Renewable Energy Strategy to promote an enhanced investment climate for renewable energy technologies for submission to national and regional authorities in participating CIS countries

1. Introduction

Renewable Energy Strategy to promote investment climate for renewable energy technologies for submission to national and regional authorities in the CIS states (further – Strategy) is a complex of opinions agreed by the CIS states concerning the common aims, priorities and prospects for widening use of renewable energy sources to intensify interstate economic relations and transformation of the Commonwealth of Independent States into a full member of the system of international relations in the sphere of global energy.

This Strategy has been prepared in the framework of the UN ECE project "Development of Renewable Energy in the Russian Federation and CIS countries: Prospects of Interregional Cooperation" on the principles of consolidated report presented on the base of national reports reflecting the assessment of potential development of renewable energy in the CIS countries during the course of the international seminar held in Minsk (Republic of Belarus) in July 2010 in the framework of the abovementioned project.

The aim of the present Strategy is to give the additional impetus to interregional cooperation of the CIS states in the sphere of sustainable energy development, further expansion of economic cooperation; to provide sustainable energy development, energy security; to increase wellbeing and life quality of people, national economy competitiveness of the CIS states and to strengthen their positions in the world economic system.

Implementation of the Strategy responds to very important interests of every participating CIS state and is designed to help harmonized development of economic life.

The development of cooperation in the sphere of renewable energy sources in the CIS frame does not contradict the development of relations with other states, does not limit and does not infringe their cooperation.

World financial and economic crisis influenced negatively the activity of many energy companies making them do strong changes in their business strategies and plans for investments into the infrastructure.

Despite the fact that slowdown of economic growth reduced world demand for energy which in its turn caused the reduction of emissions of greenhouse gas, volatility of prices for energy resources made appreciable negative influence on the development of energy efficiency and renewable energy sources.

Due to this fact state authorities must develop the policy and take additional measures to increase energy efficiency, to elaborate local energy resources, to diversify the energy supply sources, to decrease taxes for energy goods and to promote the ecologically pure energy production.

At present Renewable Energy Sources (RES) are the most dynamic developing form of energy generation in the world. Every year global growth rates exceed by 10% and according to existing expectations will be kept in future.

The use of RES as an alternative for traditional energy carriers is at present a strategic task on a national and regional scale. Unquestionable advantage for their use is inexhaustibility and ecological compatibility, as well as the necessity for providing energy security of the country by means of diversification of using fuel and energy resources, decreasing the volumes of harmful emissions and reserving of energy resources for future generations.

The base of the Strategy is voluntariness and independence of the participating CIS states in determining the tendency and depth of participation in integration process, succession and stages of measure implementation to develop energy cooperation.

2. Place of renewable energy in the context of developing global energy at present stage

Active use of renewable energy sources in the world for the last decades is connected in great measure with solving the problems of energy security of the states–importers of energy carriers against the background of high and unstable prices for the fossil fuels and the global company on climate change mitigation and reduction of greenhouse gas emissions into atmosphere.

Meanwhile national programs for renewable energy development at present have been adopted in more than 60 countries of the world, as the use of renewable energy sources are often the most rational solution of the energy saving problems in far distant human settlements and regions where the development of centralized heat and power supply is economically unreasonable. Renewable energy can become a base of regional and local energy supply system.

Renewable energy sources today are widely used in the whole world covering about 14% of world energy balance though the main part among them are traditional types of renewable energy sources, that is wood and wood waste biomass (in developing countries) and large hydropower plants.

But for the last decade the essential growth of using nontraditional renewable energy sources has been marked: solar and geothermal energy, energy of wind and waste, small hydropower plants, tidal and wave energy of ocean which has been caused by great price decreasing for renewable energy technologies and price increasing for organic fuel.

The countries of the European Union, the USA and Japan, China and India and others have achieved the greatest success in using nontraditional types of renewable energy.

According to some prognoses renewable energy development rates can be rather high under conditions of implementing reasonable policy of its support in the most countries of the world.

