

# Renewable energy – Quo vadis?

Overview of the renewable energy market in Central and South Eastern Europe
Selected country reports



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The Paris Agreement of the 2015 United Nations Climate Change Conference is a very topical issue these days. The key aspect of this agreement is the limitation of global warming to 1,5-2%. Furthermore the Roadmap of the European Union aims to reduce fossil fuels about 80-95% until 2050. These agreements give again significant importance to the renewable energy sources. The EU Member States have already assigned the Renewable Energy Directive (Directive 2009/28/EC) in 2009, which is still the basis for the National Action Plans (NAP). These policies are complemented by EU-wide and national measures addressing areas such as energy efficiency, low carbon technologies and transport.

The TPA country reports are an efficient business intelligence tool for investors and analysts in the renewable energy field. This brochure will give you a clear overview of the most important markets regarding renewable energy in Central and South Eastern Europe: Albania, Austria, Bulgaria, Croatia, Czech Republic, Poland, Romania, Serbia and Slovakia.

The country reports, with the information status of January 2016, contain the latest figures for the renewable energy sources such as wind, solar, hydro and biomass. In the light of several legislative changes introduced in 2014 and 2015 this reports provide per country a comprehensive overview of trends in the renewable energy sector, the regulatory environment, financing sources and profitability in the Central and Southeastern European market.

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#### 1. Overview and trends

The current production of energy in Albania is based 100 % on renewable sources. The target to be reached by 2018, following EU Directive 2009/28/EC, is to improve the stability and the efficiency of the sector by reducing losses and to improve collection for end-users. Last year (2014) 4,724 GWh had been fed-in and were structured as follows:

#### Water energy sector:

- Generated by the state-owned company ("KESH"): 3,406,226 MWh
- Generated by the private sector 1,318,204 MWh
- The installed capacity is currently 1,725 MW (1,350 MW state-owned; 375 MW private sector)
- Focus on small and medium-sized hydro power plants up to 15 MW

#### Thermic energy sector:

• The installed capacity is currently 98 MW

Currently not functional and there are no future plans to develop.

## 2. Funding situation

Support scheme is based on feed-in tariffs. In accordance with the methodology developed for the fixed fee, at the end of every year, the Energy Regulatory Office approves the respective values of fixed fees, to be paid to producers with installed capacity up to 15 MW, dividing them into three groups based on their installed capacity; the first group: from 0 up to 2,000 kW, the second from 2,001 to 5,000 kW and the third group from 5,001 to 15,000 kW.

The same support scheme and fixed tariffs as for hydropower are applied for all other types of renewable energy. In the case of plants with installed capacity greater than 15 MW, the owner of a renewable project bears the higher market risk as he/she is responsible for finding a customer for the electricity generated and for setting the conditions of such supply.

Banks are willing to re-finance existing projects or new projects. Most are cautious towards hydropower due to difficulties that this sector has experienced in the past.

In 2016, it is expected that more funds will be allocated in order to support promoted energy sources.

#### 3. Permits and authorizations

In Albania, the following permits and authorizations should normally be obtained in order to operate renewable energy sources in line with national legislation:

- Building permit
- License from the Energy Regulatory Office (www.ere.gov.a)
- Connection agreement to a distribution grid
- Specific permits and authorizations dependent upon the type and size of an installation (e.g. authorization for use of surface water)

# 4. Competitiveness

Energy efficiency and stability have always been the subjects of political debates. Several measures covering existing renewable energy projects have been introduced to improve the sector's stability. Due to improvements in the collection of and payments from the Albanian Government, Albania is becoming a relatively competitive country in the renewable energy field (in particular, water). This will lead to a continuing development of the renewable energy sector in Albania.

## 5. Grid connection

OST is the sole Albanian transmission system operator. OST is responsible for transmitting electricity at the highest voltage level and for maintaining the balance between the production and consumption of electric power. The system is:

- 2,788 km long, of which
- 293.7 km are 400 kV power lines;
- 1,170.9 km are 220 kV power lines;
- 34.4 km are 150 kV power lines and
- 1,289 km are 110 kV power lines

The amount of electricity transferred across the transmission system is approximately 7,538 GWh per year (2014)

The OST is pursuing an extensive investment plan to maintain grid stability, reduce losses and improve the reliability of supplies.



