



Research



Konrad  
Adenauer  
Stiftung

## Assessment of the Challenges and Opportunities for Renewable Energy Directive Transposition

*The research is conducted in the framework of the project “Policy Research for Sustainable Growth”, implemented by PMC Research Center by the support of Konrad Adenauer Foundation*

*The content does not necessarily reflect the view of PMC Research Center or Konrad Adenauer Foundation*

Researcher: Zviad Gachechiladze

Reviewer: Nikoloz Sumbadze

## Table of Contents

1. Introduction .....	1
2. Methodology .....	4
3. Summary of Renewable Energy Directive .....	4
3.1. Policy and Strategy .....	4
3.2 Legislation and Regulation and Market Access.....	5
4. Review of best practice in RE directive implementation status in EU and EnC CPs. ....	7
5. Assessment of Georgian Electricity Market in Renewable Energy Directive Framework.....	16
5.1 Outlook of Georgian Energy Sector .....	16
5.2 Synopsis of Legal and Regulatory Acts of Georgian Energy Sector in relation to Directive 2009/28/EC .....	17
5.2.1 Policy and Strategy .....	17
5.2.2 Legislation and Regulation and Market Access.....	20
6. Challenges and Opportunities for Transposition of the Directive in Georgia.....	24
6.1 Calculation of Indicative Renewable Energy Target for Georgia.....	24
6.2. Job Opportunities.....	27
6.3 Reduction in CO <sub>2</sub> Emissions.....	28
7. Conclusions and Recommendations .....	29
References .....	32
Appendix 1 - Gap analysis .....	33
Appendix 2 - 2020 Renewable Energy Target Calculation for Georgia.....	41
Appendix 3 - Assessment of the administrative procedures.....	42

## List of Abbreviations

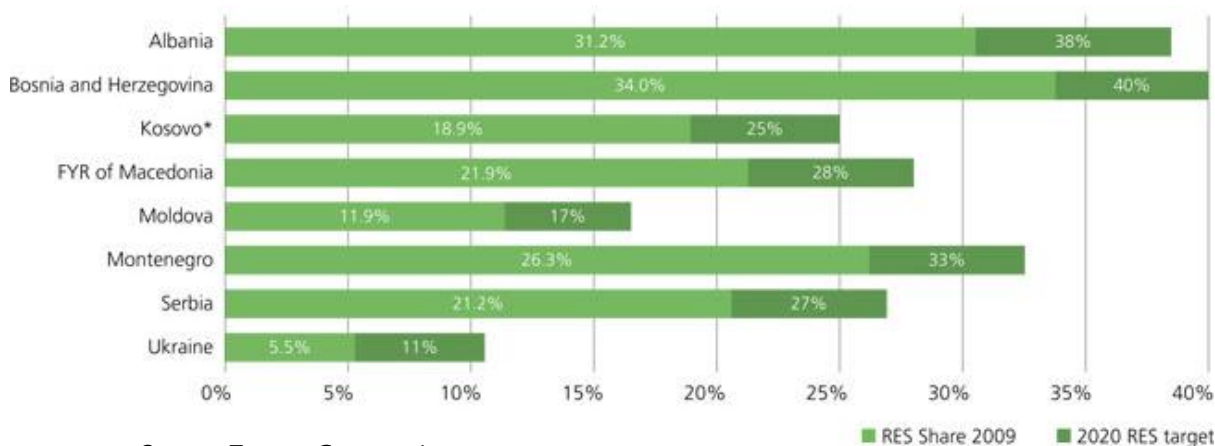
RES	Renewable Energy Sources
EU	European Union
NREAP	National Renewable Energy Action Plan
EnC	Energy Community
ESCO	Electricity System Commercial Operator
CP	Contracting Party
Ktoe	Thousands of Tons of Equivalent
Directive	Renewable Energy Directive
TPES	Total Primary Energy Supply
TSO	Transmission System Operator
DSO	Distribution System Operator
GFEC	Gross Final Energy Consumption
AA	Association Agreement
DCFTA	Deep and Comprehensive Free Trade Area
HPP	Hydro Power Plant
GO	Guarantee of Origin
MoU	Memorandum of Understanding
TPP	Thermal Power Plant
MW	Megawatts
R&D	Research and development
GNERC	Georgian National Energy and Water Supply Regulatory Commission
GoG	Government of Georgia
IT	Information Technology
PPA	Power Purchase Agreement
NRA	National Regulatory Authority
TYNDP	Ten Year Network Development Plan
CEER	Council of European Energy Regulators
NRA	National regulatory authority
ERRA	Energy regulators regional association

## 1. Introduction

The importance and use of renewable energy sources (RES) has been rising in recent years on a global scale. This tendency is expected to continue in the future because on the one hand energy is very crucial for our everyday life, economic growth and development of the country and on another hand countries has to be committed to take actions for an environmentally acceptable and sustainable development path. Recent cost reductions in electricity generation from RES is estimated to continue which clearly demonstrates RES importance to achieve sustainable development goals due to its increasing cost-effectiveness. Therefore, role of renewable energy sources in energy mix is becoming more and more significant while it can enhance and promote countries security of electricity supply, sustainable energy future and socio-economic benefits as well as reduce burden on the environment.

Promotion of renewable energy sources is part of EU's energy policy. In 2014, share of RES in total electricity generation amounted to 28% in the EU. Therefore, EU demonstrates commitments to its objective to deliver carbon-neutral electricity supply by 2050. With this broad objective and approach of RES deployment, Renewable Energy Directive 2009/28/EC (hereafter – Directive) is a common framework to promote RES in order to increase share of renewables in the EU's energy consumption up to 20% by 2020. It is a legally binding document for EU member states and Energy Community<sup>1</sup> Contracting Parties (hereafter – CPs)<sup>2</sup>. The Directive was adopted by Decision D/2012/04/MC-EnC of the Ministerial Council with minor modifications for CPs. However, it still determines binding individual national targets for the CPs' to increase share of energy from renewable sources in their gross final consumption of energy by 2020 (see Figure 1). At the same time, under 2030 policy framework for climate and energy EU has targeted to increase the share of renewable energy generation in EU energy consumption to 27% in a cost-effective and economically efficient manner<sup>3</sup>.

Figure 1. Energy Community's CPs' renewable energy targets for 2020



Source: Energy Community

<sup>1</sup> The Energy Community was established under Treaty of Athens in 2005. The main objective of the Energy community is to extend the EU internal energy market to South East Europe (SEE) and beyond on the basis of a legally binding framework. Nowadays Energy Community unites nine CPs: Albania, Bosnia and Herzegovina, Kosovo, the FYR Macedonia, Moldova, Montenegro, Serbia and Ukraine and EU Member State. On the other hand, any countries can join Energy community as observer with possibility to become its full member later. Currently, there are four countries with the observers' status: Armenia, Norway and Turkey and Georgia has a status of candidate.

<sup>2</sup> For the research purposes, term "contracting party" instead of "member state" will be used in the text below with regards to renewable energy directive requirements given the fact that adapted directive for the Energy Community CPs is being analyzed as Georgia is candidate country for accession in the Energy Community.

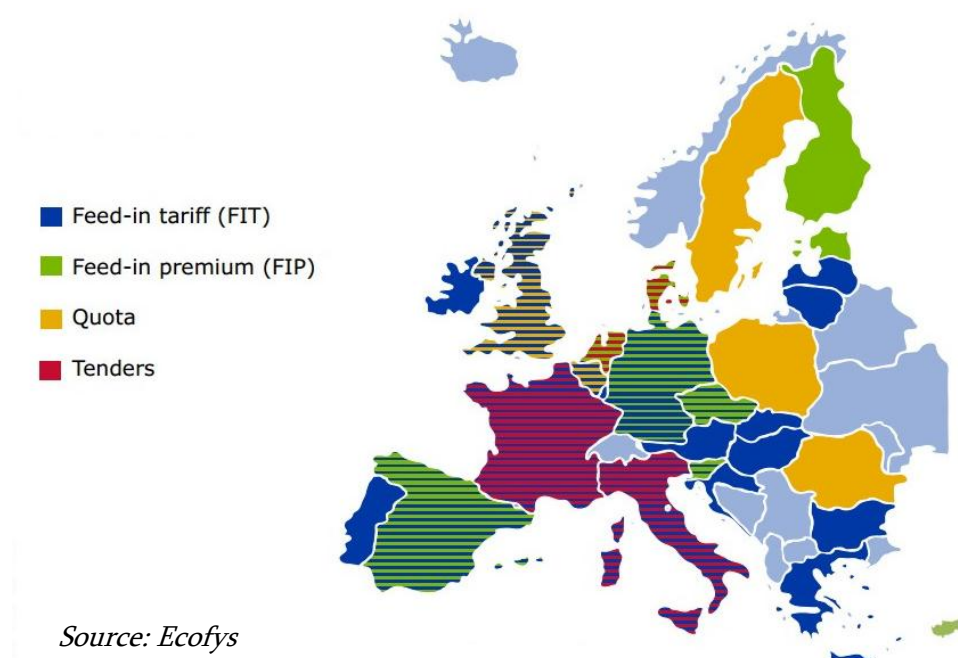
<sup>3</sup> [http://www.consilium.europa.eu/uedocs/cms\\_data/docs/pressdata/en/ec/145356.pdf](http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/145356.pdf)

At the same time, adoption of the NREAPs by each CP is a mandatory requirement of this Directive. The action plans set targets for the share of energy from renewable energy sources in transport, electricity and heating and cooling for 2020. NREAPs also take into account the effects of other energy efficiency measures on final energy consumption implying that there will be less energy required from RES if reduction in final energy consumption is higher than the target. The Directive also establishes framework for administrative procedures, regulations and codes for promoting RES in CPs under transparent and non-discriminatory treatment. On the other hand, Directive also enables CPs to define guarantee of origin for electricity, heating and cooling produced from RES. Guarantee of origin is used for the purposes of proving information on bills to final customers about share or quantity of energy from RES in an energy supplier’s energy mix.

One of the most important issues related to promotion of RES are prescribed in article 13 and article 16 of this Directive. According to article 13, CPs shall support authorisation, certification and licensing procedures of renewable energy resources through reflecting it in their energy legislation. In case of production of electricity, heating or cooling from RES, it is associated to transmission and distribution network infrastructures while in case of buildings, building code should incorporate appropriate measures to increase the share of all kinds of energy from renewable sources in the building sector. On the other hand, Article 16 obliges CPs to build appropriate transmission and distribution network infrastructure in order to ensure that Transmission System Operators (TSO) and Distribution System Operators (DSO) provide priority access for the RES. At the same time CPs shall require from TSOs and DSOs to provide priority or guaranteed access to any new producer of energy from renewable sources wishing to be connected to the network.

There are different support schemes for RES as a key mechanisms in order to achieve overall and individual renewables goals across EU. These support schemes varies country by country. However, the most used support schemes are Feed-in Tariffs, Feed-in Premiums, Quotas and Tenders. These support schemes also varies implemented varies from regulatory policies, fiscal incentives to public financing (see Figure 2).

Figure 2. Key support schemes in national renewable energy support policies



The assessment of this Directive and its requirements is very crucial because Georgia is an observer of EnC since 2007 and eagers to become its member. Therefore, Georgia applied to full membership of European Energy Community in 2013. The negotiations between the EnC and Georgian government is already finalized. Georgia's accession in the EnC is a special case, while it is an isolated energy system from EnC member countries. Therefore, becoming full member of EnC will not be easy while Georgia will be required to gradually approximate and harmonize its energy legislation to the EnC Third Energy Package.

In parallel to this process, EU and Georgia has signed an Association Agreement (AA) including the Deep and Comprehensive Free Trade Area (DCFTA) in 2014. Association Agreement provides a framework for a new relationship based on political association and economic integration and also sets out the requirements for Georgia to comply with EU standards and regulations for eventual membership in the EU. The AA constitutes a reform agenda for Georgia focusing on economic recovery and growth, governance and sector cooperation. Therefore, reforms and approximation process envisaged in broad range of areas including energy sector of Georgia. Within the AA, Georgia is committed to gradually approximate its legislation to the EU energy legislation and international instruments. Approximation process should be implemented in accordance with the timeline agreed by Georgia in the framework of the Energy Community Treaty. In case Georgia will not join to the EnC within two years of the entry into force of AA, it has to prepare a proposal that will define a timeline no later than three years after the entry into force of the AA for the implementation of EU Energy Directives.

Currently, Georgian energy legislation incorporates regulations on renewable energy such are State Program "Renewable Energy 2008" approved by the Government of Georgia in 2008 (resolution №107) and government №214 resolution on "approval of the rules of express of interest in regards to feasibility study, construction, ownership and operation of Power plants in Georgia". These are the only documents, which provides rules to enable construction of renewable energy power plants in Georgia. The Georgian Law on Electricity and Natural Gas provides only short and limited definition renewable energy sources. Furthermore, country does not have particular law on RES which is not sufficient to support development of RES in Georgia in large extent. Also, based on electricity balances, promotion of renewable energy sources (RES) in terms of hydro is well-established in Georgia (on average 80% in yearly generation). Recent energy projects which are under construction and to be commissioned no later than 2020 are mostly related to hydro power plants (HPPs) amounting to 830 MW of installed capacity in total together with about 36 perspective HPP projects<sup>4</sup>. At the same time, only one wind power plant project with 20 MW of installed capacity is planned to be commissioned in the year of 2017 while other renewables are not supported enough at the national level.

