"The perspective of using the potential of non-traditional energy sources in the Autonomous Republic of Crimea"

Babenko Gennadiy Alexandrovich
Academician of the Academy of Economic Sciences of Ukraine,
The Vice-Chairman of the Council of Ministers of the Autonomous Republic of Crimea

Dear participants!

The last decade international community pays great attention to development and introduction of one of the perspective directions of fuel and energy saving - the renewable energy sources, which are practically inexhaustible and ecologically clean.

Analysis indicates that increase of population causes rise of energy consumption, but according to the optimistic scenarios shortage of organic fuel will arise in 70 to 100 years.

However, that is not the only problem, the process of energy production involving organic fuel, nuclear or thermonuclear energy is accompanied by emissions, leading to "heat pollution" of the environment. There is an opinion, that warming of the atmosphere by 3.5 degrees is a critical value that may lead to global climate change and initiation of greenhouse effect as the increase of carbon dioxide concentration causes the ecological climate to deteriorate.

So the precedent is created: in struggle to achieve efficient and universal energy consumption the community finds itself in low controlled conditions of existence and dependence of usage of organic element.

Realising these problems and being aware of the situation, we consider, that the main trends of development of contemporary power engineering are to be based on compromise, in particular:

- ♦ wide usage of renewable energy sources;
- ♦ development and introduction of efficient energy-saving technologies in traditional power engineering.

At the same time the important factor is present condition of power engineering, which is described by level of energy resource availability, ecological and economical characteristics of energy resources and applied technologies.

At present the situation is very complex: import of energy resources amounts to 50%, equipment is out of date, efficient energy saving is not introduced, as a consequence there is low level of transformation and transportation of the energy that results in increase of energy consumption in industry, agriculture and communal sector.

There are several state programmes on renewable energy sources and energy-saving technologies developed and approved in Ukraine on national level.

The main objective of these programmes is creation of national sustainable energy complex in Ukraine with renewable energy sources as its integral part.

So, the usage of renewable energy sources (RES) has national priority, and even there is no budget financing allocated for the implementation of programmes' activities, there is a stable uptrend to use the potential of RES within the general energy consumption.

The Autonomous Republic of Crimea, its energy complex are the reflection of the above mentioned problems and possibilities of perspective development with usage of potential of renewable energy resources.

Our region has low availability of traditional energy resources. Deficit of all types of energy sources in Crimea exceeds 70%, internal energy generation at the peninsula amounts to 7%, that formulates a task for us to implement efficiently and utilise the renewable energy sources.

The expediency of accelerated development of non-traditional power engineering of Crimea is based not only on the enormous quantity of natural resources, its own material and industrial base but on economically favorable conditions for utilisation of RES equipment as well.

Utilisation of non-traditional and renewable energy sources in Crimea may be considered as one of the most efficient possibilities for economic growth of the region, harmless to the population and environmentally friendly. At present possibility arises to reduce energy production costs by introduction of renewable energy sources, to achieve its competitiveness in relation to traditional energy sources.

In 1999 the energy potential of renewable energy sources and utilisation capacity were assessed by local and foreign experts within the realisation of the project on evaluation of the development of power engineering in Crimea. The project was carried out within the framework of TACIS technical aid programme, initiated by the EU countries. The annual energy potential of the renewable energy sources is assessed at 565 thsd. tons of equivalent fuel or 1.5 billion kWt.H. per year.

According to the Complex programme of construction of wind power stations in Ukraine, wind power generation is considered to be the most important renewable energy source in Crimea.

Since second half of 1980th the Autonomous Republic Crimea is not only the active participant of wind power stations constructions but also the major consumer of wind power equipment. Capacity of wind power stations in Crimea amounts to 34 MWt, that is more than 70% of total wind power generation in Ukraine.

In 1999 according to initiative of Council of ministers of the Autonomous Republic Crimea within the framework of TACIS program the 1st level wind atlas of Crimea was created using WASP software (Riso, Denmark), the most perspective areas for wind power generation construction in Crimea were determined. Strategic areas for wind power generation construction are Kerch and Tarkhankut peninsulas. The most perspective is Chaganov region.

At present there are 5 wind power stations operating with 326 wind generators, the total amount of produced electricity is 52.8 million KWt.H.

