



Renewable energy in Macedonia

- Focus on 'green' electricity production -

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Introduction

In future, beside the level of energy consumption as a parameter for the economic growth of a country, the capacity and capability for introducing renewable energies will become an important criterion for the level of the sustainable development of the countries. At the end of September 2008 the International Energy Agency (IEA) has called for a major boost in renewable energy use, estimating that until the middle of the century nearly 50 percent of global electricity supplies will have to come from renewable energy sources.¹

These ambitious objectives require government action for unprecedented political commitment and effective policy design and implementation. As a part of the overall EU energy policy for energy mix achieving the objectives of security of supply, competitiveness and sustainable development, in the last decade the countries of the European Union have strategically moved towards promotion of energy production from renewable energy sources. The major achievement in the area of renewable energies has been the introduction of the renewable energy sources for electricity production in EU. Starting with the White Paper on Renewable Energy almost a decade ago, the member states have set binding targets for renewable energy. This policy mechanism has allowed for an increased market penetration of electricity produced from renewable energy sources and since then the promotion of electricity produced from RES is a high Community priority, ambitiously targeting the 22 percent of electricity produced from renewables until 2010.²

While the countries of EU are largely investing to increase the share of renewable energy sources, becoming world leaders in “green electricity” production, Macedonia and the countries of the South East Europe (SEE) are facing immense problems on the electricity supply side, frequent electricity shortages and continuous dependence on electricity import. The transition period and the process of reconstruction of their energy sectors didn't always go hand in hand with the development of alternative energy sources and the concept of sustainable development. Thus, the energy sector of the countries of SEE nowadays is characterized with high energy intensity, low energy efficiency and lack of domestic renewable energy sources in the energy supply.

In a period when EU member states are steadily approaching the binding target of 20 percent of the EU's overall energy consumption coming from renewables by 2020, Macedonia is only on the doorsteps of introducing the RES in the energy market of the country. With no electricity production from RES and no set targets for renewables for energy production Macedonia risks staying at the bottom of the RES map in Europe, with inefficient energy market that is highly dependent on fossil fuels and uncompetitive in the liberalized electricity market of the EU.

Next section looks the reasons for switching to RES in electricity production in Macedonia. After that the paper analyzes the market of renewable energy in Macedonia, the

¹ International Energy Agency, Press release, (29 September 2008), available at: http://www.ies.org/Textbase/press/pressdetail.asp?PRESS_REL_ID=271.

² European Commission Directive 2001/77 on the promotion of electricity produced from renewable energy sources in the internal electricity market, Official Journal of the European Communities L283/33, (27 October 2007).

level of market development and the obstacles, with the focus on the electricity production. The final part offers recommendations for closer integration of the RES in the electricity market in the country.

The aim of this paper is to offer a set of recommendations for promotion of the RES in the energy market in Macedonia. Outlining the discrepancy of the energy potential of the RES in Macedonia and the level of their exploitation in the country, the accent of the policy analysis is put on the electricity market and the prospects for generation of “green electricity” from renewable energy sources in Macedonia.

Why electricity production by RES in Macedonia?

Development of a stable electricity market

The electricity market is vital to the economic growth and prosperity of the country and in the same time most vulnerable part of the energy sector in Macedonia. Electricity is the commonly used energy source in the industry and in the private sector, thus making the country highly dependent on cheap and easily accessible electricity. On the other side, the electricity sector is one of the weakest and highly loaded, facing a crisis in the electricity supply and rising consumption of this energy source. Inclusion of the renewable energy for electricity production will allow for improved and more stable electricity supply and an energy mix, which is one of the objectives of the EU energy policy as well. The implementation of energy projects with renewable energy sources will also have an economic benefit also for the industry and the job market in Macedonia. On one hand, the technology transfer and the construction of energy capacities for production of biogas or windmills for example, will also include national industrial companies that will participate in the final, implementation phase of the construction work. On the other hand, the operation and the maintenance of new capacities of renewable energy will require opening of new job positions both in the high qualified personnel and training of workforce. The experience of Germany shows that the renewable energies are a job creator. The number of employees in the sector of renewable energy in 2007 was 250 000 jobs, which it translated to 55 percent increase compared to the numbers of 160 000 jobs in 2004.³ Another economic benefit from the renewable energy sources is the increased competitiveness of Macedonia in the wider regional energy market, developing a solid and stable market for new foreign and also domestic investments.