The governments of the USA, Japan and countries of the European Union in the last years have adopted special programs to increase the use of renewable energy sources.

CIS countries have considerable potential for development of renewable energy. In this connection the CIS states governments are proposed to consider a possibility of adopting a common renewable energy strategy which can become a significant component of sustainable energy development both for the countries-importers and exporters of fossil fuel sources.

To determine optimal ways of renewable energy development it is necessary on the national level to have a general assessment of potential made of renewable energy sources on the assumption of existing at present stage technological possibilities of their use. Practically in all the CIS states such work has been done or is being done at present.

3. CIS place in the system of global energy and segment of renewable energy sources

CIS has a significant resources potential. It occupies 16.4% world territory where about 4.4% world population live. The part of CIS has about 20% of world oil supply, 40% of natural gas, 25% of coal and 10% of electric power production.

Meanwhile the national input of main renewable energy sources into CIS countries energy system is appreciated as:

- Biomass, biofuel – 20 MTOE;
- Hydroelectric power – 10 MTOE;
- Geothermal energy – 12 MTOE;
- Wind energy – 15 billion MTOE;
- Solar energy – 6 billion MTOE.

The main driving forces of the renewable energy sources market in CIS countries are to be considered:

- Price growth for energy carriers import;
- Decreasing cost of technology for use of RES;
- Technology efficiency of RES using;
- Energy security;

- Reduction of greenhouse gas emissions.

At present in all CIS countries renewable energy sources are only small part of the whole energy consumption. In long term perspective the part of renewable energy sources can drastically grow.

Wind energy: in all CIS countries there is a great potential for the development of wind energy. In most CIS countries there are officially adopted plans or programs to develop wind energy.

Solar energy: the countries of Central Asia are the most interested in the development of solar energy where the number of sunny days in a year is the most among CIS countries.

Hydro energy: hydro energy development is the most important priority in the sphere of renewable energy sources development in most CIS countries having significant water resources. Small hydro power plants (power capacity < 10 MW) do not influence negatively the environment and can be considered the main trend of hydro energy development.

Biomass: two CIS countries – Belarus and Russia – have a great potential in energy production out of wood and wood waste biomass. The use of wood biomass for boiler combustion is one of the main priorities of Belarus government. In the north-west of Russia there have been installed some boilers working with wood biomass and there are good prospects to widen activity in this direction. Wood waste as well can be used for heating in other CIS countries such as Moldova and the Ukraine.

In the all CIS countries there are great potential for using agricultural waste for heating and producing biofuel. Grain crops straw has principal potential (wheat, barley, oats, and so on) in the CIS countries located in the north such as Belarus, Moldova, Russia and the Ukraine, and in the states of Central Asia which are engaged in cotton production, for example in Uzbekistan the waste after cotton production can be used.

Geothermal energy: in Azerbaijan, Russia and the Ukraine there is a serious development potential of geothermal energy. Russia has a wide practical experience of installing geothermal power plants on Kamchatka and Russia can share its experience with other interested CIS countries.

Tidal energy: only Russia among the all CIS countries has practical experience and a serious potential of using tidal energy.

4. Aims and the main tasks of developing renewable energy in CIS countries

Strategy aims of interregional cooperation to develop renewable energy sources common for the CIS states are:

- Rational use and consumption growth rates decreasing of existing resources of fossil fuel under conditions of unavoidable exhaust of its supply;

- Sustainable national economy growth based on effective use of energy resources;

- Decreasing growth rates of anthropogenic load on the environment and opposition to climatic changes when necessary to meet growing needs in energy consumption;

- Reduction of energy poverty scale especially for distant and difficult for access regions in some participating CIS states, including assistance to their socio-economic development;

- Keeping health of population and life quality by way of retarding growth rates of environment contamination when using fossil fuel and decreasing state costs for health protection as well;

- Increasing energy security level and reliability of energy supply at the expense of increasing its decentralization level;

- Involving of additional fuel and energy resources into fuel and energy balance;

- Retarding costs growth rates for distribution and transportation of electric energy, fuel and losses originated due to these factors.

