

# National Action Plan for Renewable Energy Resources in Albania 2015-2020

Albania, as a Contractual Party in the Treaty of Energy Community



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## **Acronyms**

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NANR	National Agency of Natural Resources
RER	Renewable Energy Resources
RER-H&C	Renewable Energy Resources in Heating and Cooling
RER-E	Renewable Energy Resources in Electrical Energy
RER-T	Renewable Energy Resources in Transport
EE	Energy Efficiency
ERE	Energy Regulatory Entity
EUROSTAT	European Statistics
HPP	Hydro Power Station
SHPP	Small Hydropower Plant
CM	Council of Ministers
EGFC	Energy Gross Final Consumption
ktoe	Kilo ton oil equivalent
MARDWA	Ministry of Agriculture, Rural Development and Water Administration
MEI	Ministry of Energy and Industry
ME	Ministry of Environment
WHSP	Water Heating with Solar Power
GDP	Gross Domestic Product
NAPEE	National Action Plan for Energy Efficiency
NREAP	National Action Plan for Renewable Energies
IAE	Influence Assessment on Environment
UNFCCC	United Nations Framework Convention on Climate Changes

## EXECUTIVE SUMMARY

Albania as one of the Contractual Parties of the Energy Community Treaty is obliged to transpose and to be in compliance with the EU Directive 2009/28/EC “On the enhancement of the use of energy from renewable resources”. One of the requests of the law 138/2013 “On Renewable Energy Resources” and of this Directive is the preparation and the approval of the National Action Plan for Renewable Energy (NREAP), which establishes national objectives of renewable energies in the final total domestic consumption as well as the supporting measures to achieve them.

Also, Albanian Government considers the promotion of renewable energies implementation as an important means of energy policies to increase the security for energy supply, economic development, energy sector sustainability and environment protection.

Even though Albania ensures over 90% of the power from the hydropower stations, a considerable part of the energy is imported. This part varies – depending on the annual conditions- between 30% and 60%<sup>4</sup> of the Total Supply with Prime Energy. Renewable energies might be a solution for the reduction of this dependence from the imports and it might improve not only the security for the supply with energy, but even the macroeconomic and political security of the country decreasing the country budget deficit.

Based on these facts, which offer the context for potential increase of the EREs role in the current situation of energy and economy in Albania, and based upon the principles of energy and the added domestic economic value, the potential objectives of EREs policies have been passed:

- I. Consumption of renewable energy resources at the measure of 38% in 2020;
- II. Desertification of domestic renewable resources, not only from the water resources but even from wind, sun, biomass and geothermal energy; the use of domestic energy resources, especially in the remote areas providing vacancies and improving the living standards.
- III. The increase of the contribution of bio-fuels and other burning materials from renewable resources with 10% in the total of fuel consumption in transport sector until 2020.

The increase of the use of EREs technologies is an essential step in general towards a more sustainable society and in particular it brings considerable benefits for Albanian industry.

ERE’s 38% objective was passed in the Decision of the Council of Ministers of Energy Community 2012/04/MC-EnC.

### General National Objective

The year 2009 will be the starting point in the National Objective for ERE. In this year the EGFC was 2,104 ktce and ERE percentage in consumption terms was 31.2%. Implementing the approach determined in the Directive, pursuant to technologies, the basic data are provided for ERE promotion.

**Renewable energy for ERE-T transport sector:** In order for the ERE consumption National Objective of 38% to be accomplished in 2020, the consumption of 3% for the Albanian territory of EGFC has been predicted. Otherwise, the mixture up to the measure of 10% in the volume of fuels of the renewable burning materials (FAME), consumed in the Transport sector, has been predicted. This amount is equal with at least 75 ktce FAME for the transport sector in 2020. This amount of the renewable part in biofuels takes into consideration the increase with 60 ktce in 2020 compared to 2014.

**Renewable energy for heating and cooling sector ERE-H&C:** in order for the ERE consumption National Objective of 38% to be accomplished in 2020, it is necessary that the consumption of 10% of EGFC in the Albanian territory, which has to be consumed in the Heating and Cooling system, ERE-H&C, is consumed. This amount means an additional increase of the heat with at least 800 GWh/year in 2020 or an annual consumption of ERE-H&C of 2/9 ktce heat from wood/industrial/waste and heating pumps biomass.

**Renewable energy for energy sector, ERE-E:** In order for ERE consumption National Objective of 38% in 2020, it is necessary that the amount of 29% of EGFC, used in energy sector, ERE-E, in the Albanian territory is consumed. This amount means an additional increase of at least 270 ktce (3,140 GWh) until 2020. Also, this means an average increase of energy generators from renewable resources in the amount of 830 MW (20-35% capacity factor) which are proposed to be divided according to the summarizing table:

Table 1 – Summarizing table of ERE for Heating/Cooling, Transport and Energy which will be added to the Final Gross Energy Consumption in Albania after 2015 until 2020.

	<i>ERE additional technology 2015-2020</i>	<i>Quantity ktoe</i>	<i>Generation GWh</i>	<i>Instalatyion MW</i>
1. ERE-E	<b>SHPP up to 10 MW (SHPP)</b>	200	2,326	750
	<b>Eolic (Wind)</b>	30	233	30
	<b>Photovoltaic (PV)</b>	40	582	50
	<b>Total 1</b>	<b><i>270ktoe</i></b>	<b><i>3,140</i></b>	<b><i>830</i></b>
	<b>% in EGFC</b>	<b>25%</b>		
2. ERE-H&C	<b><i>Biomass</i></b>	52	800 <sup>th</sup>	-
	<b>Total 2</b>	<b><i>52ktoe</i></b>		
	<b>% in EGFC</b>	<b>10%</b>		
3. ERE-T	<b><i>Biofuel FAME</i></b>	75		-
	<b>Total 3</b>	<b><i>75ktoe</i></b>		
	<b>% in EGFC</b>	<b>3%</b>		
ERE	<b>Total 1+2+3</b>	<b><i>397 ktoe</i></b> from the total 1,017 ktoe		
	<b>% in EGFC</b>	<b>38%</b>		

Table 1/2 – The remaining percentage 2014-2020 for the accomplishment of EREs national objective

<b>A</b>	EREs part consumed compared to <u>EGFC</u> during 2009-2014	%	<b>31.2%</b>
<b>B</b>	ERE objective which will be consumed in EGFC in 2020	%	<b>38.0%</b>
<b>C</b>	ERE quantity consumed in average in EGFC during 2009-2014	ktoe	<b>666.7</b>
<b>D</b>	EGFC for Albania during 2009-2014	ktoe	<b>2,281.5</b>
<b>E</b>	Expected EGFC for Albania in 2020 (with EE)	ktoe	<b>2,678.5</b>
<b>F</b>	ERE additional annual quantity to achieve the objective in 2020	ktoe	<b>397.0</b>
<b>G</b>	ERE total annual quantity to be consumed in 2020	ktoe	<b>1,017.2</b>

# 1. RES ACTUAL SITUATION IN ALBANIA

## 1.1 *Introduction and historic overview*

The supply with prime energy in Albania has been dominated by fuel, hydropower plants and biomass. Domestic energy sector has been supported by energy imports, especially by fuel products and energy imports. Historically, energy needs have been accomplished almost exclusively by the hydropower plants. The total installed energy capacity in Albania reaches up to 1.8 GW, dominated by hydropower plants. Water resources are the most important natural resources in Albania and the general hydropower potential is assessed up to 4.500 MW. Today, the country has exploited only 35% of the hydropower stations potential. The hydropower stations established and linked on the cascade on the river Drin represent about 80% of the total energy production.

The changes in power production might be attributed to the unstable production from the hydropower plants. Furthermore, the country suffers from significant transmission and delivery losses – which are technical and non-technical – which were assessed up to 44.96% in 2012, according to ERE, and due to the tough and active measures undertaken by the Albanian Government, they fell up to 29% in the first six months of 2015.

As the water conditions change year after year, the country is compelled to support on energy export at a large measure. The increasing requests for energy have increased even the support of Albania in energy import. Especially, during the first decade (2001-2010), energy final request increased with an annual average norm of 4.8%. On the other side, energy generating capacity increased by an annual norm of 0.6%. The country has changed from an energy exporter into an importer. For this reason, the generating capacity extension is one of the main priorities of energy policies sector in Albania. The future development of energy capacity has been planned mainly along the rivers Mat, Vjosa, Devoll and Bistrica. Apart from this, the Albanian government has been focused on the diversification of its supply with energy and the promotion of other renewable energy resources, such as biomass, solar energy and wind energy.

Albania has a considerable potential of RER. Its solar power potential has been assessed in 1,500-1,700 kWh/m<sup>2</sup> per year. The country has also unexploited potentials of wind power, especially along the Adriatic coastline. According to the Albanian Agency of Investment Developments a series of zones have been identified with high potential of wind energy, with an average annual wind speed of 6-8 m/s and with energy density of 250-600 W/m<sup>2</sup>. Albania has also considerable potential of biomass from agricultural waste, which is assessed approximately about 2,300 GWh/year. The heat from renewable resources, which is being offered from the inefficient use of firewood, is promoted mainly through the implementation of solar systems for water heating, industrial biomass and agricultural biomass. As long as energy production system is concerned, despite the hydropower stations, which is the main RES technology, it is expected to expand considerably up to the year 2020. The other RES technologies such as wind, biomass or solar power are expected to play a limited role, even though considerable potential exists.

The developments in energy final consumption indicate the domination of fuel products. From 1990 up to 2013, a considerable decrease might be noticed in the contribution of solid combustibles, that means coal and natural gas. In 2013, transport sector was the greatest energy consumer, with about 40% of the final total consumption, followed by the residential sector (27%), industry (17%), service sector (9%) and at the end agriculture (5%).

Albania as one of the Contractual Parties of Energy Community Treaty is compelled to transpose and to be in compliance with the EU Directive 2009/28/EC “On the enhancement of energy use from renewable resources and it must amend and then abrogate Directives 2001/77/EC and 2003/30/EC”. This comes even as a request of Law 138/2013 “On Energy Renewable Resources”. One of the requests of law and of this Directive is the preparation and the approval of the National Action Plan for Renewable Energy (NREAP), which would stipulate the national objectives on renewable energies in the

final consumption of domestic energy. On the other hand, Albanian government has considered the promotion of renewable energy use as an important tool of energy policies for the increase of the security for energy supply, economic development, energy sector sustainability and environment protection. Even though, in Albania, more than 95% of energy and 20-23% of primary total resources have been provided by hydropower stations, the objectives of Albanian Government energy policy intend to increase further more the use of RER.

In the last decade all over the world, the greatest part of the debate in relation to the encouragement for the implementation of renewable resources has been focused on the financial support schemes and the improvement of the conditions in network connection for renewable energy. There is no doubt that these are the main issues which continue to remain in the centre of the policy-makers' attention today and in the future.

Albania is a special case because domestic energy production is realized mostly by the use of big and medium hydropower plants. Also, about 10-13% of the Total Energy Primary Resources (TEPR) in the country – including the imports – is ensured by biomass, and especially from the firewood.

On the other hand, Albania carries out important imports of energy which according to the annual conditions, change from 30-60% of the TEPR. Renewable energy might not be the solution for the decrease of this strategic dependence on the imports and the improvement not only of the security for energy supply but even of the macroeconomic and political security of the country decreasing the domestic budget deficit.

Based on these facts which offer the context for the potential increase of the role of RES in the current energy and economy condition in Albania, based even on the energy security principles and on the added domestic economic value, the potential objectives of RES policies have been approved. The increase of the use of technologies RES is a step of special importance in general towards a more sustainable society and in particular it brings considerable benefits for Albanian industry. The argument of added value in domestic economy shall be used in the decision-making process for the new supporting schemes towards RES. The support of RES installations might offer an opportunity of importance for the development of local areas which are relatively poor.

## ***1.2 OFFER and DEMAND for energy***

Based on Energy National Balance 2009, where the general net consumption of the primary energy resources is 2100.93 ktoe, where just 449.82 was produced by the hydropower stations, 210 ktoe is the contribution from biomass, solar power is 6.65 ktoe and in total all the RES are 666.47 ktoe (equal to 31.2% of energy final consumption in 2009). Meanwhile, according to the last energy balance for Albania issued by the Natural Resources National Centre (NRNC) in 2013, from a general net consumption of energy primary resources of 2345.90 ktoe, just 592.72 ktoe are from the hydropower plants, biomass contribution is 201.50 ktoe, solar power is 11,92 ktoe, non fuels 35 ktoe, and in total all the RES are equal to 846.63 (equal to 33.20% of energy gross final consumption in 2013).

Historically, Albania has gone through a high abnormal increase of energy consumption. A considerable part of this increase has been encouraged artificially by the extraordinary levels of energy theft, the failure to pay the energy bills and in some cases by the tariffs under cost. The high consumption of energy in the sector of buildings, especially to heat the buildings, has caused that a valuable resource is removed by the trade and industrial use which otherwise would create vacancies and would contribute in the economic growth. The measure taken by the Albanian Government recently for the prevention of energy non-payment (reduced from 52% in 2013 to about 29,8% for the first six months of 2015) have removed one of the main obstacles for the introduction of RES and the energy efficient measures for both sides of Albanian energy system: the request and the supply.

## **2. OBJECTIVE FOR RES IN ALBANIA**

### ***2.1 National Objective for RES***

[7]

The main intention of the new EU Directive for renewable energy (Directive 2009/28) is the determination of mandatory objectives for the use of energy for renewable resources. The Directive stipulates a general objective of 20% for EU and individual objectives for the Member States based on their current renewable energy level and their economic development level. Within the general objective for RES, there is a specific obligation that 10% of the energy that is used in the transport sector is provided from the renewable resources.

The same approach, but with another base year (2009 instead of 2005) has been applied to calculate the individual objectives of each Contractual Party in Energy Community, exactly for Albania, there is an Objective of 38% and the specific obligation within this Objective to fulfill 10% of the energy used in transport by renewable resources.

The objective of 38% from RES has been adopted in the Decision of the Council of Ministers 2012/04/MC-EnC, when the Directive of RES was approved for the Energy Community.

In table 1 below, there are all the predicted figures of the final energy gross consumption of all the kinds of energy (from both the renewable as well as the conventional resources), in the period until 2020. These calculations have taken into consideration even the expected effects of the measures for energy efficiency and saving which will be introduced over the period. Under the title “reference scenario”, a scenario has been introduced taking into consideration only the measures of the efficiency of energy and savings. It is very important to emphasize the fact that as it was mentioned above, these savings have been almost inconsiderable, as the RENAP was passed officially in September 2011. Under the title “Additional Scenario for Energy Efficiency”, a scenario has been introduced taking into consideration all the measures that will be undertaken in order to achieve the RENAP objective of 9% in 2018. Pursuant to article 5 (6) of the Directive 2009/28/EC, with the intention to measure the compatibility with the indicative objective 2020 and the temporary trajectory, the amount of energy consumed in aviation must be considered not to be higher than 6,18% of the general consumption of the Contractual Party energy. Energy consumption in aviation for Albania during 2009 and 2010 was 0.97% and 1.07% respectively of the general consumption of final gross energy. Therefore, there is no need for regulation as these values are lower than 6.18% (in continuation table 1).

Energy currents in the national balance.	2009		2010		2011		2012		2013		2014	
	Base year		Reference Scenario	RE Scenario								
(1) heating/cooling <sup>1</sup>	511.89		587.66	587.66	610.56	610.56	529.20	526.69	679.66	669.93	649.34	630.67
(2) power <sup>2</sup>	619.20		632.96	632.96	634.59	634.59	649.47	646.38	662.29	652.80	670.23	650.97
(3) transport <sup>3</sup>	754.44		759.44	759.44	767.00	767.00	736.73	733.23	801.86	790.37	788.80	766.13
(4) Gross Energy Final Consumption <sup>4</sup>	<b>1,885.53</b>		<b>1,980.06</b>	<b>1,980.06</b>	<b>2,012.15</b>	<b>2,012.15</b>	<b>1,915.41</b>	<b>1,906.30</b>	<b>2,143.81</b>	<b>2,113.10</b>	<b>2,108.37</b>	<b>2,047.77</b>
Energy currents in the national balance.	2015		2016		2017		2018		2019		2020	
	Reference Scenario	RE Scenario										
(1) heating/cooling	719.17	687.40	786.48	739.56	822.43	763.78	875.12	799.04	916.68	832.45	949.02	857.09
(2) power	687.50	657.13	704.80	662.75	722.10	670.60	739.40	675.12	756.70	687.17	774.00	699.02
(3) transport	828.30	791.71	842.00	791.77	869.70	807.67	884.10	807.24	913.20	829.29	955.26	862.72
(4) Gross Energy Final Consumption	<b>2,234.97</b>	<b>2,136.24</b>	<b>2,333.28</b>	<b>2,194.08</b>	<b>2,414.23</b>	<b>2,242.05</b>	<b>2,498.62</b>	<b>2,281.39</b>	<b>2,586.58</b>	<b>2,348.90</b>	<b>2,678.28</b>	<b>2,418.82</b>

Table 1: Final gross consumption predicted in Albania for heating-cooling and transport until 2020, taking into consideration energy efficiency effects and the measures for energy saving<sup>5</sup> 2009-2020 (ktoe)

<sup>1</sup> Is the final energy consumption for all the energy commodities apart from power for other purposes apart from transport, (EU/OJ L304 of 14.11.2008)

<sup>2</sup> Energy gross consumption is taken from the internal gross production of energy, including autoproduction, plus the import, minus the export.

<sup>3</sup> Consumption in transport is provided for in Article 3(4)a) of the Directive 2009/28/EC. Energy from RERs in road transport for this parameter shall be multiplied with the factor 2,5 as it is described in Article 3(4)c) of the Directive 2009/28/EC

<sup>4</sup> According to the provision in Article (2)f) of the Directive 2009/28/EC. It includes the final consumption of energy plus the losses in the network and the use of heat for internal needs and energy in energy and heat production plants.

<sup>5</sup> These predictions on energy efficiency and the savings of energy in compliance with the RENAP.

## 2. NREAP-THE FULFILLMENTS OF THE OBJECTIVES ON RES

### 2.1 Summary of the policy for renewable energy in Albania

In the recent years, the Albanian Government has been trying to improve the legal and the regulatory framework for energy. In this direction, it made several attempts to change the existing laws and to encourage a competing climate for energy productions in general and the RES in particular. Along with a series of legal improvements, four key laws have been passed: the law for concessions, for energy sector (passed by the Parliament of Albania in May 2015), for renewable energy (passed by the Parliament of Albania in May 2015, but is being reviewed and is going to be ready for approval at the end of 2015), for the efficiency of energy in the buildings (the draft law was passed the previous year. It was prepared in line with the EU Directive). The purpose of these laws is the liberalization of energy market, competition increase, encouragement of renewable resources development and the attraction of the foreign investments in energy sector and ensuring a sustainable reform in the field of energy. With regard to the development of the projects for renewable energy, the licensing process has been improved. The establishment of one-stop-shop office for the licenses is a big step ahead made by the Albanian Government from 2009. However, with regard to its functioning, it needs further improvements.

### 2.2 Indicating objectives for renewable energy

Pursuant to article 4 (1) of the Directive 2009/28/EC, the Contractual Parties in the EC Treaty were asked to have the following indicating objectives with regard to the part of the energy with renewable resources in 2020:

- Heating and cooling;
- Energy, and
- Transport.

The calculation of specific objectives of these three sectors converted in the predicts energy values (ktoe) must be at least as big as the energy amount expected from renewable resources which correspond with the general objective of RES for Albania in 2020, as it is reported in the final cell of the table 6b). Furthermore, the specific objective for transport shall be in compliance with the requests of article 3 (4) of the Directive 2009/28/EC for a level of 10% of the part covered by renewable energies in transport sector. From oil products, only diesel and diesel fuel are calculated for the nominator. This means that “Jet” fuel used in aviation as well as the fuel used for the ships is not calculated. Biofuels from the rubbish, the waste, cellulose non-food material and the lignocellulose material are calculated double regarding the nominator; General National Objective for energy from renewable resources in the final energy gross production in 2009 and 2020 (data taken from Appendix 1, Part A of Directive 2009/28/EC) has been presented in Table 2.

Table 2: General National Objective

<b>A</b>	<b>EREs part consumed compared to EGFC during 2009-2014</b>	<b>%</b>	<b>31.2%</b>
<b>B</b>	<b>ERE objective which will be consumed in EGFC in 2020</b>	<b>%</b>	<b>38.0%</b>
<b>C</b>	<b>ERE quantity consumed in average in EGFC during 2009-2014</b>	<b>ktoe</b>	<b>666.7</b>
<b>D</b>	<b>EGFC for Albania during 2009-2014</b>	<b>ktoe</b>	<b>2,281.5</b>
<b>E</b>	<b>Expected EGFC for Albania in 2020 (with EE)</b>	<b>ktoe</b>	<b>2,678.5</b>
<b>F</b>	<b>ERE additional annual quantity to achieve the objective in 2020</b>	<b>ktoe</b>	<b>397.0</b>
<b>G</b>	<b>ERE total annual quantity to be consumed in 2020</b>	<b>ktoe</b>	<b>1,017.2</b>

Tables 2a dhe 2b have been filled in for both specific objectives and the energy trajectory assessed by renewable resources for heating, cooling and air conditioning, energy and transport. The calculation of

the table 2a and 2b provide instructions for the preparation of tables 3a and 3b, based on the methodology proposed by the Secretariat for Energy.