Adoption of EU legislation

The RES are characterized as the best way to achieve energy independence and stability of energy supply. Since a decade ago they become part of the EU strategy of energy

³ Federal ministry for the Environment, Nature Conservation and Nuclear Safety, *Renewable energy sources in figures*, (Berlin, June 2008): 31.

security, characterized with diversification of the energy sources. The Union has set up a wide framework enabling the promotion of renewables. In the White paper on renewable energies from 1998, the EU for the first time has agreed upon setting national targets for the share of RES at 12 percents until 2010 in the total energy production in the Union.⁴ In the Renewable energy Roadmap from 2007 the target for the RES was set on 20 percent in the energy supply in EU27 until 2020, with every country setting specific targets on the share of RES according to their individual characteristics and implementation capacities.⁵ Today, the RES are counting to more than 8 percents in the final energy consumption in the EU27.⁶ With the entering in force of the EU Directive 2001/77/EC for electricity produced from renewable energy sources in the internal electricity market of EU the electricity generation from RES has raised by an average of 2 percent per annum, reaching the amount of 454TWh in 2006 compared to 281TWh in 1990.⁷

It is within the EU policy on renewable energy sources that Macedonia is obliged to include the renewables in the energy supply. As a country aspiring for the EU membership, Macedonia has committed itself to transfer the EU legislation (Aquis Communautaire) into its legal system. The National Strategy for Integration in the EU emphasizes the improvement of the energy efficiency and the inclusion of more renewables in the energy consumption, as of high importance for the security of the energy supply, economic benefit and for stability of the overall energy sector of the country. In addition, the renewable energies are also very important for the sustainable energy development in the country, as well as in the wider region.⁸

As a signatory country of the Energy Treaty for South East Europe since 2005, Macedonia is also obliged to develop a national strategy for renewable energy sources and to set the national targets for energy production from renewables. The Treaty obligates that each Contracting Party provides to implement the Directive 2001/77/EC on the promotion of electricity within one year of the date of entry into force of the Treaty.⁹

CO₂ reduction and protection of climate change

The energy sector is undoubtedly one of the sectors that put largest pressure on the environment. The energy production in Macedonia is based mainly on the use of non renewable natural resources, with a high share of low-quality domestic lignite in the electricity production. Thus, the energy sector contributes with about three-quarters of the

⁴ European Commission, *Energy for the future: Renewable Sources of Energy. White Paper for a Community Strategy and Action Plan*, (Brussels, 26 November 1997). Available at: http://ec.europa.eu/energy/library/599fi_en.pdf.

⁵ European Commission, *Renewable Energy Road Map. Renewable energies in the 21st century: building a more sustainable future*, (Berlin, 10 January 2007). Available at: http://eur-lex.europa.eu/LexUriServ/site/en/com/2006/com2006_0848en01.pdf.

⁶ Federal ministry for the Environment, Nature Conservation and Nuclear Safety, *Renewable energy sources in figures*, (Berlin, June 2008): 55.

⁷ *Ibid.*

⁸ Vlada na Republika Makedonija, Sektor za Evropska Integracija, *Nacionalna strategija za Integracija na Republika Makedonija vo Evropskata Unija*, (Skopje, 2004): 141. Available at: http://www.sei.gov.mk/Content/Publications/Documents/NSEI_mk.pdf.