In prospect it is planned to provide rational and economically reasoned growth of using different types of renewable energy sources to produce electric and heat energy and to broaden the use of alternative types of fuel for the transport and energy sectors.

Global (strategic) task in realizing objectives **is to double in nearest 10 years gross (total) potential of renewable energy sources in common energy balance of participating CIS states.**

CIS states' efforts to achieve the abovementioned aims will be directed to solving the following **tasks:**

- To provide effective use of energy potential of the CIS member states and sustainable total energy potential of commonwealth at the expense of renewable energy;
- To provide nondiscriminatory access of RES to the market of energy production;
- To introduce fiscal and financial measures assisting more wide use of RES (implementation of flexible investment policy, preferential taxation introduction, provision of subsidies for creating new production facilities, provision of financial incentives for energy consumers with the aim of stimulating their use of energy based on RES);
- To support new initiatives concerning biomass use for transport needs, heat production, energy including the market of different types of fuel produced from biomass, promotion of biogas technologies, to widen the use of solid state biomass;
- To support renewable energy sources use when building and reconstructing;
- To train the energy sector specialists of the CIS states in the field of renewable energy;
- To develop common information field in the sector of renewable energy.

5. Priority directions of interregional cooperation of participating CIS states in the renewable energy sphere

Priority directions of interregional cooperation of participating states in the sphere of renewable energy on which the achievements of the aims mentioned above and the objective solutions will be concentrated:

- To strengthen the measures coordination mechanisms in the field of renewable energy development first of all at national level;
- Creation of favorable conditions for attracting off-budget investments with the aim of creating new and reconstructing generating capacities functioning on the base of RES use and the use of mechanism of venture fund for investing into renewable energy sites;
- To support the development of small enterprises functioning on the market of energy service in the field of renewable energy;
- To support the implementation of mechanisms of public-private partnership in the field of renewable energy including assistance to activity's development to shape the market of renewable energy sources;
- To provide access of information about formulating and implementing of measures to develop renewable energy;
- To fulfill technical and technological control and supervision over compliance with security conditions when using renewable energy sources.

The implementation of this Strategy will be realized by developing proper plans. It is possible to develop special programs for priority directions of interregional cooperation.

6. Main aspects of interregional cooperation to develop renewable energy in CIS countries

Realization of top priority measures on main directions of interregional cooperation CIS member states in the framework of the present Strategy is supposed to concentrate around the following **complex of main aspects to develop the sector of renewable energy:**

1) Legislative aspect

As experience shows at initial stage of wide scale implementation of renewable energy sources even in the countries with developed market economy the state plays a crucial important role. Top priority state role consists of forming common aims in the field of renewable energy sources development, adopting law and regulations base, adopting state programs and assisting to their fulfillment;

2) Economic and financial aspect:

Economic conditions and financial incentives are important prerequisites of successful implementation of new technologies. It is important that policy aimed at supporting energy producers using renewable energy sources should systematically provide with guarantees for investors into the sector;

3) Science and technology aspects including the development of education in the sphere of renewable energy;

4) Information aspect

Lack of knowledge or insufficient information among decision-makers and potential users of technologies for renewable energy about possibilities of economically beneficial use of renewable energy sources and technologies applicable under concrete conditions limit the possibilities of the development of this energy sector.

The proposed complex of renewable energy development aspects in CIS countries:

- has been composed to develop consolidated report of national experts presented in Minsk during the International seminar on the UN ECE project "Development of Renewable Energy in the Russian Federation and CIS countries: Prospects of Interregional Cooperation" where the main tendencies and factors preventing from the development of renewable energy sector in CIS countries were reflected;
- includes a set of recommendations concerning the practical implementation of the specific measures on the main directions of interregional cooperation.