The following legislation governs renewables in the Republic of Albania, principally:

- Law No. 138/2013 on renewable energy sources and amending certain laws based on EU Directive 2009/28/EC.
- The Energy Regulatory Office's Price Decision,
- National Action Plan for renewable energy.

#### C. SUPPORT SCHEME/GREEN CERTIFICATES

The main regulatory body is the Energy Regulatory Office which is responsible for determining the scope and level of support for supported energy sources

There is one type of support available, namely purchase prices (feed-in tariffs) for 15 years for renewable energy producers with installed capacity up to 15 MW. At the end of every year, the Energy Regulatory Office, in accordance with the methodology developed for fixed fees, approves the respective values of fixed fees to be paid to renewable energy producers, categorizing them into three groups:

- the first group from 0 up to 2,000 kW,
- the second group from 2,001 to 5,000 kW and,
- the third group from 5,001 to 15,000 kW.

In 2014, the reported volumes breakdown for energy producers up to 15 MW was as follows:

• feed-in tariff 552 GWh (11.6% of total).

The Energy Regulatory Office is required to determine the feed-in tariff separately for each type of renewable energy source on a yearly basis.

#### D. ISSUES AND PROFITABILITY

#### Tax issues

Companies which manufacture or assemble solar systems for hot water production are exempt from customs duties and VAT for these solar panel systems following the strategy of the National Action Plan (NAP) to improve energy efficiency. For further information related to tax issues, please consult our brochure, "Investing in Albania".

# **Profitability**

Feed-in tariffs for producers with installed capacity up to 15 MW are set by the Energy Regulatory Office such that the 15-year simple return on investment will justify their investment. At the end of every year, the Energy Regulatory Office, in accordance with the methodology developed for the fixed fees, approves the respective values of fixed fees to be paid to renewable energy producers. In the case of plants with installed capacity greater than 15 MW, the owner of a renewable project bears the higher market risk as he/she is responsible for finding a customer for the electricity generated and for setting the conditions of such supply. However this higher risk tends to be associated with higher revenues and hence theoretically a shorter pay-back period / higher IRR.

Nonetheless, Albania is often deemed by investors as an unstable and also unpredictable venue for their long term investment. Renewables sources concessions are subject to negative scrutiny from regulators and politicians.



#### 1. Overview and trends

Following EU Directive 2009/28/EC, the target should amount to a 34% renewable energy quote by 2020. This high amount reflects the Austrian pioneering role in this sector. In 2015 8,199 GWh had been fed-in and were structured as follows:

#### Wind energy sector:

- The installed capacity is currently 2,095 MW
- National Action Plan ("NAP"): 2,578 MW
- In 2013 Austria reached a record level by installing 309 MW
- In 2014 Austria was able to outperform this value, by installing 408 MW

## Photovoltaic energy sector:

- The installed capacity is currently 750 MWp
- NAP: 322 MWp, was reached to 100 % in 2014
- Only 40% of all installations are supported

# Water energy sector:

- The installed capacity is currently 8,475 MW
- NAP: 8.998 MW
- Focus on small and medium-sized hydro power plants
- Greatest capacity will be gained from large hydro power plants

# 2. Funding situation

"So-called annual **entitlement support payments**" - total amount of EUR 47 million:

- Wind power EUR 11.5 million
- Photovoltaic systems EUR 8 million
- Small hydro power plants EUR 1.5 million
- Biomass systems EUR 10 million
- The rest, in total EUR 16 million can be used in addition for PV, wind and water power installations.
- The remaining value will be reduced by the amount of EUR 1 million every year.

#### Feed-in tariffs:

(more information under the bullet point Green Certificates)

# Banks:

At the moment banks are looking for opportunities to invest. Renewable energy projects are very likely to be supported in general, also because of their high acceptance from the population.

#### 3. Permits and authorizations

In Austria a cross-national law between the federal states does not exist. Every single federal state has its own regulations, which makes the situation very complex. In general the following permits are necessary:

#### Building permit (Suitability)

The application documents should include in general:

- A technical report
- Planning documents
- Information about the owner of the installation

## Austrian regional planning (type of use)

The planning schemes are prepared by the local authorities and are structured as follows:

- Building land
- Traffic area
- Open land

The **setting-up authorization** is not necessary in every single federal state and depends on the installation output.

To summarize, Austrian law is dependent on the respective federal state and each project has to be reviewed closely on a case-by-case basis.

