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RENEWABLE ENERGY SOURCES AND SOCIETY

Abstract: Solar energy and society is a compound that still needs to get settled in many communities. Solar power generation modules have now become quite accessible to most residents and therefore they must be shown how and where to install them. In addition, the energy of the Sun will in the future play a significant role in the supply of electricity to energy systems. Environmental awareness is reflected in the way in which society manages natural resources. Encouraging the use of renewable energy sources has an impact on the development of the environmental awareness and responsible environmental management. By utilizing the available renewable energy resources, the need for their import is reduced, and in this way, one contributes to a cleaner and more independent society. Replacing fossil fuels by the renewable energy resources reduces the impact of the emissions of harmful substances into the environment, thus enhancing a healthier and sustainable future.

Key words: *renewable energy sources, solar energy, society*

1. INTRODUCTION

Renewable energy sources include hydro-energy, solar energy, wind energy, geothermal energy, biomass energy and biogas energy. Recent data from the International Renewable Energy Agency (IRENA) show that about 10 million people work in the field of renewable energy in Europe.

In Bosnia, wood is mainly used for heating. Most of the RES in B&H are small and large hydropower plants and solar power plants. In B&H, there

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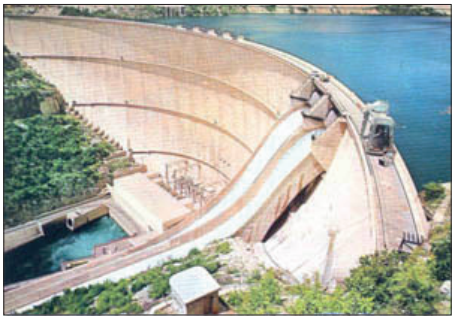

Fig. 1. Hydropower plant *Trebinje 1* on Trebišnjica, 1968

Fig. 2. Hydropower plant *Višegrad* on Drina, 1989

is one turbine producer for small hydropower plants. There are no manufacturers of the equipment in the field of solar energy in B&H. In B&H there are not enough experts in the field of solar energy. Work in the field of solar energy in B&H is based on the import of equipment and knowledge from abroad.

Over the last ten years in B&H, about 60 new pellet and briquette production plants and one plant for the production of boilers on pellets and briquettes have been installed.

2. THE INFLUENCE OF SOLAR ENERGY ON THE SOCIETY

Although in a small number of countries it is already now cheaper to produce electricity from photovoltaic panels than from coal, in just 10 years, the production of energy from this renewable resource will become the cheapest form in almost the entire world. According to Bloomberg New Energy Finance [7] since 2009, the prices of solar panels fell by 62%, as the lowering of bank loans brought production capacity to record levels. According to this source, in the average 1 MW power plant, the price from the current $ 1.14 per installed watt of power should drop to 73 cents by 2025. This is more or less in line with the predictions of other energy institutions.

The International Renewable Energy Agency estimates that the price of photovoltaic panels will fall by an additional 43–65% by that year, bringing the total decline in prices from 2009 to 84% in. The International Energy Agency expects a 25% reduction. However, the price of photovoltaic panels will fall below the price of coal with different dynamics in some parts of the world.

Fig. 3. PV solar power plant *BLC 1* of 20 kWp, (2012) and *BLC2* of 10 kWp, (2014) Banja Luka

Fig. 4. PV solar power plant *Novakovic-besjeda* of 249 kWp Vijacani, Prnjavor, (2014)

In Europe and Brazil, through taxes, imports and the use of coal as a dirty source of energy are destimulated, and they stimulate the use of solar energy.

According to international indicators, China is the largest producer and consumer of solar modules and other equipment in the field of solar energy. In China, coal continues to be widely used to generate electricity.

Last year, the price of electricity from solar power plants in the United Arab Emirates and Chile was lower than the price of electricity generated by coal.

Thus, in regions that import coal or through taxes to diminish dirty energy, such as Brazil or Europe, prices should fall in four to five years. In China, the world's largest solar panel market, this should happen by 2030.

By 2021, workplaces in the field of solar energy will increase to 175,000 and will add an extra value of € 9.5 billion, according to Ernst & Young Global Limited (EY) Consultancy and Audit Report [7]. The EY report also shows that the European Union's efforts to increase the use of RES from 27% to 35% by 2030 could create 120,000 additional jobs in the field of solar energy [1–9].

3. GOOD ENERGY

Good energy is renewable energy that involves citizens and society in the processes of production and energy consumption. Good energy brings added value to the local community through new jobs and reduces energy poverty. The transition to the use of renewable energy sources is progressing faster in countries where citizens and local communities are actively involved in the development and implementation of local energy initiatives. Almost all cities in the Balkans are energy-poor, and investment in energy efficiency and renewable resources can create opportunities for new development projects.