The research paper is organized in the following structure: Section 2 defines methodology of research paper. Section 3 provides summary of the Directive mainly concentrating on the implications of article 13 and article 16. Section 4 reviews best international practices in renewable energy directive implementation status in EU and EnC's CPs. Section 5 assesses Georgian energy market in the framework of renewable energy directive while section 6 provides challenges and opportunities for renewable energy directive transposition in Georgia. Finally, Section 7 draws conclusions and recommendations for best support schemes for the promotion of renewable energy sources in Georgia and summarizes main results.

---

<sup>4</sup> Ministry of Energy of Georgia

The results of the paper is expected to contribute to the transposition process of Renewable energy Directive in the Georgian energy legislation. Based on this analysis best policy instruments and support schemes is selected for Georgia. On the other hand, research identifies challenges and opportunities that Georgia would face while transposing renewable energy directive into Georgia's legislation and overall recommendations will be provide with key actions in order to overcome obstacles.

## 2. Methodology

The paper is based on desk research and gap analysis between Directive and related acts in Georgian energy legislation. The research paper incorporates analysis of existing policy, legal, regulatory and institutional framework in Georgia and identifies issues for approximation and measures to mitigate revealed gaps through outlining the need for changes applicable for the energy market of Georgia in order to comply with the Directive. Furthermore, research paper also provides analysis of different supporting schemes and policy instruments together with their advantages and disadvantages for the renewable energy promotion. Also, best examples of renewable energy directive implementation from EU member states and Energy Community contracting parties are analysed taking into consideration Georgia's specifics. On the other hand, providing reasonable policy recommendations and optimal support schemes, research paper also attempts to benchmark indicative renewable energy target for Georgia.

The scope of research paper mainly covers assessment of compliance level of the existing legal and regulatory framework for renewable energy promotion in the electricity sector of Georgia with the provisions of the Directive. Given that the majority of policy instruments basically are focused on the electricity sector, target for transport sector of 10% share of RES in Georgia by 2020 is not taken into account due to the fact that neither there is no information available about share of RES in transport sector nor relevant plans exists. Therefore, it is unreasonable considering achieving such target by 2020 and this requirement is most likely to become the subject of derogation for Georgia.

## 3. Summary of Renewable Energy Directive

The Directive amends Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources in the internal electricity market and Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport. Therefore, it has expanded its scope and integrated areas of electricity and transport sectors that were treated separately previously. Furthermore, renewable energy targets for both sectors modified and projected for 2020 which are binding for CPs. On the other hand, Directive also encourages cooperation mechanisms among EU member states, CPs and this parties through statistical transfers, joint projects and joint support schemes. Assessment of main provisions of the Directive are summarised under following categories: (1) Policy and Strategy and (2) Legislation and Regulation and Market Access.

### 3.1. Policy and Strategy

According to Article 2 of the Directive, definition of RES covers number of energy sources that should be transposed in national policy and strategy in the energy sector. At the same time, Article 3 requires from CPs to meet their individual renewable energy targets in line with overall EU target of 20% of final energy consumption form RES. For achieving their national targets, CPs are required to adopt NREAPs that should set detailed policy strategy measures and actions such cooperation between local, regional and national authorities, planned statistical transfers or joint projects in order to achieve targets and fulfil the requirements of the Directive. The NREAPs should be published, revised every two years and CPs should notify EnC six months before their NREAPs are due. EnC reviews each NREAP and can issue recommendations if it is needed. When CPs do not

meet their target, EnC thought its Permanent High Level Group can oblige CPs to submit amended NREAPs.

In order to meet overall EU target, statistical transfers, joint projects or joint support schemes are encouraged. In all cases, CPs involved in the one of abovementioned arrangements has to be notified to the EnC in order to consider it in the target calculations.

### 3.2 Legislation and Regulation and Market Access

As Directive encourages various support schemes and cooperation mechanisms among CPs and third parties, these support mechanisms has to be included in national legal and regulatory acts.

According to Article 15 of the Directive, CPs should ensure the origin of electricity produced from RES under transparent and non-discriminatory criteria. The main purpose of guarantee of origin of electricity produced from RES is to provide prove of share or quantity of energy from RES in energy suppliers' energy mix to the final customers. Guaranty of Origin (GO) can be issued for electricity, heating and cooling. Its standard size is defined as a 1 MWh and validity period as a 12 month. GO should also define source, date and location of energy production from RES as well as information of country and date of issue of GO.

Article 13 and Article 16 set a series of obligations in relation to the development of electricity infrastructure and to the operation of the electricity network that have a direct impact on transmission and distribution system operators. Main aspects of these articles are:

1. The rules on the development of electricity infrastructure:
  - a. *The general obligation to develop the grid:* CPs to take the appropriate steps to ensure that the electricity infrastructure developments needed in view of their national targets for renewable electricity are in fact carried out while maintaining the secure operation of the whole system.
  - b. *Costs sharing rules:* TSOs and DSOs will have to support a fair part of the eventual costs related to connecting new generators to the network; this can include even building new transmission and distribution lines or adapt existing ones. The Policy Guidelines on the Reform of the support schemes issued by the EnC<sup>5</sup> recommended the “shallow connection costs” approach related to the bearing and sharing the connection costs between renewable energy producers and TSOs and DSOs.

The cost for connection to the grids is an important part of the overall investment decision an investor in renewable energy has to take into consideration. It goes beyond the costs of connection and involves the ownership of assets, cost of operation and maintenance, etc. The Directive calls on the CPs to develop transmission and distribution grid infrastructure in terms of intelligent networks, storage facilities and the electricity system in order to allow the secure operation of the electricity system as it accommodates the further increase of electricity production from RES.

Furthermore, transparency towards applicants has to be ensured and the rules for connecting to the power grid has to be based on objective and non-discriminatory criteria. In order to make sure producers can generate electricity where renewable resources are available, producers should be charged with the cost of connection to the nearest point in the public electricity network only (“shallow” connection cost) and not

---

<sup>5</sup> Informal note jointly prepared by the European Commission and the Energy Community Secretariat on the interpretation of the Directive 2009/28/EC, Article 16, and the main obligations for TSOs of Energy Community Contracting Parties, December 2015



with the costs for reinforcement or expansion of the networks (“deep” connection costs). The transmission and distribution system operators are the appropriate undertakings to create an optimal infrastructure by investing in grids reinforcement or expansion of the grids and socialize the cost for the ownership and maintenance of the network assets with all network users through regulated network tariffs.

- c. *Obligations of information:* TSOs and DSOs are required to provide new generators with comprehensive and detailed estimates of the connection costs. They will also have to give a timetable for processing requests for grid connection and for delivering the connection. Both timetables have to be “reasonable”. The timetable for processing the request, which depends on the system operator, also has to be detailed and precise.
2. Operational rules of electricity grid infrastructure relating to renewable electricity:

It ensures that transmission and distribution of electricity from renewable sources is guaranteed and electricity generated from renewable energy has priority access or guaranteed access to the grid. At the same time, transmission system operator should give priority to the RES while dispatching generating installations and curtailment of electricity from RES is minimized. All the provisions are subject to the condition that the grid system must remain reliable and safe implying that integration of renewable energy sources into the grid should not harm the reliability and safety of the grid. Therefore CPs are allowed to choose several payment mechanisms in order to financially compensate the affected producers.

    - a. *Priority or guaranteed access:* This requirement establishes two access regimes for RES to the grid depending on the regulatory framework: (1) Guaranteed access, if the regulatory regime is one in which renewable electricity is sold in the ordinary electricity market and electricity contracted and sold in ensured access to the grid, or (2) Priority access, if the regulatory regime is one in which a system operator is obliged to buy, at a fixed price, all the electricity from RES that is produced. This does not create nevertheless the right of access to a support system of any type.
    - b. *Priority dispatch:* this provision ensures that installations generating electricity from renewable energy sources are given priority over plants using conventional sources when electricity generators are dispatched by TSOs/DSOs. This requirement was introduced mostly because of almost zero variable costs and the environmental benefits of renewable energy generation. However, this requirement can nevertheless be limited to avoid putting at risk the stability of the electricity network. But this possibility should be exceptional and TSOs/DSOs should have in place appropriate grid and market related operational measures in order to minimize the curtailment of electricity produced from RES.
  3. Transmission and distribution charges: this provision require CPs to ensure that any tariffs charged by TSOs/DSOs to electricity generators using RES are non-discriminatory, and such costs reflect potential benefits and not only costs.

## 4. Review of best practice in RE directive implementation status in EU and EnC CPs.

### 4.1 EU member state experience

Energy sector liberalization process is an important development around the world in the period of the past two decades. Reforms in energy sector are mainly driven by the motivation to introduce competition, transparency and customer choice. It is believed that competition will lead more efficiency in the sector and lower system costs, while transparency will make energy prices non-discriminatory, which on its turn will maintain to decline of electricity prices and to improve services. The reforms in electricity sector in the EU was aimed to develop a single electricity market. In this context, pivotal step was creation of European Energy Community. It establishes a common development policy and regulatory framework for energy markets within the EU member states and number of third countries.

One of the aims of the European Commission's 2020 Climate and Energy Package is to reach a 20% share of renewables in EU energy consumption by 2020 in a cost-effective and economically efficient manner. Individual Member States have set targets in EU legislation and some have set additional objectives nationally.

Understanding the different approaches to RES subsidies undertaken by EU Member States can help to inform future subsidy designs, ensure the benefits of harmonized approaches are maximized as well as equally distributed across consumer groups and help to provide decision-makers (both at Member State and European Commission level with the comparative information needed to apply subsidies in a targeted and cost-effective manner.

According to EU member states experience several support schemes are interesting when analyzed EU member country experience in promotion RES development. Such support schemes are:

- Support instruments for promoting RES deployment
- Level of priority granted for RES electricity when connecting and using the grid
- Charges for RES electricity when connecting and using the grid

#### Support instruments for promoting RES deployment:

Table 1. summarizes the main support schemes which are in place by EU members. Only the instruments which were detailed by CEER members are included here.

Table 1. Support Schemes

Country	Bioenergy	Geo-thermal	Hydro	Solar	Wind
Austria	Feed-in Tariff		Feed-in tariff, investment grant	Feed-in tariff, investment grant	Feed-in tariff,
Belgium	Green certificates		Green certificates	Green certificates	Green certificates, investment grant
Croatia	Feed-in Tariff		Feed-in Tariff	Feed-in Tariff	Feed-in Tariff

Czech Republic	Feed-in Tariff, Feed-in premium		Feed-in Tariff, Feed-in premium	Feed-in Tariff, Feed-in premium	Feed-in Tariff, Feed-in premium
Denmark	Feed-in Tariff, Feed-in premium			Feed-in Tariff, Feed-in premium	Feed-in Tariff, Feed-in premium
Estonia	Feed-in Tariff		Feed-in Tariff	Feed-in Tariff	Feed-in Tariff
Finland	Feed-in Tariff, Feed-in premium, investment grant	investment grant	investment grant	investment grant	Feed-in Tariff
France	Feed-in Tariff, call for tender	Feed-in Tariff	Feed-in Tariff	Feed-in Tariff, call for tender	Feed-in Tariff, call for tender
Germany	Feed-in Tariff, Feed-in premium	Feed-in Tariff, Feed-in premium	Feed-in Tariff, Feed-in premium	Feed-in Tariff, Feed-in premium	Feed-in Tariff, Feed-in premium
Greece	Feed-in Tariff		Feed-in Tariff	Feed-in Tariff	Feed-in Tariff
Hungary	Feed-in Tariff		Feed-in Tariff	Feed-in Tariff	Feed-in Tariff
Ireland	Feed-in Tariff		Feed-in Tariff	Feed-in Tariff	Feed-in Tariff
Italy	Feed-in Tariff, Feed-in premium, green certificates		Feed-in Tariff, Feed-in premium, green certificates	Feed-in Tariff, Feed-in premium, green certificates	Feed-in Tariff, Feed-in premium, green certificates
Lithuania	Feed-in Tariff		Feed-in Tariff	Feed-in Tariff	Feed-in Tariff
Netherlands	Feed-in premium	Feed-in premium	Feed-in premium	Feed-in premium	Feed-in premium
Norway			green certificates		green certificates
Poland	Green certificates		Green certificates	Green certificates	Green certificates
Portugal	Feed-in Tariff		Feed-in Tariff	Feed-in Tariff	Feed-in Tariff
Romania	Green certificates		Green certificates	Green certificates	Green certificates
Spain	Feed-in Tariff		Feed-in Tariff	Feed-in Tariff	Feed-in Tariff
Sweden	Green certificates		Green certificates	Green certificates	Green certificates

UK	Feed-in Tariff, green certificates		Feed-in Tariff, green certificates	Feed-in Tariff, green certificates	Feed-in Tariff, green certificates
----	------------------------------------	--	------------------------------------	------------------------------------	------------------------------------

### Level of priority granted for RES electricity when connecting and using the grid

Arrangements concerning connection, access and dispatching can also affect access to the market by renewable sources. Table show that in the majority of European countries (that took part in the Status Review), connection is non-discriminatory and RES are granted priority or guaranteed access and priority dispatching.