⁹ The Energy Community Treaty. *Official Journal of the EU* L198/18, (20 July 2006), chapter V, art. 20. Available at: http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_198/l_19820060720en00180037.pdf

total greenhouse gas (GHG) emissions in the country, which mostly derives from electricity generation and consumption, using electricity also for heating.¹⁰ The total annual amount of GHG emissions is at the level of approximately 15Mt CO₂ equivalent per year.¹¹

Within the Second Communication to the UNFCCC¹² at the end of 2008, in addition to energy efficiency, the increase of the use of renewable energy is elevated as an essential factor in mitigating climate change in Macedonia.¹³ As a non-Annex country of the UN Convention of Climate Changes Macedonia is not obliged to reduce the GHG emission in the atmosphere. On contrary, the developed countries are obliged to reduce their GHG emission until 2010. Hence, the CDM mechanism of the Kyoto agreement and the development of world market for trading with the Certificates for Emission Reduction (CER) is encouraging future investor from developed countries to invest in renewable energy projects in Macedonia. The use of RES in Macedonia can reduce the CO₂ up to 6 Mt CO₂ per year. Considering that the market price of emission reduction ranges between 6 and 9 euros/t of CO₂ eq the resulting potential carbon investment in Macedonia can be expected to range between 35 and 55 million euros per year.¹⁴

Energy market of Renewable Energy Sources in Macedonia – Potential and Obstacles

The share of the RES in the total energy supply and consumption in Macedonia is very low. Main renewable energy sources that can be exploited in the country are hydropower, wind, solar power, biomass and geothermal energy. Some of them, like the geothermal energy and the biomass, have been traditionally used in the energy consumption in Macedonia for heating purposes, yet with very low energy efficiency in their exploitation. For the rest of the renewable energy sources in Macedonia, for example the wind energy or the geothermal energy, there is still a lack of systematic mapping of the capacity of the energy sources, and that is one of the reasons why they remain none or under explored.

According to the 2007 data the share of the renewable energy sources (RES) in the total primary energy supply (IPES) in Macedonia is 10 percents.¹⁵ If comparing this number

¹⁰ According to the First National Communication to UNFCCC in 2003 the electricity generation contributed with 73% to the CO₂ emissions, as opposed to the heat energy with 17% and the transport with 10%. In the “First National Communication under the UN Framework Convention on Climate Change”, (Skopje, 2003). Available at: <http://unfccc.int/resource/docs/natc/macnc1.pdf>.

¹¹ In Macedonia 60 percent of the national energy consumption derives from coal.

¹² United Nation Framework Convention on Climate Change –UNFCCC.

¹³ Second National Communication on Climate Change, (December 2008). Available at: <http://www.unfccc.org.mk/documents/EN%20komplet.pdf>.

¹⁴ For an annual production of electricity of 60.000MWh/y the number of CERs will be 54,900 CERs per year or 274,500 CERs from 2008-2012. The economic benefit will be 2.74 million US dollars. In *Ibid*, 82. Teodora Grncarovska Obradovic, “Climate Change and the Kyoto Protocol in Republic of Macedonia”, in the Review of papers and presentations *Energy Efficiency – Regional Cooperation*, (Skopje, December 2008): 80, 82.

¹⁵ The share of the RES in the total primary energy supply in Macedonia is around 300toe (tones of oil equivalent), out of which the share of hydro power for electricity production is 132toe, the biomass for residential, commercial and industrial heating 155toe, and geothermal for district heating and in agriculture

with the EU average of 8-10 percents, the situation with the RES in Macedonia doesn't look so appalling. However, by analyzing of the structure of the renewable energies in the country we can see that the share of the renewable sources in the energy supply in Macedonia and in other EU countries is not on the same level. The major part of the renewable energy in Macedonia goes to firewood, which is largely used as a heating source in the country, in a very inefficient and unsustainable way; while the second largest part goes to hydropower for electricity generation from large hydro power plants.