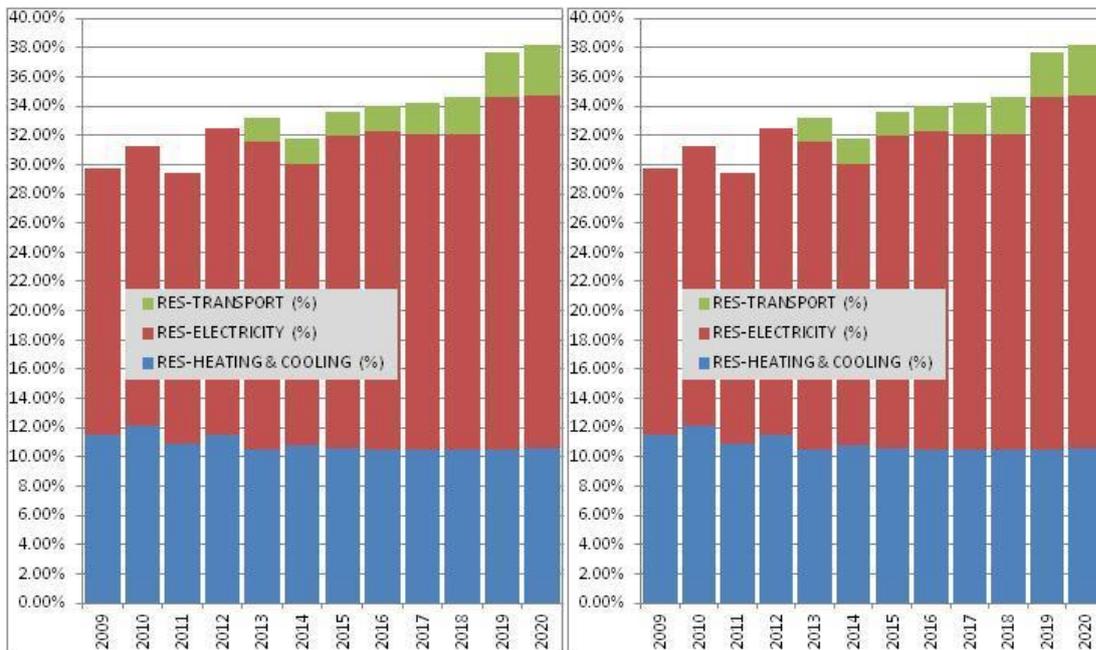


Figure 1: Indicating objectives and the trajectory predicted for energy from renewable resources for heating and cooling, energy and transport (%)

Figure 2: Trajectory predicted for energy from renewable resources for heating and cooling, energy and transport (ktoe)

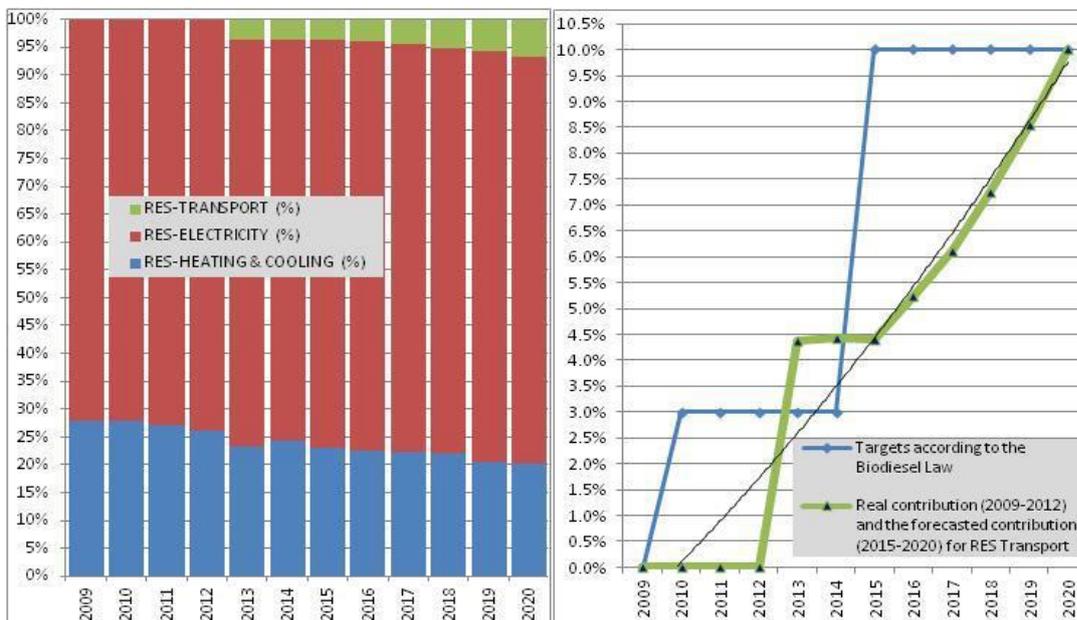


Figure 3: Part of energy from renewable resources for heating and cooling, energy and transport (%)

Figure 4: Indicating objectives of RES which are used in transport pursuant to the requests of the law for bio-fuel and the objectives of RES in transport (%)

RER Technologies	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
RER Heating and Cooling(%)	11.55%	12.12%	10.87%	11.51%	10.52%	10.80%	10.97%	11.06%	11.15%	11.37%	11.42%	11.60%
RER Energy(%)	18.16%	19.18%	18.51%	20.98%	21.05%	19.27%	22.69%	23.83%	24.25%	24.80%	26.00%	26.21%
RER-Transport(%)	0.00%	0.00%	0.00%	0.00%	1.63%	1.66%	1.66%	1.83%	2.16%	2.60%	3.09%	3.65%
<b>National objective</b>	<b>29.71%</b>	<b>31.31%</b>	<b>29.38%</b>	<b>32.49%</b>	<b>33.20%</b>	<b>31.73%</b>	<b>35.32%</b>	<b>36.73%</b>	<b>37.55%</b>	<b>38.76%</b>	<b>40.48%</b>	<b>41.43%</b>
RER-T (%) vs Transport	0.00%	0.00%	0.00%	0.00%	4.36%	4.44%	4.40%	5.23%	6.10%	7.25%	8.55%	10.00%

Table 2a: Specific objective 2020 and the energy trajectory assessed from RES in heating and cooling, energy and transport (the figures belong to the scenario with the implementation of RENAP)

RER Technologies	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
RER Heating and Cooling(%)	11.55%	12.12%	10.87%	11.51%	10.52%	10.80%	10.63%	10.58%	10.58%	10.66%	10.67%	10.80%
RER Energy(%)	18.16%	19.18%	18.51%	20.98%	21.05%	19.17%	21.69%	22.41%	22.52%	22.64%	23.61%	23.67%
RER-Transport(%)	0.00%	0.00%	0.00%	0.00%	1.63%	1.66%	1.66%	1.83%	2.16%	2.60%	3.09%	3.65%
<b>RER National Objective</b>	<b>29.71%</b>	<b>31.31%</b>	<b>29.38%</b>	<b>32.49%</b>	<b>33.20%</b>	<b>31.63%</b>	<b>33.95%</b>	<b>34.81%</b>	<b>35.23%</b>	<b>35.85%</b>	<b>37.31%</b>	<b>38.04%</b>
RER-T (%) vs Transport	0.00%	0.00%	0.00%	0.00%	4.36%	4.44%	4.40%	5.23%	6.10%	7.25%	8.55%	10.00%

Table 2b: Specific objective and the energy trajectory assessed from RES in heating and cooling, energy and transport (the figures belong to the scenario with the implementation of RENAP)

Predicted final gross consumption:	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>(A) of RESfor heating and cooling</b>	217.72	240.06	218.74	220.50	225.50	227.62	237.49	246.01	253.86	264.24	273.72	286.34
<b>(B) of energy from RER</b>	342.48	379.86	372.50	401.86	451.23	404.15	484.66	522.94	543.63	565.77	610.82	633.94
<b>(C) from RESin transport</b>	0.00	0.00	0.00	0.00	35.00	35.00	36.60	42.44	51.56	63.83	78.41	95.53
<b><i>RER predicted consumption</i></b>	<b><i>560.20</i></b>	<b><i>619.92</i></b>	<b><i>591.24</i></b>	<b><i>622.36</i></b>	<b><i>711.73</i></b>	<b><i>666.77</i></b>	<b><i>758.75</i></b>	<b><i>811.39</i></b>	<b><i>849.05</i></b>	<b><i>893.84</i></b>	<b><i>962.95</i></b>	<b><i>1017.2</i></b>

Table 3a: Final Calculation Table for the part covered by renewable energy in three base sectors: Heating/ Cooling, Energy and Transport (ktoe)

### 3. MEASURES FOR THE FULFILMENT OF SPECIFIC OBJECTIVES IN EACH SECTOR

#### *3.1 Summary of the policies and of the measures for the enhancement to use energy from renewable resources*

Albania has undertaken a series of steps for the inclusion of in its policies for energy, the requests of the EU Directives about the common rules for the creation and the development of internal energy market and the enhancement of production and energy consumption from renewable resources. In order for Albania to fulfill its international obligations and to achieve pursuant to the legal obligation the objective of 38% renewable energy in the final gross consumption until 2020, the country is undertaking a review of its supporting tools for renewable energy production. The scheme described in the following paragraphs will permit Albania to follow its objectives of RES and more concretely preserving and increasing the security in supply including a variety of RES generation technologies.

#### **3.1.1 Current supporting schemes for energy production from Renewable Resources .**

At the moment there is a promoting tariff just for the small HPPs with installed power less than 15 MW and the tariff is calculated according to the average annual price of energy at Energy Stock market in Hungary (HUPX) determined in Euro cent/kWh x 1.24 x average exchange rate Euro/Lek for the previous year. This approach has been based on a simple formula and furthermore takes into consideration the price of energy import and connects it with the tariff to avoid the costs against the customer. The abovementioned formula, pursuant to the Decision of the Council of Ministers, shall be for 2015-2016 for the existing HPPs.

The new system of promoting tariff shall be presented through the adaptation of the new law for RES, which is being prepared, taking into consideration that the level of the tariffs shall take into consideration the type the technology and the efficiency of the generating equipments. Also, the new law for RES shall offer other stimuli, such as:

- The determination of a national objective for RES in the total of the final energy consumption;
- The obligation of the transmission or distribution companies to connect new plants of RES in their networks; the payment only of the direct costs of the connection in the transmission networks and of energy distribution;
- Recognition of the existing agreements for the purchase of energy produced from RES and the obligation of the Operator to buy energy produces from small HPPs.

As a result of these measures the interest on renewable resources has increase considerably, particularly on small hydropower stations as the “most” traditional technology that is best known.

The thermal system of solar panels for hot water preparation has gone through a considerable development. The current law provides facilitating measures in the tax system for these panels.

### ***3.1.2 Supporting promoting schemes of RES in energy market.***

The state support is intended to be restructured for renewable energies and to replace the scheme of the feed-in tariff with a system based on Contracts for the difference (CfD). Anyway, in the legislation that is being amended, the feed-in tariff scheme is expected to remain into force to support the renewable energy in a small scale up to the capacity 2 MW installed for generating units.

The renewable energy producers, at the moment with energy-purchase agreements finalized before the law which is being amended will enter into force, will have a fixed feed-in tariff for the remaining part of the contact. This situation does not exclude the right of these producers to move to a Supporting Scheme Contract for Difference.

Based upon law 43/2015 “On energy sector”, the new model of energy market is being drafted, providing for the trading of energy from the renewable sources, to the advanced market when the Albanian Energy Stock market is established.

The legal criteria of RES generation shall be established by ERE. Only the generation that fulfils the legal conditions might be supported pursuant to a CfD. The renewable technologies that will be acceptable for support according to the scheme CfD are listed in the following paragraph:

- Biomass transformation
- Wind in terrestrial boundaries
- Solar photovoltaics
- Hydroenergy
- Energy from the waste through CHP
- Gas from landfills
- Gas from the dirty urban water sanitation

The Ministry shall review the list every year and might propose a change to the list at the Council of Ministers in case another technology is considered consolidated.

Also, the legal changes will provide for the drafting of the Methodologies for the determination of standard prices which will be calculated in such a way that they will support the production of considerable renewable energy, economically acceptable from the market.

### ***3.2 Supporting schemes for the promotion of energy use from renewable resources of heating and cooling (RER-H&C).***

The government is being planned to introduce some supporting schemes for the use of renewable energies for heating and cooling. The government is reviewing the law on RES to add a provision that would finance the projects for heating and cooling, which use mainly biomass in the sector of agriculture. The financing is expected to be made through the grants from the RESfund set up by the government. The grants will reach up to 30% of the total cost of project investment. Ministry of Energy and Industry in corporation with the Ministry of Agriculture, Rural Development and Water Administration will identify the most suitable projects based on their financial realization and the influence to fulfill the objective of RES in the sector of agriculture.

### *3.3 Supporting schemes for the promotion of the use of energy from renewable resources in transport (RER-T)*

Law no. 9876, dated 14.2.2008 “On the use, transportation and trading of bio-fuels and other renewable combustibles for transport”, article 8 (4), provides that from 2010, the minimal annual amount of bio-fuels and other renewable combustibles which are used for transport shall not be less than 3% of the total of the combustibles traded in the market, meanwhile from 2015-ongoing, it won't be less than 10%.

The new draft law on biofuels will have the same objective of 10% to comply with the EU Directive 2009/28/EC. The legislation does not contain any specific objectives about the different kinds of technology.

Based upon point 2 article 8 law no. 9876, dated 14.2.2008 “On the production, transport and trading of biofuels and other renewable combustibles for transport”, the Council of Ministers, with the proposal of the minister in charge of the transport sector and the minister in charge for the sector of hydrocarbon/energy determines the minimal annual amount of bio-fuels and other renewable combustibles that shall be used in the following year in transport. However, this determination has not been made by any ministers from the moment the law entered into force.

The obligation mentioned above has been determined for the whole companies of fuel products, which have a trading license.

The law does not provide for sanctions or punishing measures for non-accomplishing the objective. However, the people who go through this obligation, licensed by the Ministry of Energy and Industry might be punished by this institution for noncompliance with the requirements of the primary and secondary legislation into force which regulates the activities for renewable combustibles used for transport purposes.

Furthermore, the same law provides for fining for the retail tradesmen of fuel products who do not publish in a visible place in the places/points where they sell a note that indicates bio-fuels of other renewable combustibles as well as oil or diesel, mixed with bio-dieseline and bio-ethanol in the measure of 5%.

No mechanism has been established for the supervision of the accomplishment of the objective. Ehen though the law for bio-fuels does not express this, the Technical and Industrial State Inspectorate, which is responsible for market surveillance of oil products, has the authority to supervise the accomplishment of the objectives provided for by law.

Financial support might be classified in different ways. Such examples are: financial support for investment, capital grants, loans with low interest, the exclusion from the taxes or their reduction, tax reimbursement, tendering schemes, obligations for renewable tariffs with or without green certificates (tradable green certificates), promoting tariffs (feed in), promoting rewards, voluntary schemes.

Financial support for bio-fuels used for transport is provided through the exclusion from the taxes. Pursuant to article 10 of law on bio fuels, from the period when the law enters into force and until 2018, the excise tax for these products will be zero.

Apart from this, the law has another exception which was into force in 2012, the exclusion from the customs taxes and the VAT for all the machineries and the necessary equipments and the parts of the used objects for the production of bio-fuels and other renewable combustibles, include, but are not limited only with:

- The equipments and the machineries which changer the organic fertilizer into organic improver of the soil, which might be used for the cultivation of the plants for energy purpose;
- The equipments, materials and the agricultural machineries which will be used by the local farmers for plant cultivation for energy purposes;
- The equipments and the main and assistant technological machineries of the bio-fuel production plants and of the other renewable combustibles are excluded from the customs taxes and from the VAT for the first period until the end of 2012.

The executive bodies of this scheme are the Ministry of Energy and Industry and the Ministry of Finances along with the General Directorate of Taxes and the General Customs Directorate.

No assessment has been made about the expected influences related to energy production. However, last year a plant was implemented for bio-fuel production in the industrial area of Porto Romano in Durres with the production capacity of about 100 000 ton per year. The tax decrease is not conditioned from any criteria about energy efficiency.

This is a supportive measure implemented since 2008. The legal basis of this measure is law no. 9876, dated 14.2.2008 “On the production, transportation and the trading of bio-fuels and other renewable combustibles for transport”. The supporting scheme has been functional since 2008.

The starting date of exclusion from the taxes (VAT and the customs taxes) for the equipments and the farmers’ machineries which produce the raw material for bio-fuel production and which are used for the construction of bio-fuel production plant was 14<sup>th</sup> March 2008, meanwhile the last date was 31<sup>st</sup> December 2012.

The starting date from the excise exception regarding the produced bio-fuels was 14<sup>th</sup> March 2008, meanwhile the last date is 31<sup>st</sup> December 2018. No maximal or minimal system measurement has been determined for the producers of bio-fuels who benefit from the tax exclusion as it is provided for by law. At the moment, only one supporting measure is applied in Albania for the producers of bio-fuels: the one of the exclusion from the taxes. No local or regional scheme is applied for bio-fuels in Albania.

The scheme offers the tax exclusion (VAT and the customs taxes) for the machineries and the equipments which are used for the construction of a plant for bio-fuel production. Anybody benefits from this scheme as long as he receives a permission for the construction of a plant for bio-fuels production. The scheme does not include specifications related to the technology implemented for bio-fuels production to benefit from this scheme. VAT is reimbursed pursuant to the procedures provided for in law for VAT, meanwhile that the exclusion from the customs taxes is applied in the moment the machineries and the equipments enter the Albanian boundary. As it was mentioned above, even though the law stipulates that the Council of Ministers after the joint proposal for energy and the minister in charge of transport, determines the minimal objective

(percentage) of bio-fuels which will be used within e year in the sector of transport, no such an obligation has been determined. As it was mentioned above, the law does not make distinctions about the support based on the fuel and technology types. No specific support for bio-fuels, which fulfill the criteria of article 21 (2) of the Directive 2009/28/EC, has been provided.

### ***3.3.1 Specific measures for the promotion of the exploitation of energy from biomass***

In many Member States, energy source of biomass plays a crucial role as primary energy to cover the energy needs in the three sectors: heating and cooling, energy and transport. National strategy for biomass prepared in several Member States, is essential to plan the role and the interlinking of the uses among the terminal use of energy and the interconnection with the other non-energy sectors. For this reason, even Albania has assessed the domestic potential of biomass to use it with more efficiency in different sectors. The supportive measures will be provided with the review of Law on RES.

#### ***3.3.1.1 Supply with biomass: domestically and abroad***

Biomass is one of the most implemented sources of energy in Albania – mainly in the form of firewood, combined in some cases with shrubs and waste of the plans from the agricultural sector. The consumption of firewood has decreased at about three up to four times more during the period 1990-2002. After this year, firewood consumption has increased a little in the last years, as the result of the increase of the prices of the other combustibles and energy. The processed wood combustibles – woodchips, pallets and briquettes – are not used a lot due to their high price and the underdeveloped supply system.

The remains which have fallen by the trees and the woods of poor quality are mainly used. The waste of biomass from agriculture is not used widely and usually it is destroyed right in the spot. The use of bio-gas is not developed, despite the available resources. It is important to consider that the majority of the heating equipments which are used – the stoves and the chimneys – are old and inefficient, with heat loss up to 40-50%. The heating through the radiators with high efficiency for the local systems is underdeveloped. The assessments of the updated energy strategy indicate a considerable potential for extraction and exploitation of biomass in Albania from forestry, agriculture and livestock (for bio-gas production).

Biomass might be used for the production of energy only in the cogenerating plants (CHP-Combined Heat and Power), especially in the ones which function with sawdust by different wood processing industries. Its use in the energy centrals with condensation (it is considered as unfavourable from the environmental, economic and technical prospective. Base on table 6 in the following paragraph it is clear that the information about the available amounts of biomass is insufficient. Of course, the state authorities should make more attempts for the development and the implementation of an information system related to the sources of biomass, which serves to channel the information in the Natural Resources National Agency.

Sector of origin	Internal Resource Amount	Imports		Exports	Net quantity (ktoe)	Energy (ktoe)
		BE (ktoe)	Jo-BE (ktoe)	BE/Jo-BE (ktoe)		
Biomass from forests:	Out of which:	0	0	0	0	<b>210.00</b>
	1.direct supply with wood biomass from forests and form the other forest lands for energy production	0	0	0	0	<b>210.00</b>
	Optional – if there is information, you can detail the quantity of teh raw material which belongs to this category.	0	0	0	0	
	Cut wood	0	0	0	0	<b>180.00</b>
	Remains from teh cut woods (tops, branches, roots)	0	0	0	0	<b>20.00</b>
	Remains from the management of the landscapes (wood biomass form the parks, gardens, rows with trees, shrubs)	0	0	0	0	<b>10.00</b>
	others (please specify)	0	0	0	0	<b>0.00</b>
	Indirect wood biomass supply for energy production	0	0	0	0	<b>0</b>
	Optional – if thers is information, you migh detail further more:	0	0	0	0	<b>0</b>
	a) remains from the saws divisions, wood processing industry, furniture industry (sawdust)	0	0	0	0	<b>0</b>
	b) subproducts of paper dough industry and paper (“black liquid”, liquid resin)	0	0	0	0	<b>0</b>
	c) processed woodfire	0	0	0	0	<b>0</b>
	Recycled wood after teh consumption (recycled wood for energy production, wood from family waste)	0	0	0	0	<b>0</b>
	Others (please specify)	0	0	0	0	<b>0</b>

Table 6: Supply with biomass in 2009 (with the latest available data)

Tables 7a and 7b give the assessed energy contribution from biomass in 2015 and 2020.

Sector of origin		2015		2020	
		Expected amount of internal resources (m3)	Main energy production (ktoe)	Expected internal resource quantity (m3)	Main energy production (ktoe)
<b>A) Biomass from forests:</b>	1.direct supply with wood biomass from the forests and teh other forestated lands	1,119,010	2316.28	923,112	2469.78
	2.indirect supply with wood biomass for energy production	156,250		173,307	
<b>B) Biomass from agriculture and fishing</b>	1.agricultural energy culture and fishing products supplied directly	145,000		574,286	
	2. Subproducts: Agricultural/processed waste and fishing subproducts	-		-	
<b>C) Biomass from waste</b>	1. The bio-degradable part of inert urban waste, including the biological waste and the gas of the rubbish collection lanfills.	-		61,429	
	2. The biodegradable part of teh industrial waste (including papers, cardboard, pallettes)	-		235,286	
	3. Canalization sludge	-	-		

Table 7a: Internal supply calculated with biomass in 2015 and 2020

Apart from the information provided above, table 7b provides that at the moment, there are no plans for the use of agricultural land for the production of energy agricultural cultures.