Table 2. Priority of access

Country	Connection		Access		Dispatch	
	Priority	Non-discriminatory	Priority	Guaranteed	Priority	Non-priority
Austria		X		X	X	
Belgium	X		X		X	
Croatia		X	X		X	
Czech Republic		X	X		X	
Denmark		X	X		X	
Estonia		X		X	X	
Finland		X		X		x
France		X	X		X	
Germany	X		X		X	
Greece		X		X	X	
Hungary	X		X		X	
Ireland		X		X	X	
Italy	X		X		X	
Lithuania	X		X		X	
Netherlands		X		X		X
Norway		X		X		X
Poland	X		X		X	
Portugal		X		X	X	
Romania		X		X	X	
Spain	X		X		X	
Sweden		X		X		X
UK		X		X	X	

### Charges for RES electricity when connecting and using the grid:

Table 3 gives an overview of the connection regime that applies when RES generators connect to the transmission or distribution networks. It shows that deep (where the generator pays) and semi-deep (where generators and system operators share the costs) are the most common types of connection regimes. Semi-shallow was only used in Hungary, Italy and Poland.

For those countries who noted other arrangements were in place, further details were provided as follows:

**Belgium:** For offshore wind farms, financial support in the form of an investment grant is given (€25 million over a 5-year period).

**Lithuania:** RES generators who receive support have to pay the expenses of connection to the grid by following proportion: 1) 40% of the connection costs (for plants with a capacity above 350 kW) and 2) 20% of the connection costs (for plants with a capacity of up to 350 kW). RES generators who do not receive support have to pay 100% of the connection costs.

**UK:** For transmission connections, the costs of assets required to provide connection that are not shareable are recovered in full from the generator. The majority of assets are potentially shareable and the costs of these are recovered via access charges, so most generators do not pay a connection charge. The access charge contains a locational signal reflecting the incremental cost of transmission incurred by the generator. For assets local to a generator (typically a radial circuit and substation) this locational signal is particularly sharp and therefore has some similarities with connection charges whilst still being based on generic information. For the distribution connection regime, the connecting customer is only charged for works up to one voltage level above the voltage they are connecting to e.g. if they are connecting at low voltage and work is required at low voltage, high voltage and extra high voltage, the customer will only be charged for the work at low voltage and high voltage. The work at extra high voltage will be socialized (i.e. spread across all users).

In addition, in Ireland, the generator pays 100% of the construction of the least cost connection - a physical connection to the transmission system i.e. the shallow connection works. Any deep reinforcements required to facilitate the connections are not charged to the RES.

Table 3. Connection regime

Country	Deep – generator pays	Semi deep – generator and system operator shares cost	Semi shallow – RES generator pays less than conventional generator	Shallow – System operator pays	Other
Austria				X	
Belgium					x
Croatia	X				
Czech Republic				X	
Denmark				X	
Estonia	X				
Finland	X				
France		X			
Germany	X				
Greece				X	
Hungary			X		
Ireland	X				
Italy		X	x		
Lithuania					x
Netherlands					
Norway		X			
Poland			x		
Portugal		X			

Romania		X			
Spain	X				
Sweden					
UK					x

## 4.2 Energy Community CPs experience

In 2012, the Ministerial Council of the EnC adopted Decision 2012/04/MC-EnC on the implementation of the Renewable Energy Directive 2009/28/EC and amending Article 20. Article 20 of the Treaty includes an obligation for the CPs to implement the Directive.

The CPs agreed to binding renewable energy targets by 2020 modelled on the same methodology as for the EU Member States. Following the Ministerial Council Decision, the CPs were obliged to submit their NREAPs to the EnC Secretariat by 30 June 2013. It was a prerequisite that their plans were to be prepared in accordance with a template published by the European Commission. All in all, the plans map down each CPs expected steps to reach the legally binding renewable energy target by 2020.

In the NREAPs, the CPs are to lay down the sector targets, including the technology mix they expect to use. They also must determine the trajectory they intend to follow in the years to come. The plans are to comprise detailed descriptions on the measures and reforms the Parties intend to undertake to overcome the barriers in developing renewable energy.

### Support schemes

Technology specific feed-in tariffs combined with industrial policies have proven to be the most suitable way to ensure investor confidence and to tap renewable energy potential in EU Member States. When this support was not appropriately designed, it led to “stop-and-go” policies for renewable energy, eroding investor confidence and created unnecessary burden for end-consumers.

At the end of 2013, the European Commission issued the Communication “Delivering the internal market in electricity and making the most of public interventions”<sup>6</sup> that includes specific guidance for the design of renewable energy support schemes. The guidance calls for flexible and market-based solutions in order to avoid market distortions through overcompensation. Therefore, the support for renewable energy shall be provided in such a way as to ensure more exposure to market signals for renewable energy producers and be flexible enough to respond to falling production costs. In this way the feed-in tariffs shall be replaced by feed-in premiums, tendering or quota systems that incentivize investors to respond to market developments.

Learning from European experience and benefiting from reduction in technology costs in the last years, the CPs adopted rather conservative feed-in tariffs as the main operational support to promote renewable energy. This is supplemented by investment support like tax incentives or tax reductions in some CPs.

Nevertheless, the feed-in tariff models adopted by the CPS, as the preferred support option, are not used in the traditional way and are not applicable to all technologies in the EnC.

Currently Albania has support schemes only for small hydro producers, up to 15 MW. In the other CPS, the limit of support for hydro is 10 MW, except for Serbia where the limit is 30 MW. All other CPs (except Albania) have adopted feed-in tariffs for technologies like wind, solar PV, biomass,

<sup>6</sup> <http://europeanmemoranda.cabinetoffice.gov.uk/files/2014/03/15776-131.pdf>

biogas and most of them also for geothermal. Only Montenegro and Serbia have adopted feed-in tariffs for energy produced from waste and landfill gas. In Moldova, the support scheme, which is currently in force, differs from the usually applicable support schemes: a generally applicable tariff calculation methodology is in place, based on which producers calculate annually their own tariffs and submit them to the national energy regulator, ANRE, for approval.

Non-hydro technologies often have strict budgetary limits in the form of capacity caps. This system restricts the diversity of the renewable energy technology mix despite existing potential or sufficient transmission and distribution capacities to integrate more renewable energy into the grids. This approach is taken mainly to limit the impact of renewable energy on electricity end-user prices. Yet at the same time, it has to be taken into account to what extent this approach is contributing to the achievement of the 2020 renewable energy targets. While the capital costs are higher in the CPs than in the EU, the labor and other operational costs are lower for renewable energy projects in the EnC. Implementation of measures that reduce capital costs in the EnC combined with policies to promote renewable energy with the lowest impact on end-user consumer prices is the only way to ensure that the renewable energy targets will be reached in the most cost-effective way.

Moreover, few steps towards increased market exposure of renewable energy investors have been taken in the EnC. Feed-in premiums were adopted in one entity of Bosnia and Herzegovina (Republika Srpska) as an alternative to feed-in tariffs. Moldova is the only CP which is considering introducing a tendering scheme to promote renewable energy.

Despite the fact that most progress has been registered in electricity produced from renewable sources, the support schemes show mixed success in the CPs. Up till now an expansion of non-hydro technologies has taken place only in a few CPs. In most CPs, for example, there are no wind parks or only the first wind parks are beginning to be realized, although feed-in tariffs have been in place for several years like in Bosnia and Herzegovina, Former Yugoslav Republic of Macedonia and Montenegro. Only Ukraine succeeded to reach significant levels of investments in wind and solar photovoltaic. However the crisis in the eastern part of the country and the temporary reduction of renewables support in 2014 and 2015 increased investment risks and the plans for new investments were halted.

This confirms that the level of feed-in tariffs is not the major bottleneck in renewable energy investment. The major obstacle rather consists of the administrative measures which increase the risks for the potential investors willing to operate in the respective CPs. In majority of CPs these support measures are subject to changes and uncertainties. The feed-in tariffs are frequently revised after their adoption, sometimes decreased as a result of administrative measures (e.g. Ukraine in 2015) or calculated on an annual basis leading to increased uncertainty for investors. There is a clear need in all CPs to provide more investor confidence, particularly through stable and predictable support schemes.

The duration of the support for renewable energy is offered for:

- 10 years in Kosovo\* (small hydro, wind, biomass and biogas);
- 12 years in one entity of Bosnia and Herzegovina (Federation of Bosnia and Herzegovina), Kosovo\* (solar PV), Montenegro and Serbia;
- 15 years in Albania, one entity of Bosnia and Herzegovina (Republika Srpska), former Yugoslav Republic of Macedonia (solar PV, biomass, biogas) and Moldova;
- 20 years in former Yugoslav Republic of Macedonia (hydro and wind);
- Until 2030 in Ukraine.

Power purchase agreements (PPA) are instrumental in financing renewable energy projects in EnC. The minimum terms included in the template of a PPA are provided either by legislation (in Bosnia and Herzegovina, Montenegro, Serbia, Ukraine) or by the national energy regulator, which is mandated to approve a PPA template (in Albania, former Yugoslav Republic of Macedonia and Moldova).

The PPA has to be signed in different stages of development of a renewable energy project in the CPs. This approach does not always provide sufficient security to investors. In Bosnia and Herzegovina, there are two PPA agreements, one preliminary and one final in both entities. For example, Republika Srpska requires an agreement on the applicable support scheme and a different PPA agreement based on feed-in premiums to be signed. In Kosovo\*, the rules have been recently amended in order to increase security for investors by allowing for the possibility to sign a PPA agreement at the moment of obtaining the preliminary authorization for the RES project.

Securing the support scheme valid at the time of signature of a PPA is key to ensure investor confidence and to finance the RES projects. In Serbia, the adoption of the new PPA template, in accordance with the Energy Law adopted in 2014, is pending. It is expected that the new PPA template will secure the feed-in tariff applicable at the time of the PPA's signature for the investor, which was not the case so far. In Ukraine, the PPA is signed only after the construction of the RES project has been completed. This approach has not deterred investors so far due to the predictability of the support scheme in place.

For renewable energy used for heating and cooling, only few CPs have support schemes in place and in most cases this support is rather limited. The status for renewable energy in transport is also non-compliant as only a few CPs have in place legal provisions covering the blending obligation, which has however not been implemented in practice so far. No CP with the exception of Moldova has legal provisions for other support mechanisms in place.

### **Electricity grid – connection, access to and operation of the systems with renewable energy**

While the NREAPs provide a fairly positive picture of measures that will be undertaken, in many cases the implementation of these measures is still pending. The adopted or drafted primary legislation of the CPs requires the transmission and distribution system operators to prepare development plans that include RES integration. Ten-year network development plans of the transmission networks are required to take into account the uptake RES.

Priority or guaranteed access to the grid for renewable energy is included in the adopted or draft primary legislation of all CPs with the exception of Bosnia and Herzegovina in the case of access to the transmission network. Priority dispatch of renewable energy is implemented in all CPs. However, requirements for minimizing curtailment of energy from renewable sources are not properly addressed in most CPs.

In relation to connection to the grids, the picture is quite mixed among the CPs. There are good examples where connection of RES to the transmission and distribution grids has been facilitated in the last years. In Former Yugoslav Republic of Macedonia, the connection rules have been simplified through amendments to both network codes resulting in several wind (37 MW) and solar photovoltaic projects (15 MW) to be connected to the grids in the last two years. In Bosnia and Herzegovina and Serbia, transmission and distribution system operators have published rules and methodologies for calculation of the cost for connection to the networks. The rules also include costs estimates and the timetable for processing the applications after the preliminary approval from the system operator.



In Albania, the draft Law on Renewable Energy lays down extensive obligations on grid operators. The draft law requires a specific regulation regarding connection of RES, which is currently not in place. In Moldova, the Electricity Law assigns the regulator the task to set up conditions for grid connection in an objective and transparent way. The technical conditions for connection to the grids have been issued only by the transmission system operator. In Montenegro, calculation of costs of connection to the distribution grids for small RES of up to 10 MW are provided in the Distribution Grid Code, while for the power plants exceeding this capacity the conditions are determined based on project specific analyses and calculations. In Ukraine, connection to the grids is decided on a case-by-case basis using methodology approved by the regulator.

In general, connection costs are paid by the RES. Only in Bosnia and Herzegovina, Kosovo\* and Former Yugoslav Republic of Macedonia (only for connection to the distribution grid), there are rules for bearing and sharing the connection costs between initially and subsequently connected renewable energy producers.

With few exceptions, RES are not paying balancing costs. In Former Yugoslav Republic of Macedonia, large renewable energy producers (capacities above 10 MW) with preferential status are required to take balance responsibility since beginning of 2015. In Bosnia and Herzegovina (Republika Srpska), RES supported through feed-in tariffs are required to pay 25% of the balancing costs while the ones supported through feed-in premiums pay 100% of the balancing costs.

### **Guarantees of origin**

The implementation of a system to issue, transfer and cancel guarantees of origin for energy produced from RES is in a very early stage of development in most of the CPs. Only in Montenegro the first guarantees of origin have been issued and the legislative and regulatory framework has been completed. In Bosnia and Herzegovina, Kosovo\*, former Yugoslav Republic of Macedonia and Serbia there is yet no practical implementation despite the transposed requirements in laws and regulations. In Albania and Moldova, the adoption of an adequate legislative framework is still pending.

