



Theme: Renewable energy sources and Ecology

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Following the first energy crisis pertinent to drastic hike of the primary energy sources price on the world markets, immediately the interest towards utilising the sun energy arose. Most countries faced the necessity not only to solve the energy provision problem via adopting rigid measures aimed at energy sources preservation and energy saving technologies but also applying new alternative energy sources.

The share of untraditional renewable energy sources in the world energy balance is estimated from 1-2 to 10% of the total primary energy sources consumption. Depending on the natural-climatic conditions, thermal energy sources availability, political and economical conditions, the untraditional renewable energy sources in the different countries are at different extent of utilisation.

The interest toward renewable energy sources grows continuously. They meet a small portion of the European energy needs as primary energy for power energy production or as direct sources of thermal energy. Since 1990 until now the power energy production via such sources marks continuous growth, over 3 % per annum. In 1993 an almost 10 % share has been indicated and the total energy production from them, including power and heating energy, provided for about 3.3 % of the internal needs of the European Union (EU). The renewable energy sources's share was even greater - 6.2 %. The hydropower capacities and the incineration of biomass converted into heat have the biggest merit for that. Yet the former dominate in the power energy production with a share of 91 % while the biomass surpasses the rest of the renewable energy sources in the thermal energy production with a share of 98 %. The figures for energy generation (production of electricity and heat) using the renewable energy sources for EU's countries on 1993 are presented in Tables 1 and 2.

Table 1

Electricity production from renewable energy sources for 1993, GWh							
EU's country	Hydro energy	Energy from incineration of biomass	Geothermal energy	Wind energy	Solar energy	Total	Share in the total electricity production in %
EU - 12	172 496	10 273	3 671	2 304	18	188 721	9.6
EU - 15	299 496	18 763	3 671	2 352	18	324 259	14.5
Belgium	251	522	0	8	0	781	1.1
Denmark	28	603	0	1 034	0	1 638	4.9
Germany	18 221	3 168	0	674	2	22 053	4.2
Greece	2 518	0	0	47	0	2 565	6.7
Spain	24 377	625	0	116	1	25 199	16.0
France	68 698	1 601	0	4	0	70 303	14.9
Ireland - Eire	750	0	0	15	0	765	4.7
Italy	44 482	279	3 667	4	12	48 445	21.8
Luxembourg	62	5 050	0	0	0	112	10.5
Holland	92	1 315	0	178	2	1 587	2.1
Austria	38 020	360	0	0	0	38 380	72.9
Portugal	8 737	901	4	11	0	9 653	30.9
Finland	13 600	5 990	0	0	0	19 590	32.0
Sweden	75 380	2 140	0	48	0	77 568	53.1
Great Britain	4 280	1 209	0	213	0	5 702	1.8

Table 2

Heat production from renewable energy sources for 1993, TOE				
EU's country	Energy from incineration of biomass	Geothermal energy	Solar energy	Total
EU - 12	24 159.1	359.2	186.8	24 705.2
Belgium	238.5	1.2	0.8	240.6
Denmark	1 068.4	1.1	3.8	1 073.3

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Heat production from renewable energy sources for 1993, TOE

EU's country	Energy from incineration of biomass	Geothermal energy	Solar energy	Total
Germany	2 141.9	8.6	21.0	2 171.5
Greece	1 393.3	3.1	92.5	1 494.9
Spain	3 115.7	6.5	21.5	3 143.7
France	11 014.4	121.8	17.4	11 153.6
Ireland - Eire	92.2	0.1	0.1	92.4
Italy	2 125.5	7.2	7.2	2 348.7
Luxembourg	15.4	0.0	0.0	15.4
Holland	450.0	2.4	2.4	452.4
Portugal	2 140.0	13.9	13.9	2 153.9
Great Britain	357.8	6.1	6.1	364.7

In the updated Environmental Strategy for Bulgaria, elaborated together with the World Bank in 1994, it is specially emphasised for the necessity of taking active measures for protecting of the human health. On this basis the criteria for identifying the priorities are set forth - the most frequent diseases, due to a small number of pollutants:

- high concentrations of lead in the air and soils from the metallurgical enterprises and the use of leaded gasoline;
- high concentration of dust particles in the air from the heating of the households, the thermo electric power stations and the industrial enterprises;
- high concentrations of sulphur dioxide and other gases, particularly in combination with dust particles from the energy generation sector and industry.

Basic features of the new national energy strategy are:

- increasing the energy efficiency;
- utilizing renewable energy sources;
- granting preference to the regional energy concept;
- establishing regional energy centres based on the European countries experience.