Exploitation of agricultural land for the production of agricultural cultures for energy	Surface (ha)
Land used for the trees with a fast growth cycle (willow, poplars)	Zero
Land used for other agricultural energy cultures, such as: grasses (Phalaris arundinacea, Panicum virgatum, Miscanthus), sorgum	Zero

Table 7b: Current use of agricultural land for the production of energy agricultural cultures in 2009 (with teh latest data at disposal)

### **3.3.2 Measures to increase biomass availability taking into consideration the other users of biomass (agriculture and other sectors based on the forests)**

The role of biomass will increase very little in absolute terms, as it is shown above, but at the same time, its relative contribution will decrease. Measures have been predicted in two directions:

- The slight decrease of biomass in the final energy consumption;
- The slight decrease of the heating energy produced by biomass exploitation.

The use of biomass has been stable during the last three years for the following reasons:

- The slow introduction of improved installations used for the exploitation of biomass in heating;
- The increase of wood price;
- The improved performance of energy in buildings.

Apart from the above information, we are kindly asking you to describe the current agricultural land situation used for energy production as follows:

- The current use of the agricultural land for the production of agricultural energy cultures in 2009 (ha);
  - The use of agricultural land for the production of agricultural energy cultures, Surface
1. Land used for wood with a fast growing cycle (poplins, willows); For the period 2006-2009 there is no HPptare of land used for these purposes;
  2. Land used for other agricultural energy cultures, such as: grasses (*Phalaris arundinacea*, *Panicum virgatum*, *Miscanthus*), sorghum: based on the statistics published by INSTAT, there is no HPptar of land used for these purposes.

#### **3.3.1.2 Mobilization of the new biomass resources**

According to the figures offered by the Ministry of Agriculture, Rural Development and Water Administration (based on the annual publication in 2009), the degraded land surface is 12,335 ha.

The unused agricultural land is assessed as approximately 34 568 ha. There is no planned measure for the increase of energy agricultural cultures but at the same time it is important to mention the fact that planting energy agricultural cultures is one of the mitigating measures for the gases with the greenhouse effect, which is mentioned in the Second National Communication of Albania addressed to the Framework Convention of United Nations on Climate Changes (FCUNCC) from 2009. Energy was not generated from the animals' fertilizer and some preliminary feasibility studies have been carried out for the production of bio-gas from the fertilizer of different farms. There are no specific stimuli which promote the production and the use of bio-gas, apart from its use in the combined production of heat and energy, based on which the produced amount of energy is bought with preferential prices and Energy Regulatory Entity (ERE) should prepare the special fees for this technology. At the moment, the amount of biogas produced is zero; however, measures have been planned for getting the product in an amount of 7,1 ktoe biogas pursuant to the current document of RENAP.

Attempts are being made to improve the management of forests in order to increase the development on the future and the sustainable reproduction. The certification of the communal forest and the state ones has been planned, to improve the techniques for their management.

### **3.3.1.3 Influence on other schemes**

No assessment has been made for the influence of energy use from biomass in the other sectors. Such an assessment will be carried out in the future (a draft proposal has been drafted to study these effects. The draft proposal is still under the internal discussion through the national actors).

The use of biofuel in the agriculture sector , 85% of energy consumption in agriculture in 2009, was based on the liquid combustibles. So, the use of biofuels in this sector would facilitate its increase

(b) What kind of developments is expected in the other sectors which are based on agriculture and forestry, which would influence on energy production? (For example: Would the efficiency/the improved product increase or decrease the amount of sub-products at disposal for energy use?)

The increase of processed biomass production, for example, pallets, etc would cause a decrease in price for the final consumers. This thing would decrease the consumption of firewood and would decrease the loss of the companies which sell them.

**Measures for the promotion of RES are presented summarized in table 4:**

Measure name and reference	Type of measure	Expected results	Targeted group and /or activity	Existing or planned	Starting date/Completion	Financ. effects. mil. ALL/year
<b>MEASURES REGARDING LEGAL AND REGULATORY FRAMEWORK</b>						
1. To meet the national objective of 38% for RES in the total of Energy Final Gross Consumption.	Project of DCM for the amount of RES which will be consumed until 2020.	Produced energy (ktoe)	RER investors, NRNA, MEI	Planned in 2015	2015-2020	n/a
2. drafting the approach for fixed prices of energy from RES at energy market.	Regulatory	RER-E in the energy stockmarket	ERE/MEI	Planned	Within 2016	25. <sup>50</sup>
3. Appropriate procedures for the auction of RES capacities provided for in RRNAP pursuant to MEI proposal	Regulatory	Produced energy (ktoe)	MEI/ERE	Planned	5years	100. <sup>00</sup>
4. Origin warranty for all RES	Regulatory	Produced energy (ktoe)	Investors	Planned	No specific term	400. <sup>0</sup>
5. The obligations of the transmission or distribution companies to connect new RES plants in their network; the payment of the direct costs for the connection in the energy transmission and distribution networks	Legal Regulatory	Loss reduction	RER Investors, OST/OSSH.	Planned on 2/4 e 2016	2016-2017	5,200. <sup>00</sup>
<b>MEASURES WITH FINANCIAL EFFECTS TO PROMOTE RES</b>						
6. Receiver's obligation (Operator) to buy energy produced from small HPPs.	Financial	Produced energy (ktoe)	RER Investors, OSSH,	Existing with improvements in 1/4 tē 2016	For new projects, the measure will continue beyond 2020	7,400. <sup>00</sup>
7. Long-term agreements to purchase energy produced by the current energy producers from RER	Legal Finance Regulatory	Produced energy (ktoe) 3,700GWh	RES Investors, OSSH, KESH, OST	Existing	Depending on the existing contracts PPA	5,400. <sup>00</sup>
8. Fiscal Supporting policy for the promotion of diversified RES systems (HPP, PV and Eolik)	Finance	Produced energy (ktoe)	RES Investors, OSSH, KESH, OST	Existing with improvements 1/4 tē 2016	PPA Contract	

8. Mandatory purchase of energy through CfD in the market of energy from RES	Legal Regulatory	finance Produced energy (ktoe)	RES Investors, OSSh, KESh, Ndihma Shteterore	Planned ¾ të 2016	2016-2020	650. <sup>00</sup>
9. The obligations who introduce in the market, for transport reasons, liquid combustibles originating from oil, to provide fuel for the motors with oil and diesel, which are mixed with biofuels according to the percentages determined in the existing law for biofuels.	Financial	Production and use of biofuels (ktoe)	Investors MEI/MB/MM And the Offices of the assessment of sustainability criteria	Planned	2016-2020	883. <sup>00</sup>
10. Zero level of the excise tax for clean biodiesel until 2018	Financial	Identical	Trading investors and public administration	Existing	2016-2020	555. <sup>00</sup>
11. The supervision of biofuels quality from the Technical State Inspectorate and the Offices of the assessment of sustainability criteria	Administrative	Use of biofuels for transport	Distributors and final users	Planned	2016-2020	15. <sup>30</sup>
12. The approval of the policies and measures for the increase of solar energy in buildings for water heating	Administrative	Energy produced from NUED systems	Public or private buildings constructed from the beginning or the existing ones	Existing	2016-2020	116. <sup>00</sup>
13. Financing through the grants form RES Fund for the heating and cooling projects in agriculture sector using biomass.	Financial	Enrgy produced from biomass	Agricultural sector	Planned	Qershor 2016	1.352. <sup>00</sup>
14. Firewood processing	Financial	Thermal energy	Environment sector	Planned		
<b>TOTAL in 5 along with 108,500 million ALL</b>				<b>TOTAL in mil. ALL/year</b>		<b>21,696.<sup>80</sup></b>

Table 4: Summary of all the policies and measures

### ***3.4 Specific measures to meet the requirements under articles 13, 14, 16 and articles 17 to 21 of the Directive 2009/28/EC***

#### ***3.4.1 Administrative procedures and spatial planning***

(a) A list of the existing legislation and if possible, the regional legislation on the procedures of authorization, certification and licensing and territorial planning applied to plants and their power transmission and distribution to the network infrastructure:

#### **Relevant applicable legislation in the energy sector**

- Law no. 43/2015, dated 30.04.2015 “On power sector” sets out the main principles for the energy sector development, including RESpower plants and the transmission and distribution networks. Law transposes the EU Directive 2009/72 on electricity and repealing the previous law on electricity (Law no. 40/2015, dated 22.05.2003). This law also includes the requirements and criteria for granting a license to carry out an activity in energy sector. The law also includes a number of specific provisions regulating the construction of a direct line or of a commercial interconnection line.
- The Albanian Government and ERE are reviewing bylaws, with the aim of meeting the requirements of the new law on energy sector, including a number of bylaws provided below.
- Decision of Council of Ministers no.1701, dated 12.12.2008 “On approval of the regulation for procedures of granting permits/authorizations for the construction of new power generation plants/facilities not subject to concession” sets out the necessary procedures and documents for application, evaluation and granting of an authorization for building a new power generation capacity that is still not subject to concession.
- ERE decision no. 108, dated 9.09.2008 “On approval of the regulation for procedures of licensing and granting, changing and/or revoking a license”, as amended. This decision sets out the procedures and requirements for granting a license to carry out any activities in energy sector.
- Law no.125/2013, dated 25.04.2013 “On concessions and public-private partnership” establishes the legal framework for all concessions. The purpose of this law is to build a favorable framework to promote and facilitate the implementation of concessionary projects, increase transparency, justice, effectiveness, long-term stability for the development of infrastructure-related projects and public services, including the concessions for construction of hydropower plants.
- DCM no. 575, dated 10.07 “On approval of evaluation rules and award of concessions/public-private partnership” defines the detailed procedures and requirements for the evaluation and award of an applicable concession for hydropower plants.
- Law no.111/, dated 15.11.2012 “On integrated management of water resources”, establishing the legal framework for the use of local water resources, including their use for power generation.
- Decision of Council of Ministers no. 416, dated 13.05.2015 “On approval of the general and special conditions, accompanying documents, term of validity, application forms for authorization and permit, procedures for the revision of decision-making process and forms of authorization of permit for the use of water resources”, which defines the specific conditions and procedures for reviewing and decision-making to grant an authorization or permit of use of water resources, including the use of water for construction of hydropower plants.
- ERE Decision no. 123, dated 24.10.2008, “On approval of the code of transmission network operation”, as amended, which defines the planning and connection procedures for the development of transmission system.
- ERE Decision no. 100, dated 26.08.2008, “On approval of the power distribution code”, as amended, which defines the planning and connection procedures for the development of distribution system.
- ERE Decision no. 9, dated 21.02.2007, “On rules and procedures of the certification of energy production from renewable resources”, which defines specific rules and procedures for granting warranties of origin and green certificates for the power generated from renewable resources.

- Law no. 8734, dated 1.2.2001 “On guaranteeing work safety of electrical equipment and installations”.
- DCM no. 646, dated 12.12.2002 “On approval of technical standards and conditions of design and implementation in the fields of industry and energy, to acquire the status of “Technical rules”, which are binding for application”
- DCM no. 529, dated 15.08.2007 “On approval of criteria and procedures of application and approval of construction permits of commercial interconnection lines”.

### **Specific applicable legislation in the sector of RER**

- Law no.138/2013, dated 2.05.2013 “On renewable energy resources” with special provisions for the connection of RESoperated plants to the transmission and/or distribution network.
- Law no. 9876, dated 14.02.2008 “On production, transport and trade of bio-fuels and other renewable fuels for transport”, as amended, sets out the legal framework for granting permits for the production, wholesale and retail of bio-fuels and other renewable fuels, for the purpose of transport.

### **Specific applicable legislation on spatial planning**

- Law no. 107/ , dated 31.07.2014“On territory planning and development”, as amended, is the key legislation governing the territory planning and development in Albania, with the aim to define the general principles, rules and procedures, including the responsibilities and powers of the central and local government institutions for territory planning and development. The law on territory planning and development specifies the institutions for bodies responsible for territory planning, including:

#### **a) At central level**

- Council of Ministers;
- National Territory Council;

Ministry responsible for territorial planning and development (Minister of Urban Development)

#### **b) at regional level**

- Regional Council

#### **c) at local level**

- Municipal councils; the law provides for that National Territory Council (NTC) and the Mayor are two competent authorities to issue construction permits.
- Construction permits for each power plant are issued by the National Territorial Council.

Although the line ministries, including the ministry responsible for energy, have no decision-making power regarding the territory planning and development, they are charged with responsibilities for preparing sector-based development plans and should ensure that each application for construction permit complies with the effective sector-based plans.

- DCM no. 408, dated 13.05.2015 “On approval of the regulation for territory development”, which defines detailed conditions and procedures for territory development.
- DCM no. 1190, dated 13.11.2009 “On the way of organization and functioning of the National Agency of Territorial Planning”. This decision sets out the duties and responsibilities of the National Agency of Territorial Planning acting as Technical Secretariat of the National Tourism Council.

- DCM no. 68, dated 15.2.2001 “On approval of technical standards and technical design conditions and implementation of construction works”.
- Law no. 8561, dated 22.12.1999 “On expropriations and temporary usufruct of private property for public interest” that sets out criteria and procedures for the expropriation of private property for each project representing a public interest, such as the construction of a power plant, including the generation, transmission and distribution power plants, facilities for the production of bio-fuels etc.
- Law no. 8652, dated 31.07.2000 “On organization and functioning of local government”, as amended, governing the organization and functioning of local authorities, including their specific responsibilities for spatial regulation.

#### Specific environmental protection

- Law no.10431, dated 14.07.2011 “On environmental protection”, as amended, aiming at environmental protection at a high level, its preservation and improvement, prevention and reduction of risks to human life and health, assurance and improvement of life quality in the interest of the present and future generations, and preparing the ground for national sustainable development.
- Law no. 91/2013, dated 28.02.2013 “On environmental strategic assessment”, aiming to afford high environmental protection and sustainable development through the involvement of environmental matters in drafting, approval, revision, change or modification of plans and programs with potential negative environmental consequences. The requirements of this law are subject to formulation of all plans and programs for agriculture, forests, fishing, energy, industry, mining industry, transport, waste management, water administration, telecommunication, tourism, national and local urban and rural territory planning, including also the landscape protection, land use, establishing the framework for approval in the future, of projects listed in annexes 1 and 2 of Law no. 10 440, dated 7.7.2011 “On environmental impact assessment”;
- DCM no. 507, dated 10.06.2015 “On approval of the detailed list of plans or programs with significant negative environmental effects, to be subject to the environmental strategic assessment process”
- DCM no. 219 dated 11.03.2015 “On rules and procedures for the consultation with stakeholders and public, and public hearing during the environmental strategic assessment process.”
- DCM no 620 dated 7.7.2015 “On approval of rules, responsibilities and detailed procedures for the environmental strategic assessment in the cross-border context”
- Law no.10440, dated 07.07.2011“On environmental impact assessment”, as amended, specifying that prior to the approval of every construction permit for the plants of production, transmission or distribution, a process of environmental impact assessment should be carried out (EIA).
- DCM no. 686, dated 29.07.2015 ““On approval of rules, responsibilities and deadlines for the implementation of the Environmental Impact Assessment procedure (EIA) and the procedure of transfer of the decision and environmental declaration”
- DCM no. 247, dated 30.04.2014 “On definition of rules, requirements and procedures for information and public participation in the environmental decision-making process”
- DCM No. 598 dated 01.07.2015 “On definition of rules and procedures for the impact assessment in the cross-border environment”
- Law no.10448, dated 14.07.2011 “On environmental permits”, as amended, aims to prevent, decrease and keep under control the pollution caused by a number of categories of activities, in order to achieve a high level of environmental protection as a whole, human health and life quality. Every installation listed in annex 1 of this law should be subject to the requirements of this Law.
- DCM no. 417, dated 25.06.2014 “On approval of tariffs for environmental permits”.
- Law no.8906, dated 6.06.2002 “ On protected areas “;
- Law no. 111/2012 “On integrated management of water resources”

- Law no. 10 463, dated 22.9. 2011 “On integrated waste management”, as amended
- DCM no. 417, dated 25.06.2014 “On approval of tariffs for environmental permits”.
- DCM no. 103, dated 31.3.2002 “ On environmental monitoring in the Republic of Albania“;
- Law no.8906, dated 6.06.2002 “ On protected areas “;
- Law no. 8905, dated 6.06.2002 “ On protection of marine environment from pollution and damage“;
- Law no.7875, dated 23.11.1994 “ On protection of wild fauna and hunting“;
- Law no 9385, dated 4.05.2005, as amended, pending a new Law to be approved by this year;
- Law no. 8672, dated 26.10.2000 “On ratification of Aarhus Convention “On the right of the public, DCM no. 16 dated 4.1.2012 “On the right of the public to environmental information”
- Law no. 9334, dated 16.12.2004 “On accession of the Republic of Albania to Kyoto Protocol of the Framework Convention of the United Nations on Climate Changes”;
- DCM 1353 and 1257 “On criteria of the removal from the national forest and pasture fund of surface areas, subject to concessions”.
- DCM no. 1553, dated 26.11.2008 “Establishment of the Designated National Authority of Clean Development Mechanism, in the framework of the implementation of Kyoto Protocol commitments”.
- Law no.10463, dated 22.09.2011 “On waste integrated management”, as amended.
- DCM no. 608, dated 17.09.2014 “On the determination of proper measures for bio-waste collection and processing, and the criteria and deadlines for their decrease”.
- DCM no. 127, dated 11.02.2015 “Requirements for agricultural use of wastewater sludge”.

#### **Other key legislation**

- Law no. 10081, dated 23.02.2009 “On licenses, authorizations and permits in the Republic of Albania”, identifying a “one-stop shop” for all licenses, authorizations and permits issued for the natural persons or legal entities to carry out an activity of public interest or use of a public facility.
- Law no. 10137, dated 11.05.2009 “On some amendments to the legislation in force on licenses, authorizations and permits in the Republic of Albania”, reflecting the amendments to the existing legislation, of specific areas affected by Law no. 10081, dated 23.02.2009.
- DCM no. 538, dated 26.05.2009 “On licenses and permits treated by or through the National Licensing Centre and some other common sublegal remedies”.
- DCM no. 410, dated 13.05. “On creation, organization and functioning of the State Technical and Industrial Inspectorate” establishing the central technical inspectorate that is competent for technical equipment, pressure-operated equipment and the market of oil byproducts.  
(b)Body (bodies) that are responsible for the distribution of information at national/regional/local level:

**Ministry of Energy and Industry (MEI)** is fully responsible for the electricity sector. MEI is the responsible institution for the development of energy policies and mid-term and long-term strategies for the energy sector. MEI is also responsible for the assessment and revision of the requirements for the rights to concession for the construction of hydropower plants and for the authorizations of other types of technology for the energy production from renewable resources such as wind, biomass, solar resources etc. The mission of the ministry in energy sector is to promote a solid, sustainable economic development through:

The mission of the ministry in the sector of energy is to promote a rapid and sustainable economic development through:

- Preparation, periodical review and update of the National Strategy on Electrical Power;
- Promotion of energy efficiency and renewable resources, including small hydropower plants;

- Forecast of the demand for various energy resources;
- Promotion of private local or foreign investments in the sector of energy, building an attractive legal climate for these investments;
- Development of market reforms in the power sector to meet the national objectives for the integration in EU and development of a rational electricity market;
- Formulation of the adequate legal framework;
- Preparation for the privatization of state energy companies.

**National Agency of Natural Resources**, with the scope of its work focusing on the development and supervision of rational use of natural resources, based on governmental policies and monitoring of the phase after their use in mining, hydrocarbons and energy. National Agency of Natural Resources has a number of responsibilities under the law for RER, as the body responsible for RESdevelopment.

**State Technical and Industrial Inspectorate** is an institution responsible for ensuring the safety of persons for goods placed on the market. The inspectorate has the authority to oversee the safety of electrical equipment and installations, including the safety of power generation facilities, transmission and distribution of electricity.

**Energy Regulatory Entity (ERE)** is an independent public body responsible for the regulation of activities in the sectors of electricity and natural gas. ERE is the body responsible for issuing licenses to carry out activities of generation, transmission, distribution, supply and trade of electricity. It is responsible for the approval of the grid that provides to all electricity producers a connection and access to transmission and distribution networks. ERE has also the authority to adopt promotional tariffs (feed-in) to all eligible producers of renewable sources, including fees, and standard agreement for the purchase of energy applied to the priority RESproducer.

A key responsibility given to ERE is the development and adoption of rules of the electricity market and monitoring of the energy market.

**Ministry of Economic Development, Trade, Entrepreneurship and Tourism** is responsible for the overall development strategy of the country's economic development. A number of other entities that play a role in RESdevelopment are subordinate to the ministry.

**National Licensing Centre (NLC)** is a public institution established by law and under the subordination of the Ministry of Economic Development, Trade, Entrepreneurship and Tourism. The mission of the National Licensing Center is to facilitate licensing procedures, authorizations and permits issued by public authorities. NLC is designed to function as a "one-stop center" (one-stop shop) for all licenses, authorizations and permits issued by public authorities.

**Agency for Treatment of Concessions (ATC)** is a unit established in conformity with the law on concessions and is under the subordination of the Ministry of Economic Development, Trade, Entrepreneurship and Tourism. ATC mission is to support the Contracting Authority to evaluate and negotiate the concessions in all fields of concessions, including the construction of hydropower plants.

**National Territory Council (NTC)** is the decision-making body responsible for the adoption of national territorial planning instruments under provisions of law. NTC is a collegial body attached to the Council of Ministers. The National Territory Council (NTC) has the following powers:

- a) decides on the approval, approval with changes, postponement for subsequent review or non-approval of the national territorial planning instruments;

- b) decides on the approval of the identification of national importance of a territorial planning related issue;
- c) revises and adopts the compliance of the local instrument with the applicable planning instruments;
- d) urges the development of national territorial and local plans from the relevant planning authorities and ensures they comply with technical and procedural standards defined by law.
- e) approves construction projects on main development projects, including the construction of new power plants.