The appointed body for issue, transfer and cancellation of guarantees of origin varies among the CPs and the schemes in place are not always regulated. In Albania and Kosovo\*, the energy regulator is the authority responsible for issuing and supervising the guarantees of origin. In Bosnia and Herzegovina, in Republika Srpska the energy regulator is the issuing body while in Federation of Bosnia and Herzegovina the renewable energy operator issues guarantees of origin. The supervision is not assigned to either entity of Bosnia and Herzegovina. In former Yugoslav Republic of Macedonia, the Energy Agency is the issuing body, while the supervision is not regulated. In Montenegro, guarantees of origin are issued by the energy regulator and the supervision is entrusted to the market operator. In Moldova, according to the Renewable Energy Law, the TSO shall issue guarantees of origin, while the supervision is not assigned. In Serbia, the guarantees of origin are issued by the TSO and supervised by the Ministry of Energy. In Ukraine, the issuing body is not clearly appointed yet.

In relation to recognition of guarantees of origin issued by other CPs of the EnC and by EU Member States, the approach is very different. Albania and Moldova recognize guarantees of origin issued by other CPs and EU Member States without the condition of reciprocity. Bosnia and Herzegovina, Montenegro and Serbia recognize guarantees of origin issued by other CPs only under the condition of reciprocity. In addition, Serbia will recognize the guarantees of origin issued by other members of the European Association of the Issuing Bodies for issuing of guarantees of origin only once it becomes a member. In Ukraine, the recognition of guarantees of origin is not regulated.

### Administrative procedures

Since the adoption of the NREAPs, limited progress has been made in improving the administrative procedures in the CPs. Lengthy and not clearly defined procedures remain a key barrier for renewable energy development. A lack of coordination between different administrative levels, agencies and institutions is a major problem in most CPs. Often numerous State and local level authorities are involved in the licensing and administrative procedures for RES projects.

The provision of information is not coordinated and in some cases it is neither transparent nor comprehensive. Serbia is a notable exception and provides a good model for the other CPs. However, the recently adopted measures in Serbia have yet to be translated in a significant increase in installed generation capacities, which so far remain minimal. In 2013, Serbia updated guides for investors in RES projects on wind, solar, hydro and biomass, which replaced the ones issued in 2010. An investor guide for solar thermal was developed for the first time also in 2013. In the former Yugoslav Republic of Macedonia and Kosovo\* measures to simplify and streamline the procedures taken in the last years have yielded good results. In the rest of the CPs, at least some attempts to simplify administrative procedures can be observed. Nevertheless additional simplification of administrative measures for smaller, distributed generation or decentralised projects is required.

Very little progress can be seen in the CPs on the establishment of a one-stop shop. A one-stop shop only for construction licenses was implemented in Serbia and for the majority of licenses and permits in Albania.

For the renewables in transport sector, there is little to report as nearly no efforts have been made to improve the licensing or authorisation procedures. This is largely linked to the fact that there is no biofuels production and consumption taking place in most CPs.

The figure below summarize EnC CPs progress in compliance with the directive requirements.

Contracting Party	AL	BIH (State) (FBiH/RS)	KO*	FYR of Macedonia	MO	ME	SE	UA
Support schemes	Yellow	Green	Yellow	Green	Yellow	Green	Green	Yellow
Streamlined administrative procedures	Yellow	Red	Yellow	Yellow	Orange	Yellow	Green	Yellow
Transparent and cost-related administrative charges	Green	Yellow	Green	Green	Green	Green	Green	Yellow
Electricity Infrastructure development	Yellow	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Objective rules on connection requirements (incl. costs) made public	Yellow	Yellow	Green	Green	Orange	Yellow	Yellow	Yellow
Guaranteed and/or priority access to the grid	Green	Red	Green	Green	Orange	Green	Green	Red
Non-discriminatory transmission and distribution tariffs	Green	Green	Green	Green	Orange	Green	Green	Yellow
Guarantees of origin	Yellow	Yellow	Yellow	Yellow	Orange	Green	Yellow	Yellow

Table legend:

	The red light indicates a zero level of compliance whereby the CPs have not adopted any legal act transposing the relevant provisions of the RES-D neither has such act been prepared and included in a relevant decision making procedure.
	The orange light indicates a low level of compliance whereby the CPs have drafted some legal acts within a relevant decision making procedure, but these have not been adopted yet.
	The yellow light indicates a moderate level of compliance whereby the CPs have adopted some major legal acts, but they are not implemented in practice and/or substantive supporting regulation is needed for the implementation.
	The green light indicates an advanced level of compliance whereby the CPs have successfully transposed and implemented all or most of the provisions of the RES-D.

Figure 3. EnC CPs compliance to the directive

## 5. Assessment of Georgian Electricity Market in Renewable Energy Directive Framework

As Georgia desires to significantly deepen its ties and finally integrate with the EU, it has made considerable progress in the reforms such as economic development, fostering democracy, equality, rule of law and strengthening human rights credentials. Since 2004 Georgia is a part of the EU's European Neighborhood Policy and in 2014 EU and Georgia has successfully signed an Association Agreement which demonstrates a stronger future cooperation between EU and Georgia. On the other hand, Georgia has been an observer of EnC since 2007 and applied for full membership in 2014. In general, EU-Georgia relations have been centered on three main issues: assistance to political and economic transition processes, conflict resolution and support to the development of the energy potential of the country.

Path to EU is quite long and challenging for the country first tasting competitive world two decades ago. In previous decades, significant achievements has been made in the development of energy sector and its legal and regulatory framework. Currently, principal energy sector primary and secondary legislation in Georgia incorporates some aspects of regulation and rules in accordance with EU principles. However, complying with EnC's requirements obliges Georgia to change significantly its energy legislation and to create new market framework, which will maintain to achieve security of supply, competitiveness and sustainability goals.

Georgia's GDP grew at 4.6% in 2014, but along with the recent global economic developments and currency crisis in the region significantly affected to Georgia's GDP grows amounted to 2.8% in 2015<sup>7</sup>.

This section provides general description of Georgian energy sector together with assessment of the current legal and regulatory framework which supports and promotes utilization of renewable energy sources in the country and is in compliant with the provisions of the Directive.

### 5.1 Outlook of Georgian Energy Sector

Hydro resources is a dominant source of energy in Georgia. However, it is estimated that only 18-20% of this potential is currently utilized. In terms of other renewable energy sources, solar, wind and geothermal also have considerable economic potential. Annual potential of solar energy in Georgia is estimated to be 108 MW, while wind energy potential is estimated up to 1450 MW and potential of Geothermal – 250 mln cubic meter<sup>8</sup>.

In 2015, electricity generation in Georgia increased by 4.3% compared to 2014 and by 7.4% - compared to 2013. Recent years, Georgia has experienced considerable increase in electricity generation with an average annual increase of 4.2% between 2006 and 2015 years which is mainly due to new power plants commissioning. On the other hand, electricity consumption in 2015 increase by 2.1% compared to previous year and by 7.1% compared to 2013. Furthermore, average annual increase of electricity consumption amounted to 3.2%. In terms of electricity generation from thermal and hydro power plants, electricity generated by TPPs has reached 21.4% of total generated electricity while share of HPPs constituted to 78.6% in 2015. At the same time, electricity import amounted to 699.2 mln kWh in 2016 which is 17.9% less than in 2014. On the other hand, 659.9 mln kWh of electricity was exported in 2015 9.3% more than in 2014. The export-import figures indicate that negative balance has decreased in 2015, however, since 2012 Georgia is net-

<sup>7</sup> Adjusted data will available by the end of 2016 by National Statistics Office of Georgia

<sup>8</sup> Ministry of Energy of Georgia, [www.energy.gov.ge](http://www.energy.gov.ge). Last accessed June, 2016

importer of electricity. On monthly basis, electricity import takes place in Autumn-Winter months of the year, whereas electricity export is mainly executed during Spring-Summer month when Georgia has enormous hydro resources. In regard to generation capacities, total installed capacity in the country increased by 7.1% compared with previous year and has constituted 3,718.16 MW in 2015<sup>9</sup>.

Considering high potential of RES in Georgia and recent electricity market development, development of renewable energy resources can overcome abovementioned issues. However, high capital costs of other RES compared to hydro resources still prevents their utilization on large scale. At the same time, lack of optimal support schemes existence in the market also hinders their development in the country.

## 5.2 Synopsis of Legal and Regulatory Acts of Georgian Energy Sector in relation to Directive 2009/28/EC

### 5.2.1 Policy and Strategy

Four relevant aspects are considered with regard to policy and strategy for the promotion of RES in Georgia for the purposes of respective studies<sup>10</sup>:

- Existence of dedicated RES policy or strategy document;
- Mandatory national overall target is set and action plan for the use of energy from RES are in place;
- Existence of support mechanisms for RES;
- Public outreach and awareness raising activities for RES, including information and training are encouraged.

**Existence of a dedicated RES policy or strategy document:** Currently, Georgian primary energy legislation does not contain any dedicated policy on RES policy except Main Directions of the State Energy Policy of Georgia<sup>11</sup> (hereinafter – Energy Policy) which was approved by the Parliament in 2015 which considers RES development in Georgia and approximation of Georgian legislation to EU energy acquis as one of priority. According to the policy, Georgia is remarkably rich in hydro-power resources, also having potential of wind, solar, biomass and geothermal resources, which can be used for creation of additional capacity by means of domestic and foreign investments. In order to achieve this goal, it is vital to improve investment climate through creation of stable, transparent and non-discriminatory legal basis, deepen strong and stable trading relations with neighboring countries' energy markets, develop corresponding domestic and cross-border infrastructure and support of scientific research (R&D) activities. All of the above will decrease dependence on imported energy carriers and increase energy security level of Georgia.

On the other hand, government resolution №214 (that is continuation of state program “Renewable Energy 2008”) is attempt to set regulation upon express of interest, construction, ownership and operation of power plants and to introduce support scheme. This document envisages sign PPAs mostly for 10-15 years period through memorandum of understandings (MoU) signed between

---

<sup>9</sup> Report on Activities of 2015, Georgian National Energy and Water Supply Regulatory Commission (GNERC), [www.gnec.org](http://www.gnec.org)

<sup>10</sup> Study on the calculations of revised 2020 RES targets for the Energy Community. Energy Community secretariat. 2010

<sup>11</sup> <http://energy.gov.ge/projects/pdf/pages/MAIN%20DIRECTIONS%20OF%20THE%20STATE%20POLICY%20IN%20ENERGY%20SECTOR%20OF%201047%20eng.pdf>

investor and state on individual bases. However, electricity purchase price which is fixed in the MoU mostly do not cover all period of a year, instead in covers only 8 month of a winter season.

It must be noted that, after adoption of State policy “Renewable energy 2008” decisive changes has not happened in development of RES in Georgia, because the policy document was not thorough and did not foresee international fundamental principles of supporting and regulating RES development. Due to this fact, several changes has been made in the document but still it cannot be deemed as a state policy to support RES development but rather technical document temporary to regulate ongoing RES construction issues.

Analysis of dedicated RES policy and strategy shows that Georgia is premature in having proper RES legislation. Therefore Georgia does not satisfy most principles of the directive (see Annex I).

**Mandatory national overall targets and action plans for the use of energy from RES:** According to Article 3 of the directive, each Member States has a mandatory target to increase share energy from renewable energy sources in their gross final consumption for 2020. All countries should increase the RES share by a certain given flat rate plus additional effort depending on the country’s GDP per capita. In order to achieve these targets Member States must encourage energy efficiency and energy savings through various support schemes and measures of cooperation between different Member States and with third countries. On the other hand, target for transport sector (10%) must be investigated further in addition to the examination of RES technical potential in Georgia to set measures and key actions in the NREAP. NREAP will establish procedures for the reform of planning and pricing schemes and access to electricity networks, promoting energy from renewable sources, harmonising of legislation with the Directive, to remove administrative barriers, accelerate authorization procedures and etc. Development of such NREAP requires comprehensive research and study to evaluate potential of RES in Georgia, recent energy consumption trends and project its future development. No obligatory provision is available in Georgian legislation that will entitle certain entity to provide such plans and will define major framework of such plan.

The Directive defines that in order to reach the targets set above Member States may apply the following measures various support schemes and/or measures of cooperation between different Member States and with third countries for achieving their national overall targets. Renewable Energy Directive doesn’t specify support schemes which may be applied and every country is free to choose among the feed-in tariffs, green certificates, tax exemptions or reductions, investment subsidies or any other market support mechanism. The most popular mechanism in the EU is a feed-in tariffs, situation when a fixed tariff (higher than the market price) is paid to RES electricity generators (in case of hydro power plants, this may apply only to small units, with the capacity not to exceed 10 MW) for a certain fixed period (10-20 years). The tariffs should differ for different types of sources, different technologies, capacities and time of commissioning.

