasse etc.), domestic wastes. According to the "Plan for Development of Electric Power in Vietnam for the period of 2006-2025" the potential of biomass energy in Vietnam amounts tons early 400-600 MW including 100-150 MW of rice hulls, bagasse - 200-250 MW, wood waste - 5 MW, straw - 100-150 MW.

Main sources of raw materials for biogas production in Vietnam are animal and vegetable. The estimated potential of biogas in the country is equal to more than 3 billion m^3 per year and is used mainly for cooking process.

Vietnam has a ramified river system: 90% of the rivers are small and they are suitable for development of small hydropower (0.1-30 MW). The total potential capacity of small hydropower in Vietnam is estimated at 3000 MW. About 300 MW have been put into operation up to the present moment.

The Republic of Belarus and Vietnam have one common problem in the use of renewable energy sources. It is expedient to unite efforts of researchers and practical persons with the purpose to solve these problems. This cooperation can be executed in various forms:

Development of concepts for the use of certain types of renewable energy sources;

- Development of technologies for electric-power generation from renewable energy sources;
- Development of tariff methodology for energy from renewable energy sources;
- Decoding of ecological component in energy tariff;
- Development of legislative framework for the use of renewable energy sources and energy saving.