RES in numbers

So far the experience of Macedonia with the electricity production of renewable energy is very poor. The most exploited renewable energy for electricity generation is the **hydro power**.¹⁶ The hydropower is regarded as renewable energy source when used for electricity production from Small Hydro power plants (SHPP) with installed capacity up to 10MW. According to a study from 1980's, about 400 potential sites were identified for projects as small as 45 kW and up to 5.000 kW. According to this extensive list, the overall identified potential is in the order of 255 MW in capacity and 1 100 GWh in terms of annual possible energy production or 10 percent of the country's current electricity needs.¹⁷ Until now two tenders for concession of small hydro power plants, 60 in 2007 with installed power up to 5 MW on the rivers Vardar, Strumica and Crni Drim and 28 in 2008 have been published by the government. Last month the government started the project "Vardarska Dolina" publishing a call for construction of SHPP on the valley of the river Vardar. The realization and implementation of these projects hasn't started yet.

The electricity generation from the other renewable energy sources in Macedonia is still on a study level. The **wind** is seen as the second best energy source for electricity production in Macedonia. According to some measurements the average speed of the wind in Macedonia is between 5 -7 m/s and is characterized as a low ranking according to the standards for the speed of the wind for electricity production.¹⁸ Only in the mountainous areas the wind can reach speeds of over 8 m/s, but usually the exploitation of the wind power in these areas is hard because of their inaccessibility. In Macedonia from the power of the wind we can generate from 12 000 to 15 000MWh electricity, however, currently there are no wind mills in Macedonia. One of the main reasons for this is technical issue, since there is no Atlas for the wind in Macedonia, thus the potential investors can not find the necessary data for the wind capacity in Macedonia. There is a Monitoring programme of the Wind potential in progress, implemented by the Energy Agency, which consists of measurement and data collection of the wind parameters in Macedonia.

is 12toe. See, Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA), *In-Depth Review of the Energy Efficiency Policy of the Former Yugoslav Republic of Macedonia*, (October 2007): 67, Table 7.

¹⁶ According to detailed estimations made in the early 1970's the total hydro potential in Macedonia is 7 500GWh. Out of this amount, the net potential appropriate for exploitation and electricity generation is 4 500GWh, participating with 5 percent in the TPES or 17-18 percents in the country's electricity production.

¹⁷ In 1981 the University in Skopje performed a study in order to identify possible sites for the development of small hydro power plants (SHPP).

¹⁸ Nataša Markovska, "Energija na veterot vo Makedonija", in Kiril Popovski, *Obnovlivi Izvori na Energija vo Makedonija*, (MAGA, Skopje, June 2006): 71.

The other renewable energy sources in Macedonia (geothermal, solar and biomass) have found their use for heat production in the private and less in the industrial sector of the country, but are still not considered for electricity production.

The **geothermal energy** as a renewable energy source has a long tradition in the energy sector in Macedonia. The country was one of the leading countries in geothermal energy during the second half of the last century. However, nowadays with the lack of new investments in this sector, the usage of the geothermal energy for energy production is limited, mostly concentrated on heating in the agriculture, for greenhouses and heating of spas. The share of the geothermal energy in the TPES in Macedonia is less than half percent. Its share in heat production is 2.4 percents, while the present energy production is 139 000 MWh/y.¹⁹ There are seven main geothermal fields and 18 localities with thermal waters.

The huge **solar energy** potential with 2000 - 2400 sunny hours during the year and generation potential of around 10GWh per year can satisfy at least 75-80 percent of the annual needs for heating and for hot water. Currently its usage is limited to water heating. In Macedonia there are only 7.5m² solar panels on every 1000 people, or 15 000m² installed solar panels. At the end of 2006 the total collector area in operation in Macedonia was 17,118m².²⁰ From 500 000 households in Macedonia only 2500 – 3000 are using solar systems for water heating. This represents only 0.5 percents of the total market for solar panels.²¹

In Macedonia the share of the **biomass** (wood, agriculture and residual waste, solid municipal waste) in the TEPS is around 6,5 percents and is used primarily for heating. The largest part in this amount has the firewood. In 1999 – 2001 the quantity of residual wood was around 787 000 m³, while the firewood production in 2007 was 65.0000m³. The firewood and charcoal of nowadays are used mostly in domestic sector. The firewood is used for heating of the households, while the waste as an energy source participates with insignificant percent. The largest beneficiary of the biomass energy is the private sector, while the share of the biomass in the industry is only one percent. There is no electricity generation from biogas from biomass, even though it is estimated that an amount of around 200 000m³ is sufficient for production of 86,46GWh electricity per year.²²