**Ministry of Urban Development** is responsible for the development of spatial planning policies and issues licenses for the design, construction, supervision and testing of construction works. This Ministry is also responsible for issuing professional licenses for the individuals involved in the design, supervision and testing of construction works.

**National Agency of Territorial Planning (NATP)** is a public institution under the subordination of the Ministry of Urban Development and has the following responsibilities:

- a) supports the horizontal coordination between the national authorities in the field of territory planning, with a view of harmonizing issues of national importance addressed in different fields and sectors, bringing together the responsible authorities and interested stakeholders and helping to resolve the conflicts between them;
- b) supports the vertical coordination between the national and local planning authorities, with a view of harmonizing the treatment of issues of national and local importance in the field of territorial planning by bringing together the responsible authorities and interested stakeholders and by helping with the settlement of disputes between the national and local authorities and the interested stakeholders;
- d) provides technical support to the local government units for the formulation of policies and acts for urban planning and management, as well as the development inspection;
- e) supports the development of professional and technical skills of the national and local planning authorities through direct training and assistance;
- f) conducts studies and assessments for territorial developments and based thereupon, recommends to the Council of Ministers the improvement of legal system for territorial planning and development control instruments or the need to launch planning processes or other appropriate measures;
- g) informs the public about the planning processes, provides information and advises the planning authorities of the procedures and rules for a territorial planning process; h) prepares and publishes methodological manuals for territorial planning and prepares and delivers training programs for the preparation of planning documents;
- i) designs and distributes technical standards for building and administering the register;
- j) supports the planning authorities in respect of the method of registration and independent administration of data in the register and advises the planning authorities for their effective distribution to the interested stakeholders and consultation procedures;
- k) supports international cooperation in the field of territory planning.

**Ministry of Environment (MoE)** is fully responsible for the environmental protection, specifically for air, waste, chemicals, climate changes and of forests, protected areas and biodiversity.

The Ministry is responsible for approving the strategic environmental assessments for any territorial or sector-based plan approved under the Law on planning and development of the territory “as per the approval of EIA in-depth reports for any previous impact through special projects within the territorial plans.

MoE is responsible for policies related to climate change and focal point for the Albanian government for the UNFCCC and Kyoto Protocol. MoE also exercises the powers of the national authority for Clean Development Mechanism projects defined under the Kyoto Protocol in Albania.

**National Environmental Agency (NEA)** is an institution under the subordination of the Ministry of Environment, which is responsible for reviewing the environmental impact assessment process for projects under law no. 10 440, dated 7.7.2011 “On environmental impact assessment”, as amended, and for reviewing environmental permit applications. Further, this Agency is responsible for environmental monitoring.

In view of article 13 (1) of the Directive 2009/28/EC, the Albanian government has taken some important steps. The new law on power sector (Law no.43/2015) in Article 49 (1) provides for that building of new generating capacity up to 2 MW, including renewable energy producers, is approved by the minister responsible for energy. On the other hand, the new law on renewable energy sources (Law 138/2013), in its Article 10 foresees that the Council of Ministers approves simplified procedures for obtaining authorizations and licenses required for the production of energy from RER.

Article 37, paragraph 6 (b) of the law on energy sector also provides for that all producers, including the producers connected to the national grid with an installed capacity up to 1 MW, are not obliged to obtain a production license by ERE. The same law, in Article 39, paragraph 2, provides for that ERE may adopt simplified licensing procedures for producers connected to the distribution network. Based on the above legislation, the Council of Ministers is expected to prepare and adopt specific procedures that will simplify the issuance of construction permit necessary for RESproducers, while ERE will adopt a simplified procedure for the licensing of small producers of electricity, including RESproducers directly connected to the distribution network.

Currently it appears that there is no unnecessary obstacle or inappropriate claims regarding authorization, certification and licensing procedures applied to plants and associated transmission and distribution infrastructure. Furthermore, the RESlaw contains provisions that exclude small producers of energy, with installed capacity up to 1 MW, from the obligation to obtain the production license. On the other hand, the creation of the National Licensing Center, according to Law no. 10081 dated 23.02.2009 "On licenses, authorizations and permits in the Republic of Albania", as amended, has significantly facilitated the process of obtaining a license, permit or authorization.

Authorizations for the construction of installations of renewable energy are granted by the Council of Ministers or by the requirements of the law on concessions for hydropower plants, or as required by law for the energy sector to other types of producers of electricity using renewable energy, or the law on bio-fuels for bio-fuel producers.

Licenses for the implementation of the activity of power production from renewable energy resources are issued by the Energy Regulatory Entity.

Any project which envisages the power generation from RES or for any producer of bio-fuels is required to perform the procedure of preliminary or in-depth Environmental Impact Assessment (depending on the project), and then if the installation is listed in Annex 1 the law in force for environmental permits, and should be supplied with an environmental Permit of type A, B or C. Environmental protection law and the law on environmental impact assessment require the Ministry of Environment and its subordinate institutions and local authorities to cooperate throughout the process, ensuring public participation in any potential decision making process.

As regards the construction permits, according to the new law on territorial planning (Law no. 107/2014 and DCM no. 408, dated 13.05.2015), the local authorities are responsible for granting permission for construction of any power plant. On the other hand, for each installation of photovoltaic or NUED systems in buildings that are not considered as part of cultural heritage, require only a preliminary notice of the local authorities (the Mayor). An important improved measure presented by the new legislation on territorial planning is to create a one-stop office ("One stop shop") for each building permit. This measure will reduce the time required for obtaining a construction permit within a period not to exceed 60 days, and will increase the transparency of the process.

Concessions for the construction of hydropower plants are awarded through an open and competitive bidding process, where bidders are provided equal access to information and data relating to the project. The information and data for a specific concession are also made available in the official website of MEI. Conditions and criteria for granting a permit for the construction of a plant with renewable resources, other than hydropower plant, are already foreseen in the new law for the energy sector (Law no. 43/2015, dated 30.04.2015) and the specific Regulation approved by the Council of Ministers (DCM no. 1701, dated 17.12.2008).

Licenses for the production of electricity from renewable resources, transmission and distribution are granted based on the criteria established by law for the energy sector and licensing procedures approved by ERE, which are published in the Official Journal and in ERE official website. Interested parties wishing to carry out an activity in the energy sector can contact also directly with ERE technical staff, which is responsible for licensing, and to receive information on the procedures, requirements and documents to be submitted for obtaining a license.

The Albanian government has made a number of efforts to facilitate coordination between different administrative bodies responsible for different parts of the permit for a specific project. Establishment of the National Licensing Center has been a positive step forward in creating a "one-stop shop" service for all licenses and permits required for a project.

However, according to the legislation in force for the construction of a new plant or new transmission or distribution infrastructure, a series of main authorizations/permits/licenses are approved or other approving acts, including:

- decision of the National Environmental Agency for the preliminary environmental impact assessment (EIA) or the Minister's Declaration for the in-depth EIA as per the stipulations of Law no. 10440, dated 7.7.2011 "On environmental impact assessment", as amended;
- concession or authorization approved by the Council of Ministers or of the minister responsible for energy, in accordance with the law on concessions and law on power sector;
- activity license issued by the Energy Regulatory Entity.

As regards the time limits for application processing, it is hard to provide an average period for administering a case because it largely depends on the project. The major projects should often be subject to a spatial planning process that would require more time, partly due to the complex character of

the project and involvement of local population during the reviewing process (process of approval of the environmental impact assessment).

It is worth stressing the fact that legislation provides for the implementation of the principle of acquiescence in case of the failure to reply of the administrative institution to a specific request, within a specific time limit provided for in the respective legislation.

As regards the EIA process, the legislation foresees some differences. Construction of small power plants with renewable energy, under the legislation in force, are initially subject only to preliminary EIA, and the National Environmental Agency is the one that based on its Decision, decides whether the proposed project should be subject or not to the in-depth EIA. Further, the plants with conventional energy undergo a more advanced EIA process. The authorization procedures of Albania take into account the specificities of different technologies of renewable energies, because they are governed by different legislations. As mentioned above, the authorizations for the new hydropower plants are granted in accordance with the law on concessions, which contains specific procedures and authorizations for other REStechologies are granted as required by law for the energy sector. Both legislations have different procedures, because while concessions are awarded on the basis of a competitive bidding process, authorizations for other renewable energy technologies are granted on the basis of the principle "first in time, first in rights".

Regarding construction permits, the legislation makes no distinction between renewable energy technologies and other conventional technologies.

Currently, there are no specific procedures in Albania for small decentralized RESinstallations. Both laws, the one for the power sector and on renewable energy, lay down provisions requiring the Council of Ministers and ERE to adopt procedures and simpler requirements for providing licenses and permits to producers of eligible RESand small producers.

Tariffs for the authorization of new RESplants are published in the Official Journal and in MEI website together with the relevant government decision containing the criteria and procedures for reviewing and granting authorizations.

Royalties set by ERE for production licenses are published in the Official Journal and in ERE website together with the regulation on licensing procedures. After the start of production activity, the licensees will be subject to a regulatory fee set by ERE based on their annual turnover, however, these fees are public and are applied proportionally to all licensed companies.

Fees for environmental permits are published in the Official Journal and are and published in the website of the MoE.

Concession fees for the hydropower plants are the result of the bidding process, where bidders offer concession fee based on a percentage of annual output they foresee, which is one of the bid evaluation requirements.

There is no official guidance available to local administrative bodies of planning, design, construction and rehabilitation of industrial and residential areas to install equipment and systems using renewable energy resources for producing electricity, and for heating and cooling purposes.

The new law (Article 8) provides for that the Ministry responsible for energy and the agency authorized to be responsible for renewable energy resources, will need to ensure that information on support measures for installations should be available to all interested parties such as developers, sponsors, investors, financial institutions, builders, installers, architects and suppliers of energy equipment and systems for heating and cooling in accordance with the use of energy from renewable resources

However, the law does not set out any deadline or specific procedure on the way how to provide this information or instruction. Therefore, a specific remedy needs to be applied for this purpose in the near future, and the order of the minister responsible for energy should be approved.

On the other hand, the RESlaw (Article 28/1) provides for that the Council of Ministers shall issue a regulation to ensure that the public is made available information on the availability and environmental benefits of all renewable energy resources for transport. Regulation will impose an obligation to specify at the sales points, where the percentages of bio-fuels mixed with crude oil derivatives, exceed the percentage of the volume defined by ERE.

### **3.4.2 Buildings**

Law on RES provides for that the Council of Ministers will adopt policies and measures to increase the use of solar energy within buildings, including the obligation for different categories of buildings, whether new or existing, public or private ones, in order to install water heating systems with solar energy to produce hot sanitary or technological water and therefore to meet the objectives set for increasing the input of solar energy in the total energy consumption within the country. The same article requires the Council of Ministers, upon the approval of the Minister responsible for energy, to identify the economic sectors and categories of buildings, the minimum area or capacity of water heating system with solar energy, the technical requirements of water heating systems with solar energy that will be installed, as well as specific procedures and criteria to be followed in connection with the implementation and monitoring of this obligation by the responsible institutions.

Ministry responsible for the construction sector is the Ministry of Urban Development. However, energy issues in buildings are divided to some extent between the Ministry of Urban Development and the Ministry of Energy and Industry. It is worth noting that based on current legislation on urban planning and development, local authorities have a key role in the construction sector and they are responsible for issuing and monitoring construction permits.

The new law 124/2015 on energy efficiency attaches stronger role to the Agency responsible for energy efficiency regarding the energy performance in buildings, where the conformity of each objective mandatory for RESinstallation within buildings will be monitored in the framework of overall performance of the building.

RER law does not set out any deadline or schedule on this measure, however, a draft governmental decision is already prepared, establishing a schedule for the mandatory installation of NUED systems in different categories of buildings. It is important that the adoption and implementation of this decision is in line with the new legislation on the energy performance of buildings (energy efficiency legislation).

Another major revision of the existing legislation is the one proposed by the UNDP Program on Climate Changes for the establishment and strengthening of the market of solar panels for hot water, and for revision of Law no.10112, dated 9.4.2009 "On administration of co-ownership in residential buildings. " Based on the proposed revisions, NUED system installations must be included in the joint ownership of apartment buildings enabling a better functioning and management of these systems.

According to UNDP Program on Climate Changes for creating and strengthening of market solar panels for hot water, a proposal is made by virtue of a decision of the municipal council of Tirana for installation within minimum surfaces of NUED into different categories of buildings, including buildings with households, apartment blocks, private offices, hotels and restaurants, sports facilities.

According to the draft decision, this NUED system will have a surface area to meet at least 60% of the demand for hot water, apart from the open-door swimming pools that should fully heat water from solar thermal energy systems.

Currently, there is no minimum level for the use of renewable energy in building regulations and codes. As mentioned above, the new law on renewable energies requires the Council of Ministers to set minimum targets for the production of sanitary and technological hot water with solar energy in buildings, and mandatory installation of NUED systems for a category of buildings. Meanwhile, a governmental draft decision is prepared on mandatory installation of NUED systems within buildings. The draft-decision also contains minimum NUED area that must be installed to meet the building demand for hot water. According to the draft decision, this NUED system will have an area to meet at least 60% of the demand for hot water, apart from the addition that will have to heat water completely by solar thermal energy systems.

The national policy has not taken into account any obligations for the minimum levels of renewable energy at the new and recently refurbished buildings. Based on the requirements of the new law on renewable energies, these minimum levels should be taken into account in these policies.

### **3.4.3 *Informative provisions***

Current and future information, as well as awareness campaigns and programs together with planned revisions and expected results should be described. Member States should also indicate which responsible authority will monitor and review the effects of the programs. When regional authorities / governments have a key role, please specify and summarize.

According to Article 8 of the law on renewable energies, the Ministry responsible for energy and the authorized agency being responsible for renewable energy resources (NANR) ensures that all stakeholders, such as customers, developers, planners, sponsors, investors, financial institutions, builders, installers, architects and suppliers of equipment and heating and cooling systems, electrical power equipment and other devices that use renewable energy, are made available information on support measures for plants that use renewable energy resources.

The same article (paragraph 2) provides for that the Ministry responsible for energy or agency responsible for renewable energy should develop appropriate programs for training or guidance on public awareness and information, in order to inform the interested parties and citizens about the benefits, costs and realization of the development and use of energy from renewable sources.

Ministry responsible for energy or subordinate institutions have not provided detailed rules or procedures on the way how to provide this information or awareness. However, it should be noted that a series of awareness campaigns have been launched by energy institutions in Albania to promote the use of RES in Albania, through various seminars, advertising in mass media etc. Ministry responsible for energy, together with its subordinate agencies, have organized a number of promotional activities that private investors invest in small power products with very good results. In recent years, a large number of private investors have shown keen interest to invest in electricity produced from water and wind.

There is still no plan of measures to promote the use of RES at a local level. The new territorial reforms, which will enable the creation of large municipalities expected to emerge after local elections of June 2015, can be a key opportunity to enhance the role of local authorities for the implementation of RES policies.

Currently, there are no bodies responsible for providing information on the use of renewable energies in the heating and cooling sector and transport sector. As mentioned above, the new law on renewable energy (Article 25), the Council of Ministers issues a regulation to ensure that public is given information on the ownership and environmental benefits from all different sources of renewable energy for transport. Regulation should also foresee the obligation to specify at the sales points when the content of bio-fuels diluted in oil byproducts exceed the limit set in percentage, according to the stipulations made by ERE.

As mentioned above, the new draft on renewable energies requires, with regard to information on support measures for the use of renewable resources for electricity, the government has made available this information to investors not only through legislation published in the Official Journal or various websites, but also through a series of public events such as conferences, seminars etc.

The government aims to transform the agency responsible for renewable energies into an information center for all stakeholders regarding support measures for the use of renewable energies.

Currently, no institution or agency is responsible for developing and providing guidance for planners and architects to help them to take into due account the optimal combination of renewable energy resources, high-efficiency technologies, as well as central heating and cooling when planning, designing, building and refurbishing industrial or residential areas.

The Albanian government is preparing new legislation on energy efficiency and energy performance of buildings, including specific provisions for the optimal combination of renewable energy resources and high-efficiency technologies in planning, designing, building and refurbishing industrial or residential areas.

Information, awareness and training programs on the benefits and practices of using renewable energies to date have not been properly organized. Institutions responsible for energy policy, mainly for the support of international donors, have launched a series of information and awareness campaigns, but with little results. The only area where these programs have had satisfactory results are programs for the promotion of small power producers. A great interest is recently shown by the Ministry responsible for energy and the National Agency of Natural Resources to promote solar panel systems for hot water at local level.

#### **3.4.4 *Electricity infrastructure development***

In addition to the existing situation and future actions of the current legislation, a description should be made of the planned revisions, relevant responsible bodies and expected results.

The existing domestic legislation includes as follows:

- Law no.43/2015, dated 30.04.2015 “On energy sector”;
- Law no.138/2013, dated 2.05.2013 “On renewable energy resources”
- Transmission Code
- Distribution Code
- Measurement Code
- Market Rules
- Law no. 107, dated 31.07.2014 “On territorial planning and development”, as amended
- Law no. 91/2013 “On environmental strategic assessment”
- Law no.10440, dated 07.07.2011 “On environmental impact assessment”, as amended
- Law no. 10448, dated 14.07.2011 “On environmental permits”, as amended

- Other secondary legislation approved in conformity with law.

According to the law on energy sector (Article 60), the Transmission System Operator, in consultation with interested stakeholders, draws up a ten-year plan on network developments and submits it for approval to ERE. Network development plan should take into account existing and scheduled demand for electricity; urban and regional planning of the area where transmission installations are extended; investment plans for regional networks and legislation on environmental protection, in particular the requirements of applicable law on environmental strategic assessment.

Also, the Transmission Code (Chapter 2, 3 and 4), Transmission Operator System (TSO) is, *inter alia*, responsible for the operation, development and expansion of the transmission network, as well as for the management of any transit of electricity between foreign systems using Albanian grid. According to Article III.5.1 of the Transmission Code, TSO is required to produce a Perspective Plan that covers a period of 15 years for the development of transmission system, taking into account the forecasts for electricity demand, peak capacity, additional capacities for electricity, transmission capacities, losses and other important parameters of SEE.

On the other hand, the Distribution Code (article II.4) requires the Distribution System Operator (DSO) to prepare a development plan for the distribution system based on the study of the future development of electric grid for an average period of 5 years and maximum 10 year term.

Both the transmission and distribution code will be revised to be in line with the provisions of law for the energy sector.

It is clear that any development plan must take into account the National Energy Strategy, updated for the development of energy resources, including the production of electricity from renewable sources.

Currently, TSO has in place not a too modern system of information measurement and collection. However, in recent years TSO realized a new dispatch center, together with a more advanced SCADA system that will enable TSO to gather real-time information from all producers of electricity and transformation points.

The new energy law (Article 78) requires that intelligent metering systems of end users can be installed in the power supply market. Implementation of intelligent metering systems will undergo a preliminary economic assessment, which must take into account all long-term future costs and benefits of the market and clients, including also the form of intelligent metering to be selected, which must be economically more effective and with more appropriate time limit for applying in practice such metering system. DSO will perform an economic assessment and prepare a schedule with the aim of installing intelligent metering systems within a period of 10 years.

Albanian operator of the transmission system has already completed a new 400 kV interconnection line with Montenegro (Tirana 2 - Podgorica), which increased the capacity of the Albanian system interconnection up to 1000 MW.

Currently, OST is working to build a new 400 kV line with Kosovo (Tirana 2 - Pristina), which is expected to be completed in 2016.

In addition, a Memorandum of Understanding is signed between the Albanian and Macedonian transmission system operators for the construction of a new 400 kV line (Elbasan-Bitola). The project is expected to be financed by German KfW bank.

Private investors have also shown interest to build an underwater cable system linking Albania to Italy. All these interconnections are increasing and strengthening the interconnection capacity of Albania with other neighboring states, which will largely facilitate the potential development of a regional market, where power plants with RES are expected to play a key role, considering the substantial resources in Albania and in other regional countries.

According to article 31 of Law no. 40/2015, dated 30.04.2015 "On power sector" authorization for construction of new interconnection lines, whether funded by the TSO or by private persons, should be approved by the Council of Ministers.

Furthermore, construction permits for network infrastructure are granted to companies that have a license for the transmission and/or distribution of power. According to Law no. 107/2014 dated 31.07.2014 "On territorial planning and development" and DCM no. 408, dated 13.05.2015 "On approval of the regulation on territorial development", every construction permit for energy infrastructure will be granted by the National Territory Council.

Projects for building new infrastructure facilities for electricity are required to undergo the procedure of Environmental Impact Assessment according to provisions of applicable legislation in this area. The main problems that transmission and distribution companies face in the construction of a line are related to land ownership. These issues are not related to the cost of paying the compensation price in case of expropriation, instead they are linked with the fact that in many cases landowners do not possess the certificate of ownership, since most of the lands in remote areas are not registered with the Immovable Property Registration Office.

Procedures for transfer of land ownership, where the project is implemented, are followed in accordance with law 8361, dated 22.12.1999 "On expropriation and temporary usufruct of private property for public interest". For this purpose, the interested subject prepares the relevant file as required by law.

The file is sent to the Ministry of Energy and Industry (MEI), which designated the Special Committee on Expropriation to review the file. If the file is completed in accordance with the law, MEI sends a proposal for expropriation to the Council of Ministers, which decides in favor where it notes that expropriation is based on law.

Further, the applicant properly compensates the owners according to tariffs set by withdrawing the title of ownership (retrieved from the Immovable Property Chief Registrar Office) and an identity document and prepares documentation for registration of property in his/her name with IPRO.

Due to the difficulties of Albania in administrative spatial planning, there existed a more efficient coordination between grid infrastructure approval and other administrative procedures planning. However, specific regulations adopted by the ERE regarding the review and approval of investment plans of the licensees in the electricity sector provides that such plans must take into account any spatial planning to develop the institutions of central or local authorities.

Discipline and better planning of new constructions will facilitate the development and building of a new network infrastructure in the future.