#### 4. Competitiveness

Due to the positive investment environment, Austria is a very competitive country in the renewable energy field. The regulatory framework provides investors with high investment and planning security. This will lead to the continuing development of the renewable energy sector in Austria.

## 5. Grid connection

The grid connection is controlled by the independent regulator Austrian Power Grid ("APG"), which is the only transmission system operator in Austria. The system

- is 6,777 km long
- has approx. 12,000 power poles and
- transports approx. 43,957 GWh per year

The transmissions system is very efficient and stable and feed-in problems are very unlikely. In accordance with the Eco Energy Act 2012 ("ÖSG 2012"), the APG will enlarge their system over the next 10 years.



# Real rights required

Under Austrian law there are two main ways for investors to hold the specific right in rem required for a building permit:

- An ownership title to the land
- A right of superficies to the land (not registered in the land register)

# Ownership right

The ownership right under Austrian law offers the owner an absolute right to

- use
- build
- encumber and
- sell

Necessary permits, easements and other loads can restrict this right.

## Superficies right

A right of superficies consists of:

- The right to have or to erect a building on, under or above the land owned by another person
- The ownership right to the building
- The right to use the land pertaining to the building

The Civil Code limits the duration of a right of superficies to a maximum of 99 years, with a prolongation option.

# Conventional and statutory right of usage and easements

- During the permit phase, abutting owners have the right to raise objections to the project, if their rights would be limited by it.
- The investor must hold rights of easement to the lands crossed by access ways or by cables.
- The right of way is incumbent upon the federal state and has to be reviewed closely on a case-by-case basis.

#### C. SUPPORT SCHEME/GREEN CERTIFICATES

#### Issues that might impede/delay the investment process

The following issues have to be taken into consideration when planning a renewable energy park in order to avoid any delays or even cancellation of the project:

- No cross-national law
- Property rights have to be suitable for the project
- Instatement of ownership title; prohibitions on sale
- Necessary permits

## Legal provisions

- Eco Energy Act 2012 ("ÖSG 2012") support scheme
- "Processing centre for renewable energy" ("OeMAG") investment grant
- Applicable building provision

#### **Green certificates**

Green Certificates do not exist in Austria. To support renewable energy power, fixed feed-in tariffs and investment grants are used. These are regulated in the:

- ÖSG 2012: fixed feed-in tariffs, which are guaranteed for a period of 13 years (biomass: 15 years)
- OeMAG: investment grants (can only be used instead of the feed-in tariffs) operate on a first come, first served principal.

#### Updates

From the vantage point of the present, no major amendments are planned in 2015.

## D. ISSUES AND PROFITABILITY

#### Tax issues

For further information, please consult our brochure, "Investing in Austria".

# **Profitability**

Any investment expenditure analysis must account for the preparation and design costs incurred during the initial stage of a project (the first 1-4 years). Currently this expenditure ranges between EUR 55,000 up to as much as EUR 70,000 per MW of capacity of the designed wind farm (which represents about 2-4% of the investment value). These costs include, but are not limited to:

- Developing technical design
- Drafting a feasibility study
- Erecting measuring masts and wind density measurements
- Performing a study on the impact of the wind farm on the natural environment and local community geological research
- Administrative proceedings

Due to the decentralization of power generation, other grid solutions are necessary. Smart grids can deal better with inconsistent renewable energy sources and, as a result of the better connection, power will become cheaper. A successful energy transition is only possible with a smart grid. Furthermore, customers have an important part to play. They should help to make the system more effective. The first model region has been installed and is already a role model.

The energy fund, KLI.EN has started a funding programme. In total EUR 17 million is available for PVs which produce less than 5 kWp. With this programme they support the self-sufficiency of industry and private households.



#### 1. Overview and trends

# Wind energy sector development:

The targets for the production of energy from renewable energy sources by the year 2020 for all EU countries were set in EU Directive 2009/28/EC. Percentage of renewable energy in the total gross consumption:

2013 - 19%

2012 - 16%

2011 - 14.3%

2010 - 14.1%

## Installed capacity:

(as of 31 March 2014) 701 MW, representing 5.17% share of the total installed capacity in the country.

## 2. Funding situation

#### **EEA Grants:**

More than 500 projects were financed with support from Norway, Iceland and Liechtenstein in the period 2009 - 2014. The thematic panel "Economy" consisted of projects from 2 programmes - Green Industry Innovation and Energy Efficiency and Renewable Energy Sources.