¹⁹ However, the geothermal potential of the country is 173 MW, with maximum production capacity of 210 000 MWh/y. However, the geothermal potential of the country is 173 MW, with maximum production capacity of 210 000 MWh/y. Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA), *Ibid*, 52.

²⁰ For example in Cyprus this area was 811,538 m², in Germany it was 1,160,400 m². Werner Weiss, Irene Bergman, Gerhard Faniger, *Solar Heat Worldwide* (IEA Solar Heating & Cooling Programme, May 2008)

²¹ Data from the Eterna Solar web page, available at: www.eternasolar.com.mk.

²² Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA), “In-Depth Review of the Energy Efficiency Policy of the Former Yugoslav Republic of Macedonia”, October 2007, pg. 53

Institutional and legislative frame

The development of the market of renewable energy requires a functional framework that consist of 1) rights and obligations for all the subjects in the energy sector (guaranteed under the Law on energy); 2) Regulatory Commission that will regulate the prices of the electricity produced by the RES, which will be profit oriented and regulated in a way profitable for the producer; 3) construction of equipment for energy production from RES and modernization of the technology for energy production in order to be competitive on the market and to create space for economic operation; 4) education; and 5) media presentation in form of public campaigns for attraction of investments.

In absence of a National energy strategy and Renewable energy strategy, the electricity production by renewable energy sources in Macedonia is regulated by the Law on Energy, as the highest legal document in the energy sector in the country. The Energy Law from 2006, with the amendments from 2008, encourages electricity production by renewable energy sources, closely regulating the work of the Ministry of Economy and the Energy Agency in the field of electricity generation by RES, and stipulates the way of the development of the energy market. The law perceives the prerequisite for national targets for electricity produced by RES as a responsibility of the government.²³

Besides the Energy Law, under the political pressure of the EU in the last two years the government has drafted most of the secondary legislation needed to ensure implementation of the EU legislation on electricity production by RES. They include: Rulebook for Renewable energy sources for production of electricity (October 2008); Rulebook on the guarantee of origin of the electricity produced from RES (October 2008); Rulebook for acquiring of status of preferential/privileged producer of electricity from RES (2006); Regulations for connection to the national grid; Manual for construction and operation of wind mills (April 2008); and Rulebooks on the method and procedure for establishing and approving the use of feed-in tariffs for electricity produced from biomass, small hydro power plants, wind power plants and photovoltaic systems.²⁴ (See Table 1)

²³ Zakon za Energetika. *Sluzben Vesnik na RM*, No. 63/06, 36/07 and 106/08 (August 2008), art. 139.

²⁴ “Decision on determination of feed-in tariff for sale of electricity produced and delivered by power facilities which as operating fuel use biogas got from biomass”, (November 2007); “Rulebook on the method and procedure for establishing and approving the use of feed-in tariffs for purchase of electricity produced from small hydropower plants”, (February 2007); “Rulebook on the method and procedure for determination and approving the use of feed-in tariff for purchase of electricity generated by wind power plants”, (May 2007); “Rulebook on the method and procedure for determination and approving the use of feed-in tariff for purchase of electricity generated by photovoltaic systems”, (September 2008).

Table 1:

Guaranteed Feed-in tariffs

Because of the specificity of the renewable energy, the modern technology and the high capital costs, in order to develop the market of renewable energies there is the need of economic incentives in form of governmental subsidizes. In Macedonia they are in the form of **guaranteed feed-in tariffs** for electricity production from renewable energy sources. The market operator of electricity is obliged to purchase the total quantity of electricity delivered by the privileged producer under the approved feed-in tariffs.