7. Realization mechanisms of the Strategy of interregional cooperation by the member states of the Commonwealth of Independent States to develop renewable energy and recommendations for their practical implementation (Policy Recommendations)

Existence of significant potential for renewable energy in the CIS countries is necessary but not sufficient condition to involve it widely into energy balance of every concrete country.

International experience of implementing modern renewable energy technologies shows that in every country there are definite legal and regulative, economic, technical, informational and other limiting factors preventing from their developing and implementing. Not all the factors are directly connected with renewable energy technologies; however this fact does not prevent them to retard wide development of renewable energy sources potential.

Detection, removal or overcoming of these retarding factors often require significant and continuous efforts from the state's side and availability of organizations and specialists interested in the implementation and further promotion of renewable energy technologies.

In the context of implementation mechanisms of the present Strategy the above mentioned complex of aspects to develop renewable energy in CIS countries is considered by CIS member states as the main tool of interregional cooperation.

1) Practical recommendations for developing interregional cooperation in the framework of legislative aspect.

All the CIS states realize the importance of renewable energy development and work at the creation of legal and regulative and institutional base.

Meanwhile one of the main success factors of the support policy for energy producers using renewable energy sources is its incorporation into the process of long term planning together with other political and strategic decisions.

In this connection in addition to the present Strategy for the successful development of renewable energy technologies it is reasonable to provide an **adoption of appropriate comprehensively reasonable complex special purpose program.** This complex program can include detailed sub-programs on separate directions (development of hydro, wind, solar energy and etc.) reflecting national priorities and specific development of renewable energy sector of concrete CIS state.

Common target guideline of renewable energy development in the CIS countries both in the framework of the present Strategy and considering the following adoption on its base of the complex target program is **increasing relative volume production and consumption of electricity produced with RES use.** To achieve planned volume of electricity production based on renewable energy sources it is necessary to provide the input of generating plants (small hydropower plants, wind power stations, tidal energy stations, geothermal energy plants, heat energy stations using biomass as one of fuels, other types of power plants).

To solve this task it is necessary to form a complex of state policy measures in the sphere providing for system state support of this direction and connected with the development rate of renewable energy sources planned and being realized. Indicated rates as well must be connected with creation of necessary infrastructure, increase of competitiveness in energy production on the base of renewable energy sources and with reasonable participation in the formation of fuel and energy balances in the concrete CIS states and their regions.

Organizational base for the problem solution of renewable energy sources development in CIS countries in the frame of legislative aspect consists of **defining supra-national authority (body)** responsible in general for given direction (further – authority).

Functions of authority proposed to be created must be: to compose working out state RES development programs including Research and Development (R&D), carrying out market investigations at the internal and external markets, promotion and popularization of wide RES use, developing legislative initiatives in this sphere (including possible initiative to conclude the special Agreement on cooperation of CIS member states in the sphere of RES development) as well as coordinating cooperation in the sector of renewable energy at the regional and international levels (including cooperation with UN ECE, EU and IRENA).

The decision to approve authority must be taken by the CIS member states during one year since this Strategy has been adopted. Precise organizational and functional peculiarities of authority's activity must be agreed by the CIS member states by the given date.

By the moment of adopting the authority participating CIS states should:

-Take the liability to send regularly to the authority the official reports reflecting the tasks of the given country in increasing energy consumption received from renewable energy sources for the following 10 years and the events carried out by that time;

-Take the obligations to publish regularly the official reports together with the measures' analysis carried out in the frame of realization of the present Strategy;

- Define the obligations for the authority to publish regularly common report based on the countries' reports.

In the frame of legislative aspect the state policy of the CIS countries in the sphere of using renewable energy sources in whole will provide for:

- Coordination of measures in the field of renewable energy development;
- Creation of favorable conditions for attracting off-budget investments aimed at constructing new and rebuilding existing generating plants, functioning on the base of renewable energy sources and use of venture funds mechanisms to invest into the renewable energy sites;
- Creation of favorable conditions for developing activity to shape the renewable energy sources market;
- Support of the development of small enterprises functioning at the energy service market in the field of renewable energy;
- Support of developing mechanisms of private - public partnership in the sphere of renewable energy;
- Provision of the information access on shaping and implementing measures to develop renewable energy;
- Carrying out technical and technological control and supervision over the compliance with the security requirements when using renewable energy sources.