Investment opportunities comprise numerous small decentralized heat systems that still use fuel oil and can use locally available biomass. City authorities do not have sufficient expertise in the field of energy, and citizens are not sufficiently informed to engage and initiate problem-solving. The obstacles are also centralized decision-making and budget management, that is, the lack of autonomy of local authorities. Sharing experiences with other, more successful small European cities (e. g. through the Energy Cities network) can help develop the local supply model in our country.

Solar energy becomes a commercial reality, cost-effective even without government incentives, and is a good basis for further development of the RES sector. It is important that the citizens and the local economy benefit from the investment. RES is increasingly representing an economic opportunity for citizens, energy cooperatives, small and medium-sized enterprises. Cooperation with cities and municipalities is crucial, as well as the action at the local level for the development of civil energy in the entire region. By creating and implementing good local initiatives, opportunities are created for defining civic energy and designing models that are applicable in the local context, for the needs of the local community. Citizens' trust towards their local community and representatives of public authorities is crucial for the development of civil energy models, especially for the development of energy cooperatives and group financing of local projects. It is necessary to establish strong cooperation and good communication between citizens, cooperatives, local authorities, educational and research institutions [1–6].

Recommendations that emerged at the Vis event center are intended for all participants who need to contribute to a fair energy transition: local and state authorities, power companies, citizens, energy cooperatives, civil society and the economy [9].

Recommendations for local governments are that they should create a long-term vision to reduce CO_2 emissions. Investing and fostering the forms of (co) ownership of the RES, as it maintains large financial resources that have previously been spent on imports of energy and fossil fuels. Starting education of energy advisers and their employment, which can create new jobs through employment and self-employment. Encouraging RES models to be financed through crowd funding and group crowd sourcing by citizens who themselves initiate projects they want in their local community. Enabling citizens to invest in the RES in public buildings.

Creating models of ownership and management of RES that link public authorities to civil society because they create added value and invested funds are left in the local community.

Fig. 5. Wind power plant

Fig. 6. Three biogas installations in Bač with digestate reservoaire

Joining in the EU networks like Energy Cities and Covenant of Mayors and use the existing experience and network of other cities in the EU.

Developing and encouraging the establishment of public utility companies as this enables non-profit-making activities of supply and lower energy prices for households.

Recommendations for government authorities:

— include models of ownership of the local community in the construction of renewable energy sources in the energy and climate strategies that are still being drawn up;

— launch a national program for combating energy poverty through a network of energy advisers on site, modeled on experiences from Germany and Slovenia;

— energy cooperatives need to be identified as a model of social enterprises and provide a line of financing from the EU funds;

— create a more favorable environment for the operation of energy cooperatives through tax policy;

— create all the preconditions for the development of solar energy on the market basis;

— funds collected through a solidarity fee should be directed to invest in renewable sources and energy efficiency instead of in one-time assistance.

Recommendations for Electric Power Industries:

— create partnerships involving the local community in financing renewable energy projects and/or establishing local suppliers. Partnership can be connected with energy cooperatives and/or with local authorities;

— issue recommendations for small investors in renewable energy sources — citizens, energy cooperatives, civil society and the economy;

— with the support of the state, locally join the energy cooperative, following the example of Scotland and England;

— invest in RES through group financing through microcredit or by cooperative model [7–9].

4. CONCLUSION

Degrading entire ecosystems and drastically violating natural balance, man also conditions the immediate future of mankind, and thus the existing social relationships. First of all, this requires a change of the frame of mind, and then the rooted habits, which is the most difficult part of the policy of changing. Reprogramming, for nature harmful habits requires time, knowledge and continuity, but it is certainly the direction in which mankind must and should move. A modern man must not live in the belief that the riches of nature are inexhaustible and that he can in that nature carry out activities, regardless of the consequences that result from such behavior. The growing need of mankind for energy is a trend that will not change the direction or intensity of today's development. The shortage of that same energy would cause cataclysmic changes in the present way of life and in general survival and it is quite certain that from all the crises that could befall humanity, the scariest would be the energy crisis. It would be, on the basis of the existing knowledge of the functioning of the world and the world economy, a crisis that would in catastrophic proportions simultaneously accompany hunger, cold, darkness, traffic cessation, suspension of industrial production, etc. Sustainable use of energy and other resources of the population and economy imply improving their efficiency, saving and using clean renewable energy sources and other resources. In that sense, the implementation of "clean" energy and the use of renewable sources is an important step that should be taken by all important industries because this reduces the emissions of harmful substances into the environment.

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