According to the newly drafted Rulebooks by the Energy Regulatory Commission the established feed-in tariffs for electricity produced by:

- Newly constructed run-of-river small hydro power plants which have qualified as privileged producers are from **4.5 to 12 €cents/kWh** depending on the annual quantities of delivered electricity. The privileged producer is obliged to use the feed-in tariffs approved for him for **20 years**.
- Wind power plants, is **8.9 €cents/kWh**.
- Photovoltaic systems, is **46 €cents/kWh** for installed capacity **up to 50kW** and **41 €cents/kWh** for installed capacity of **more than 50kW**.
- Power facilities which as operating fuel use biogas got from biomass is **13€cents/kWh** for installed capacity up to **500 kW**, and **11 €cents/kWh** for installed capacity over **500 kW**.

Source: Energy Regulatory Commission www.erc.org.mk

Market Stakeholders

Major stakeholders that regulate the market of renewable energy in Macedonia and are responsible for the policy towards the development of the renewable energy production are the Department for Energy in the Ministry of Economy, the Energy Agency and the Regulatory Commission for Energy.

The Ministry of Economy has the key role and is responsible for: conducting the state energy policy through programs, measures and other activities; developing laws, sub-laws, and other legal documents on energy; initiating and implementing the policy for energy sector restructuring; creating and developing approvals and agreements for any energy activity and exploitation.

The Energy Agency was founded in July 2005, with the Law on Energy Agency²⁵ as an institution responsible for implementation and promotion of the policies of energy efficiency and renewable energy sources. It is financially supported by the World Bank GEF Project. Its main activities include: preparation of mid-term and long-term strategies and development plans; preparation and coordination of the energy reforms; proposal and evaluation of studies and projects on the energy sectors, energy efficiency and renewable energy sources; preparation and coordination of the implementation of investment projects; regional cooperation and coordination of regional projects, and other promotional activities.

The Regulatory Commission for Energy is an independent body, founded in 2002, in operation from 2003. Its obligations concerning the energy produced from RES are as follows: establishment of tariff systems and prices; authorization procedures (licenses for generation, distribution, supply and eventually other services within the energy industry);

²⁵ Zakon za osnivanje na Agencija za Energetika na Republika Makedonija. *Sluzben Vesnik na RM*, No. 62/05 (2005).

development and verification of Grid Codes and Market Codes; dispute settlement and customer protection.

Obstacles for development of the RES market

In practice, the market of renewable energy in Macedonia is functional only in the legal acts, while the implementation of the renewable energy projects is lagging behind, hampered by many obstacles of legal, financial and technical character.

First, there is a lack of overall National Strategy for the development of the energy sector, and in particular lack of Strategy for development of the Renewable energy market. The latter document has been already anticipated in the Energy Efficiency strategy from 2004, and also in the provisions of the Treaty of the Energy Community in SEE and in the National Strategy for EU accession. Intended to be drafted until the end of the year 2008, the market of renewable energy is still waiting for an umbrella document for its development.

Second, there are many administrative barriers in the implementation of the renewable energy projects, due to inefficiency and politicisation of the public administration, and also due to low level of education and lack of systemized training in the specific area of the renewable energy. One example is the current situation with the tender for the small hydro power plants from 2007. The 60 companies that were selected on this first tender and were granted concession rights are still waiting to sign the final agreement and to start with the construction, while their warranty money is still stranded in the governmental institutions.

Third obstacle is the structure and the size of the energy market in Macedonia, in particular the electricity market. The price of electricity in Macedonia is not an economic category, but still a social one, regulated by the government. In Macedonia there is unsustainable fossil fuel electricity generation and since the prices of the fossil fuels and transportation costs are rising every day, the social price of the electricity in Macedonia is no longer sustainable as a governmental policy.²⁶ This has a negative impact on the future investments in the sector of renewable energies in Macedonia. Right now the electricity price in Macedonia is on the lowest level in Europe and is not cost-reflective. This has an influence on the demand for electricity produced by RES because the final consumers are not aware of the value and the importance of the development of new technologies introducing alternative energy sources, like the renewables in the process of electricity generation.