At the first stage in the CIS frame it is necessary to carry out analysis of the experience accumulated and to prepare:

- a set of recommendations to formulate national strategies for developing renewable energy;
- a set of recommendations to formulate national complex programs for using RES closely integrated with national strategies.

2) Practical recommendations to develop interregional cooperation in the frame of economic and financial aspect.

The strategy of supporting the energy producers using renewable energy sources must be as simple as possible and provide for low administrative costs. At the same time it must be flexible enough to win the market and to provide for the effective costs as it gives in result gradual price decrease.

It is necessary to analyze separately the international experience of economic incentives to develop renewable energy and its application under CIS countries conditions and the existing national experience of using economic incentives in the CIS countries as well and to prepare a **set of recommendations to incorporate the most effective measures into national legislation** in the sphere of regulating renewable energy development.

Concrete support schemes and mechanisms of stimulation may be:

- to implement special programs and demonstration projects;
- to provide with concessional loans for acquisition of renewable energy equipment and partial return of investments for consumers;
- to implement accelerated amortization for renewable energy equipment;
- to exempt from taxation and to decrease tax rates; to fix fossil fuel tax including CO^2 emissions, or tax for electricity produced by using fossil fuel;
- to introduce special guaranteed rates for buying energy produced from renewable energy sources and obligations to buy this type of energy for power grids;
- to subsidize the investments into renewable energy;
- to finance R&D leading to decreasing renewable energy costs;
- to create state institutions and to support public organizations which activity is directed to using renewable energy sources.

The aims and type of investments into renewable energy define the use of this or that mechanism. **Effective schemes of support and stimulating mechanisms** can be divided into **4 main groups**:

- supporting and stimulating “independent energy producers” (IEP) (investors who are not members of the state structures and energy supply organizations) which comply in the best way with the aims of renewable energy development);

- stimulating renewable energy development for energy supply organizations and state structures;
- attraction of private investments;
- attraction of investments into renewable energy development for small cooperative societies.

In middle term prospects in the frame of developing cooperation among the CIS countries it is necessary to consider the possibility of creating a special fund for renewable energy development which could become a specialized financial mechanism for support of states' joint efforts to implement national strategies of renewable energy development and intergovernmental programs.

3) Practical recommendations for the development of interregional cooperation in the frame of scientific and technological aspect.

Successful implementation of the present Strategy in the frame of scientific and technological aspect of renewable energy development in the CIS countries must be concentrated on the following main directions:

Carrying out scientific research and commercializing the investigations

Usually scientific and research works are very expensive and it is recommended to develop the most close cooperation in this sphere in the frame of CIS.

At the first stage it is recommended for the governments of the Commonwealth to conduct the information exchange on main national investigations directions and to detect the possibilities to join the efforts; to define priorities and types of cooperation and to consider the question of allocating special budget finance.

Commonwealth states can choose different types of cooperation:

- implementation of joint projects and programs;

- creation of common information fund, libraries of reference and information literature, fulfillment of analytical reviews on advanced achievements and application experience of the energy generation installations and systems based on RES in other countries;

- scientific exchange and training for specialists;

- publishing scientific journals, working out regional manuals, reference books and leaflets on RES development;

-conducting conferences and seminars for experts, specialists and the community, giving special significance to the types of training specialists and decision makers in state authorities, and the

types of wide cooperation with representatives of science, education, civil public and mass media as well;

-scientific cooperation.

At the same time to successfully commercialize the investigation results it is necessary to consider a question of creation in future of **intergovernmental scientific and research CIS centre for renewable energy** for successful implementation of joint investigations program and unification of standards in the sphere of renewable energy on the CIS territory as well.