The starting point of the target determination for each Party is the renewable share of gross final energy consumption in the baseline year of 2009. Gross final energy consumption is defined as consumption measured before transmission and distribution losses and including own use by the heat and power sectors, but excluding non-energy use. However, when this issue will be reviewed for the Georgian case, base year must be selected taking into account number of reasons:

- The calculation is being undertaken two years later than for the EU MSs;
- Data for 2009 is not available for the CPs in the same consistent and methodological format as for the majority of EU MSs (as discussed earlier in the report). However, CPs are now starting to collate statistics on a more consistent basis (Eurostat method) which suggests that better data might be available for later years; and

- There have been structural changes within the region subsequent to 2009 which might suggest a later year would be more appropriate.

Due to the structure of Georgia's annual energy balance and nature of the power system dominated by the hydro power, target requirements of directive on level of RES in consumption shall be easily met even if certain part the perspective projects will be realized<sup>12</sup>. However, it needs more in-depth analysis what is the transport energy consumption level and what measures should be taken to meet 10% target level imposed by the Directive. NREAP to be adopted by the GoG pursuant to the Renewable Energy Directive should take into account the referred.

In order to ensure compliance with the Directive and demonstrate whether and how the RES targets are met, Georgia needs to elaborate national renewable energy action plan. In order to elaborate such action plan, a detailed study on the present sources of energy consumption and transport energy consumption should be evaluated, as well as future consumption patterns forecasted and validated.

**Existence of support mechanisms for RES:** The Georgian Law on Electricity and Natural Gas<sup>13</sup> provides only short and limited definition RES. Furthermore, country does not have particular law on RES which is not sufficient to support development of RES in Georgia in large extent. Law defines micro generation status and net-metering policy framework<sup>14</sup>. According to the definition, micro generation is renewable power source under ownership of retail consumer that does not exceed 100 KW. On its side, GNERC's regulation on "Electricity (Capacity) Supply and Consumption Rules" defines in detail such micro generation connection procedures and net-metering policy, according to which connection of such power sources are carried out on very simplified procedure (based on one stop shop principle) and offsetting of consumed and produced energy is done on equal basis. As regards to carrying out excess energy, it is done on monthly basis and in case there is still surplus on the early timeframe, consumer has right to ask distribution licence financial remuneration for such surplus. Such policy is step forward to incentivize development of micro and distributed RES but not enough to establish RES support schemes on EU standards. More specifically, absence of such provisions in Georgian legislation that might be specific feed-in tariffs mechanism for different renewable energy sources, green certificates or tax exemptions allowing emissions reductions hinders development of RES in Georgia. In order to comply with the requirements of the Directive, Georgia requires to develop and adopt law on renewable energy sources.

Furthermore, GoG has developed power purchase agreement (PPA) tools to support development of RES through signing MoUs. RES developers can sign a long term PPA with the government of Georgia for up to 10-15 years at a fix tariffs. This tariff is set by the GoG based on the individual project and the tariffs are not regulated and/or approved by GNERC. The intent is that long term PPAs apply only to a portion of power plant output and the rest must be traded on the market (or exported) to avoid delay in the electricity market development process. PPAs are instrumental in financing renewable energy projects in the EnC contracting parties through securing the support conditions valid at the time of signature of a PPA is key to ensure investor confidence. The minimum terms included in the template of a PPA are provided either by legislation (in Bosnia and Herzegovina, Montenegro, Serbia, Ukraine) or by the national energy regulator, which is mandated to approve a PPA template (in Albania, Former Yugoslav Republic of Macedonia and Moldova). It

---

<sup>12</sup><http://energy.gov.ge/projects/pdf/pages/Sakartveloshi%20Asashenebeli%20Potentsiuri%20Elektrosadgurebis%20Nuska%201306%20geo.pdf>

<sup>13</sup> Paragraph z<sup>22</sup> of Article 2,

<sup>14</sup> Changes in Electricity (Capacity) Supply and Consumption Rules by GNERC, 10.05.2015

is advisable to be adopted standard template of PPA in Georgia that will be standardized based on the type or resource/technology of RES.

One of the drawback of the PPAs are the possibility from government to intervene subjectively in the RES development process (except when it comes to energy security issue) and lack of transparency of the process. Adoption of standard template PPAs will assist to deal with the abovementioned issue.

**Activity in public outreach and awareness raising, including information and training:** Awareness raising, information and/or training programmes for RES appears to be usually connected with or incorporated in energy efficiency programmes. A number of EnC CPs have conferred public outreach and information to energy efficiency agencies and institutes while others delegate in particular the area of consumer protection to the regulator. Again others retain this area within the Ministries and government bodies. Also, some universities are involved with research and education programmes.

Separate activity for RES awareness rising and trainings are not carried out in Georgia except the process that GNERC initiated in terms of public outreach and awareness raising process that among others included information exchange and public workshops regarding micro-generation construction and net-metering policy in Georgia. Process was headed toward several direction, such are media club format that included various meetings with media and NGO representatives and explaining basic principles of net metering policy, also interview's at local media sources (Radio, TV and etc).

## 5.2.2 Legislation and Regulation and Market Access

As mentioned above, currently Georgia does not have dedicated law on RES. Only short and limited definition of RES exists in the Georgian Law on Electricity and Natural Gas. Currently, in Georgian energy legislation all types of energy sources are treated similarly. Therefore, this requirement should be also considered in the development process of the renewable energy law for Georgia. Furthermore, Georgian Law on Electricity and Natural Gas Law does not go further than allocating "bio" source of energy to renewable energy source in general. There are no specific provisions regarding biofuels and bioliquids in Georgian legislation, either definition nor sustainability criteria or financial support schemes as it is required by the Directive. On the other hand, Georgian legislation does not imply any provisions regarding guarantees of origin and shall have to envisage requirements imposed on guarantees of origin to enable qualification of RES and eligibility for power exchange for the purposes of Article 9 of the Directive.

The only support mechanism for RES development was currently enacted in the primary and secondary legislation. It mainly covers mainly retail electricity market, enabling retail consumers install micro generations from RES. However, as a whole, Georgian legislation is silent on the technical specification of support schemes as RES do not benefit from support schemes. GNERC's resolution on "Electricity (Capacity) Supply and Consumption Rules" does not go into more details of technical specifications and certification micro-generation issue neither in terms of facilities nor certification requirements for construction works (installers). Furthermore, Georgian Grid Code also enacted by GNERC in 2014 does not contain any provision regarding technical criteria for renewable energy equipment.

One of the barriers to commercial feasibility and broad utilization of RES is not the lack of RES but the absence of inadequacy of existing transmission lines to move energy from generation to consumption or support the anticipated growth in RES requiring grid access. In general, renewable

energy project developers are reluctant to build transmission and distribution lines where RES exist but there are scarce transmission and distribution facilities. The EU has recognized that the NRAs in CPs must take action to simplify the conditions for grid connections and extensions, eliminate red tape for innovative small and medium-sized enterprises and enable better integration of RES into the power grid including cross-border grid connections. The answer is in Article 16 of the directive which deals with “Access to and operation of the grids”, providing for facilitation of access of RES to the grid to be implemented in a way that does not work contrary to the competitive electricity market.

Georgia undertakes significant attempts to facilitate integration of RES into transmission grid. Georgian Law on Electricity and Natural Gas establishes obligation and procedures for preparation of Ten Year Network Development Plan (TYNDP) by Georgian TSO. One of the main goal of the plan is to integrate RES into transmission network. According to 2016-2026 TYNDP, significant projects are envisaged to integrate RES into transmission network among which are two development transmission infrastructure in all directions where potential RES projects are planned.

More problematic situation is in distribution network where operates two major private companies, such are JSC “Telasi” and JSC “Energo-pro Georgia”. Due to the lack of unbundling of the distribution network from production and supply, distribution companies (who at the same time undertake generation and supply activities) put certain barriers for distributed RES at their network. Barriers are mostly shown in the form of exaggerated technical terms of reference upon connection application by RES. Inadequate financial burden for reinforcing distribution network by RES developers are major obstacle in embankment of RES projects. The situation was aggravated by lack of proper legislative and regulatory framework. Despite the fact that third party access was guaranteed by the Georgian Law on Electricity and Natural Gas, no proper regulation sets clear policy about RES grid access. Given the abovementioned, all burden to develop distribution facilities shifted toward RES developers that created unfavorable conditions for RES access to distribution network. To improve this situation, GNERC established distribution grid code through 2016 year 23 April №11 resolution on amendments into Grid Code. According to distribution network development chapter, distribution companies are obliged to prepare distribution network five year development plans and one of the goal of the plan must be development of the grid for RES integration in coordination with transmission network development 10 year plans.

The existing network infrastructure currently have remote control capability and can use power measures to control and manage the networks power flows. Despite this, IT tools include stochastic RES forecasting in scheduling of plant and new voltage conductors to accommodate large volumes of RES is missing. There is no R&D initiatives including developing home networks for use with smart meters and charging infrastructure for electric vehicles allowing potential for vehicle to grid flow of energy is not part of distribution network investment plans yet in Georgia. 13<sup>th</sup> chapter – distribution metering code of Georgian Grid Distribution Code mentions about development of smart metering systems at retail level and sets certain requirements that such metering systems must satisfy but does not set precise obligation and targets for distribution companies to develop such systems, rather it envisages this activity to be voluntary endeavor of distribution companies. Thus, neither Georgian grid code nor other normative acts supports development of intelligent network systems in Georgia.

For developing RE projects, clear and transparent administrative procedures such as licensing, planning permission and grid access approvals are necessary to be in place. Unclear administrative procedures may cause administrative cost increases and delay RE’s deployment. Administrative



burden in Georgia is estimated as average that leaves room for the removing administrative barriers and implementing more proportionate and streamlined procedures and rules (see appendix № 3).

In regard to administrative procedures, Ministry of Energy of Georgia is responsible for preparing potential projects, accepting interests from developers and negotiating project characteristics and monitoring construction according to the terms of memorandum of understanding. Either Ministry of Economy and Sustainable Development of Georgia or local authorities are responsible for granting permits to construct generation facilities. GNERC is responsible to license generator if it is above 13 MW. Ministry of Environment and Natural Resources Protection of Georgia is responsible for environmental permits to be granted to the RE developers (with installed capacity more than 2 MW) before signing MoU with Ministry of Energy of Georgia.

In Georgia connection procedure is the same for all type of generators and load. Georgian grid code regulates connection rules to transmission and distribution network based on the standard application form that RES must submit once it has all permits for construction and right on the land. After which TSO carries out studies on network impact and proposes connection offer that among others comprises terms of reference and connection agreement draft. Neither primary nor secondary legislation defines type of connection method (i.e. shallow, deep... etc.) that is subject of unclarity and abuse of the dominant position by the network companies and thus obstacle of RES integration into the network.

Currently, Georgian legislation does not envisage group processing of connection application of RES. All application must be based on individual approach that creates certain barriers for developers to prepare so cold basin development joint projects and/or connection cost sharing between adjacent RES projects.

Connection to the distribution network is more complicated rather than transmission network as distribution system is not unbundled in Georgia according to 3<sup>rd</sup> energy package requirements and distribution companies are at the same time incumbent producers and suppliers. When RES-electricity investors are to connect to integrated network operators that have production and trading interests, these operators might be motivated to foreclose those RES-electricity projects from the market that compete directly with their production units. These barriers can be easily implemented by the integrated network operator through discriminatory practices to grid connection requests. In order to promote fair competition for development opportunities, regulators should ensure transparent and nondiscriminatory practices from the side of network companies with regard to grid connection and access.

Regulators can respond to such a situation either by providing generation developers a non-constrained connection right to the grid or by establishing, in cooperation with the network companies, connection capacity limits to the grid and develop an evaluation and selection methodology to grant scarce development and connection rights. This latter option is called queue management.

Competitive tendering to allocate connection capacity and /or resource development licenses (or rights) should be preferred to other allocation schemes (e.g. first come first served) because such tenders might provide RES resource development at least cost for the customers. For example, winning a tender of this sort can be based on the fee/kWh feed in tariff bid of the developers. Such a scheme, by promoting competition, might provide a significant discount to an officially established uniform feed in tariff.

Georgian legislation does not contain any specific provision that regulates guaranteed or priority access of RES to the grid except market rules that defines that electricity produced by small power

plants (less than 13 MW) is subject of guaranteed purchase by ESCO and it regulates also access priorities on the new cross-border interconnectors. Regarding curtailment, current dispatch model, that is based on the central dispatching approach, doesn't envisage any curtailment rules or compensation mechanism. Curtailments are based on the real regimes and is operational peculiarities of the Georgian transmission system. Thus, Georgia in this part is not in compliance with the obligation of the Directive. Access priorities on the cross-border interconnectors are determined based on the following declining sequence:

- a) Electricity import and export in emergency situations;
- b) Export of electricity generated by a renewable power plant (including hydro power plants) built in Georgia after 2010, conditional that there is a long term electricity export agreement provided for in Paragraph 9, Article 14<sup>1</sup> of these Rules – during the effective period of the agreement;
- c) Export of electricity generated by a renewable power plant (including hydro power plants) built in Georgia after 2010, conditional that less than 10 years have passed since the start-up and beginning of the commercial operation of the power plant and there is no long term electricity export agreement provided for in Paragraph 9, Article 14<sup>1</sup> of these Rules. Export of electricity generated by a renewable power plants (including hydro power plants) which are under construction also belong to the same priority group if:
  - c.a) An agreement is signed with the government on construction of the power plant,
  - c.b) A long term agreement provided for in Paragraph 9, Article 14<sup>1</sup> of these Rules has not been signed for export of its generation.
- d) Export, transit, re-export of electricity generated by other Georgian power plants or imported into Georgia which is not provided for in Paragraphs (a), (b) and (c) of this Clause

At first hand priority of access rules grants priority of access on cross-border trade to RES, but it discriminates between new and old RES, also gives priority to such RES which has signed agreement with government of Georgia for construction of power plans over the RES projects that has not signed the agreement. Such differentiation between RES projects additionally must be analyzed through transparency and discrimination criteria of the Directive of the common electricity market. Thus, Georgian energy legislation (including IV<sup>th</sup> chapter of Georgian grid code regarding dispatch and scheduling rules) does not define precise priority of dispatch of the power generation under non-discriminatory and transparent approach. However, according to Electricity (capacity) market rules merit order dispatch must be based on least cost principles, taking into account system security issues. The principles of abovementioned must be incorporated in the Georgian legislation to ensure priority of access and dispatch is ensured.