In its strive toward association with the European energy standards Bulgaria meets the support of the European Union member countries. Estimating the harmful impact of the heavy metals on the environment and human health, for evaluation and management of the quality of the air the Ministry of Environment (MoE) and the Ministry of Health Care pursue a consistent policy for harmonization of the Bulgarian standards with those of the World Health Organization and the developed countries. The standards for the quality of the air are harmonized in the year 1994 (State Gazette No 43/94). The concentrations of the priority heavy metals in all hot spots of Bulgaria are controlled exclusively precise with the apparatus provided through the Programme PHARE.

Among the implemented projects preference has been granted to projects employing new energy saving technologies and renewable energy sources. As an examples the very good results achieved in the period 1992-1995 in abatement of the emissions of dust and heavy metals from several industrial companies and particularly the Plant for non-ferrous metals in the town of Plovdiv and the Lead-Zinc Plant in the town of Kardjaly. By taking secondary measures purification of the waste gases through filtration installations, concentrations of dust and heavy metals below the permitted standards were achieved. Unfortunately, the shortage of financial resources and the high interest rate of the credits in Bulgaria could delay significantly the implementation of the environmental intentions.

Bulgaria Environmental legislation had made substantial progress in areas of renewable energy sources' utilization: laws have been passed, financial sources mobilised and used to tackle priority problems, institutions have been strengthened and environmental management skills enhanced. These achievements have largely developed with Western assistance sometimes playing an important supportive or catalytic role.

The countries now developing their economy in transition are the most affected by the consequences of the pollution that was the result of the applicability of inadequate patterns of producing and consumption. The developed countries should comply with the engagement referring to the transfer of non-pollutant technologies as well as with environmental costs for the benefit of all countries and especially of environment.

The adjustment and harmonisation of the legal environmental framework in this field is bound to be integrated in the overall democratic restructuring process which our country is undertaking. Bulgaria had got an environmental protection law. This law and the associated environmental media regulations call for being amended and harmonised with the international legislation and adapted to the economic situation inflicted by the market economy transition.

The consolidation of the renewable energy sources role takes an important stake at the energy policy of Bulgaria in a close relation with the environment preservation. Among the advantages of this type of sources are: decrease of CO₂ emission, the fact that they are local resource, low operational costs, etc. Some of these energy sources however, pose high investment costs and low efficiency factor compared to the classical methods of energy production. The goal is set to overcome the shortcomings of the renewable energy sources and to speed up the commercial application of these new energy technologies. The forecast for continuous expansion of this energy sector in Bulgaria in the coming years is positive and optimistic.

The possibilities of full value utilization of renewable energy sources is one of the initiatives within the framework of activities to accelerate and further promote implementation of Environmental Action Programme (EAP) in Bulgaria. Our country working on several important areas of environmental management, which could come into the focus of international co-operation. These areas include:

- I. Solid waste management, including hazardous and industrial waste.
- II. Water sources management, including drinking water supply and irrigation.
- III. Water pollution problems, especially on transboundary waters.
- IV. Soil degradation.
- V. Transport and environment.
- VI. Nuclear safety and nuclear waste problems.
- VII. Full value utilisation of the renewable energy sources.

The challenges for implementation of EAP in Bulgaria are the following:

- To review problems, consolidate priorities, achieve cross-sectoral support and create closer links between priorities and projects for financing, and overcome the disjunction between cross-sectoral investment programs and the MoE priorities;
- To create mechanisms for managing of domestic and international financing;
- To introduce bottom-up approaches where local governments, businesses and utilities identify their needs, develop projects and assume responsibility to pay loans back or finance projects.

The EAP should assist the MoE and local Authorities in developing their policies and implementing them through a range of activities in different priority areas. The objectives of this activity would be to identify areas where the greatest environmental benefits can be achieved at least cost and, on this basis:

- to identify successful local air pollution control strategies, including target setting and implementation measures, and analyse the factors which encourage or constrain their implementation;
- to promote the sharing of experience among relevant authorities on practical measures for reducing local air pollution;
- to examine how local air pollution activities have been, and could be, incorporated into national or local environmental action programmes;

- to provide direct assistance to country in developing and implementing local air pollution control strategies, including the design of policy and institutional measures and the preparation of investment projects.
- to organise workshops on specific topics and other activities.

Before few years the situation in Bulgaria was further complicated by a lack of transparency and understanding of objectives and mode of operation of western partners - be it governments, consultants and private investors, and by the long processing time of requests for financing. In the meantime it has been shown that western assistance accounts for a small percentage of environmental financing in the country, despite the increasing sums going into direct investment.

In general, the private sector in Bulgaria cannot afford large environmental investments in a time of economic crisis, credit is very expensive and corporate structure remains mixed between public and private ownership. A most promising development is the expansion of commitment to Environment Funds. The utility of the Funds will increase as raise the levels of pollution fees and fines, and as collection techniques improve. The development of expenditure priorities linked with national policy and national environmental action programmes is increasing, as is involvement with Western partners. Therefore, it is clear that, Western Donors and relevant international organisations also should be fully involved, sharing their experience and providing much-needed support for developing and implementation a more coherent activities on the regional and country level.