Other obstacles are technical questions in the production and transport of electricity by RES and of financial character, like the high expenses for exploitation of renewable energy sources, and the project financing. The exploitation of the renewable energy is expensive technology that need stabile and constant source of financing. Main supporters of these projects are the state through governmental subventions (like: quota system, feed-in

²⁶ The state is importing electricity by much higher prices then it is sold to the final consumers, buying electricity by 90 euros per MWh and selling it by 60 euros per MWh to the final consumers.

regulation and quota system, tax incentives/investment grants, “green loans”, “green taxes”) or the banking sector. The global financial crises at the end of this year has weakened the banking sector and their credit liquidity, which is one of the most used mode for financing of the large and expensive projects of renewable energy. But in Macedonia there is lack of domestic financing through the banking sector, and most of the RES projects are internationally financed, by international donors like World Bank (GEF facility), Austrian Development Agency (ADA), EBRD. Moreover, specialized fund regional energy agencies and financing of renewable energy projects has not been established yet.²⁷

Recommendations

In order to allow for penetration of the renewable energies in the electricity market in Macedonia and to increase the electricity production from renewable energy sources, this issue should be tackled on both the supply and the demand side.

On the supply side

1. To develop the energy market of renewable energy it is essential that the country has an overall umbrella strategy for the energy sector, which will also include the energy production from renewable energy sources. Currently, Macedonian Academy of Arts and Sciences (MANU) is working on drafting the National Energy Strategy until 2030. It will be of great importance that this strategy prioritizes the renewable energy as a potential source in the future energy supply of the country. The strategy should be based on a comprehensive study of the potential of the energy production by the RES, and in particular the strategy should elaborate on the opportunities for development of the electricity production from renewable energy in Macedonia.

2. Within the prospects of sustainable development of the energy sector in Macedonia, besides the energy efficiency, the second element is the renewable energy. Already in 2004 the government has officially embraced the energy efficiency as a national priority with the legislating of the National Energy Efficiency strategy until 2020. In order Macedonia to have a sustainable development it is necessary that a second strategy on Renewable Energy Sources is drafted. This strategy will present a stable and predictable framework over the next twelve years, with a possible revision in 2014 increasing the investment risk factor. The strategy should be drafted according to the geographic conditions and the real potential of the RES (hydro, geothermal, solar, wind, biomass) in the country. In order to provide a stabile ground for implementation of the project of renewable energy, like in other countries of EU, the strategy on RES should set the national targets for energy production from renewable energy sources that are still lacking in Macedonia.

3. For effective functioning of the market of renewable energy in Macedonia, there should be an effective legal framework, on paper and in practice, in order to provide security of private investments in renewable energies and guarantee of investor’s confidence in the renewable energies. The technology for exploitation of the RES is advanced and expensive

²⁷ Energy Community Secretariat, *Report on the Implementation of the Acquis under the Treaty establishing the Energy Community*, (May 2008): 20-24.

one, with very high initial costs. Thus it is crucial that the state provide good conditions for investments, guaranteeing the safety of the investment and return of the capital costs in a considerable time period. Therefore we need better secondary legislation that will fully cover all areas, by strictly defined and implemented procedures, from the issues of expropriation of land, to construction permits. According to the last progress report of the European Commission, Macedonia is moderately advanced in the area of renewable energy, the implementing legislation on RES has been adopted and the Energy Regulatory Commission has adopted the manuals on feed-in tariffs for electricity produced from renewable energy sources, which offer advantageous tariffs to potential investors.²⁸ Still, in order to become competitive in the EU market, there is a need for more work in the legislating of new legal documents, particularly in regard to the implementation of the Directive 2001/77/EC for electricity production from renewable energy sources.