According to Article 11 of the law on renewable energies, at the request of a producer and in accordance with ERE regulations, the network system operators realize the connection of the plant with its point in the network system at the best option possible regarding the distance and technical requirements of the plant, if the network system has no other more favorable connection point. In choosing the best and

most appropriate network, the system operator must take into account technical limitations or technical efficiency of the point where connection will be realized.

The same article (paragraph 2) provides that network system operators, at the request of the manufacturer of highest priority, make the connection of the plant with its point in the system, at the best option possible for the manufacturer with priority from the location of the plant, meeting the technical requirements of the plant, if the network system has no other more favorable connection.

There are no such cases because the current legislation requires that before a concession or authorization is granted for the construction of a new power generator from TSO or DSO, a connection point should be ensured to the transmission or distribution network.

According to the Power Sector Law (article 28) any costs of connection to the transmission and / or distribution network of a producer of electricity, including RES electricity producers, will be borne by the manufacturer. The connection procedures are defined by codes of transmission or distribution. Article 27 of the law on energy sector provides for that each new connection will be based on the rules and procedures proposed by the licensee and approved by ERE, including the cost calculation methodology and standard agreement of network connectivity.

However, the new law on renewable sources (article 11) provides for that operators of network system must optimize, expand and improve the system for connection and transmission of electricity from new power plants that use renewable energy resources, in accordance with the National Action Plan for Renewable Energy, master-plans of network operators to expand network system or any official document in force. These plans for optimization, expansion and reconstruction of the network system, where appropriate, should include the capacities of interconnection, intelligent networks and accumulation capabilities, in order to ensure the operation of network operator, and adaption of further developments for the production of electricity from renewable energy resources.

The same article stipulates that network system operators should develop and publish standard rules for keeping and sharing costs of technical adaptations, such as network connections and strengthening of network, improvement of the operation of networks and rules for the non-discriminatory implementation of network codes required to integrate a new producer on the national grid. These rules should be based on objective, transparent and non-discriminatory criteria taking into account all costs and benefits from the connection of producers to the network, as well as special circumstances of producers located in peripheral regions and in regions with low population density. Standard rules on cost maintenance and sharing will be approved by ERE.

Any expenses incurred by transmission and distribution system operators to improve relevant systems in order to enable the connection of new producers of electricity with RES are reflected in their rates of transmission and distribution approved by ERE, if the investment for these improvements is previously consented by ERE.

Costs incurred by electricity producers for connection to the grid will be borne by themselves. As mentioned above, the new law on renewable resources authorizes ERE to develop standard rules, including the allocation of costs between electricity producers and RES network operator. However, these specific rules are not yet developed and approved.

There are no such rules for costs associated with upgrading of the network. If an investment for connection of a new producer of electricity is done by the private investor, any connection to other manufactuRES who use this investment will be subject to a private agreement between the two

manufactures. Specific rules for the cost allocation of connection to the grid, as required by law for renewable energies, would include provisions dealing with the connection of this producer to a connection of an existing plant, already included by the first manufacturer.

Currently, the connection of new producers with RES is done according to specific rules contained in the transmission and distribution code, but the primary legislation does not include any specific provision for this purpose. Renewable energy law (Article 11/3) provides for that, upon the request of producers seeking connection to the network systems, network system operators will give them full and necessary information, including

- A comprehensive and detailed assessment of the costs for physical connection to the network;
- Reasonable and accurate time limit for receiving and processing the request for grid connection;
- Reasonable time limit for any proposed grid connection.
- All these requirements will also be part of the relevant codes or other special regulations approved by ERE.

### **3.4.5 Grid operation**

The new law on energy sector (Article 29) provides for that operators of transmission and distribution system ensure access to the network for all clients and users of the system, on transparent and non-discriminatory basis and at ERE approved and published tariffs. The same article foresees that producers who produce energy from renewable sources, have priority access to the grids.

The new law on renewable energies (article 11/7) provides for that transmission and distribution of electricity produced from renewable energy resources are guaranteed, except in emergency situations defined in the law on energy sector or in the transmission and distribution codes. In the course of the dispatch of power generation plants, the Transmission System Operator will attach priority to power generation installations to the extent that allows safe operation of the national electricity system and based on transparent and non-discriminatory criteria.

Currently, all existing producers of electricity in Albania rely on hydropower, therefore no priority is attached to the generating installations. Furthermore, the transmission system operation is carried out by an independent operator of the transmission system that dispatches the producers based on market rules.

As for producers connected to the distribution network, existing legislation guarantees their access to the network, unless there is a security problem with the functioning of the network.

Constraints/interruptions of electricity from renewable sources are reported when the distribution system operator has been forced, due to technical reasons, to disconnect a remote area where it is and where the small hydropower manufacturer is connected. The Albanian government has prepared a purchase contract for small hydropower plants based on the principle "take or pay", which will guarantee that in the event of constraint/interruption by the network operator without a technical reason small producers of electricity will be compensated for the decreased product.

Energy Regulatory Entity (ERE) is the responsible institution for monitoring the application and implementation of the measures described above. This regulatory entity is also responsible for the adoption of secondary legislation on the operation of network.

All RESpower plants are integrated in the energy market. The energy market is designed in accordance with the Albanian market model adopted by DCM no. 338, dated 19.3.2008. This market model requires that all electricity of the distributed producer ( ) be purchased by the buyer at a regulated promotional fee approved by ERE. At the same time, ERE has approved a standard agreement for the purchase of

electricity (EPA) for these SHPPs. However, the model also foresees that SHPPs sell their electricity in the market at market prices, if they prefer so.

Albania has adopted a new law on the energy sector (law No.43 /2015, dated 30. 04.2015) and secondary legislation should be developed to implement this new law, including a new model of the market and new market rules. Considering that the new law abolishes the concept of Public Wholesale Supplier, a new entity is expected to be designated as a recipient of electricity produced from renewable energy plants.

On the other hand, power producers (IPPs), which do not meet the conditions to receive a promotional fee of selling electricity to the receiver, can sell electricity to DSO at negotiable prices to cover the losses of distribution or to sell in their energy at the competitive domestic market or export it abroad by using the right of access to the transmission system.

All electricity producers are required to be licensed by ERE and be registered with the market operator, and to pay a financial guarantee. These requirements are the same for the participants in the market and no preferential treatment is afforded to RES producers of electricity.

The new law on power sector envisages that energy market should be consolidated in Albania, in order to further increase transparency and competition in the wholesale market. Day-ahead market will create more market opportunities for renewable energy plants, especially for those that are not eligible for a promotional fee.

Based on the transmission and distribution tariff methodologies, and according to market rules approved by ERE, transmission or distribution tariffs in the domestic market are paid as per the load and not by producers. There are no plans to introduce a distribution or transmission fee for electricity producers, including those with RES plants in the near future.

### **3.4.6 Development of regional heating and cooling infrastructure**

The country has no long-distance heating or cooling infrastructure and no specific legislation for long-distance heating or cooling is approved or expected to be approved

### **3.4.7 Bio-fuels and other bio-liquids-sustainability criteria and compliance**

The following part of the national action plan should explain the future strategy of the Contracting Parties to meet sustainability criteria for bio-fuels and bio-liquids and ensure compliance with the scheme.

In February 2008 Albania adopted a special law on bio-fuels and other renewable fuels for use in transport (law no. 9876, dated 14.02.2008). The purpose of this law is to promote the production and use of bio-fuels and other renewable fuels used for the replacement of oil byproducts in the transport sector, in order to contribute to the accomplishment of commitments established under Kyoto Protocol for climate changes, as well as provide tools and promote renewable energy resources through the introduction and cultivation of crops for energy and environmental protection. The law transposes the previous EU Directive 2003/30/EC of 8 May 2003 on the promotion of bio-fuels or other renewable fuels used for transport. However, the current law has no special provision to define the sustainability criteria for bio-fuels and bio-liquids.

The Albanian government is in the process of development of a new law on bio-fuels to transpose the Directive 2009/28/EC.

The new law is expected to contain a number of provisions on the sustainability criteria for bio-fuels and bio-liquids produced or traded in the Albanian market.

Law on bio-fuels has set specific objectives for the use of bio-fuels in the transport sector, and according to the new law on renewable sources, these objectives will be integrated into the overall objective of renewable energies in the total final consumption within the country. Every compliance with the objectives set by law for the consumption of bio-fuels and NREAP will be monitored by State Technical and Industrial Inspectorate, which is the successor of the former Central Technical Inspectorate.

According to the new law on renewable sources, the National Action Plan for Renewable Energies to be adopted by the Council of Ministers, will be monitored by the agency responsible for renewable energy resources, which is expected to have authority and powers to monitor compliance with targets set for all renewable resources, including bio-fuels.

While the current law on renewable sources has no special provisions for the sustainability criteria on bio-fuels and bio-liquids, the new draft law on bio-fuels will incorporate such criteria transposing the Directive 2009/28/EC. At the same time, the new draft law on bio-fuels will require the responsible Agency for renewable sources that in cooperation with the respective authorities responsible for agriculture and forestry, it will monitor and check compliance of bio-fuel producers with the sustainability criteria defined by law.

National Agency for Natural Resources, which is responsible for renewable sources, as required by the revised law on renewable resources, will have responsibility for monitoring and checking the compliance with sustainability criteria. This Agency is expected to be supported by responsible authorities for agriculture and forests based on the new law on administrative and territorial division.

Protected areas established in accordance with law no. 8906, dated 6.6.2002 "On protected areas" are managed by the relevant state authority set up by the Decision of Council of Ministers, depending on the type and nature of the protected area. The composition, duties, responsibilities and functioning of the administration of each category of protected area are approved by the Council of Ministers.

MoE, after approval by the Council of Ministers, can take over the management of protected areas, including its auspices of the respective administrative body for this administration.

ME defines the method of marking the protected areas on the ground and on the map. The emblem of the Republic of Albania will be used to mark the protected areas. ME informs the relevant geodesic and mapping bodies about the statements, changes or removal of the protected area status. Protected areas are registered with the central archiving system of the Ministry of Environment, which is created by using data of the relevant state institutions and other specialized institutions.

MM formulates and approves rules for establishment, operation and use of the central archiving system.

The central archiving system of protected areas is open to the public and everyone can use it with permission and in the presence of an authorized official.

Law no. 8906, dated 6.6.2002 "On protected areas" provides special protection for some key components of nature and biodiversity. This law classifies protected areas into six categories, as follows:

- a. strictly natural reserve/scientific reserves - Category I
- b. national parks - Category II
- c. natural monuments - Category III
- d. managed nature reserve / area of management of habitats and species - Category IV
- e. protected Landscape - Category V

f. protected area of managed resources - Category VI

The categorization of areas, status and level of protection for each area based on the criteria of the World Centre for Nature Conservation.

For each category, the legislation provides a certain level of protection. Categories of protected areas are defined in the Decision of the Council of Ministers for their recognition.

Article 4/3 of the Law also foresees that areas where natural habitat species of interest to the European Community, as well as other habitats of interest to this community, are declared areas of special conservation. These areas are part of the national ecological network and may include protected areas and ecosystems, habitats and landscapes outside the network. Minister responsible for the environment approves the list of Albanian areas of interest to the European Community.

The law provides that protected areas are declared land, water, marine and coastal areas designated for the protection of biodiversity, natural, cultural and social features managed by legal remedies and modern scientific methods.

Article 15 of the law stipulates that the Ministry of Environment, other state agencies and local government authorities or in cooperation with third parties, draw up for each protected area, management plans of this area. Management plans of protected areas will be included in policies, plans and programs related thereto, as well as in decision-making at the national, regional or local level. Procedures for changing the status of agricultural land are provided by DCM no. 665, dated 28.07.2010 "On the rules and procedures of change of categories of land resources" and DCM. no. 410, dated 27.06.2012 "On establishment of rules and procedures of change of categories of land resources" including a number of requirements for each application associated with the land status change. The process involves a number of institutions, Regional Directorates of Agriculture, Ministry of Agriculture, Rural Development and Water Administration, Regional Forest Service and Ministry of Environment in cases of the change of forest land status.

The decision on the land status change is made by the Minister of Agriculture, Rural Development and Water Administration to change the status of agricultural land to forest land, pasture or meadow and through a joint decision of the Minister of Agriculture, Rural Development and Water Administration and the Minister of Environment to change the status of forest land, pasture or meadow to agricultural land.

The protection status of a protected area is removed or changed when the circumstances or objective for granting this status has changed. The status of a protected area is revoked by a Decision of Council of Ministers, with proposal of the Ministry of Environment, after receiving feedback from specialized institutions, local government authorities, non-profit organizations and owners when their properties are part of the protected area.

The proposal on revocation of the status of a protected area should include:

- a) Justification for the status revocation ;
- b) environmental impact assessment that reflects the impact on the existing categorization of the protected area, biodiversity and local communities or populations;
- c) a description of mitigation measures;
- d) the results of the coordination and consultation processes with stakeholders from civil society, especially with populations or communities within and around the protected area, including a summary of comments received and reflection on the proposal.

The legislation has not provided for any time limit to update the registry (cadastral) of land zoning, however the legislation requires that under the new territorial and administrative division, the Department of Land Administration and Protection should update cadastral documentation for the territory under

their jurisdiction and they are also obliged to inform the local immovable property registration offices of any changes of land categories, which can be adopted according to the requirements and procedures of the applicable legislation.

The Albanian legislation generally requires that raw materials used in agriculture should meet the best agrarian-environmental practices. The use of raw materials in agriculture is regulated by Law no. 7659, dated 12.01.1993 "On seeds and saplings". The State Entity of Seeds and Saplings is set up for the purposes of quality control for the plant cultivation material and for conservation of genetic material. This institution is under the Ministry of Agriculture, Rural Development and Water Administration. The State Entity for Seeds and Saplings is the only governmental body responsible for licensing the importation or exportation of any kind of plant cultivation material.

### ***3.5 Intended use of statistical transfers between Member States and planned participation in joint projects with other member states and third countries***

This sub-chapter should describe the intended use of cooperation mechanisms between Member States and third countries like Albania. This information should be based on what is provided in the forecast document, referred to in Article 4 (3) of Directive 2009/28/EC.

#### **3.5.1 Procedural aspects**

Accurate, reliable and timely assessment of production capacities is essential for the country's ability to provide statistically "surplus production" for Member States, taking into account the mandatory percentage of renewable energies in energy consumption.

The establishment of national procedures requires the creation of an updated and well-coordinated register of gross final energy consumption in all sectors of the economy and reliable tracking of the implementation of renewable energy projects. In the sector of electricity, gross production and consumption from renewable energy resources is determined on the basis of guarantees/certificate of origin. Currently in Albania there is still no market for warranties/certificates of origin (e.g. as part of the sales of energy green certificates (produced from renewable sources). Detailed promotions of the guarantee / certificate of origin under the new law on RES are set out in Articles 19, 20 and 21.

##### **3.3.1.4 Certificate of origin warranty**

ERE, at the request of a manufacturer that has been supplied by ERE with technical preliminary qualification for the plant with renewable energy under provisions of the regulation referred to in paragraph 10 of this Article, will issue a certificate of origin guarantee for electricity or heat produced by a generating plant. Guarantees of Origin will apply to the standard size of 1 MWh and will specify:

- energy resources from which electricity is produced, classified by type and key components, including the information to what extent the electricity was produced from renewable energy resources;
- exclusive percentage of biomass, in cases where biomass is used;
- name and address of the producer;
- location, capacity and date of commissioning of the plant;
- Period during which energy is produced and to what extent it is paid in accordance with Articles 15 and 16 of this Law, and
- Place of issue and unique identification number.

ERE will supervise the issuance, transfer and cancellation of guarantees of origin in accordance with the provisions of the regulation issued under paragraph 9 of this article.

Guarantees of origin are issued based on comprehensive data and correct information to certify the origin of electricity supplied by the manufacturer and certified measurement data from network system operator. Guarantees of origin are issued only if the producer provides all the information required under paragraph (2) of this Article.

Any use of the guarantee of origin is made within 12 months of production of the corresponding energy unit. The guarantee of origin is canceled after use.

If electricity is produced from a hydro power plant with a reversible pumping system, guarantees of origin will be issued only for the amount of energy corresponding to the difference between the electricity produced by hydropower plant and electricity consumed by the reversible pumping system. If electricity is produced from biomass, guarantees of origin will be issued only for the percentage of energy corresponding to the bio-degradable share, as defined in paragraph 1 of Article 3 of this law.

Within a period of 12 months from the date of entry into force of this law, ERE will create an electronic register of guarantees of origin with a suitable mechanism for data processing to ensure that guarantees of origin are issued, transferred and canceled electronically and are accurate, reliable and not subject to fraud. Any interested party is entitled to freely have access to this register.

Within the same period referred to in paragraph 8 of this article, ERE will adopt a specific regulation for the procedure applied for guarantees of origin. The regulation foresees in particular:

Documents to be submitted by the Producer for technical qualification of its installation as a plant for generating electricity or heat from renewable energy resources.

Technical qualification procedure and in particular the timeframe within which ERE must respond to applications submitted, as well as the legal consequences due to failure to meet this obligation.

### **3.3.1.5 Monitoring procedure**

Procedure applied to the issuance, registration, transfer or cancellation of guarantees of origin.

Issues related to cooperation with competent authorities of the EU Member States and other countries with which an agreement is signed for mutual recognition of guarantees of origin. ERE is responsible for changing the previous regulations on the procedure applied for guarantees of origin to reflect the provisions set out in paragraph 9 of this article

### **3.3.1.6 Monitoring procedure and prohibition of multiple sales**

To ensure that the conditions for issuing the guarantees of origin are met and that data and information on which their issue is based are correct, ERE representatives and any person authorized by it, have a right of free access to the respective generation plant and to all data and information related thereto, without prejudice to the maintenance of business secrets. The producer is obliged to facilitate the work of ERE representatives and the persons authorized by it.

Electricity and heat produced from renewable energy resources, as well as landfill gas or gas from wastewater treatment disposed to the gas network cannot be sold or transferred more than once. As a result, the Producer is paid by promotional legal fees and will not be permitted to transfer or sell any guarantee of origin for electricity. If the Producer delegates this guarantee of origin for electricity from renewable energy resources, no feed-in tariff can be paid for electricity and the Producer may lose benefits from feed-in tariffs.

### 3.3.1.7 International cooperation for origin guarantees

The guarantee of origin for electricity produced from renewable energy resources, which is issued by a state that is a Contracting Party or a Member State of a Contracting Party to the Energy Community Treaty, is also recognized in Albania.

The Council of Ministers or the Ministry responsible for energy may enter into agreements with one of EU member states or a contracting party to the Treaty of the Energy Community for Southeastern Europe for mutual recognition of guarantees of origin for the purposes of measuring compliance with the requirements of Article 4 of this law on general national objectives for renewable energy. Guarantees of Origin issued/registered by ERE and this mechanism are sufficient to determine the production of renewable energy as part of the gross final consumption of electricity.

It is more difficult to determine the major contribution of biomass energy in the heating and cooling sector. Given the huge consumption of wood biomass for heating purposes, the estimation of the part of renewable energy resources in final energy consumption in this sector requires information on:

- total direct supply with wood biomass (from the managed forests);
- total direct supply of wood biomass from individual collection of villagers;
- total biomass supply from industrial waste (from the wood processing and furniture industry, sawmill units, paper and paper pulp processing industry, recycling of wood);
- total recycled / remained / regenerated biomass;
- assessment of the gross calorific value of alternative biomass
- total biomass production from energy agricultural crops;

To this end, we need to ensure close cooperation between the Ministry of Agriculture, Rural Development and Water Administration, Ministry of Environment, Ministry of Energy and Industry, Ministry of Public Works and Transport, National Agency of Natural Resources and Institute of Statistics (INSTAT).

Based on the above information, it can determine the total energy content of the total biomass production can be calculated compared to the corresponding total energy content of fuel used for heating. Despite the great variety of combustion technologies with high efficiency, it can be assumed that in a certain use, the total usable energy content of the biomass would be equal to that of ordinary fuels, i.e. bio-fuels directly replace the same amount of conventional energy.

ERE and the National Agency of Natural Resources will administer a national database for electricity, for all the statistical data related to energy resources as described above. Statistical guarantees of origin shall be issued for every 1 MWh (0.086 toe) produced from renewable energy resources in transport and heating, as well as for electricity produced from renewable energy resources. These origin warranties will be available for trading by EU member states.

The implementation of renewable energy projects can be combined with the implementation of energy efficiency measures based on NAPEE, already approved by the Albanian Government on September 9, 2011. Given the national potential for implementing energy efficiency measures, a key criterion in the selection of fund-eligible projects will be the participation of enterprises making improvements in energy efficiency, for example, enterprises with high demand for energy, large buildings and energy traders. Another advantage would be the existence of an energy audit report to contain information about the economic advantages of energy efficiency measures, allowing an assessment whether these measures should be integrated or not to the measures for renewable energies.

Contracts with guaranteed results, together with grant financing for additional measures from the state budget, private investors and the operational programs will constitute an appropriate mechanism. Albania is ready to participate in joint projects with Member States. After the approval of law on RER, ERE shall prepare feed-in tariffs for cogeneration plants using biomass energy.

### **3.3.1.8 Calculated surplus of the production of renewable energies that may be transferred to other member states compared to the indicative trajectory**

In the best scenario for the development of energy production from renewable sources, combined with a firm policy on energy efficiency, Albania has high potential for statistical transfers to other member states, especially based on the concept that only wind power plants (eolic parks/wind farms) with a capacity of 100-120 MW would be needed to meet RESobjective. Wind potential is approximately 1500 MW, as it will be mentioned in the following section, and all the difference will be available for export purposes.

#### ***3.3.1.8.1 Potential calculated for joint projects***

There are a number of options for the development of projects for the use of renewable energy in Albania. Production of electricity from renewable energy resources is strongly supported by the domestic legislation and a number of investors from the European Union. Several projects have already been completed, while others are ongoing. There are a number of opportunities for joint projects in this field within the range of up to 3000 MW of installed capacity (mainly hydropower, wind, biomass and solar energy).