**Banks** are also an important source of financing for wind energy and corporate finance projects. Investment projects may be subject to grant financing by the European Bank for Reconstruction and Development and the European Investment Bank in collaboration with a local bank.

#### 3. Permits and authorizations

# **Building permits:**

Obtaining a building permit for a power plant of over 30 kV working capacity includes generally drafting an investment project, drafting and coordinating a technical and an operative investment project and concluding a preliminary agreement for a grid connection.

# Operating permission:

Constructions of first, second and third category are entered into exploitation on the basis of an operating permission, issued by the state bodies.

#### Licensing:

The production of electricity requires a license issued in the name of the producer by the Energy and Water Regulatory Commission (EWRC), unless the producer's power plant installed powers do not exceed 5 MW. The license must be obtained prior to commencement of the production activity.

# 4. Competitiveness

Bulgaria is competitive in terms of its natural assets, as well as due to its favourable investment environment with still relatively low salary levels and a 10% flat tax rate on profit.

# 5. Grid connection

Producers of renewable electric energy wishing to build an energy site for production or to enlarge an existing one submit an application to join the operator of the relevant electricity network in regions indicated by the grid operator. The application is subsequently to be approved by the EWRC.



# Real rights required

According to the Energy Act, anyone applying for a license to produce electric energy must prove the presence of a real right over the power plant producing energy.

# Ownership right

The ownership right under Bulgarian law includes a right to use, possess, encumber and sell the owned property without limitation in time. It is usually established by way of agreement executed in notarised form for validity purposes.

#### Superficies right

The right of superficies consists of the right to erect a building on land owned by another person; the ownership right to the building; and the right to use the land pertaining to the building.

# Conventional and statutory right of usage and easements

Easements under the Energy Act arise for entities when building power facilities. They comprise of the right of passage of people and equipment; laying power lines, technical installations as well as corresponding security restrictions.

#### C. SUPPORT SCHEME/GREEN CERTIFICATES

# Issues that might impede/delay the investment process

Starting an investment project requires the preliminary completion of thorough and professional research of the project's compliance with the local laws as well as of any other existing or possible claims. Examplary points regularly taken into consideration are: the existence of required ownership rights; clear property status; environmental status of the area; archeological and cultural status of the area; connectivity capacity of the corresponding grid operator.

## Legal provisions

Bulgarian national legislation: Energy Act, Renewable Energy Sources Act, Spatial Planning Act, Environmental Protection Act, and subordinate legislation.

## Green certificates

Green Certificates, as a trading instrument, have not yet been implemented in the Bulgarian energy market. The support scheme for the mandatory purchase of electricity produced by renewable energy sources (RES) is connected to the presence of monthly guarantees issued by the Sustainable Energy Development Agency (SEDA) per megawatt produced energy.

# Updates

The 15/07/24 amendment to the Energy Act (EA) imposes an additional financial obligation upon all electric energy producers. The obligation consists of a 5%-monthly installment based on the producer's aggregate net income from electricity sales on a monthly basis. The purpose of the installment is to cover costs and losses of the National Electric Company.

#### D. ISSUES AND PROFITABILITY

## Tax issues

The general tax frame, as well as the special regulations which are applicable for the power production stated above, are fully applicable to electricity producers from renewable sources.

For further information please consult our brochure "Investing in Bulgaria".

# **Profitability**

Any investment expenditure analysis must account for the preparation and design costs incurred during the initial stage of a project (the first 1-4 years). Currently this expenditure ranges between EUR 55,000 up to as much as EUR 70,000 per MW of capacity of the designed wind farm (which represents about 2-4% of the investment value). These costs include, but are not limited to:

- Developing the technical design;
- Drafting the feasibility study;
- Erecting measuring masts and wind density measurements;
- Performing a study on the impact of the wind farm on the natural environment and local community:
- Geological research;
- Administrative proceedings.

Along with the statutory amendments from July 2015 (see section "C"-Updates), the new regulation limits the purchase of electricity from renewable energy sources at a preferential price [only] for the quantities of electricity up to [not exceeding] the "net specific production of electricity", based upon which the preferential prices have been set in the corresponding decisions of EWRC.

Quantities for "net specific production of electricity" were set in a resolution of 31 July 2015 defining different thresholds for the different types of power plants.