4. Although the EU accessed a strengthening of the administrative capacity for developing renewable energy sources, the institutional capacity for implementation of the policies towards the renewable energy in Macedonia remains underscored. The Energy Department in the Ministry of Economy and the Energy Agency, the two responsible institutions for developing and implementation of policies and projects in the field of renewable energy, remain understaffed. Thus, in the upcoming period the government should strengthen the mandate and capacity of the Ministry of Economy, and also provide the Energy Agency with adequate and sufficient resources to implement national policies in coordination with other actors in this area. In the administration, the bureaucratic obstacles should be removed, as soon as possible, through trainings in the administration for more efficient and effective civil service and transfer of knowledge.

5. The exploitation of the renewable energy requires expensive and advanced technologies, thus capital investments are needed for the start up of the projects. Therefore there is a need of stable sources of financing of the RES projects (bank loans, state subsidizes, regional or international funds). More important is the transfer of technology and state investments in research and development and education, which on long-term will lead to sustainability of pilot projects and competitiveness in the European and international market of renewable energies.

On the demand side

The development of the market of renewable energy, like every market, depends on the demand of this source. In Macedonia there is a lack of demand of renewable energy, an issue that can be tackled at several levels.

1. One way to increase the electricity production from RES is by increasing the overall energy consumption in the country. This is an issue since according to MANU the current energy consumption in Macedonia is still low and even with a growing rate of 3.5 percent per year the energy consumption until 2020 will remain low. Therefore, a performance of

²⁸ European Commission, *The Former Yugoslav Republic of Macedonia 2008 Progress Report*. Available at: http://ec.europa.eu/enlargement/pdf/press_corner/key-documents/reports_nov_2008/the_former_yugoslav_republic_of_macedonia_progress_report_en.pdf.

real economic growth and full opening of the market of electricity will make the country more attractive for foreign investments.

2. Because the electricity prices in Macedonia still do not reflect costs, the government should gradually withdraw from subsidizing the electricity sector, keeping the electricity price on economically unbeneficial, artificially low level. The electricity from RES is more expensive than from the traditional energy sources, and in the final consumption, the consumers are those who are paying the difference in the traditional and “green” electricity. For that reason there is a necessity of cost-effective, market regulated electricity price, in order the projects of renewable energy to take off, to be profitable and sustainable. Higher electricity prices will allow for more energy saving and more energy efficiency, and also search for cheaper sources of electricity on a long term, which the renewable energy for sure is, thus providing sustainable action among the consumers.

3. Parallel to the institutional and financial measures, raising public awareness is crucial part for the expansion of the renewable energy. The citizens should be well informed about the advantages of the renewable energy sources and the economic and environmental benefit of the electricity production by renewables, in order to get acquainted and to accept this kind of energy. In order to promote the renewable energy, taking the best practices of the leading countries in this area in EU²⁹, the Energy Agency should develop a strategy for opening towards the citizens and the consumers, organizing a large-scale promotion and awareness raising campaigns, as well as educational projects, quizzes, lottery, etc.

Conclusion

The issue of the renewable energy sources in Macedonia remains on the level of political rhetoric, with no strategy nor clear political will to move forward and to introduce the renewable energies in the energy sector in the country. Being aware that the energy sector in Macedonia has been developing with a very slow pace since the country's independence, it is not a surprise that the renewable energies have remained on the last place of the priorities in the energy sector. The lack of institutional capacity and the non developed strategy for exploitation of the RES have been identified as the major obstacles for the development of the electricity production from renewable energy sources.

In order to comply with the EU directives of the renewable energy and to provide a sustainable energy development of the country, in the upcoming period the Macedonian government will have to undertake more efficient energy policies that will comprise the energy production from renewable energy sources, and explicitly encourage electricity production from RES. The energy crisis of the electricity sector in Macedonia urges for a thoughtful and timely actions. Therefore, in the drafting of the National Energy Strategy, the government should reconsider and prioritize the renewable energies as a domestic, clean and cheap source of energy and finally resolve the issues of security of energy supply and energy stability of the country for the future generations.

²⁹ Like in Germany, Holland, Spain, Austria, Denmark, etc.



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