

# HEAT PUMP ENERGY IN THE ENERGY AND ENVIRONMENTAL SECURITY IN THE ECONOMIC DEVELOPMENT OF UKRAINE

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Volatility of Ukraine on imported energy resources and modern requirements to reduce anthropogenic pressure on the environment threaten the country's economic situation. A similar picture emerges in other countries. In this regard, special attention is paid to the energy policy of the development of heat pump energy.

World market of heat pumps tends to positive growth (2 times every 23 years) as a result of state support of the consumers of this equipment. Total sales of heat pumps in 20 European countries in 2012 amounted to 780 thousand units, which is 2.5 % more than in 2011, and the share of the heat manufactured on their base in heat power balance of some countries is 70%.

It is stated that almost all the countries with a high proportion of the heat pump energy in the energy balance manufacture heat pumps themselves, and they widely use methods of state regulation and support, which are not the same for different groups of consumers of heat pumps. The scientific and technological progress in the field of heat pump energy is rapidly developing; this process is based on consolidation of the efforts of developed countries in the International Energy Agency. The Ukraine is not yet the member of the International Energy Agency. National market for heat pumps presents a huge variety of styles and types of heat pumps, which causes difficulty for the consumer in selecting them. Often consumers choose expensive model of heat pump or the pump which is not suitable for climatic and other conditions. The cost of the heat pump of the same model may be twice more expensive, depending on the brand image of the selling company. Companies which offer ecologically safe models enjoy tax benefits, and the landlords who buy this equipment, receive grants, subsidies and tax credits.

In our opinion, the formation of energy-efficient economy is necessary. This can be done through a phased release of promising projects for the use of heat pumps in heating supplies of the Ukraine. They should be ranked by the degree of «profitability». The efficiency of the use of different scale projects of the heat pumps is based. The use of the average economic performance, as it is presented in the Energy Strategic Plan of the Ukraine till 2030, can discredit the very idea of the development of the heat pump energy in Ukraine.

We have conducted classification of the heat pumps usage according to the unit capacity, the direction of their use in various sectors of human life and activity (energy, utilities, industry and agriculture), and have assessed their effectiveness, which varies by

5-7 times.

The current expenditures on using heat pumps is comparatively lower for 20-50% than traditional heaters when using large scale (about 3300 kW) and medium scale (50-150 kW) of power because of the reduction, the expenditures of organic fuel. The heat pumps are paid off in 2-3 years which proves its beneficial realization. Thus the cost of the heat pump system can be comparable or scientifically higher than the value of the traditionally used boilers, depending on the type and model of the heat pump.

The realization of the individual heating projects based on heat pumps with small capacity (10-50 kW) requires more investments if compared with the traditional pumps. Low and standard capacity heat pumps are good for commercial institutions, organizations, enterprises, since heat tariffs for these consumers is 2-3 times higher than for others. So, if the pay off period for these projects for the population is 8-10 years, for commercial customers it is twice shorter. At the moment, the efficiency of the heat pump usage may increase due to the use of all its technical and technological capabilities (heating, hot water supply, air, water), as well as special control mechanisms.

The most promising direction from the economic point of view, is the implementation of projects of heat pumps for upgrading TPP boilers manmade park which physically and morally outdated by 60-80% %. These projects will be compensated in 2-3 years. In addition, taking into account environmental factors the period of the payback of these projects may be reduced.

The most expensive projects are the projects in which groundwater heat pumps are used. To improve economic efficiency of such projects we recommend to use them in heat and water supply, which is really important for water-scarce regions of the Ukraine.

At the same time, the lack of effective management development of the pump energy, as in European countries, endangers both the implementation of the national energy policy and the implementation of the international obligations under the Kyoto Protocol to reduce greenhouse gases.

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