#### 1. Overview and trends

Croatia accepted commitments to apply European Directives in the field of renewable energy sources ("RES"), including EU Directive 2009/28/EC, setting the target for RES by the year 2020 to 20%. Currently, the total installed RES capacity is more than 400 MW and is structured as follows:

- Wind power plants: 339.25 MW
- Solar power 40.39 MW
- Small hydro 28.64 MW
- Biomass: 15.93 MW

The Croatian National Energy Strategy 2009-2020 has three basic objectives:

- to increase the safety of energy supply
- to develop a competitive energy system and
- to ensure the development of a sustainable energy sector

These objectives are particularly important due to Croatia's heavy dependence on energy imports which results in the country's vulnerability to energy prices volatilities.

#### Targets:

- decrease by 20% greenhouse gas emissions by 2020 taking emissions level of 1990 as a baseline
- increase share of renewable energy by 20% in annual gross energy consumption of the country by 2020
- cover 10% of energy consumption in all transport sector with energy derived from renewable sources by 2020
- decrease final energy consumption by 9 % by 2016

# 2. Funding situation

Renewable energy is mainly supported through a feed-in tariff (Art. 28 Energy Act). Every producer who holds the status of "qualified producer" ("povlašteni proizvođač", Art. 9 Qualified Producer Rulebook) and who has signed a formal agreement with the Croatian Energy Market Operator HROTE (as defined in Art. 53 Electricity Market Act), has the right to receive an incentive depending on the type of RES technology and power output of his RES-E plant or PV installation, as defined in the Tariff System (Art. 4 Tariff System for RES-E).

There is a cap for solar energy: The Croatian Electricity Market Operator provides feed-in tariff funding only for the first 5 MW of building-integrated PV capacity on private buildings and the first 2 MW on buildings that are the property of the public administration. The cap for ground-mounted installations amounts to 5 MW (Art. 12 § 4 Tariff system for RES-E).

#### 3. Permits and authorizations

The following are the main permits required for the construction and operation of an RES power plant:

- Energy permit;
- Construction permit;
- Use permit;
- Energy license.

# 4. Competitiveness

The competitiveness of the Croatian energy system is quite satisfying due to the diverse energy structure of electricity generation and relatively high share of local natural gas generation. Energy market development, country openness, risk sharing at investments, development and technological improvement, promoting larger participation of local generation and services at building and exploitation of power generation plants represent mechanisms for retaining and increasing the competitive energy system.

#### 5. Grid connection

The access of electricity from RES to the grid is regulated by the general legislation on energy and follows the principle of non-discrimination. Electricity from RES is subject to special provisions only in the case of wind power plants, which must meet special requirements and technical specifications during the connection process. The electricity transmission service within the Croatian power system is provided by the grid operator "HEP-OPS" to network users according to the agreements which they sign with the grid operator.

#### **B. LEGAL FRAMEWORK**

# Real rights required

Under Croatian law, one of the legal preconditions for the issuance of a construction permit is that the applicant submits sufficient evidence that it has appropriate title to the land on which the construction is supposed to take place. Such evidence include ownership of the land and other rights to the land recognised by the law as a legal basis for issuance of the construction permit.



# Ownership right

Croatian law recognises the following rights over land: ownership right (pravo vlasništvo); mortgage (hipoteka); easement right (pravo služnosti); land charge (pravo stvarnog tereta); and building right (pravo građenja). These rights are in principle established by their registration into the land registry and have legal effect not only between contractual parties but also against all third parties.

## Superficies right

Superficies is a limited in rem right. It consists in the exclusion of the principle that the owner of the land owns whatever building is erected on his property. The superficies right consists of:

- the right to have or to erect a building on, under or above the land owned by another person;
- the ownership right to the building;
- the right to use the land pertaining to the building

The superficies right allows for delimitation between the ownership to the land and the ownership to the building erected on, under or above the land owned by another person.

## Conventional and statutory right of usage and easements

- If the power plant is to be constructed on agricultural land, this would require the conversion of the agricultural land into construction land.
- The investor must hold rights of easement to land crossed by access ways or by cables.
- During the permit phase, abutting owners have the right to raise objections against the project, if their rights would be limited by it.
- The investor must hold rights of easement to the lands crossed by access ways or by cables.

# C. SUPPORT SCHEME/GREEN CERTIFICATES

#### Issues that might impede/delay the investment process

Some of the main issues that have to be taken into consideration when planning a renewable energy park in order to avoid any delays or even cancellation of the project:

- obtaining a necessary right over land;
- obtaining necessary permits;
- securing a grid connection;
- obtaining financing.