However, economic conditions in Albania require a combination of policies to encourage the use of renewable energy policy promoting the production of heat, which is much more efficient in terms of primary energy use and requires less relative investment. Costs of supply and transformation would also be lower because production would be closer to the consumer. There are a number of options:

- a large-scale program to promote the use of solar panels for water heating, thus reducing energy use. It is worth noting that UNDP program on Climate Changes supported by FGM and the Albanian government is working for two years to promote this technology as one of the main uses of RESto cover the demand for hot water, coupled with the reduction of gases with greenhouse effect;
- combined burning of fossil fuels and biomass for central / regional heating in public buildings;
- expansion of the production of wood chips from wood waste use, with a view of replacing installations for the production of heat in industry and public services buildings.
- The Albanian Government is also implementing a project to replace fossil fuels with renewable energy resources for heating / water heating in public buildings. This project supported by KfW "Promotion of energy efficiency of renewable energy resources in Albania" is already implemented as a pilot project in three cases and is planning to invest around 5 million Euro in various public buildings. The fuel-operated current boilers can be completely replaced with plants using solid biomass, bio-gas or bio-fuels to meet energy demand for the heating of premises and solar collectors to cover hot water demand.

Yes, a proper technology for the heating of premises is based on the combustion of solid unprocessed biomass raw (e.g. wood chips and pallets) in boilers with installed capacity of 0.1 to 0.3 MW. The exact number of potential installations will be determined in the next two calendar years after the preparation of the register of hot water boilers in the Albanian territory, as required by the draft law on energy efficiency. The National Agency of Natural Resources will start the preparation of such a register within the next two years.

Most of the waste from agriculture, food processing industry and logging can be processed by being transformed in chips and wood briquettes. Currently, these opportunities are not used due to the high

price of chips and the fairly low price of firewood widely used by families. According to estimates, about one third of apartments in Albania use wood biomass for heating, most of which is crude. This market is continuously expanding because families refuse to use the expensive services of central heating companies, which use mainly electricity and LPG.

Municipalities with their forests that have proper annual growth to supply the planned capacities, are suitable for the implementation of joint projects. Funding may be provided under contracts for guaranteed energy savings under operational programs and the European Union. Owners of forests or large farms and producers of biomass boilers are eligible participants for the construction of factories for the production of chips and wooden pallets.

Currently, Albania has no joint project with other member states regarding the promotion of biomass boilers with high energy efficiency. However, suitable technologies from Germany and Austria have just arrived in the Albanian market.

## ASSESSMENTS

### *3.6 Assessment of the available potential for the development of local renewable energy resources*

#### **3.6.1 Potential of hydropower plants (HPP)**

It should be noted that in Albania there is still a high hydro-capacity for creating new power generation capacities to be built in the coming years. The following HPP-s are proposed to be considered as new capacities:

- About nine medium and large hydropower plants with total installed capacity of 385 MW, including HPP of Kalivac.
- On Devoll River: HPP of Banja with 65 MW and HPP of Moglicë with 178 MW
- Medium and large HPPs with a total installed capacity of 480 MW
- ERE plants with total installed capacity of 30 MW
- Photovoltaic plants with total installed capacity of 32 MW

#### **3.6.2 Concessions for SHPPs**

Since 31 December 2014, the Albanian Government, based on the law "On concessions" (adopted in December 2006), has awarded up to about 120 concession contracts (110 have been already approved and 10 are in the final stage of discussion) for the construction of HPP-s of different categories. Annex I provides the total number of concessions, the relevant company, installed capacity, average annual production and respective investment for each concession contract. To have a clear picture of small medium and large hydropower plants, the total list of HPPs is divided into the following three categories:

1. One or cascade of SHPPs-with total capacity below 15 MW. Based on the definition of the Decision of the Council of Ministers (DCM), they are considered SHPP;
2. SHPP-cascade with a total capacity of over 15 MW: Based on the definition of the Decision of Council of Ministers (DCM), they as considered as SHPPs;
3. Medium and large HPP-s and cascade of hydropower plants with a capacity of over 15 MW each: Based on the definition of DCM, since each plant has a capacity of over 15 MW, they are not considered SHPPs;

The analysis shows that the largest number of concessions is related to the first and second group, with a total of 112 concession contracts included in the category of small hydropower plants. The total installed designed capacity is 1740 MW and the share of SHPP-s is about 48%, with an installed capacity of 839 MW. The new planned capacity of energy constitutes a substantial capacity when compared with the current total installed capacity of hydropower plants in Albania (1426 MW). Also, the total planned capacity of SHPP's of 839 MW is much higher compared to the installed capacity of the existing SHPP-s (25 MW) until 2006.

Comparison of estimated annual production of electricity with average annual production of electricity from existing hydroelectric plants in Albania (4180 GWh) shows that the total potential of electricity generation is 185% of current production from hydropower plants. The first group can provide 84% of the present average, while groups two and three can produce 45% and 55% of the current electricity production from hydropower plants.

Regarding the total investment for each of the aforementioned groups, the analysis shows that total demand for investment is EUR 2 471 million and the share of investment required for small HPPs is

about 785 million Euro. Both these values represent significant amounts for the Albanian economy in general and its banking sector in particular, making it a very attractive sector.

### **3.3.1.9 Operational SHPP: old rehabilitated units and new units**

The total list of existing operational SHPPs and their production for the first half of 2014 is available from MEI. In early 2015, the number of the existing operational SHPPs was approximately 90 compared to 18 in early 2006.

The total list of new operational SHPPs, their total capacity installed is equal to 294.32 MW and their production for 2014 (equal to 919 GWh).

### **3.3.1.10 SHPPs under construction**

The number of concession contracts for small hydropower plants under construction is approximately 25 and 8 of them have secured loans, 15 are in the process of negotiation with banks.

## ***3.7 Energy potential from biomass***

The usable biomasses for energy purposes may be classified into four main categories:

- Wood or its remnants from different wood processing industries;
- Plant residues (stalks, seeds etc) after the completion of their production cycle, which are not used in other production sectors;
- Energy-related agricultural crops (woods) cultivated to be burned as biomass and;
- Animal residues (bones, skin, manure), which are not used in other economy sectors.

Forests occupy about 36% of the land surface of Albania. Some afforested areas are included in calculations of the land covered with forests, where half of them are classified as groves and shrubs and the other half as forests with high stems/trunks. Almost 4/5 of woods are represented by broad-leaved species, with dominance of oak and permanently green beech trees.

Albania is one of the few European countries that has suffered a decrease in the area covered by forests in recent decades, due to cleaning for agriculture purposes, overgrazing and cutting of wood stuff for fuel, especially during the transition period (in around 1990s ). Cutting of trees has exceeded the annual net growth, which results in decrease of growing stock trees; there was also a decline in its quality as a result of illegal logging. Most of the forests are available for the supply of timber; the rest, which is the vast majority, is not available for economic reasons. More than 4/5 of forests are classified as semi-natural, while the rest is divided into forest without human intervention and plantations. The country developed a reforestation program to plant trees, mainly in a difficult terrain, but currently it is downgraded due to lack of investment in this field. All forests have been state-owned, but land ownership regime is changing categories, including private and community forests. Currently, 47% of the forest is owned by the municipalities, about 51% is owned by the state and around 2% is under private ownership. Efforts are being made to increase the area of protected forest to preserve the rich biodiversity and landscape. Protected areas comprise of more than 450 thousand HPPTares, and they will grow as a result of the commitments of the government.

From 2004 to 2012, the surface of Albanian protected areas Albanian has suffered a triple increase. During the 1990s, and despite the fact that forest management was particularly influenced by the sudden collapse of the previous economy, the forestry sector was not adequately supported. However, the productive capacity of the sector has the potential to be restored, in order to play an important role in rural employment, industrial development and environmental protection.

Contrary to its unique importance for the economy, the forestry sector continues to suffer from some typical problems of transition: declined investment, weakening of practical forest management, maintenance, lack of supervision and law enforcement. Therefore, the basis of resources has declined substantially for many years towards the end, not only in terms of quantitative aspects, but also for the large-scale degradation of forests. Growing of trees per HPptare is significantly affected, and a large amount of mature timber can be nowadays found only in physically inaccessible parts of the country. At the same time, economic restructuring has caused a decline in the efficiency of wood cutting and processing, while illegal cutting have distorted market prices. Also, the local energy policies were not in favor of forests, negatively affecting forest degradation.

Forests all over Albania, especially in mountainous areas, serve as a source of livelihood and income. Firstly, the firewood gathered by villagers, not to mention most of the population in urban areas supplied with firewood, which are vital for heating and cooking almost all over the year. Firewood is an important commodity for Albania, because they are used for heating by most households, and in rural areas they are also used for cooking. They now cover 36% of energy demand for heating and 12% of energy for cooking. This means that firewood is still indispensable source of energy and will continue to be important. Larger groups of consumers of firewood are families, but public institutions, manufactuRES of charcoal and limestone also consume large volumes of firewood.

One of the main problems of the forest sector is the lack of accurate data regarding stock of forests (increase, decrease of its surface area and volume etc.). Forest Cadastre continues to not reflect the real situation of national forests. On the other hand, there is no nationwide cadastral office to evidence/reflect the relevant changes of land use within the country. Forest area is one of the main forest indicators. Over the years, it has undergone some significant changes. It is decreased in absence of a data system due to the failure to draft management plans for many years, national inventory of forests and maintainance of the system database. For this purpose, an identification project with the support of World Bank is ongoing. Data presented in the figures below are based on information released by the Ministry of Environment.

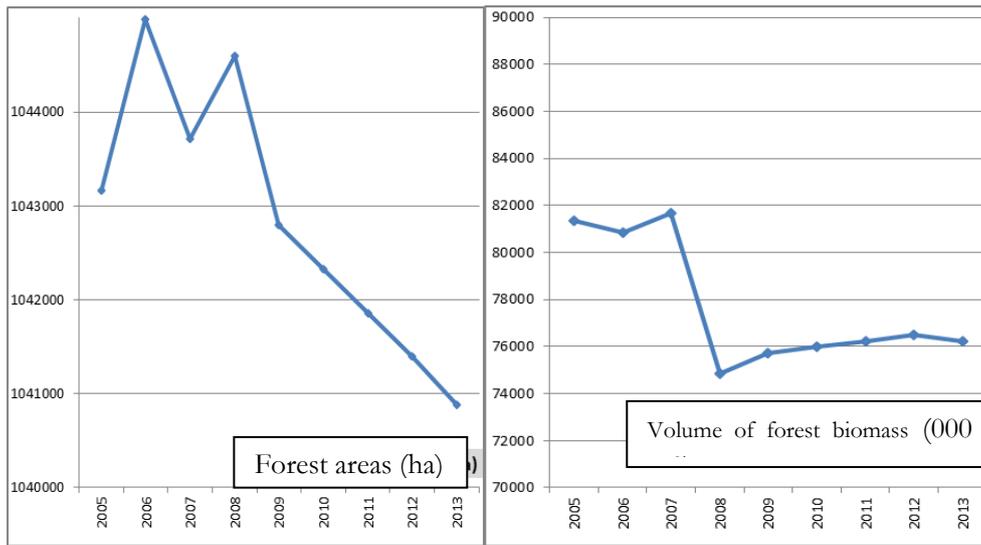


Figure 9: Annual forest area (HPPtares) for Albania (Source – Ministry of Environment)

Figure 10: Annual volume of forest biomass (000 m3) for Albania (Source-Ministry of Environment)

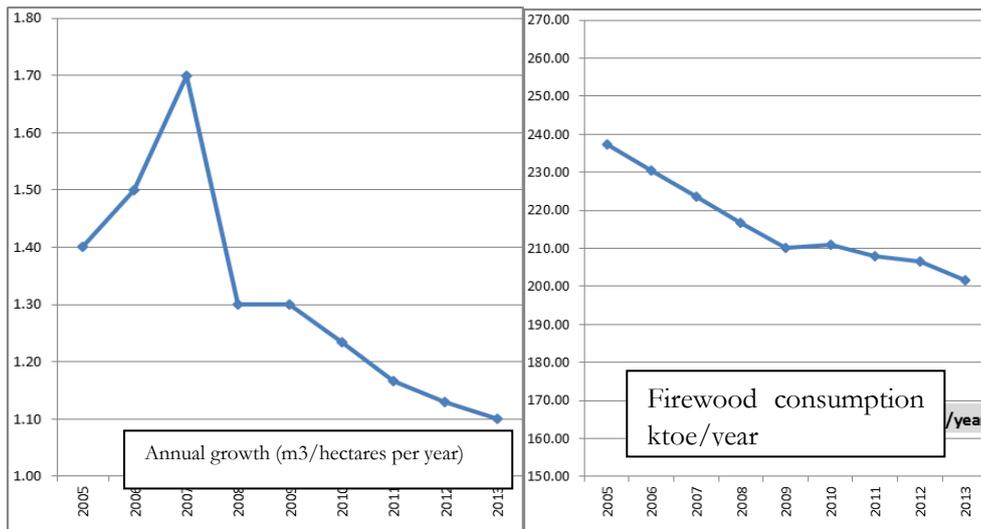


Figure 11: The respective annual growth rate (m3/HPPtares per year) for Albania (Source – Ministry of Environment)

Figure 12: Annual consumption of wood stuff as fuel (ktoe) for Albania (Source – Albanian National Balance Sheet, NANR)

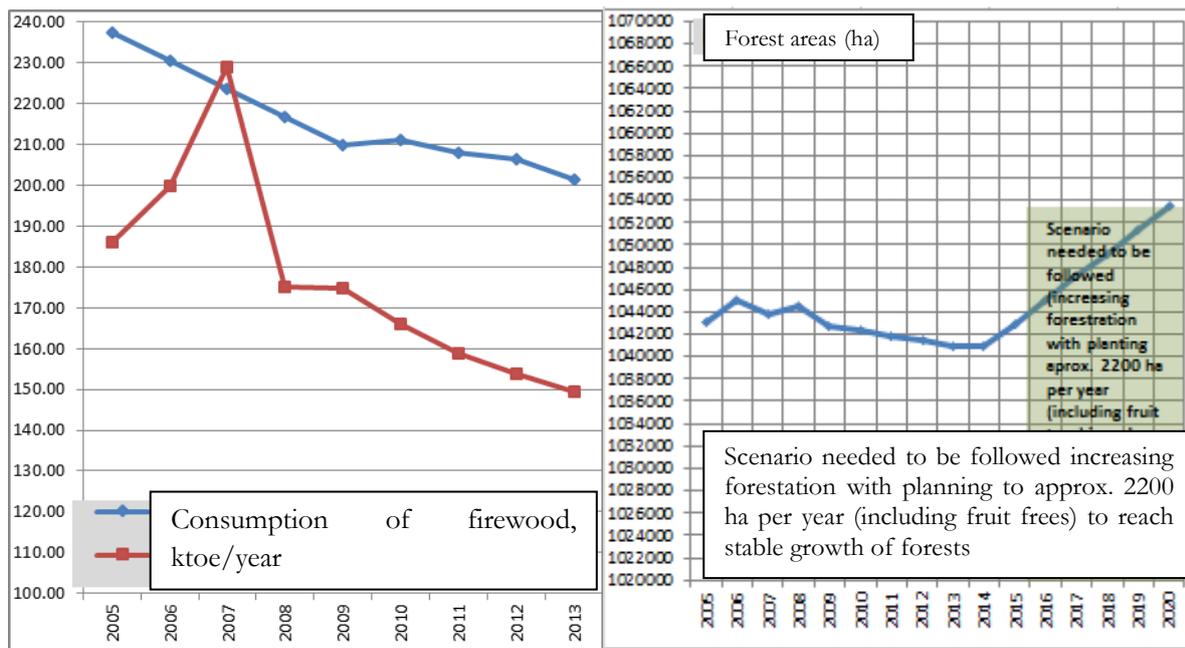


Figure 13.: Comparison of the annual wood consumption as fuel (ktoe) and annual forest growth (expressed in kt oe) for Albania

Figure 14.: Current and planned forest areas to meet the main objective: in 2020 the wood consumption as fuel will equal the annual forest growth for Albania

Biomass categories	Theoretical potential (ktoe)	Participation in energy balance (%)	Technical energy potential, heat (ktoe)	Participation in energy balance for heating (%)	Technical potential of energy, electricity (ktoe)	Theoretical potential of participation in energy balance (%)	Credible potential for the next decade (ktoe)
Forests	263.6	1.07%	234.4	0.95%	70.3	1.07%	315.1
Biomass from seed and fruit & agricultural production	1521.1	6.17%	1449.8	3.97%	293.9	4.45%	1316.8
Urban waste	1576.4	6.39%	1276	5.18%	382.8	5.80%	1446.6
Waste from fruit trees	168.1	0.68%	142.9	0.58%	42.9	0.65%	207.5
Cattle waste	585.25	2.37%	521.6	2.12%	156.50	2.37%	701.5
Power plants	62.34	0.25%	57.1	0.232%	17.13	0.260%	76.72
<b>TOTAL</b>	<b>4176</b>	<b>16.9%</b>	<b>3212</b>	<b>13.0%</b>	<b>963.6</b>	<b>14.6%</b>	<b>4064.2</b>

Table 9.: Theoretical, technical and economic potential of each category of biomass

Based on the data presented, it is clear that the current level of wood consumption as fuel used only for energy requires a higher annual growth of 35-55% than the annual increase of forests. Such a trend should change in order to allow sustainable development of this sector for the Albanian vital economy. In order to attain forest sustainable development, due account should be taken of the use of biomass as fuel to reduce consumption from 2011,50 kt oe (in 2013) to 167,79 kt oe (in 2020), and re-afforestation at the minimum threshold of at least 2200 HPPTares annually.

The use of biomass for energy generation in Albania can be obtained from the following sources (Table 9):

- Agricultural waste (stems, seeds etc) after the end of their production cycle, which are not used in other production sectors;
- firewood or wood residues from different wood processing industries;
- Energy Plantations (fast growing grove) cultivated to be burned as biomass, and;
- The remains of animals (bones, skin, livestock manure) that are not used in other sectors of the economy;
- Waste (for instance, food and household waste).

Olive cultivation is an important industry for the coastal area of Albania. Olive oil extraction is the process of oil separation from other fruit content (vegetative liquid extract and solid material). Basic steps in producing olive oil are always the same and include: 1) cleaning the olives and removing the seeds, leaves, buds and other waste; 2) pressing of olives for making a paste and 3) separating the oil from the rest of the components of olive oil. Currently, three main methods are applied to extract olive oil: "traditional process", three-phase process and two-phase process.

Types of waste generated: olive mill technology produces a variety of waste, both solid and liquid. Solid waste produced from the extraction of olive oil are alperujo [Spanish] (i.e. pomace remained from the two-phase system), and orujo [Spanish] (i.e. pomace remained from the three-phase system). Solid waste are also generated while pruning olive trees in the olive-grove. These include leaves and small branches (after pruning). The leaves can be used as animal feed, fertilizer or compost production, while small branches, pits and dried olive pomace can also be used for energy production. Liquid waste are known as oil mill sewage and in some cases are used as additives for making cosmetic products and also for bogaz as large amounts of non-collected oil and fine residues of pomace remain in the oil mill wastewater particles.

The potential uses of pomace are: (i) bio-energy production ; (ii) production of a low-quality oil as a food product, through a factory chemical process known as "olive pomace refineries"; (iii) spread in agricultural fields as fertilizers (or mixed with soil for the refilling process, for example in quarries); (iv) used as animal feed; and (v) destruction as waste. Energy production (the focus of this project), olive pomace is directly burned into boilers or transform into pallet or briquette for use in boilers and stoves. In both cases, oil-pomace must be firstly dried.

Rural areas present some features favoring the potential development of an energy chain with olive pomace because: a) agricultural sector is one of the most important economic activities in rural areas, which face serious difficulties. The unemployment rate is higher than the national average, especially among young people; b) the local community is provided additional economic activity. Community development based on bio industries often involves strengthening community support services, providing additional jobs in the local government bodies and service sectors; c) provides a green label for energy users differentiating it from other competitors; and d) mitigates rural depopulation. Document FGM / C.31/5 of FGM Council, together with the United Nations Organization for Industrial Development (UNIDO), have established at the Ministry of Environment the project on "use of olive pomace for energy purposes", with the aim of facilitating the direction for development with small amounts of carbon in agro-farming industry in Albania. Critical factors for the project success are the implementation of technical solutions adapted to local needs of four industrial sub-sectors in Albania, and the creation of a

chain of domestic supply, so that piece of equipment are produced at effective cost, building of the system and costs compliant with the local economy, and the operation and maintenance to be timely and affordable. UNIDO experience working with industrial sector in general for small and medium enterprises in particular is important for achieving the objectives set out in this project. Moreover, upon the use of pomace as biomass, most of olive oil factories have planned to use a portion of the biomass (15-20%) for domestic needs and the rest (80-85%) will be transformed into briquettes / pallet and will be sold for residential buildings, private/public service buildings, as well as for small food processing establishments by applying the latest renewable energy technologies.

Bio-gas use is underdeveloped despite the available resources, so the agricultural biomass from major plants will be subsequently calculated in detail, and the biomass to be collected by pruning the main fruit trees.

*Table 10 shows the respective areas planted with wheat, barley, corn, forage and grain and the most important agricultural plants for 2014, based on data collected from the Third National Communication.*

<b>Plants (HPPtares)</b>	Wheat	Barley	Corn	Forage	Grain
<b>TOTAL</b>	70000	2150	68000	205000	150000

*Table 11 introduces the respective number of olive trees, citrus fruits, pergola, vineyards and all other trees for year 2014, based on data collected from the Third National Communication.*

<b>Fruits (number of trees)</b>	All other fruits	Olives	Citrus fruits	Pergola	Vineyard
<b>TOTAL</b>	9882000	5590000	707000	5503000	9806000

Based on the above numbers, the tables 12-13 introduce the energy from biomass calculated from the theoretical and technical perspective, to be potentially used to cover some part of RESheating demand for the period 2015-2020.