According to the Decision of Joint Co-ordination Council on wind power station construction issues from June 27, 2002, №16 about allocation funds for construction advanced wind power generators in Crimea, it is supposed to allocate funds in 2003 for construction wind power generators of type T600-48 and establish more than 150 wind power generators USW-56/100, VEU-500, that will double the capacity of wind power generation in Crimea.

Development of wind power generation in Crimea requires implementation of wide variety of projects: completion of construction of Mirnovskaya wind power station, expansion of Sudak wind power station, construction of Tarkhankut wind power station and assessment of directions of capacity expansion at Eastern Crimean wind power station.

Creation of environmentally friendly conditions for development of the priority sectors of the economy of Crimea, especially the resort sector, is a task of

great importance. That will attract holidaymakers and will give an opportunity to receive a profit from this business.

It is a time now, when Crimea, as a unique natural curative area comparable only to Azure coast of France, should become prestigious resort.

We consider utilisation of solar energy potential as one of the conditions for realisation of this task. The examples are international resorts of Greece, Cyprus, Turkey and Miami, where solar energy is widely utilised.

Analysis indicates that perspective directions of development of solar energy utilisation in the short-term period (till 2010) are:

- installation of heating systems based on solar collectors in communal and agricultural sectors of economy;
- installation of hot water supply systems based on solar collectors for individual and communal consumers at establishments with seasonal operation (children, tourist and sport camps, sanatoriums and rest houses, residential and public buildings).

At present the most beneficial utilisation of solar energy are systems of hot water supply based on solar collectors. Solar hot water supply systems provide environmentally friendly production of heat with minimal exploitation requirements, comparatively low cost (from USD 60-200 per m^2) and long operation term (10-25 years).

There are 5,9 million m^2 of solar collectors installed in Europe, we have 13 thousand m^2, naturally its contribution to energy saving is low in comparison to the total consumption in Crimea. Analysis of information from resort areas of Crimea held by Ministry of Fuel and Energy of the Autonomous Republic of Crimea indicates that of 552 managers of sanatoriums only 68 consider good ecological conditions of rest and cure as factor for increase of number of holidaymakers and improvement of comfort.

There was a study held in a sanatorium at Southern coast of Crimea in 1998, which indicated that the use of integrated hot water supply and heating systems results in fivefold decrease of fuel consumption and pollution. According to calculations installation of 1000 m^2 of solar collectors provides heating supply for sanatorium with 400 beds capacity, reduces cost of services and prevents annual emission into atmosphere of 7.96 ton of carbon dioxide, 42.46 ton of sulphur, 2.71 ton of nitric oxides, saves 700 ton of oxygen, keeps clear 4000 ton of air. Costs for installation of 1000 units of solar collectors are recovered in 2.5 years with following annual saving of UAG 178 thousand.

This example clearly demonstrates efficiency of usage of solar collector under conditions of fuel deficit, its high cost and environmental impact of organic fuel. We think it is very important to make every effort to utilise the potential of solar energy and to create conditions under which managers of all types of organisations consider installation of solar collectors one of the ways for economical improvement of their business. Only in Greater Yalta installed solar capacities may cover 12% of required heat demand, but according to the most realistic assessments this value may be 50 to 60%.

68 solar collector stations of water heating that operate in Crimea and occupy about 13 thousand m^2 provide annual saving of approximately 2 thousand ton of equivalent fuel or 14 thousand GCal, i.e. about UAG 4 million. These are sanatoriums, rest houses, enterprises where managers deliberately make initial investments to be independent of external heat and energy resources.

In 2001 the draft resolution was proposed on introduction and usage of solar collectors in resort sector, but according to Ministry of Resort and Tourism it contradicted property priorities of sanatoriums and was not adopted.

Taking into account urgency of solar energy utilisation, energy saving in resort area, ecological issue and conclusion of TACIS programme experts, Ministry of fuel and energy of the Autonomous Republic of Crimea studied introduction of solar collectors. There was a project prepared for the Programme of social and economic development of the Autonomous Republic of Crimea for 2003 on establishment of ecologically clean hot water supply based on solar collectors produced by local manufacturers for resort areas of Crimea.