# Legal provisions

The Energy Law adopted in 2014 contains the legal framework for application of the support scheme in the form of feed-in tariffs. Implementing legislation on incentive measures pursuant to the Energy Law has still not been adopted. Renewable energy generation is mainly supported via a feed-in tariff for certain producers ("qualified producers").

Additionally, the Croatian Bank for Development and Reconstruction (HBOR) and the Fund for Environmental Protection and Energy Efficiency operate a loan scheme for RES-E projects.

#### Green certificates

Guarantee of origin is issued to the RES producer and represents a generation of 1 MWh. Such guarantees are transferrable. Guarantees of origin issued in other countries are also valid in Croatia under certain conditions. Feed-in tariffs are used. GO is issued either for electricity produced from renewable energy sources power plants or from high-efficient cogeneration plants. Eligible producers who participate in the feed-in system and who are entitled to subsidized price are not eligible to participate in the system of guarantees of origin.

#### Updates

From the vantage point of the present, no major amendments are planned in 2016.

# D. ISSUES AND PROFITABILITY

#### Tax issues

For further information please consult our brochure, "Investing in Croatia".

# Profitability

Any investment expenditure analysis must account for the preparation, design costs and costs of obtaining the relevant permits/approvals for the project. These costs include, but are not limited to:

- Developing the technical design;
- Drafting the feasibility study;
- Erecting measuring masts and wind density measurements:
- Performing a study on the impact of the wind farm on the natural environment and local community;
- Administrative proceedings for obtaining relevant permits/approvals.



#### 1. Overview and trends

EU Directive 2009/28/EC imposes a 13% renewable energy quote for the Czech Republic as a minimum. The National Action Plan (NAP) even suggests 14% for the Czech Republic as a minimum proportion of its final energy consumption (10.8% for the transport sector). In 2014, the production of electricity from renewables amounted to 9,170 GWh, 13.17% of the gross consumption. This level of output was stabilized in 2013 after the significant development in photovoltaic installations. Installed capacity in key renewables sources:

#### Photovoltaics:

- The installed capacity as of end 10/2015: 2,056.9 MW
- The NAP from August 2012 aims for 2,118 MW in 2020
- In 2010, there was a significant increase in installed capacity (from 464.6 MW as of end 2009 to 1,959.1 as of end 2010). This represents a crucial milestone for the further development of renewables.

# Wind energy:

- The installed capacity as of end 10/2015: 276.6 MW
- The NAP from August 2012 aims for 573 MW in 2020

#### Water energy\*:

- The installed capacity as of end 10/2015: 1,079.8 MW
- The NAP from August 2012 aims for 1,097 MW in 2020

(\*) w/o pumped storage power plants of 1,171.5 MW

# 2. Funding situation

The support scheme is based on two alternative forms of support:

- green bonuses and
- feed-in tariffs.

In 2014, 1,393 million EUR was distributed as support / subsidies for renewables (supported volume 7,912 GWh). Breakdown for type of sources is as follows:

- photovoltaic: EUR 894 million
  wind power: EUR 37 million
  hydro power: EUR 68 million
- biomass: EUR 121 million
- biogas, mine, landfill and sewer gas: EUR 274 million

Banks are willing to re-finance existing projects. Most of them are cautious towards photovoltaic due to the negative perception of the general public. In 2016, it is expected that up to EUR 1.6 billion will be allocated to support promoted energy sources.

#### 3. Permits and authorizations

In the Czech Republic, the following permits and authorizations should usually be obtained in order to operate renewable energy sources in line with the national legislation:

- Building permit
- Licence from the Energy Regulatory Office (www.eru.cz)
- Connection agreement to a distribution grid
- Specific permits and authorization dependent upon the type and size of an installation (e.g. authorization for use of surface water).

# 4. Competitiveness

In 2009/2010, generous subsidies and a decrease in the acquisition costs of photovoltaic panels at the same time led to an artificial development of photovaltaics. The resulting increase in the price of electricity for consumers and the increased risk of instability of the transmission system at that time had a negative impact on the perception and need of renewables by the general public. Renewables have been the subject of political debates constantly from that time. Several measures covering existing renewable projects have been introduced.