Parameters	Plants (ton)					Fruit drying (ton)				
	Wheat	Barley	Corn	Forage	Grain	All fruits	Olives	Citrus fruit	Pergola	Vineyard
Total amount of biomass, ton	183,167	5,193	305,029	443,931	241,538	71,150	40,248	5,090	3,9622	11,767
Biomass parts to be used for energy, %	20%	20%	20%	20%	20%	80%	80%	80%	80%	80%
Total amount of biomass, tons to be used for energy, ton	36,633	1,039	61,006	88,786	48,308	56,920	32,198	4072	31,697	9,414
Net calorific value (MJ/kg)	14.4	14.1	18.6	14.2	14.3	18.1	18.1	18	18.2	18.3
Agricultural biomass to be used for heating purposes, ktoe	12.60	0.35	27.11	30.12	16.50	24.61	13.92	1.75	13.78	4.12

*Table 12: Theoretical and technical biomass energy potential that may be used to cover some part of RESheating demand.*

The biomass potential for the transport sector is not presently calculated and will be a primary task for future works.

Parameters	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
<b>Agricultural plants (HPPtares)</b>	495150	519908	545903	573198	601858	631951	654069	676962	700655	725178	750559
<b>Potential of agricultural biomass</b>	86.68	91.01	95.56	100.34	105.36	110.63	116.16	121.97	128.06	134.47	141.19
<b>Agricultural biomass to be used</b>	4.334	6.371	8.601	11.038	13.697	16.594	20.909	25.613	30.736	36.306	42.357
<b>Areas of fruit trees (HPPtares)</b>	83939	86457	89051	91722	94474	97308	100227	103234	106331	109521	112807
<b>Potential of fruit trees as biomass due to the pruning process, ktoe</b>	58.18	59.93	61.72	63.58	65.48	67.45	69.47	71.56	73.70	75.91	78.19
<b>Distribution of fruit trees to be used to meet RESheating objectives to be applied</b>	10%	15.0%	20.00%	25.00%	30.00%	35.00%	40.00%	45.00%	50.00%	55.00%	60.00%
<b>Distribution of biomass of fruit trees to be used</b>	5.818	8.989	12.345	15.894	19.645	23.607	27.789	32.200	36.851	41.753	46.915
<b>TOTAL of agricultural biomass &amp; fruit trees to be used</b>	10.152	15.360	20.946	26.932	33.342	40.201	48.697	57.813	67.587	78.059	89.272

*Table 13.: Theoretical and technical biomass energy potential that may be used to cover some part of RESheating demand for the period 2015-2020*

### 3.7.1 *Solar energy potential*

The study “Sun in Action”<sup>6</sup> showed that there is a great potential for solar heating systems, not only for the EU area, but practically worldwide, including participating states in IEA countries. It was also shown that a number of obstacles must be challenged to develop the market for this consolidated technology. In general, solar energy market can be described as a market with steady growth and technology placed on the market long time ago. However, some part of the public and commercial sectors continue to be aware of these facts and are astonished by short-term profit objectives. Therefore, industries, public and private housing companies and public utilities, account for only a small portion of the users of installations for solar heating systems. The aim of this analysis is to describe the potential of water heating with solar energy and the expected market growth, as well as the main obstacles, in order to highlight opportunities to spread the use of solar heating energy market and housing sector. There have been a number of recent important market development studies and potential of solar energy systems. All these studies have reached the same result: The market is very large and, taken as a whole; it is growing steadily, although growth performance largely varies from state to state. These studies show that the potential of solar collectors for the housing sector and district heating sector can be easily expressed as a very significant figure: **0.5 to 1.0 m<sup>2</sup> solar collectors per capita**

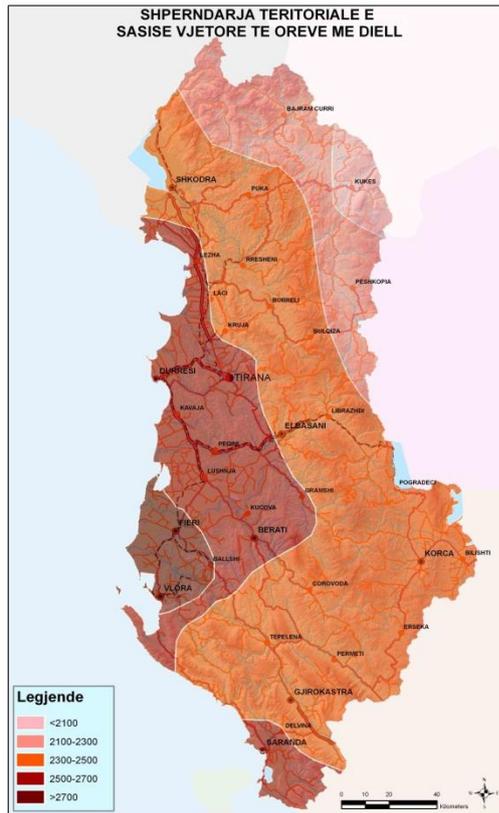
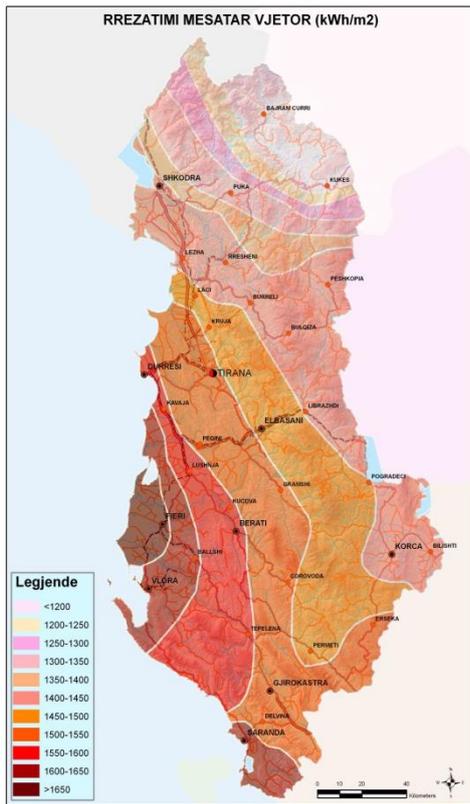
The minimum value represents warmer climates and high value the climates of Northern Europe and Central Europe. Studies also show that the number in question could go to 1 m<sup>2</sup> solar collector per capita in countries with warm climate. In Albania there are excellent conditions for water heating by solar energy heating systems. Annual solar radiation is high and could theoretically provide to Albania adequate heating water at low temperature over a period of at least (7-8) months. The regime of solar radiation and annual sunshine hours in Albania are shown in Figures 15 and 16.

Solar collector systems available in Albanian markets rely on electricity as additional energy, especially during the period from November to March. Also, it is worth noting that the demand for energy for heating water in a family of 4 people is approximately 2,500 kWh /year. The need for additional energy can be reduced by installing more effective solar panels, but as a result it will increase the surplus of solar energy from April to September.

As noted from the charts, for an average efficiency of 55% of solar systems, NUED systems can provide up to 68% of the energy demand for water heating in Peshkopi, which goes up to 86% in Saranda. MEI during the period 2009-2015, assisted by the program of FGM / UNDP "Global initiative to transform and strengthen the market for the use of solar energy for water heating: Program for Albania", MEI has taken over many tasks, particularly with regard to monitoring systems for solar heating installed so far in Albania and assessment of the future market for households, dwellings and public and private services, as well as for a number of industry sub-sectors.

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<sup>6</sup>Thermal solar markets in Europe. Market trends and statistics, 2009 (published in June 2010)



Figures 15 and 16: Solar radiation ( $kWh/m^2$  per year) and sunny hours (hours/year) in Albania

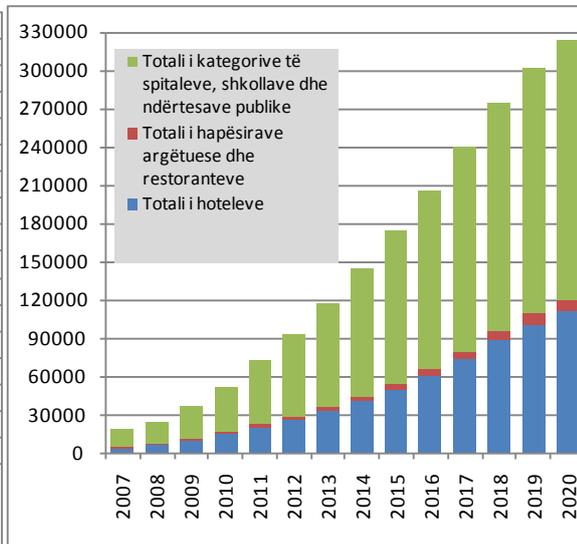
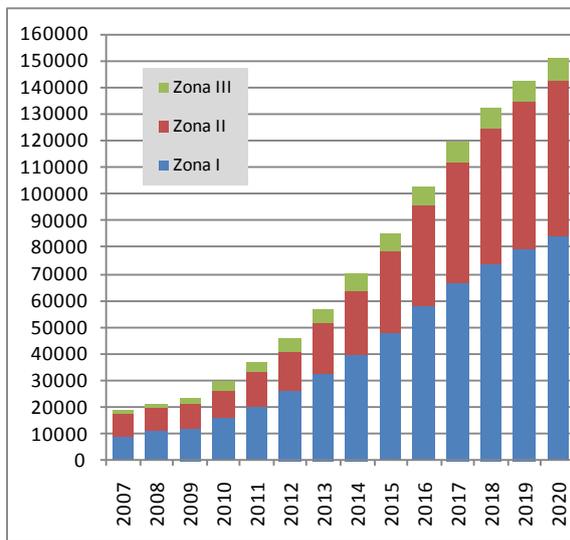


Figure 17: Potential of NUED systems for household sector / residential buildings ( $m^2$ ) for each climate area

Figure 18: Potential of NUED systems for the sector of public service and private buildings ( $m^2$ )

### 3.7.2 Wind energy potential

Wind energy is used for pumping water, windmills and in recent decades the focus is shifted on the production of electricity. Machinery operated by wind energy have an installed capacity varying from several [kW] to 5 [MW] and are being used successfully in isolated areas. Wind energy is a substantial potential as an energy resource and is uniformly distributed all over the world. Windmills can be quickly installed and use a small area of land. In most countries, windmill installations face a common concern, lack of continuous measurement of wind velocity and lack of permanent wind.

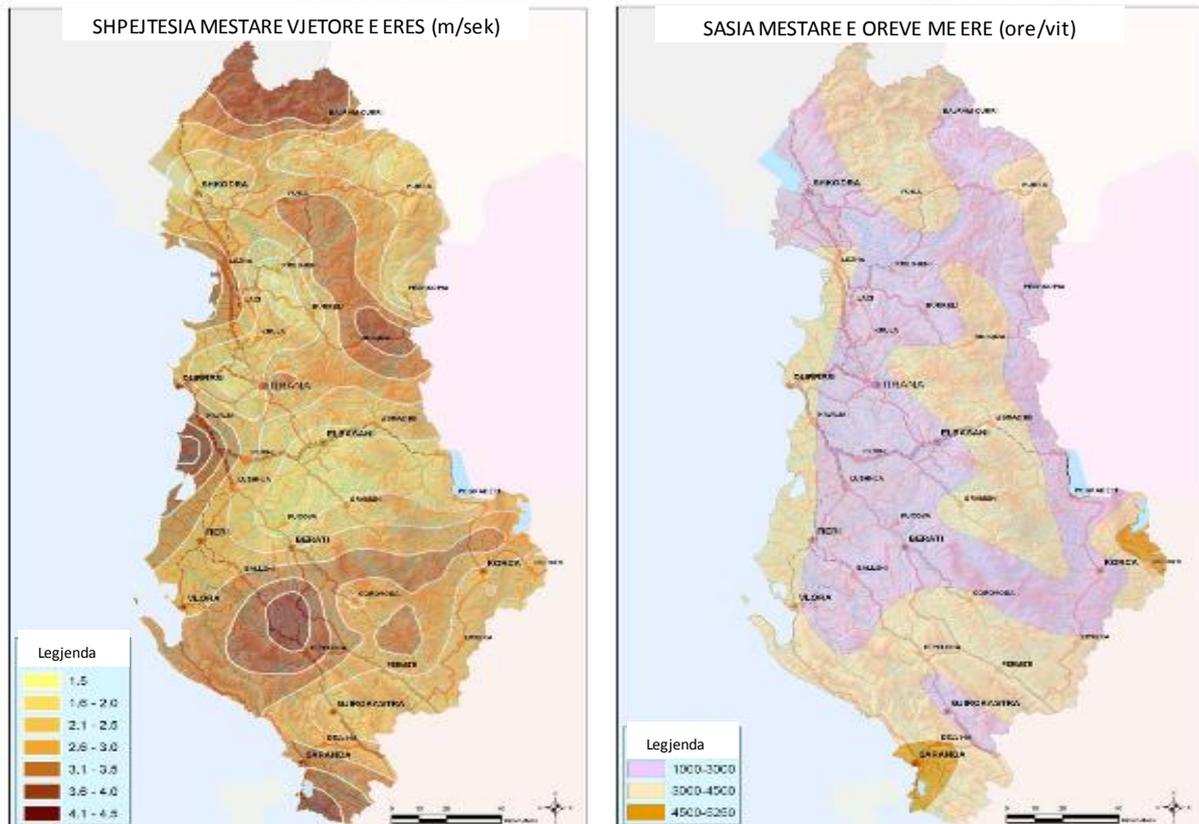


Figure 21: Division into areas as per the number of annual hours of wind per average value of wind velocity.

Therefore, various companies wishing to invest in this sector can hardly decide whether it is worth investing in a particular region without these necessary data. Data obtained from different metrological stations in Albania are conservative/approximate and not very reliable because they are not gathered with the specific purpose of measuring wind energy (table 14 and figure 21).

There are big plans for wind energy development in Albania in the coming years with significant investments, with a total of licensed windmills at a capacity of 1300 MW (Table 14) (licenses issued until 2010).

Company name	Location	Installed capacity, MW	Point of connection to the transmission network	Annual GWh production	Investment (K Euro)	Commissioning deadline	License granted in
<b>HERA Ltd</b>	Bilisht Kapshticë	150	Sub/st Zemblak 400/110 kV	330	229,037	2014	November 2007
<b>Alb Wind Energy Ltd</b>	Estuary of Shkumbin, Tërpan	225	220 kV Rrashbull – Fier, 110 kV Tempan – Uznovë	484	454,127	2013	January 2008
<b>Enpower Albania Ltd</b>	Karaburun Llogara	500	Sub/st 110 kV Kavajë	1,369	700,000	2015	October 2008
<b>Ers-08 Ltd</b>	Kryevidh Kavajë	40	Sub/st 110 kV Kavajë	68	43,582	2013	June 2008
<b>Biopower Green Energy Ltd</b>	Shëngjin Renci Hills, Lezhë	230	Sub/st 400/220/30 kV	450	250,000	2013	August 2008
<b>Unione Eolika Albania Ltd</b>	Kryevidh Kavajë	150	220 kV Rrashbull-Fier	300	149,100	2012	August 2008
<b>E-Vento Albania Ltd</b>	Butrint Markat	72	Sub/st 150 kV Bistricë	65	93,000	2012	July 2008
<b>TOTAL</b>		<b>1367</b>		<b>3,066</b>	<b>1,918,846</b>		

Table 14: List of eolic parks for which license is granted for construction, installation and generation of electricity

With a view of assessing the potential of this source, it is estimated the level of production of the eolic parks planned for construction in Albania (Table 15).

Availability of eolic park or load factor - the percentage of time during which the wind turbines are able to work at full-load is universally regarded as the biggest problem for wind energy. Uncertainty about the amount to be produced by an eolic park is a real challenge. The methodology of forecasting and estimating wind sources are tasks of the experts. The average annual wind measurements between 5,8 m/s to 7 m/s in the requested areas are promising. The table below can show load factors typically varying from 22% to 25%.

Licenses continued to be granted during the period 2010-2014 and by the end of December 2014 their total in Albania roughly amounted to 2548 MW, based on the information provided by the Ministry of Energy and Industry, with power generation potential of about 5 TWh / year. Albanian power system capacity to transmit and absorb wind energy is estimated to approximately 180-200 MW. A balanced approach is required since the wind is an energy resource of low probability. The combination of wind and hydric resources is a good option. Hydro-plants can be commissioned at any time, therefore it is an excellent balancer of wind power plants.

Company	Area	Installed capacity	Load factor	Average effective capacity during one year	Annual GWh production (company assessment)	Annual GWh production (study assessment)
HERA Ltd	Bilisht Kapshticë	150 MW	23.8%	35 MW	330	312
Alb Wind Energy Ltd	Estuary of Shkumbin, Tërpan	225 MW	20.7%	46 MW	484	407
Enpower Albania Ltd	Karaburun Llogara	500 MW	25.9%	129 MW	1,369	1,134
Ers-08 Ltd	Kryevidh Kavajë	40 MW	21.0%	8 MW	68	73
Biopower Green Energy Ltd	Shëngjin Renci Hills, Lezhë	230 MW	22.0%	50 MW	450	481
Unione Eolika Albania Ltd	Kryevidh Kavajë	150 MW	24.3%	36 MW	300	319
E-Vento Albania Ltd	Kryevidh Kavajë	72 MW	23.2%	17 MW	65	146

Table 15: List of eolic parks for which license is granted for construction, installation and generation of electricity

### 3.7.3 5.1.8 Geothermal energy reserves

There are a variety of geothermal resources, which can be classified into: hydrothermal springs, streams of hot water and molten rocks. Of these three groups, to date only hydrothermal resources have been practically used in Albania. Most of the time, hydrothermal sources are geothermal energy resources that produce hot water and are used in some countries for heating of various facilities.

A new technique of using geothermal energy is the injection of cold water in deep wells of oil and natural gas, which are already no longer used for heating. Water is injected at a temperature of (7-8) ° C and comes to the surface at a temperature of (22-25) ° C. In Albania there is little hope to produce steam from geothermal sources, but there are several hydrothermal sources at a low temperature (Table 16).

No.	Location of hydro-thermal source	Temperature, °C	Name of the well	Surface water temperature, °C
1	Karmë-Sarandë	34	Ishmi-1/b	60
2	Langaricë-Përmet	26-31	Kozan-8	54
3	Sarandapori-Leskovik	26-27	Galigati-2	45
4	Tërvoll-Gramsh	24	Bubullima-5	48-50
5	Spa Center-Elbasan	58	Seman-1	35
6	Kozan-Elbasan	57	Ardenica-12	32-38
7	Shupal-Elbasan	29-30		
8	Mamurras-Krujë	21		
9	Peshkopi	35-43.5		

Table 16: Geothermal resources in Albania

The most important geothermal resources explored to date in Albania are as follows:

- Geothermal surface of Kruja, which is the area with the largest geothermal resources in Albania, with a surface area of 18 km length and 4,5 km width, containing reserves within a range of  $5.9 \times 10^8$ - $5.1 \times 10^9$  GJ.
- Geothermal area of Ardenica, where water comes out from the depth at a temperature of 32-38 °C and flowing at surface with an intake of 15-18 l/s.
- Geothermal area of Peshkopi, where there are a number of geothermal sources located next to each other. Water intake is around 14-17 l/s and temperature is 35-43,5 °C.

### 3.7.9 RER input to power generation

In order to better prepare the implementation of Directive 2009/28/EC, similarly to all EU members and other Contracting Parties of CoE Treaty, Albania has conducted an assessment of the potential available for the development of renewable energy resources for power generation. Table 10, along with tables 1 and 3 of the National Action Plan for Renewable Energies, are used as a structure to sum up the main findings.

For the energy sector, the projected installed capacity (accumulated) (in MW) and annual production (GWh) are shown as per each individual technology. As for the hydric sector, a distinction is made between the plants at an installed capacity of less than 1 MW, between 1 and 10 MW and above 10 MW. Details for solar energy are given separately for the inputs from power plants with photovoltaic solar panels and those with solar energy heating systems. Data on wind energy in the sea (onshore) and on the ground (offshore) are presented separately. As for the biomass used for electricity, a distinction needs to be made between the solid, gaseous and liquid biomass (tables 17.a and 17.b). Figure 22 introduces the power supply provision under this study, based on different and updated studies. Furthermore, the relevant cover for each plant (including RESplants) is given in Figures 22-26.