At the same time, Georgian energy legislation does not sets clearly RES connection charge and/or cost sharing/bearing methodology that leaves quite flexible and discriminatory power to network companies to obligate RES developers to bear way much more cost that is necessary for connection to the grid. However, Georgian Law on Electricity and Natural Gas gives authority to GNERC to set transmission network connection charge methodology, but no such methodology was adopted yet. Thus, neither primary nor secondary legislation does not set connection type and clear boundary (physical or financial) of connection point between network company and the user. Connection agreement and terms of reference are subject of bilateral negotiations between network company and applicant that is non-transparent and may be discriminatory.

Taking into consideration the above, the new RES legislation should set the requirements to the transmission system operator and distribution system operators along with NRA's approval to provide any new producer of energy from renewable sources wishing to be connected to the system

with the comprehensive and necessary information required, including a comprehensive and detailed estimate of the costs associated with the connection and a reasonable and precise timetable for receiving and processing the request for grid connection. In this context, GNERC's role should be monitoring for non-discriminatory and transparent charging for transmission and distribution tariffs electricity from renewable energy sources. At the same time, GNERC should monitor TSO and DSO in order to identify any discriminative treatment of RES suppliers regarding grid connection costs and timetable. GNERC should ensure that the charging of transmission and distribution tariffs does not discriminate against electricity from RES, including in particular electricity from RES produced in peripheral regions, such as island regions, and in regions of low population density.

## 6. Challenges and Opportunities for Transposition of the Directive in Georgia

Legal, regulatory, administrative and financial measures are needed to support RES development. This is due to the fact that almost no renewable electricity technology is currently competitive in a market mostly dominated by fossil fuel power plants and large hydro. To tackle with the market failure for promotion RES development, technology specific feed-in tariffs combined with industrial policies have proven to be the most suitable way to ensure investor confidence and to tap renewable energy potential in EU. When this support was not appropriately designed, it led to “stop-and-go” policies for renewable energy, eroding investor confidence and created unnecessary burden for end-consumers. European Commission recommendations<sup>15</sup> calls for flexible and market based solutions in order to avoid market distortions through overcompensation. Therefore, the support for renewable energy shall be provided in such a way as to ensure more exposure to market signals for renewable energy producers and be flexible enough to respond to falling production costs.

The Directive does not specify support schemes which may be applied and every country is free to choose among the feed-in tariffs, feed-in premiums, green certificates, tax exemptions or reductions, investment subsidies or any other market support mechanism. The most popular mechanism in the EU is a feed-in tariffs, situation when a fixed tariff (higher than the market price) is paid to RES electricity generators (in case of hydro power plants, this may apply only to small units, with the capacity not to exceed to a pre-defined level) for a certain fixed period (10-20 years). The tariffs should differ for different types of sources, different technologies, capacities and time of commissioning.

### 6.1 Calculation of Indicative Renewable Energy Target for Georgia

As mentioned above, the Directive sets an overall target of 20% for the EU and individual targets for EU Member States and EnC's CPs based on their existing level of renewable energy and their level of economic development. According to the Directive, calculation of renewable energy target by 2020 for individual Contracting Party includes following three elements:

- Share of renewable energy in base year of 2009;
- Flat-rate increase;
- Additional residual effort determined on the basis of relative GDP per capita.

Therefore, sum of abovementioned three elements defines renewable energy target for each Contracting Party. In the process of renewable energy target calculation first step is the

---

<sup>15</sup> SWD(439) European Commission guidance for the design of renewables support schemes  
<http://ec.europa.eu/energy/en/topics/renewable-energy/support-schemes>

determination of RES share in gross final energy consumption in the base year of 2009 which is based on the following formula:

$$RES_{share} = \frac{N_{P_{Hydro}} + P_{OtherRES}}{GFEC} \quad (1)$$

where,

- $RES_{share}$  – share of energy from renewable sources in gross final energy consumption, expressed as a percentage;
- $N_{P_{Hydro}}$  – normalized production of energy from hydro resources, expressed as a ktoe;
- $P_{OtherRES}$  – sum of production of energy from other RES (geothermal, solar, wind, biofuel and waste), expressed as a ktoe;
- $GFEC$  – Gross Final Energy Consumption, expressed as a ktoe.

According to Article 2, subparagraph “F” of the Directive, Gross Final Energy Consumption (GFEC) means the energy commodities delivered for energy purposes to industry, transport, households, services including public services, agriculture, forestry and fisheries, including the consumption of electricity and heat by the energy branch for electricity and heat in distribution and transmission which is based on the following formula:

$$GFEC = TFC - NonEnergyUse + Losses + OwnConsumption \quad (2)$$

where,

- $TFC$  – Total Final Consumption covers all energy supplied to the final consumers for all energy uses, expressed as a ktoe;
- $NonEnergyUse$  – fuels that are used as raw materials in the different sectors and are not consumed as a fuel or transformed into another fuel, expressed as a ktoe;
- $Losses$  – transmission and distribution losses of energy, expressed as a ktoe;
- $OwnConsumption$  – own consumption of energy by the heat and electricity sectors, expressed as a ktoe.

Figures for GFEC’s calculation and  $P_{OtherRES}$  are taken from energy balance for base year. However, figure for  $N_{P_{Hydro}}$  is calculated as an energy production from hydro resources in the base year adjusted against hydro generation load factor in previous years. In this regard, normalization of hydro resources is applied for accounting irregularity factor of energy production from hydro resources during wet or dry years. Normalized production of energy from hydro resources is based on following formula:

$$N_{P_{Hydro}} = \frac{Hydro_{BaseYear}}{LF_{BaseYear}} * ALF \quad (3)$$

where,

- $Hydro_{BaseYear}$  – production of energy from hydro resources in the base year, expressed as a ktoe;
- $LF_{BaseYear}$  – load factor of hydro resources in the base years, expressed as percentage;
- $ALF$  – average load factor of hydro resources in previous years, expressed as percentage;

According to EU methodology, calculation of average load factor of hydro resources uses 15 years of historic data of load factor of hydro resources. However, due to data unavailability some CPs applied existing data available for previous years and/or international experience.

After calculating share of renewable energy in gross final energy consumption in base year, next step is to apply Flat-Rate Increase. It is equal to 5.5% of gross final energy consumption in 2020 for each EU Member States and EnC's CPs, added to the share of RES in the base year of 2009.

Finally, additional residual effort on the basis of relative GDP per capita should be counted in the renewable energy target by 2020 for each CP. This part of the target is varies among EU Member States and EnC's CPs while it is based on their relative GDP per capita in 2009. Same approach was used for EnC's CPs as for EU Member States, implying that average EU effort of 0.16 toe per citizen was multiplied to GDP per capita index of respective Contracting Party. On the other hand, GDP per capita index represents a ratio of Contracting Party's respective GDP per capita to the EU figure of €22,400. Lastly, in order to determine an aggregate residual effort each Contracting Party, adjusted effort per citizen is multiplied by the population of CP.

In order to count residual effort in the target, a forecasted gross final energy consumption for of 2020 is divided to the aggregated residual effort where forecasted gross final energy consumption represent total primary energy supply (TPES) for 2020 multiplied to ratio of GFEC in TPES in the base year.

The national targets under the Directive and the EnC Treaty that used the same methodology have been based not on physical potentials but rather on existing renewable energy production and GDP. This has led to gaps between national targets and (cost-effective) potentials. Therefore Directive allows countries the use of "cooperation mechanisms" for reaching the national 2020 targets for renewable energy in a cost-effective manner. Countries with relatively expensive RES potentials can thereby meet their targets by purchasing RES shares from countries with relatively cheap RES potentials to be part of the NREAPs.

For calculating indicative renewable energy target for Georgia same approach and measures were used. On the other hand, for base year figures from official energy balance of Georgia<sup>16</sup> for 2014 was used. For normalisation of electricity generated from hydropower plants, methodology of normalisation rule for accounting for electricity generated from hydropower and wind power from Directive's Annex II was applied.

In order to calculate additional residual effort on the basis of relative GDP per capita<sup>17</sup>, EU effort of 0.16 toe per citizen and GDP per capita to the EU figure of €22,400 was taken. At the same time, for forecasted gross final energy consumption for 2020 forecasted total primary energy supply for 2020 based on LEAP-Georgia model<sup>18</sup> was used which was multiplied to ratio of GFEC to TPES, assumed constant as 2015. Finally, share of RES in GFEC in 2014, flat rate increase of 5.5% and additional residual effort added to each other for the determination of indicative renewable energy target for Georgia for 2020. The result is summarized in Table 4. Detailed calculation of the target is presented in the Appendix 2.

Table 4. Indicative Renewable Energy Target for Georgia for 2020

GFEC in 2014, ktoe	RES Share in 2014	Flat Rate Increase	Forecasted GFEC in 2020, ktoe	Residual Effort per Citizen, toe/head	Residual Effort, ktoe	Residual Effort 2020 Share	RES Target in 2020
3788.6	<b>32.3%</b>	<b>5.5%</b>	4561.1	0.02	73.5	<b>1.6%</b>	<b>39.4%</b>

<sup>16</sup> National Statistics Office of Georgia, [www.geostat.ge](http://www.geostat.ge)

<sup>17</sup> For GDP per capita in Euros in 2014, figure for GDP per capita (at current prices) in GEL from National Statistics Office of Georgia was used and converted by average exchange rate for Euro in the year of 2014 based on data from National Bank of Georgia.

<sup>18</sup> Z. Gachechiladze, N. Sumbadze, I. Pirveli "Georgian energy sector projection using LEAP model", Georgian Technical University, 2015. ISBN978-9941-20-563-7

Based on the ongoing RES projects which are planned to be executed by 2020 and various international projects support RES development in Georgia together with upcoming legal and regulatory changes may make it possible to achieve indicative renewable energy target of 39.4% by 2020 but it would require several assumptions to be fulfilled such as due implementation all ongoing projects and satisfying internal demand by such renewable energy projects that will be challenging for Georgia. In calculation of renewable energy share for 2020 figures from LEAP-Georgia taken for Gross Final Energy Consumption in 2020 (4620.7 ktoe). It is also assumed that electricity generation from hydro resource will increase by 4.2%<sup>19</sup> (930 ktoe by 2020), hydro load factor for 2020 - 35% and average load factor for 2006-2020 years to be 42%. On the other hand, share of other renewables in relation to GFEC in 2014 assumed to increase from 10.8% to 15% amounting to 690 ktoe. Based on these assumptions and forecast renewables share in 2020 would easily likely to account 39.7%. Despite abovementioned calculations it is necessary to prepare first draft of NREAP of Georgia and make more detailed forecast Georgian energy balance in order to calculate trajectory of achieving RES target by 2020.

## 6.2. Job Opportunities

One of the significant impact of transposition of the Directive in Georgian energy legislation will be new job creation in the electricity sector. However, change in electricity generation mix implying that additional generation capacities will be built in the future based on local demand in the country new jobs will be created but also existing jobs will be reduced respectively. In particular, new job creation will be established through several channels. First of all, large scale deployment of RES in the country will boost employment in the renewable energy industry because number of installation of additional capacity as well as with the operation and maintenance of the new infrastructure will be increased. At the same time, it will have multiplier effects on employment across other sectors such as IT services, production of renewable technologies and etc. However, direct and indirect employment effect will be balanced by reduction of employment in other sectors. While energy production from RES will increase, production of energy from the industries using non-renewable resources will decrease.

In addition to above mentioned employment effects, growth in the use of renewable energy will support security of energy supply and energy price stability while Georgia covers about 65-70% of its energy demand by imports oil and natural gas. Therefore, higher use of renewable energies will decrease the uncertainty concerning the supply and prices of energy, and reduce risk premium in the energy markets which on top of that will scale-up economy and employment in the country.

The number of jobs created or lost each generation technology in the electricity sector of Georgia is calculated using the following formula:

$$Jobs = TEM * RM * LMP * IEM \quad (4)$$

where,

- *Jobs* – total jobs created or lost;
- *TEM* – Technology Employment Multiplier;
- *RM* – Regional Multiplier;
- *LMP* – Local Manufacturing Percentage;
- *IEM* – Indirect Employment Multiplier;

---

<sup>19</sup> GNERC's annual report for 2015 year

For each type of generation technology, the technology employment multiplier was taken from well-known industry studies<sup>20</sup> which estimates full time equivalent direct job creation both (1) construction, manufacturing and installation and (2) operation and maintenance phases for each generating technologies.