Development of renewable energy sources in future is expected as profitable and highly economic. In line with the state role great significance is given to commercial aspect of this project.

With the aim of commercializing the successful achievements it is desirable to have a list of enterprises and organizations capable to organize industrial output of the proper devices, installments and other equipment and to organize cooperation of enterprises with scientific organizations at least in the form of information and opinions exchange.

Development of educational activity and personnel training

Personnel training in the sphere of renewable energy sources has a decisive importance for solving a problem of sector development. Course on renewable energy sources must be conducted in all educational institutions of relative profile. The degree of elaboration depends on specialization of pupils, students and specialists.

The CIS states are recommended to widen the cooperation in the field of education and to provide for the specific programs of cooperation on coaching and upgrading qualification of specialists in the sphere of RES including exchange of workbooks and background materials for students and specialists in the RES field.

Besides it is necessary to summarize and distribute the best educational practices in the sphere of using renewable energy sources, to use more widely educational institutions of initial education in the field of renewable energy.

It is necessary to develop actively international cooperation for training and increasing specialists' qualifications working in the sphere of using renewable energy sources. It is recommended to use widely both for conducting seminars and for upgrading specialists' qualification the demonstration sites of renewable energy sources and training base of leading high educational institutions on the CIS territory as well.

International cooperation in the indicated field should be developed also by means of joint participation in the corresponding educational programs.

Development of modern technologies and equipment for producing renewable energy

Lack of modern technologies and equipment is one of the main technical obstacles of renewable energy development in the CIS countries. Such equipment is not produced in the CIS countries or its quality requires improvement.

To develop successfully this direction first of all it is required to elaborate unified data base of modern equipment required for application of RES, its suppliers and prices.

Besides it is necessary to initiate the implementation of new technical assistance projects in the international organizations in the sphere of using renewable energy sources for the CIS countries.

The key role in technologies transfer process of using RES may be played by the UN ECE Sustainable Energy Division. In the context of cooperation with UN ECE it is recommended to work out creating Special Working Party for RES to optimize transfer of technologies and interregional cooperation on RES in the CIS countries.

4) Practical recommendations for developing interregional cooperation in the frame of information aspect.

Insufficient information of potential users of renewable energy technologies on the possibilities of economically beneficial use of renewable energy sources and technologies applicable under concrete conditions limit possibilities to develop this energy sector. Only some enterprises and organizations have working experience with the systems of renewable energy (small hydro power plants, solar heat supply).

To realize successfully the main aims of the present Strategy in the frame of information aspect it is necessary for the specialists and population to participate actively in the solution of target set to broaden the volumes of energy use, received from renewable sources which CIS countries possess, deepening their knowledge in the field of RES, understanding the role and possible economic and ecological benefits of renewable energy sources development.

In line with the measures on the state level one must start and systematically conduct the actions to explain and to render methodological assistance to local authorities, legal entities and individuals and the support of public organizations and initiatives to develop and use of RES.

There must be organized the work to explain legislative base, existing regulations and defined preferences and benefits in the field of renewable energy sources development, methods of technical and economic calculations, financial support procedures for legal entities and individuals in the production and use of installations and systems for receiving energy from

renewable sources, rendering methodical and consultative aid, assistance in preparing projects, adapted to specific conditions of implementation space.

As a concrete mechanism of realization of this direction in interregional cooperation it is necessary to work out creating a single system of experience and information exchange on the questions of developing renewable energy in the CIS countries. The indicated system can be created on the base of united Internet portal having data base on:

- implementation of specific projects and technical solutions;
- policy and measures applied in the countries-participants of the project aimed at stimulating the use of renewable energy sources;
- legislation in the sphere of renewable energy development, elaboration of corresponding standards and norms;
- assessments of environmental effect of the renewable energy sites;
- realization of corresponding tariff policy;
- cooperation with corresponding international organizations.