Natural conditions of our region provide opportunity to solve another important issue - heating supply of steppe areas of Crimea using geothermal wells.

The assessment of Crimea's geothermal resources performed with the initial collection of geological and geothermal data indicates that the region has interesting prospects as to geothermal potential.

Thermal waters with assessed generating capacity of 1000 MWt are detected at Crimean peninsula. 1000-2300 m deep wells reached thermal waters with 1000-5000 m^3 per day output and stratal water temperature of 46-85 ^0C at well mouth.

Utilisation of thermal waters is possible only by usage of geo-circulating systems. Generating capacity of such ecologically clean systems amounts to 1-4 MWt when temperature abstraction from thermal waters is up to 30 ^0C.

At present there are 11 geo-circulating systems located at 11 populated areas. 2 of these systems are used for heating supply of villages (villages Yantarnoe and Medvedevka).

Geothermal heating supply plant has been operating in village Yantarnoe for 10 years. To achieve efficient utilisation of heating potential of geothermal waters scientists proposed to establish complex on agricultural products processing and storage in village Yantarnoe. At present business plan is studied to assess opportunities of the agricultural region on availability of agricultural products and perspectives of implementation of the proposals.

In 2001 in Medvedevka village construction of experimental geothermal power and heating plant "Sivashskaya-1" started. The plant will provide more than 20 budget financed organisations (school, administrative buildings etc.) with heat and electricity, gas generator ITTF of National Academy of Sciences of Ukraine will be employed. During the heating season of 2002-2003 the plant is used as a heating station. This will be one of the first scientific and commercial objects, which for the purpose of efficient usage of natural resources of the area will heat the village, follow the ecological norms of utilisation of geothermal water. The mechanism of establishment of profitable heat supply enterprise will be studied there as well.

Taking this fact into account we consider that the main strategic direction in utilisation of geothermal resources in Crimea at present is exploitation of the well-studied and tested wells, that will minimise risk of losses when boring non-productive wells.

Experts' assessments indicate that in one area of steppe region of Crimea 923 thousand ton of equivalent fuel of heat, 191.8 million m^3 of methane and 135 ton of iodine may be extracted annually within 30 years. Energy for pumping the waste groundwater will be received by electricity production at gas generator plants, heat will be used to supply villages. Technology of production of crystalline iodine is environmentally friendly, by employment the capacities of Crimean Bromine Factory

we can receive annually USD 2,7 million from iodine sales taking into account that iodine price at international market is USD 20000 per ton. Preliminary calculations indicate that the total investments for implementation of the technology at the perspective area of steppe region of Crimea are about USD 15 million. If there is feasible investment proposal we are ready to evaluate it and support its realisation.

Crimean Inter-branch Centre of Non-traditional Power Engineering is established in the Autonomous Republic of Crimea.

One of the first projects of the Centre is completion of construction of pilot heat supply object at the settlement of construction workers where non-deep aquifers of geological wells will be used for seasonal accumulation of solar heat.

We believe that establishment of the Centre gives an opportunity to introduce mechanism of commercial implementation of technologies of utilisation of renewable energy sources.

We plan to establish a priority zone of implementation and utilisation of renewable energy sources in Crimea and the Centre will be the co-ordinating agency in Ukraine on attraction into Crimea the task forces not only from the country, but from abroad.

So the Autonomous Republic of Crimea hopes that this respected assembly will be interested in presented projects on geothermal power engineering. We hope to start beneficial co-operation.

The Autonomous Republic of Crimea is actively involved in introduction and usage of mini hydroelectric power stations at water supply and irrigation hubs. Preliminary feasibility study presented within TACIS programme indicates that using water system hubs in Crimea additional 16 MWt of electricity may be produced by environmentally friendly source.

At present we have no commercial capacities of mini hydroelectric power stations, but analysis of operation of five experimental mini hydroelectric power stations at Greater Yalta indicates that construction of such stations at objects of water supply and irrigation systems is economically sound. We get real possibility to product cheap electricity that will allow to reduce power consumption costs at enterprises and will increase reliability of energy supply to water supply system, besides, construction of mini hydroelectric power stations doesn't require large investments as there is no need to build water mains, receiving chambers and extensive power supply lines.