Table 5: Technology Employment Multipliers for Generating Technologies

Technology	Construction, manufacturing, installation (MW)	Operation and Maintenance (MW)	Total
Solar PV	6.21	4.8	11.01
Wind	2.51	0.27	2.78
Biomass	0.4	0.44	0.84
Hydro	9.5	0.135	9.64
Coal/Lignite	0.27	0.74	1.01
Gas	0.25	0.7	0.95

Table 5 shows that RES can create more jobs per unit of installed capacity of generating technologies. These Technology Employment Multipliers for Generating Technologies calculated for developed countries. Thus, technology employment multipliers for each generating technology were adjusted by regional multipliers in order to take into account different levels of productivity between developed countries and Georgia. Regional multiplier was assumed to be 1 while there is no up to date studies on labor productivity in Georgia.

While renewable sector is still at the stage of creation in Georgia, jobs in RES technology sector will increase over time in parallel to industry development. Therefore, Local manufacturing percentage is assumed to increase 50% by 2020 from 30% in 2010 based on report of Institute for Sustainable Futures<sup>21</sup>. Lastly, indirect employment multiplier of 1.78 implying that for every 1 direct job there will be 0.78 indirect jobs created). Table 6 summarizes calculation results for job creation/lost based on each generation technology.

Table 6: Estimated Jobs Created/Lost

	Solar PV	Wind	Biomass	Hydro	Coal/Lignite	Gas	Total
Number of Jobs	490	51	2.24	6659	-9	-318	6875.24

As Table 6 shows around 7000 new jobs will be created in renewable sector of Georgia both in construction and O&M phase if perspective renewable projects will be implemented.

### 6.3 Reduction in CO<sub>2</sub> Emissions

Larger scale development of RES in Georgia will have positive effect of the environment as well. It will support sustainable development goals of the country implying that living environment will be much cleaner which in turn positively benefit health of a national. Development of potential power project will reduce fuel consumption of conventional power plants which are main source

<sup>20</sup> Employment in Europe 2009, European Commission (November 2009), Table 3, page 124

<sup>21</sup> See Table 30, *Energy Sector Jobs to 2030: A Global Analysis*, Institute for Sustainable Futures, 2009



of CO<sub>2</sub> emissions. For calculating potential CO<sub>2</sub> emissions reduction in electricity sector of Georgia emission factor of 0.3995 tCO<sub>2</sub> per kWh<sup>22</sup> was used. Based on the emission factor and potential annual generation of ongoing RES projects published on the Ministry of Energy website<sup>23</sup>, figure for reduced of CO<sub>2</sub> emissions is obtained. Therefore, about 1415 mln USD investments in RES will result in reduction of 1,417,351 tons of CO<sub>2</sub> emissions by the year 2020.

## 7. Conclusions and Recommendations

1. The primary provision of the Directive is the setting of mandatory targets for increasing the proportion of energy from renewable sources in the electricity, heat and transport sectors. The Directive sets an overall target of 20% for the EU and individual targets for Member States based on their existing level of renewable energy and their level of economic development. Within the overall energy target there is a specific obligation to meet 10% of energy used in transport from renewable sources.
2. The Directive does not specify support schemes which may be applied and every country is free to choose among the feed-in tariffs, feed-in premiums, green certificates, tax exemptions or reductions, investment subsidies or any other market support mechanism. The most popular mechanism in the EU is a feed-in tariffs, situation when a fixed tariff (higher than the market price) is paid to RES electricity generators (in case of hydro power plants, this may apply only to small units, with the capacity not to exceed to a pre-defined level) for a certain fixed period (10-20 years). The tariffs should differ for different types of sources, different technologies, capacities and time of commissioning.
3. As international practice reveals, one of the major obstacle in proper development of RES consists of the administrative measures which increase the risks for the potential investors. In majority of CPs support measures are subject to changes and uncertainties. The feed-in tariffs are frequently revised after their adoption, sometimes decreased as a result of administrative measures or calculated on an annual basis leading to increased uncertainty for investors. There is a clear need to provide more investor confidence, particularly through stable and predictable support schemes.
4. In case of Georgia's accession in EnC, transposition of principles of the directive in Georgian legislation will not only be a legal obligation but a tool that ensures transparency towards the investors in renewable energy on the policy objectives to reach the 2020 renewable energy targets and to further promote RES development. In order to assess the implications of the Directive compliance, it would be necessary to understand the costs/opportunities of transposition of the directive. Whilst it has not been within the scope of this study to consider the costs of transposition of the directive, it will be entirely dependent on the policy decisions of the Georgian governments and their plans for meeting RES share target.
5. In order to ensure compliance with the Directive and demonstrate whether and how the RES targets are met, Georgia needs to elaborate national renewable energy action plan. In order to elaborate such action plan, a detailed study on the present sources of energy consumption and transport energy consumption should be evaluated, as well as future consumption patterns forecasted and validated.
6. In case Georgia will become EnC contracting party and transpose the directive, it will have less time to achieve the RES share target calculated according to the directive. Consequently, it is suggested that meeting the targets would in fact require a greater level

<sup>22</sup> This figure is based on Ministry of Energy of Georgia's estimates

<sup>23</sup><http://energy.gov.ge/projects/pdf/pages/Mimdinare%20Ganakhlebadi%20Sainvestitsio%20Proektebi%201401%20geo.pdf>



- of ambitions. The calculation of the 2020 renewable energy target for Georgia should be established after the completion of the relevant study carried out under the responsibility of the EnC to determine real perspectives by Georgia to meet such binding target by 2020.
7. However, it needs more in-depth analysis what is the transport energy consumption level and what measures should be taken to meet 10% target level imposed by the Directive. NREAP to be adopted by the GoG pursuant to the Renewable Energy Directive should take into account the referred. Further consideration will be required of the sustainability of biomass consumption. At the moment it seem perverse to set a target that may include ongoing unsustainable consumption level (for example based on illegal logging) in order to meet the target.
  8. The target of 10% share of renewable energy in transport will most probably not be met due to the possible late transposition of the directive and implementation of the legal framework for sustainability of biofuels and bioliquids. Moreover, without adequate transposition and implementation, Georgia is not able to count the biofuels consumption towards the target. It is reasonable for Georgia to claim derogation for transport RES share target obligation.
  9. Georgia already consumes a relatively high proportion of energy from RES, but increasing the proportion of renewable energy in the mix has not been precisely set in the energy policy/strategy. Consequently the policy, legal, regulatory and institutional frameworks designed to support RES development are at a very early stage. Meeting the new targets and compliance with the Directive is likely to require new policy commitments and extensive revisions to existing legislation, plus the development of supportive regulatory and institutional arrangements. Since at this stage, Georgia has not established transparent and well-functioning electricity trading systems, the introduction of more market based support schemes, such are the feed-in premiums and etc, will have to wait. We have not been in a position to assess the effectiveness of existing support schemes in Georgia, or whether the measures implemented is in fact sufficient to attract RES investments to reach RES targets to be defined or additional support mechanisms will be needed to be implemented. If Georgia is to meet its mandatory target, the attractiveness of support schemes and the ease with which RES developer can gain access to networks and markets will become increasingly important.
  10. Many EU countries apply reduced connection charges for renewable generators to promote them in order to fulfil national renewable targets. This is so called shallow cost approach – when project promoters only pay the cost of network connection up to the connection point – could help the uptake of certain RES technologies as connection costs often amount no less the 15% of the total project cost due to the spatial distribution characteristics and smaller unit size of RES technologies. It is advisable to follow a stepwise approach related to the connection charging regime. The shallow cost approach should be used only for a limited period in the beginning of RES deployment and then substituted with the deep or semi-deep cost charge approach before more sizeable RES developments take place. This choice is supported by the lower purchasing power in the EnC CPs, as this places the cost burden on the producer, thus limiting the price impact on the final consumers.
  11. Connection to the distribution network is more complicated rather than transmission network as distribution system is not unbundled in Georgia according to 3<sup>rd</sup> energy package requirements and distribution companies are at the same time incumbent producers and suppliers. When RES-electricity investors are to connect to integrated network operators that have production and trading interests, these operators might be motivated to foreclose those RES projects from the market that compete directly with their production units.

These barriers can be easily implemented by the integrated network operator through discriminatory practices to grid connection requests. In order to promote fair competition for development opportunities, regulators should ensure transparent and nondiscriminatory practices from the side of network companies with regard to grid connection and access.

12. Georgian legislation does not contain any specific provision that regulates guaranteed or priority access of RES to the grid except market rules that defines that electricity produced by small power plants (less than 13 MW) is subject of guaranteed purchase by ESCO and it regulates also access priorities on the new cross-border interconnectors. Regarding curtailment, current dispatch model, that is based on the central dispatching approach, doesn't envisage any curtailment rules or compensation mechanism. Curtailments are based on the real regimes and is operational peculiarities of the Georgian transmission system. Thus, Georgia in this part is not in compliance with the obligation of the Directive.
13. One of the drawback of the long term PPAs from RES in Georgia are the possibility from government to intervene subjectively in the RES development process (except when it comes to energy security issue) and lack of transparency of the process. Adoption of standard template PPAs will assist to deal with the abovementioned issue.
14. Although it is not entirely clear, it appears from the Directive that CPs would be treated in the same way as the EU Member States and able to transfer renewable energy generated in the EnC to an EU member states using the statistical transfer provisions. If this is the case, physical transfer of the energy will not be required and the interconnector capacity between Georgia and EU would not be a constraint on renewable energy exports.
15. Implementation of the Directive target will have the largest impact upon job creation in the electricity sector as the target will require to build additional capacity of each generating technology. The change in the electricity generation mix will create additional jobs dependent upon the relative labor intensity of each generating technology.

## References

1. Directive 2009/28/EC on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC
2. Georgian Law on Electricity and Natural Gas
3. Main directions of the state policy in energy sector of Georgia
4. Energy Sector Jobs to 2030: A Global Analysis, Institute for Sustainable Futures, 2009
5. Employment in Europe 2009, European Commission, November 2009
6. Z. Gachechiladze, N. Sumbadze, I. Pirveli “Georgian energy sector projection using LEAP model”, Georgian Technical University, 2015. ISBN978-9941-20-563-7
7. Report on Activities of 2015, Georgian National Energy and Water Supply Regulatory Commission (GNERC)
8. Study on the calculations of revised 2020 RES targets for the Energy Community. Energy Community secretariat. 2010
9. SWD(439) European Commission guidance for the design of renewables support schemes, <http://ec.europa.eu/energy/en/topics/renewable-energy/support-schemes>
10. Report on approximation of Georgian legislation with the EU energy acquis. New Applied Technology Efficiency and Lighting Initiative (NATELI), 2013
11. Informal note jointly prepared by the European Commission and the Energy Community Secretariat on the interpretation of Directive 2009/28/EC, article 16°, and the main obligations for TSOs of Energy Community Contracting Parties.
12. USAID report on the principles of regulation to promote the development of the renewable energy in the black sea, 2012
13. Report of the secretariat to the ministerial council on the progress in the promotion of renewable energy in the Energy Community. Energy Community report, 2015
14. ERRA issue paper on regulatory practices supporting deployment of renewable generators through enhanced network connection, REKK, 2013
15. Ministry of Energy of Georgia, [www.energy.gov.ge](http://www.energy.gov.ge)
16. National Statistics Office of Georgia, [www.geostat.ge](http://www.geostat.ge)
17. Energy Community secretariat website  
[www.energycommunity.org/portal/page/portal/ENC\\_HOME](http://www.energycommunity.org/portal/page/portal/ENC_HOME)

## Appendix 1 - Gap analysis

Directive 2009/28/EC	Current provision in Georgian legislation <sup>24</sup>	Compliance (YES/NO/Partially)	Actions necessary for compliance
<b>Article 2 – Definitions</b>			
(a) Energy from renewable non-fossil sources = wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas, biogases <sup>25</sup>	renewable energy sources- all non-fossil and sustainable energy sources that are generated by, but not limited to: bio- and hydro powers, geothermal, solar, wind, and marine (including tidal, wave and thermal) energies;	yes	Definition should be expanded to comply with Directive definitions
(g) District heating or cooling = distribution of thermal energy in form of steam, hot water or chilled liquids, from central source of production through a network to multiple buildings or sites, for the use of space or process heating or cooling	There is no definition of district heating or cooling.	No	Must be included in the Law
(h) Bioliquids = liquid fuel for energy purposes other than for transport, incl. electricity and heating and cooling, produced from biomass (i) Biofuels = liquid or gaseous fuel for transport produced	There is no definition of biofuels or bioliquids	No	Must be included in the Law

<sup>24</sup> <http://esco.ge/files/01laweng.pdf>

<sup>25</sup> RED further details some resources:

(b) Aerothermal energy = energy stored in the form of heat in ambient air

(c) Geothermal energy = energy stored in the form of heat beneath the surface of solid earth