The currently relatively low level of economic development and the need for restructuring of the transition economy of our country, utilisation of the renewable energy sources combined with the nature conservation, development of sustainable tourism and other economic activities offers a model for improving the livelihoods of local populations in valuable rural areas while preserving their natural sources and biological and landscape diversity.

The EAP require the potential investor to be financially responsible for carrying out a studies. The state maintains a "control" function - reviewing the accuracy of the data presented, checking on economic judgements, and so forth. The initiatives for successfully implementation of EAP in Bulgaria are the following:

- prevention of environmentally unacceptable projects by strengthening of professional and scientific institutions through their participation in the preparation of studies;
- implementation of an effective environmental legislation.
- improve monitoring and environmental data from which to develop the instruments and evaluate their effectiveness in reducing pollution increase public awareness of environmental issues;
- long term management by introduction of environmental management systems in public and private enterprises (mines, power plants, industries and manufacturers) key environmental issues of the enterprises could be identified and addressed in a systematic way, thereby revealing the technical basis for environmental enhancements of the enterprise. The environmental management system should include among other things management plans for resources demand, pollution and occupational health and safety. The management systems should, basically, be prepared by the enterprises themselves, but the national and the regional authorities should promote the introduction hereof.
- implementation of specific conservation projects involving various actors such as local population and different sectors of the national and local government.
- share experience in community acceptance, community integration and public participation through involvement of the local representatives in the national activities;
- increase public awareness of environmental issues and public participation in the environmental decisionmaking process;
- support EAP through workshops, advisers, technical co-operation, twinning, study tours, etc.

- increase environmental quality monitoring in proposed project areas.

Some of the economic instruments which can support implementation of EAP in Bulgaria are:

- Environmental funds based on resource use charges and fines for exceeding the limits;
- Product charges;
- Import duties for old cars;
- Lower taxes for unleaded petrol/gasoline;
- Relief from taxes or import duties for environmental equipment or investment
- Debt for nature swaps;
- Waste disposal charges;
- Water use charges;
- Tradable pollution permits;
- Incentives for recycling;
- Tax allowance for environmental improvements.

Above mentioned economic instruments differ widely in scope and purpose, ranging from large environmental funds, to Market pricing for resources hitherto free, to tax allowances that as yet have not been taken up because the taxable profit has not yet been made. Unfortunately, defining economic instruments presents problems. For several countries, market pricing of resources (energy or water), and dropping governments subsidies were effective economic tools to reduce resource use, and pollution, by, for example, avoiding the need to build new facilities for water treatment or new power plants. We have therefore put such measures forward as examples of economic instruments.

LESSONS LEARNED

1. The challenge of cross-sectoral integration of policy and investment has not been fully met. A stable institutional and regulatory framework needs to be established to integrate environment into sectoral policy and investment.
2. International donors should work with the country to clarify all requirements, financing and funding possibilities, conditions of financing, priorities and interests of individual donors and financing institutions as well as the cycles of financing. This will help the government design adequate project preparation and selection processes and submit project proposals that meet requirements.
3. There is a need for a continued assistance to build and institutionalise national project preparation capacity, either as a project preparation facility or to integrate it financing mechanisms. Local governments and business, also need assistance in project preparation and management - especially in preparing the financial components of a projects.
4. Demonstration projects at regional and local level should be supported and mechanisms should be developed to transfer experience.
5. Capacity needs to be built to manage international loans, combine grant funds, international and domestic financing of projects.
6. Grants, in addition to loans, should be made available.

Environmental protection within the framework of promoting small and medium sized enterprises is an important aspect of environment policy, knowing that such enterprises can implement, from the very beginning, an accurate environment strategy which will lead to a decrease in energy and raw materials consumption and consequently to pollution abatement.

The reorganisation strategy and the reforms concerning the relationship between privatisation and restructuring promote to includes also the environmental management measures. The governmental

support given, for obtain advantageous credits creates in this transition period the possibility of self-monitoring improvement and also creates the needed conditions for alignment at the international norms and standards.

In Bulgaria the developing strategies and concepts has taken longer. In the long term the future of good environmental management (a relatively new field in Bulgaria) lies with appropriate policy formulation, target setting, and low cost, market-oriented implementation and enforcement.

As a conclusion, the environmental benefits (and disadvantages, if any) should be identified as a whole. Based on the identified environmental benefits (and disadvantages) a supervision and monitoring plan should be prepared for each sector of the Bulgarian economy.

Note: The data for preparation of Tables 1 & 2 are taken from data-base of the REC - Haskovo which was established under execution of the PHARE Project BG 9307 - 02 - 02 - L001: "Regional Energy Centre/Concept for the Pilot Region of Haskovo".