THE MEASURES OF ENERGY SECURITY CONSOLIDATION IN REPUBLIC OF MOLDOVA

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***Abstract* - The main measures of energy security in Republic of Moldova are analyzed: the measures of adaptation of Energy Complex to the energy dependence; the measures of reduction of energy dependence; the political and economical measures. The methods of manifestation of indicated measures in condition of national economy today and way of improve of situation are presented; some suggestions and recommendations are proposed.**

Keywords: *energy security, utilization of resources, energy saving.*

1. INTRODUCTION

The energy security is one of main condition of durability anyone state today. The energy security is determining by current and on longtime ensuring of reserve of energy from request quality and acceptable price with observance the requirements of an environment. Its need to resolve two global problems for ensuring of energy security [1]:

- the problem of means and sources of traditional fuels;
- the ecological problem.

The energy security was always a vulnerable problem in Republic of Moldova. This problem has become more acute in last time because the price for natural gas was increased. The share of natural gas in of the country fuel balance is exaggerated – more than 50 % and source of provisioning is only from Russia. The cost of energy resources is very high - in 2006 year was 38 % in Gros Domestic Product (GDP) and is in non-stop increasing.

A lot of measures are proposed for recovery the situation:

- the measures of Energy Complex adaptation to the energy dependence;
- the measures of energy dependence reduction;
- the political and economical measures.

2. THE ENERGY DEPENDENCE AND SECURITY INSURANCE

Republic of Moldova satisfies the necessity of energy on level of 90…95 % by import [2]. Therefore the energy depend is too big and sources of energy are Russia and Ukraine. It is needed to mention that there are states with more bin depends (for example Luxembourg – 99 % and Singapore – 100 %). But they have a satisfactory level of energy security.

The main factor in energetically dependency is determinate by the economical situation of state on the internal plane is characterized by the share of the energy import cost in the GDP. For example, this index in prosperous states of Europe is varies between 2,9…9,0 % (Ireland – 2,9 %, Italy – 3,3 %, Spain – 3,7 %, Luxembourg – 9,0 %). The essential increasing of GDP wills consideration the energy security.

The another condition to consist in economical dependence reduction the of Republic of Moldova from states, which supplies fuels. This is achieved with reduction they share in extern economical relations, that is by creation one multilateral international market.

3. THE METHODS OF STATE ENERGY DEPENDENCE REDUCTION

There are some direct methods of reduction of energy depend:

- the of autochthons fuel resources;
- the development of renewable energy resources;
- the energy conservation.

3.1. The development of autochthons fuel resources

The share of autochthons fuel resources in total energetically balance consist about 1,0 % today. There are in investigation state the deposits of petroleum in Văleni, Vulcaneşti, natural gas in Victorovca, Cantemir and of the coal in Brânza, Vulcaneşti. The workings of apply in exploitation these deposits are too for from finalization and are too complicate to make some conclusions and recommendations.

3.2. The development of renewable energy resources

The renewable energy resources are formed from solar energy, hydro energy, wind energy, geothermal energy and biomass energy. The potential of this energy sources is sufficiently big.

The available potential of solar energy is estimated about 50 PJ (1,73 Mt c.e.). To mention that total energy consumption in Republic of Moldova in 2002 year was 2,83 Mt c.e. Therefore only the available potential of solar energy consist 61 % from total energy needs. The solar energy can be used for buildings heating, for the hot water preparation, for achieved some technological processes (for example,

the drying process) and for electrical energy production [3].

The potential of wind energy is estimated about 9,4 PJ (0,32 Mt c.e.), about 11 % from 2002 year consumption. It can be used for electrical energy production of big power plants and in little autonomy power installations, for water pumps, for water heating and so on. In many causes can be advantage the direct transformation of wind mechanical energy in thermal.

The available potential of hydro energy is estimated about 4,4 PJ (0,15 Mt c.e.), about 5,3 % from 2002 year energy consumption. The hydro energy can be used for electrical energy production by small hydropower plants, which used the energy of ~~glib~~ water flows without expensive dams' construction.

The total biomass production in Republic of Moldova is estimated about 590 PJ (20 Mt c.e.) [3], about 700 % from energy consumption in 2002 year. This mass can be used for producing the solid fuels – briquettes and pellets, the liquid fuels – biodiesel and ethanol, the gases fuels – biogas. A part of biomass can be used by direct burning in the modern perfect technological processes. The use in energetically aim only 10 % of biomass will cover the total fuel consumption in 2002 year on 71 %.

A special attention is needed to give use of residential, industrial and agricultural liquid wastes for biogas production. From residential, industrial and agricultural liquid wastes it is possible to receive more than 70 millions m^3 biogas (1,6 PJ energy), from agricultural (animal's) – more 400 millions.

And if makes one final conclusion is decided, that only those renewable available energy resources which was enumerate can to cover the necessary of energy at level of 2002 year on 150 %.

3.3. The energy conservation

The energy conservation is the best method of reduce the energy dependence of state from import of energetic resources.

The definition "energy conservation" comprise a lot of politics and actions which are undertake for aim to provide the increasing the efficient use of energy resources, the rationalization it use, the substitution of expensive and deficit fuels by other more accessible.

It is more efficient from economical point to invest in energy consumption reduction that in obtaining or purchase energy resources. The energy conservation is often named a new energy source. It is needed to accord to energy conservation more attention in Republic of Moldova.

The co-generation of power and heat is a main measure of energy conservation. We obtain an fuel economy of 15…40 % in this case in comparison with separate production of energies and reduce essential the negative impact on environment. The co-generation can be introduce by transform the existing Heat Plants in Combined Heat Power (CHP) Plants. Its need to notice that in Republic of Moldova there are big reserve to reduce the heat consumption in heating technological processes. There are next way to reduce of energy consumption:

- the thermal building wall resistance increasing;
- the heat losses reducing by optimal place of building and lodgings for different destination inside the build;
- the wide use of veranda, lodges and glaze balcony;
- the program regulate of temperature inside lodgings.

By apply these measures it's possible to reduce the specific force of heating in municipal buildings from 60…80 W/m^2 to 30 W/m^2 and in rural - from 130…170 W/m^2 to 70 W/m^2.

4. THE POLITICAL ACTIONS FOR ENERGY SECURITY CONSOLIDATION

The geographic place of Republic of Moldova, which establishes exist boundary only with two state – România and Ukraine impose necessary very skillful external policy with these states. Especially, that they are bigger and have an more development economy. At the some time they have more diverse natural resources which we don't have.

A skilful policy is necessary to apply to states, which supplies fuel. For increasing the energy security is necessary to reduce the economical dependence with these states – the export in they is need to reduce.

The internal policy is need to orient to increasing the states economy by:

- to improve the business medium;
- the formation a favorable investment climate for attract the own and foreign invests;
- the perfect level of tax;
- the perfect of state and private industry management.

5. CONCLUSION

For consolidation of energy security in Republic of Moldova it is necessary:

1. More intensive use of renewable energy sources.
2. The one hard energy conservation policy promotes.
3. To directed mass-media activity in tackle of energy conservation problems, co-generation, development of renewable energy sources.
4. To be more skilful the state policy with neighbor country, first of all need to be economical problems.

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