(d) Hydrothermal energy = energy stored in the form of heat in surface water

(e) Biomass = biodegradable fraction of products, waste and residues from biological origin from agriculture (incl. vegetal and animal substances), forestry and related industries incl. fisheries and aquaculture, as well as biodegradable fraction of industrial and municipal waste

from biomass			
(j) Guarantee of origin (GoO) = electronic document with the sole function of providing proof to final customer that a given share of energy was produced from RES	The Energy law does not contain provisions regarding GoO	No	Must be included in the Law
(k) Support scheme = instrument scheme or mechanism to promote the use of RES by reducing the cost, increasing the price, or the volume (by an obligation) of such energy purchased; includes investment aid, tax exemptions or reductions, tax refunds, RES obligation support schemes (incl. green certificates), direct price support schemes (e.g. FiTs, premium payments)	The Energy law does not contain provisions regarding the support scheme.	No	Must be defined support scheme to resources specific RES and relevant definitions/provisions included in the E&G Law or new draft RES law
(l) Renewable energy obligation = national support scheme requiring the inclusion of a given proportion of energy from RES in production, supply, or consumption; includes green certificate schemes as a means for compliance	The Energy law does not contain provisions regarding the renewable energy obligation.	No	
<b>Article 3 – Mandatory national targets and measures</b>			
Individual national RES targets to be met by 2020, consistent with 20% Community target, calculated as a share of gross final energy consumption (1.) General national biofuels target of 10% of final energy consumption in transport, to be met by 2020 (4.)	There are no mandatory targets. (MoE determines annual and predictive energy balances including generation forecasts from RES)	No	Mandatory targets must be determined
Energy efficiency (EE) and energy savings shall be promoted to achieve targets more easily (1.)	An action plan for EE are Currently under preparation that will be passing through the legislative process.	No	
Measures shall be introduced to promote RES and biofuels: support schemes and joint measures between MS and with third countries (3.)	There are currently no provisions regarding transboundary cooperation in the field of renewable energy	No	Determine the rules for joint support schemes and measures between MS where feasible.
<b>Article 4 – National renewable energy action plans</b>			
Action plans must be submitted annually	The <i>Energy Sector Strategy</i> includes scenarios for meeting future energy demands until 2015. Emphasis is on construction of additional thermal	No	Annual action plans specific to RES development for electricity,

	<p>generation capacity and reduction of electricity imports but increases in energy</p>		<p>transport, and heating and cooling should be required.</p> <p>National mandatory targets should be set for RES and EE</p>
<p>Minimum requirements (Annex VI):</p> <ul style="list-style-type: none"> <li>□ Expected gross final energy consumption in electricity, transport and heating and cooling for 2020, taking into account effects of EE and energy savings</li> <li>□ National sectoral 2020 targets and estimated shares of energy from RES</li> <li>□ Measures for achieving the targets: <ul style="list-style-type: none"> <li>o Overview of all policies concerning RES</li> <li>o Specific measures to fulfil Articles 13 (Administrative procedures), 14 (Information and training) and 16 (Grid access) and measures concerning Articles 17 to 21 (Sustainability of biofuels and bioliquids and reporting and compliance/verification)</li> <li>o Support schemes for the promotion of RES in electricity, heating and cooling, and transport (applied by one MS or in cooperation)</li> <li>o Specific measures for biomass</li> <li>o Planned use of statistical transfers between MS and planned participation in joint projects</li> </ul> </li> <li>□ Assessments of RES technology and EE and energy saving measures to meet 2020 target</li> <li>□ National action plans have to assess the need to build new infrastructure for district heating and cooling (Article 16, 11.)</li> </ul>	<p>In addition, (f) “Gross final consumption of energy”, (m) “Actual value”, (n) “Typical value”, and (o) “Default value” as methodological terminology are not defined in Georgian legislation.</p> <p>TYNDP defines country wise electricity consumption forecast and energy generation projections including from RES. No split into sectors are available</p>		<p>The target should be set and it must be mandatory</p> <p>NREAP must be prepared with the final energy consumption split into the sectors</p> <p>The measures for achieving target should be defined and should match RED requirements</p> <p>NREAP must include the provision on assessments of RES technology and EE and energy saving measures and the provision about the requirement to new heating and cooling infrastructure.</p>

<b>Article 6 – Statistical transfers</b>			
Statistical transfers of energy from RES can be made between MS, after the national target has been met They do not require physical transfer of energy	There are no provisions on possible statistical transfers with other countries.	No	Provisions on statistical transfer with other countries must be set out in draft RES Law.
<b>Article 7 to 10 – Joint projects</b>			
MS can engage with other MS or third parties in joint projects for target compliance purposes (Art. 7 and 9)	There are no provisions regarding joint projects.	No	Provisions on statistical transfer with other countries must be set out in draft RES Law.
<b>Article 13 – Administrative procedures, regulations and codes</b>			
Proportionality of administrative bodies, procedures, rules, structures and charges, certification and licensing, information availability with respect to RES projects and infrastructure for RES (networks) needs to be ensured (1.)	E&G law, as well as laws on licensing and independent regulatory bodies defines proportionality of administrative bodies, procedures, rules and functions.  Moreover “renewable energy 2008“ defines availability of information on RES projects, procedures of expression of interests, information on potential projects and availability of already signed MoUs. Also TYNDP defines all network reinforcement works that are designed for facilitation of integration of new RES	Yes	Grid code requires updating. Procedures need streamlining.  Updates may be required of E&G law to include RES authorization rules
Building codes and regulations should require minimum levels of RES in new buildings and major renovated buildings and measures to encourage uptake of RES (4., 5.)	There are no provisions regarding the required minimum level of RES in new buildings.		Include provisions regarding the required minimum level of RES in new buildings in the new draft of building code

<p>Equipment should be certified and eco-labels should be used to encourage RES use (2., 3., 6.)</p>	<p>There currently no requirements for certification and eco-labels to encourage RES use.</p>		<p>Include provisions concerning the requirement for certification and eco-labels to encourage RES use in the new draft of RES law</p>
<p><b>Article 14 – Information and training</b></p>			
<p>Information and guidance programmes on RES should be made available to the public (1., 2.,</p>	<p>No organized information and guidance programmes are set regarding RES development</p> <p>GNERC organizes workshops, information sharing and consultancy support with public regarding microgeneration installations and net-metering policy</p>	<p>Partially</p>	<p>Leaflets on solar water heating will be distributed and a manual for its installation must be provided to prospective installers.</p> <p>Seminars for businessmen interested in importing solar electricity and heating technology must be organized.</p>
<p>Certification and qualification schemes for installers should be developed (3., 4.</p>	<p>There are no provisions regarding certification or qualification scheme for installers</p>	<p>No</p>	<p>Certification and qualification schemes for installers should be developed.</p>
<p>Guidance on high efficiency technologies should be given (5.)</p>	<p>Tbilisi city hall provides training center for energy efficiency technologies, but it doesn't cover trainings on high efficient RES technologies</p> <p>Georgian Technical University provides RES courses and owns RES laboratory</p>	<p>Partially</p>	<p>New programme for Energy Efficiency and RES must be established in university courses</p>



<p>Awareness-raising, guidance and training programmes should be developed (6.)</p>	<p>No streamlined public awareness campaign on RES development is currently on place that mainly must include small distribution RES technologies, except GNERC activity for promotion micro generators.</p> <p>New demonstration project for micro generation and net metering is planned by GNERC</p>	<p>Yes</p>	
<p><b>Article 15 – Guarantees of origin</b></p>			
<p>GoOs are to be issued for electricity and heating and cooling from RES and state the share of RES in an energy supplier’s energy mix (1.)</p>	<p>There are no provision specifying the function of Guarantees of Origin.</p>	<p>No</p>	<p>Specify the function of Guarantees of Origin.</p>
<p><b>Article 16 – Access to and operation of grids</b></p>			
<p>Transmission and distribution grid infrastructure, intelligent networks, storage facilities and the electricity system (incl. interconnectors) need to be developed (1.)</p>	<p>T/DSO are responsible for maintaining, modernization and development of transmission and distribution system.</p>	<p>yes</p>	
<p>Authorisation procedures for grid infrastructure development need to be accelerated and coordinated with administrative and planning procedures (1.)</p>	<p>TSO prepares TYNDP that is approved by MoE. Based on the TYNDP transmission companies prepare 3 year investment plans that must be agreed with GNERC. Permission and development procedures are coordinated between different administrative bodies of GoG or local authorities. There is no provision regarding acceleration of grid infrastructure development.</p>	<p>Yes</p>	
<p>Transmission and distribution of electricity from RES shall be guaranteed by T/DSOs in their territories (2.(a))</p>	<p>According to the market rules the</p>	<p>Partially</p>	<p>Grid access and grid connection</p>

	RE producers with installed capacity less than 13 MW have a right to sell their electricity directly to the market operator.		issues for RES should be further developed in the grid code
Priority or guaranteed access for RES shall be provided for by the MS (2. (b))	Energy Law requires equitable third party access for all generators providing the network is technically capable, but Georgian legislation doesn't envisage priority to RE producers over other producers	No	Legislation should explicitly require priority grid access for all RES producers
T/DSOs have to make public standard rules on costs for technical adaptation and these rules shall be non-biased and based on all costs and benefits of connection of new producers (3.)	There is no provision on making public standard rules and costs for technical adaptations.	No	Grid Code to include provision on making public standard rules of costs for technical adaptation.
T/DSOs have to make available to any new producer applying for connection their grid connection cost estimates, timetables for processing requests, and an indicative timetable for any proposed grid connection (5.)			
MS may require costs of technical adaptations to the grid to be borne by T/DSOs (4.)	There is no provision on requirement for T/DSO to bear the costs of technical adaptation.	No	
Transmission and distribution tariffs may not discriminate against RES producers, especially from peripheral and low population density regions (7.), and charging must be cost reflective (8.)	The transmission and distribution tariffs should be non-discriminatory but do not contain any special provision regarding RES producers.	yes	
Gas infrastructure may need to be extended, too, where necessary (9.) and technical rules for network connection may be requested to be published (10.)	T/DSO shall operate, construct and maintain the natural gas transmission and distribution system and ensure sufficient capacity to meet demand. DSO shall publish	Yes	

	information regarding condition of services and information necessary for distribution system users to use the distribution system		
<b>Article 17 – Sustainability criteria for biofuels and bioliquids</b>			
<p>Energy from biofuels and biofuels can count towards the target, irrespective of its country of origin but subject to sustainability criteria</p> <ul style="list-style-type: none"> <li>• GHG emissions savings shall be at least 35%, then 50% from 2017 and 60% from 2018</li> <li>• They shall not be made from raw materials from certain land types (high biodiversity, designated areas, biodiverse grassland, land with high carbon stock, peatland)</li> <li>• Agricultural raw materials needs to be in accordance with common agricultural policy</li> </ul>	The Montenegrin legislation and regulation do not contain provisions regarding biofuels and bioliquids.	No	Include provisions on biofuels and bio liquids

## Appendix 2 - 2020 Renewable Energy Target Calculation for Georgia

Parameter	Value
<i>Renewable Energy Share in 2014</i>	
Total Final Energy Consumption, ktoe	4022.8
– Non-Energy Use, ktoe	306.4
+ Losses (electricity and heat), ktoe	18.7
+ Own Consumption (electricity and heat), ktoe	53.5
<b>Gross Final Energy Consumption 2014, ktoe (A)</b>	<b>3788.6</b>
Hydro Generation, ktoe	716.7
÷ Hydro Load Factor 2014	41.5%
× Average Hydro Load Factor 2001-2014	~43%
Normalised Hydro Generation, ktoe (B)	742.60
Other Renewable Energy Sources, ktoe (C)	481.8
<b>Total Normalised Renewables, ktoe (D) = (B) + (C)</b>	<b>1224.40</b>
<b>Renewable Energy Share 2014 (E) = (D) / (A)</b>	<b>32.3%</b>
<b>Flat Rate Increase (F)</b>	<b>5.5%</b>
<i>Additional Effort Based on GDP</i>	
GDP per Capita 2014, €/head	2769.34
÷ EU-27 Average GDP per Capita, €/head	22,400
GDP per Capita Index	12.36%
× Residual Effort per EU-27 Citizen, toe/head	0.16
Residual Effort per Citizen, toe/head	0.02
× Population 2014, m	3.7
<b>Residual Effort, ktoe (G)</b>	<b>73.5</b>
Total Primary Energy Supply 2020, ktoe	5391.4
× Ratio of GFEC to TPES (assumed constant as 2014)	84.6%
<b>Forecast 2020 Gross Final Energy Consumption, ktoe (H)</b>	<b>4561.1</b>
<b>Residual Effort 2020 Share (I) = (G) / (H)</b>	<b>1.6%</b>
<b>Total 2020 Renewable Energy Target (E) + (F) + (I)</b>	<b>39.4%</b>

### Appendix 3 - Assessment of the administrative procedures

“One Stop Shop”	One permit?	Online application for permit?	Max time limit for procedures	Automatic permission	Facilitated procedure for small scale?	Identification of geographic sites?	Automatic entry into financial support scheme?	Licensee	Overall assessment
No (except for microgenerator)	1. Yes for Less than 2 MW 2. No for big projects 3. for microgeneration – no permit	No (except for microgenerators)	1. for big projects from 35 days up to 6 month 2. For projects less the 2 MW – 1 month	No (except for microgenerators)	Yes	Yes (for perspective projects identified by MoE)	No (except for microgenerators)	1. Yes (more than 13 MW) 2. No licensee for small scale	Average