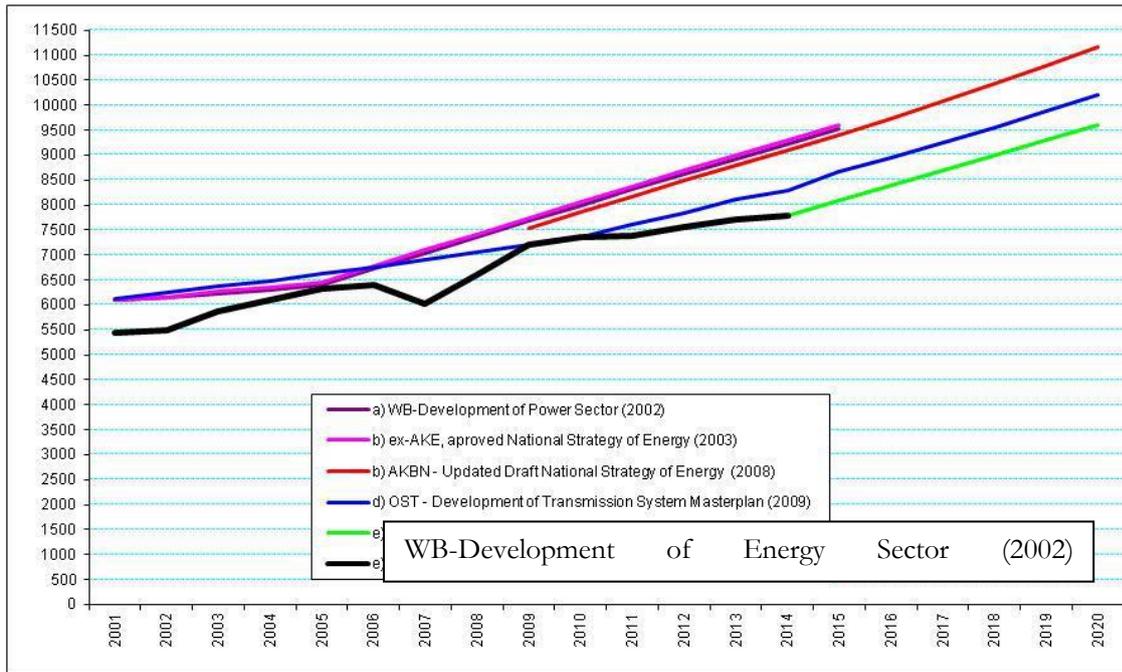


Figure 22.: Historic values (2001-2014) of power supply and respective projection for the period 2015- 2020 (GWh/year)

Technologies	2009		2010		2011		2012		2013		2014	
	MW	GWb										
<b>Hydro:</b>												
<1MW	19	53	21	69	23	91	25	101	33	122	45	164
1MW–10 MW	9	24	18	32	26	100	44	188	117	375	225	755
>10MW	1,460	5,900	1,460	7,743	1,460	4,158	1,460	4,725	1,483	6,586	1,506	4,058
<b>Solar:</b>												
Photovoltaic	-	-	-	-	-	-	-	-	-	-	-	-
Solar energy of NEUD	-	-	-	-	-	-	-	-	-	-	-	-
<b>Wind:</b>												
In sea	-	-	-	-	-	-	-	-	-	-	-	-
On ground	-	-	-	-	-	-	-	-	-	-	-	-
<b>Biomass:</b>												
Solid	-	-	1	4	2	8	3	12	4	16	5	20
Bio-gas	-	-	-	-	-	-	-	-	-	-	-	-
Biol-liquids	-	-	-	-	-	-	-	-	-	-	-	-
<b>TOTAL</b>	<b>1,488</b>	<b>7,200</b>	<b>1,499</b>	<b>7,360</b>	<b>1,509</b>	<b>7,379</b>	<b>1,529</b>	<b>7,552</b>	<b>1,633</b>	<b>7,701</b>	<b>1,777</b>	<b>7,793</b>
Of which in CHP	-	-	1	4	2	8	3	12	4	16	5	20

Technologies	2015		2016		2017		2018		2019		2020	
	MW	GWb										
<b>Hydro:</b>												
<1MW	48	185	50	195	55	213	60	232	61	236	67	259
1MW–10 MW	248	941	272	1,035	315	1,197	360	1,368	369	1,402	423	1,607
>10MW	1,506	4,453	1,571	4,713	1,571	4,713	1,571	4,713	1,834	5,680	1,834	5,680
<b>Solar:</b>												
Photovoltaic	-	-	-	-	50	120	-	-	-	-	-	-
Solar energy of NEUD	-	-	-	-	-	-	-	-	-	-	-	-
<b>Wind:</b>												
In sea	-	-	-	-	-	-	-	-	-	-	-	-
On ground	-	-	-	-	4	8	10	20	20	40	30	60
<b>Biomass:</b>												
Solid	-	-	1	4	2	8	3	12	4	16	5	20
Bio-gas	-	-	-	-	-	-	-	-	-	-	-	-
Biol-liquids	-	-	-	-	-	-	-	-	-	-	-	-
<b>TOTAL</b>	<b>1,803</b>	<b>8,095</b>	<b>1,995</b>	<b>8,396</b>	<b>2,052</b>	<b>8,697</b>	<b>2,114</b>	<b>8,998</b>	<b>2,405</b>	<b>9,299</b>	<b>2,483</b>	<b>9,600</b>
Of which in CHP	-	-	1	4	2	8	3	12	4	16	5	20

Table 17.a: Estimation of the potential available in Albania for each technology of renewable energy in the electrical energy for the period 2010-2014

**ANNEX I: ENERGY BALANCE SHEET (2009/IN KTOE)**  
**BASED ON NET CALORIFIC VALUES**

Year 2009		TOTAL	Solid fuels	Natural Gas	Crude, NGL and Feedstock	Biomass (Fuelwood)	Hydro & Electricity	Solar Energy	Derived Heat
Primary production		1263.07	3.2	8.2	576.626	213	449.82	6.65	5.6
Recovered products		0.00			0.0				
Imports (Pet Prod+ Electricity)		1298.73	50.0		1086.65		162.13		
Stock change		54.03			54.03				
Ex ports		403.83			362.00		41.83		
Bunkers		0.00							
<b>Gross inland consumption</b>		<b>2103.93</b>	<b>53.15</b>	<b>8.2</b>	<b>1247.25</b>	<b>213.00</b>	<b>570.12</b>	<b>6.65</b>	<b>5.60</b>
<b>Transformation input</b>		<b>805.14</b>			<b>355.40</b>		<b>449.75</b>		
Classic thermal Power Stations		1.70			1.7				
Public Hydro power stations		449.75				449.75			
Autoprod. thermal power stations		0.00			0.00				
Nuclear power stations		0.00							
Patent fuel and briquetting plants		0.00							
Coke-oven plants		0.00							
Blast-furnace plants		0.00							
Gas works		0.00							
Refineries		353.70			353.697				
District heating plants		0.00							
<b>Transformation output</b>		<b>663.20</b>	<b>0</b>		<b>342.30</b>		<b>447.70</b>		<b>3.3</b>
Classic thermal Power Stations		0.07					0.07		
Public Hydro power stations		447.63				447.63			
Autoprod. thermal power stations		0.00							
Nuclear power stations		0.00							
Patent fuel and briquetting plants		0.00							
Coke-oven plants		0.00							
Blast-furnace plants		0.00							
Gas works		0.00							
Refineries		345.60			342.30				3.3
District heating plants		0.00	0						
<b>Exchanges and transfers, returns</b>		<b>0.00</b>							
Interproduct transfers		0.00							
Products transferred		0.00							
Returns from petrochem. industry		0.00							
<b>Transformation Losses</b>		<b>15.15</b>	<b>0</b>		<b>13.10</b>		<b>2.05</b>		
<b>Consumption of the energy branch</b>		<b>33.29</b>		<b>7.2</b>	<b>25.63</b>		<b>0.43</b>		<b>0</b>
Production and distribution of electricity		0.41					0.41		
Pumped storage stations		0.00							
District heating plants		0.00							
Extraction and aggl. of solid fuels		0.00							
Coke-oven and gas works plants		0.00							
Oil and Nat. Gat extraction plants		22.87		3.9	18.93		0.01		
Oil & Gas pipelines		0.00							
Oil refineries		10.01		3.3	6.7		0.01		
Nuclear fuel fabrication plants		0.00							
<b>Distribution losses (humbje jo tekn ne shpernd)</b>		<b>105.49</b>					<b>105.5</b>		<b>0.00</b>
<b>Available for final consumption</b>		<b>1946.70</b>	<b>53.15</b>	<b>0.9</b>	<b>1208.52</b>	<b>213.00</b>	<b>462.15</b>	<b>6.65</b>	<b>2.30</b>
<b>Final non-energy consumption</b>		<b>76.10</b>			<b>76.10</b>				
Chemical industry		12.90			12.90				
Other sectors		63.20			63.20				
<b>Final energy consumption</b>		<b>1870.60</b>	<b>53.2</b>	<b>0.9</b>	<b>1132.4</b>	<b>213.0</b>	<b>462.15</b>	<b>6.7</b>	<b>2.3</b>
<b>Industry</b>		<b>275.54</b>	<b>50</b>		<b>149.83</b>	<b>2.1</b>	<b>71.31</b>		<b>2.3</b>
Iron & steel industry		25.60			15.86		9.74		
Non-ferrous metal industry		5.39			1.05		4.35		
Chemical industry		23.40			19.32		4.08		
Glass, pottery & building mat. industry		86.67	50		27.79		8.88		
Ore-ex traction industry		13.88			8.89		4.99		
Food, drink & tobacco industry		28.92			11.21		15.42		2.3
Textile, leather & clothing industry		11.88			2.50		9.38		
Paper and printing		8.54			1.40		7.14		
Engineering & other metal industry		6.83			2.60		4.23		
Other industries		65.39		0.90	59.29	2.1	3.10		
<b>Transport</b>		<b>754.44</b>			<b>754.44</b>				
Railways		3.00			3.00				
Road transport		721.79			721.79				
Air transport		18.50			18.50				
Inland navigation		11.15			11.15				
<b>Households, commerce, pub. auth., etc.</b>		<b>653.52</b>	<b>3.2</b>		<b>121.35</b>	<b>204.6</b>	<b>317.72</b>	<b>6.65</b>	
Households		487.32	0.9		73.00	187.42	224.00	2.00	
Agriculture		94.51			80.00	6.3	8.21		
Fisheries		25.00			25.00				
Other		65.12			0.00		65.12		
<b>Statistical difference</b>		<b>2.48</b>	<b>-0.05</b>	<b>0.94</b>	<b>1.79</b>	<b>0.00</b>	<b>-0.20</b>	<b>0.00</b>	<b>0.00</b>

*Energy balance sheet of Albania for year 2009 (Source: N.ANR – December 2011)*

## ANNEX II: ENERGY BALANCE SHEET (2014/IN KTOE)

BASED ON NET CALORIFIC VALUES

<b>Year 2014</b>		TOTAL	Solid fuels	Natural Gas	Crude, NGL and Feedstock	Biomass (Fuelwood)	Hydro & Electricity	Solar Energy	Derived Heat
Primary production		2021.34	0	27.6	1368.22	202	406.30	12.14	5.1
Recovered products		0.00			0.0				
Imports (Pet Prod+ Electricity)		1897.96	92.82		1515.20	10.400	279.54		
Stock change		307.54			307.54				
Exports		1244.97	0.26		1209.75	19.190	15.78		
Bunkers		27.00			27.00				
<b>Gross inland consumption</b>		<b>2339.78</b>	<b>92.56</b>	<b>27.6</b>	<b>1339.13</b>	<b>193.21</b>	<b>670.06</b>	<b>12.14</b>	<b>5.10</b>
<b>Transformation input</b>		<b>767.30</b>			<b>361.00</b>		<b>406.30</b>		
Classic thermal Power Stations		0.00			0		0		
Public Hydro power stations		406.30					406.30		
Autoprod. thermal power stations		0.00			0.00		0		
Nuclear power stations		0.00							
Patent fuel and briquetting plants		0.00							
Coke-oven plants		0.00							
Blast-furnace plants		0.00							
Gas works		0.00							
Refineries		361.00			361.00				
District heating plants		0.00							
<b>Transformation output</b>		<b>663.20</b>	<b>0</b>	<b>0</b>	<b>335.62</b>	<b>0</b>	<b>406.30</b>	<b>0.00</b>	<b>1.5</b>
Classic thermal Power Stations		0.00					0.00		
Public Hydro power stations		404.80					404.80		
Autoprod. thermal power stations		0.00							
Nuclear power stations		0.00							
Patent fuel and briquetting plants		0.00							
Coke-oven plants		0.00							
Blast-furnace plants		0.00							
Gas works		0.00							
Refineries		336.92			335.62				1.3
District heating plants		0.00	0						
<b>Exchanges and transfers, returns</b>		<b>0.00</b>							
Interproduct transfers		0.00							
Products transferred		0.00							
Returns from petrochem. industry		0.00							
<b>Transformation Losses</b>		<b>27.08</b>	<b>0</b>	<b>0</b>	<b>25.38</b>	<b>0</b>	<b>1.50</b>	<b>0.00</b>	<b>0.2</b>
<b>Consumption of the energy branch</b>		<b>59.31</b>	<b>0</b>	<b>20.0</b>	<b>26.48</b>	<b>0</b>	<b>12.83</b>	<b>0</b>	<b>0</b>
Production and distribution of electricity		0.33					0.33		
Pumped storage stations		0.00							
District heating plants		0.00							
Extraction and aggl. of solid fuels		2.80					2.8		
Coke-oven and gas works plants		0.00							
Oil and Nat. Gas extraction plants		27.70		20.0	2.50		5.20		
Oil & Gas pipelines		0.00							
Oil refineries		28.48		0.0	23.98		4.500		
Nuclear fuel fabrication plants		0.00							
<b>Distribution losses (humbje jo tekn ne shpernd)</b>		<b>94.74</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>94.74</b>		<b>0.00</b>
<b>Available for final consumption</b>		<b>2157.35</b>	<b>92.56</b>	<b>7.6</b>	<b>1287.26</b>	<b>193.21</b>	<b>560.99</b>	<b>12.14</b>	<b>3.60</b>
<b>Final non-energy consumption</b>		<b>87.49</b>			<b>87.49</b>				
Chemical industry		0.33			0.33				
Other sectors		87.17			87.17				
<b>Final energy consumption</b>		<b>2069.85</b>	<b>92.6</b>	<b>7.6</b>	<b>1199.8</b>	<b>193.2</b>	<b>560.99</b>	<b>12.1</b>	<b>3.6</b>
Industry		417.75	87.36	7.6	182.72	10	126.09	0.40	3.6
Iron & steel industry		104.66			88.47		16.19		
Non-ferrous metal industry		6.16			0.00		6.16		
Chemical industry		18.99			8.96		10.03		
Glass, pottery & building mat. industry		151.19	87.36		44.16		19.66		
Ore-extraction industry		7.35			0.29		7.06		
Food, drink & tobacco industry		57.60		6.6	22.35		24.67	0.40	3.6
Textile, leather & clothing industry		18.03			1.91		16.12		
Paper and printing		11.38			1.26		10.12		
Engineering & other metal industry		7.01			1.01		6.00		
Other industries		35.77		1.00	14.31	10	10.07		0.40
Transport		815.99	0	0.00	815.99	0.00	0.00	0.00	0
Railways		2.10			2.10				
Road transport		779.30			779.30				
Air transport		0.91			0.91				
Inland navigation		33.67			33.67				
Households, commerce, pub. auth., etc.		722.38	5.2	0.00	115.24	171.2	419.00	11.74	0.00
Households		546.11	0.5		79.23	160	301.00	5.38	
Agriculture		79.69			51.79	12	15.90		
Fisheries		34.04			34.04				
Other		0.00			0.00		0.00		
<b>Statistical difference</b>		<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

Energy balance sheet of Albania for year 2013 (Source: NANRF – May 2015)

## ANNEX III: FEED-IN TARIFFS FOR WIND-POWER PLANT TECHNOLOGIES AND PHOTOVOLTAIC PLANTS IN DIFFERENT COUNTRIES

### *Feed-in tariffs for wind power plants*

For many REStechologies in general and wind power plants in particular, specific costs of energy generation in MWh vary according to the plant size; this is typical for small and large wind turbines etc. Almost all EU candidate and non-candidate countries apply feed-in tariffs at different levels of remuneration, mainly based on the plant size within these technologies. By applying this approach, due account can be taken of the low/high energy generation costs due to scale economies / non-economies. The range of prices can be too high for different capacities installed. Figure 1 introduces a comparison of wind power plants in different countries and according to different sizes.

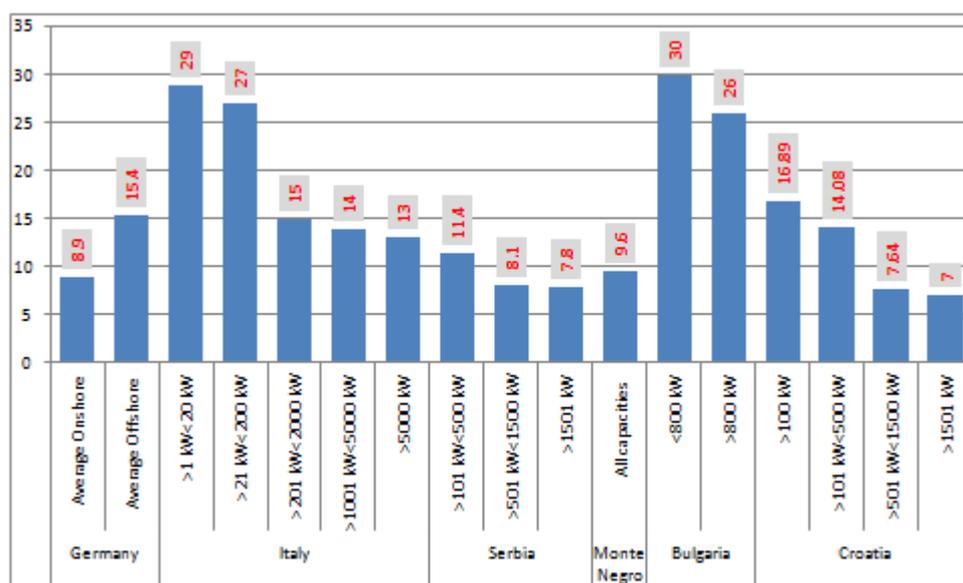


Figure 27.: Comparison of feed-in tariffs for wind power plants for different countries and different sizes (€/cent/kWh)

The projects of wind power plants require high initial investments; therefore CAPEX projection is highly critical. Figure 2 introduces the results for feed-in tariffs for wind power plants, based on the average feed-in tariffs (retrieved from figure 1) for installations of wind power plants at a higher capacity.

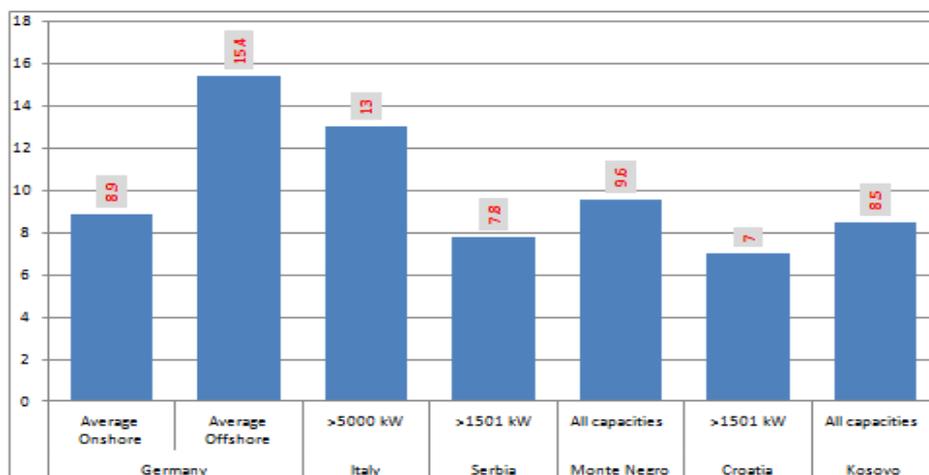


Figure 28.: Comparison of feed-in tariffs for wind power plants for different countries and average capacities (€/cent/kWh)

## Feed-in tariffs for PV plants

For a number of REStechologies in general and PV plants in particular, the specific costs of power generation per MWh vary as per the plant size. This is typical for PV plants, solar power plants, biomass and biogas, geothermal plants, small wind power plants etc. Almost all EU candidate and non-candidate countries apply feed-in tariffs at different compensation rates, mainly on the basis of plant size within these technologies. By applying this approach, due account can be taken of the low/high power production costs, due to scale economies/non-economies. The range of prices may be too high. In Germany, for solar power plants with a capacity between 500 kW and 5 MW, the tariff level varies from 130 to 80 €/MWh, while the United Kingdom falls within another extreme category, with a feed-in tariff starting from 61 €/MWh for 5 MW up to 270 €/MWh for 15 kW plants. Figure 3 introduces a comparison of feed-in tariffs for PV solar power plants for different countries and plant sizes.

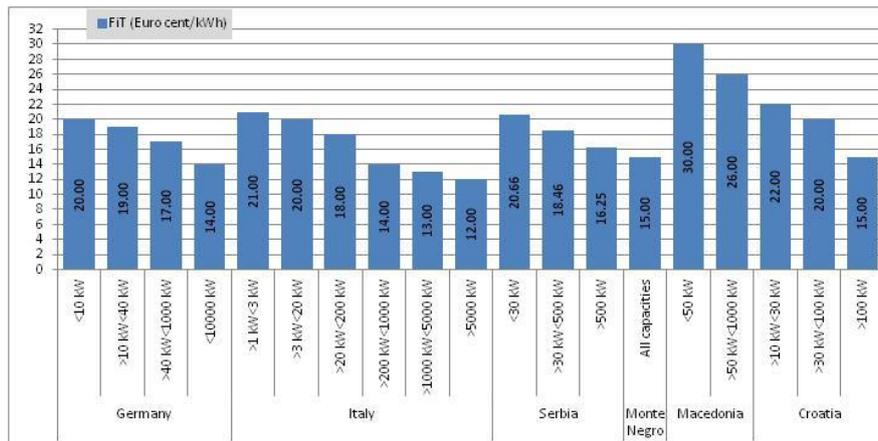


Figure 29.: Comparison of feed-in tariffs for the PV solar plants for different countries and different sizes (€ cent/ kWh)

Figure 4 shows the average feed-in tariffs (retrieved from figure 3) for PV plants with an average installed capacity (PV plants of 200-1000 kW).

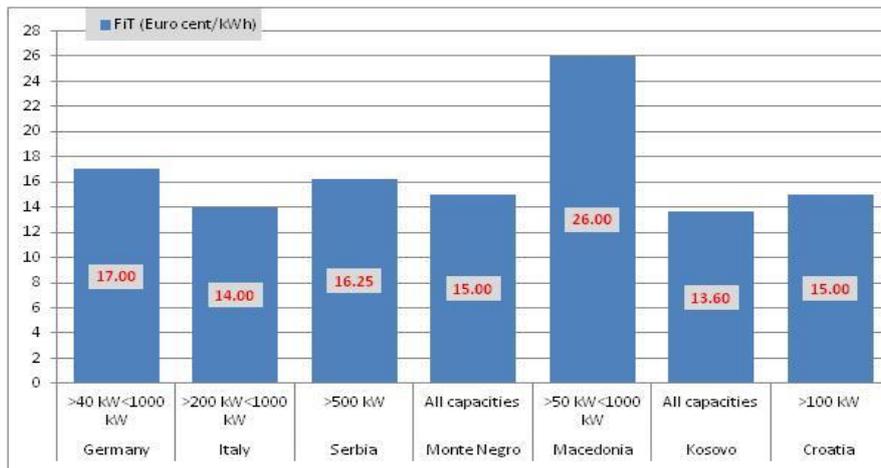


Figure 30: Comparison of feed-in tariffs for the PV solar plants for different countries and average capacity (€ cent/ kWh)