Tension escalated in November 2015 when the Energy Regulatory Office decided that most renewable energy sources would not receive the support payment in 2016. This real fear led to the owners of renewables installations and their creditors becoming anxious as their expected profits would not materialise. At the end of December 2015, the Energy Regulatory Office published the new price decision which laid down the support payments also for those installations commisioned from 2006 to 2012. However, this was not provided for in the Energy Regulatory Office's price decision from November 2015. This inconsistency has led to uncertainty and made investors cautious about putting capital funds in renewable projects in the Czech Republic.

# 5. Grid connection

ČEPS is the sole Czech transmission system operator. ČEPS is reponsible for electricity transmission at the highest voltage level and for maintaining the balance between the production and consumption of electric power. The system is 5,503 km long,

thereof length of 400 kV power lines: 3,510 km
thereof length of 220 kV power lines: 1,910 km

• thereof length of 110 kV power lines: 83 km

The amount of electricity transferred across the transmission system is approximately 62,642 GWh per year.

The electricity transmission network is deemed to be strong and realible thanks to its robust technological infrastructure. ČEPS pursues an extensive investment plan to maintain grid stability and the realibility of supplies. EUR 2.3 billion is expected to be invested until 2025.



# Real rights required

The following legal documents govern the renewables in the Czech Republic principially:

- Act No. 165/2012 on supported energy sources and amending certain laws
- The Energy Regulatory Office's Price Decision
- National Action Plan for renewable energy

#### C. SUPPORT SCHEME/GREEN CERTIFICATES

The main regulatory body is the Energy Regulatory Office which is responsible for determining the scope and level of support for supported energy sources. The term "supported energy sources" is stated in Act No. 165/2012 on supported energy sources and amending certain laws. At the beginning of 2016, there was no support for installations commisioned from 1 January 2016 onward. It is rumoured that this support might be declared in the first half of 2016 if at all.

There are two types of support available, namely green bonuses and purchase prices (feed-in tariffs).

In 2014, the reported volumes breakdown was as follows:

- green bonuses 6,222 GWh (78.6% of total) and
- feed-in tariff 1,690 GWh (21.4% of total).

In 2014, support after settlement breakdown was as follows:

- green bonuses EUR 770 million (55.3% of total) and
- feed-in tariff EUR 623 million (44.7 % of total).

The Energy Regulatory Office determines the feed-in tariff separately for each type of renewable energy source on a yearly basis.

Although commercial investments in the installation of new renewables peaked back in 2009/2010, households might apply for subsidies in the New Green Savings Programme of the Ministry of the Environment. The programme's objective is to support residential development with very low energy performance and the efficient use of energy sources. The programme applicable to the period 2014 - 2020 is to be funded by proceeds from the sale of emission allowances (EU ETS). Funds are partially intended for the efficient use of energy resources, i.e. photovoltaics, biomass-burning boiler, heat pump - to name but a few. Generally speaking, eligible applicants are limited to owners of family homes. The support is a fixed amount according to the type of new energy source/system acquired and limited to 50 % of the proven expenditure. In terms of photovoltaic systems for households, installed capacity should not exceed 10 kWp.

#### D. ISSUES AND PROFITABILITY

#### Tax issues

For further information please consult our brochure, "Investing in the Czech Republic".

#### **Profitability**

Feed-in tariffs are set by the Energy Regulatory Office such that the 15-year simple return on investment is guaranteed. In the case of green bonuses, the owner of a renewable project bears the higher market risk as he/she is responsible for finding a customer for the electricity generated and for setting the conditions of such supply. However, this higher risk tends to be associated with higher revenue and hence theoretically can shorten the pay-back period and lead to a higher IRR.

Nonetheless, the Czech Republic is often deemed by investors as an unstable and also unpredictable venue for their long term investment. Renewable sources are subject to negative scrutiny from regulators and politicians.



#### 1. Overview and trends

The Polish renewable energy market has developed dynamically. In 2015 Poland adopted RES Act introducing a new support scheme. The installed capacity is currently:

- Wind energy sector 4,254 MW
- Photovoltaic energy sector 51 MW
- Water energy sector 982 MW

Total capacity of RES sector amounts to 6,518 MW in 3Q 2015.

The share of renewable energy of the gross final energy consumption by 2020 should amount to 15 %

# 2. Funding situation

There are 3 support systems:

- auction system
- tradeable certificates of origin (Green Certificates)
- feed-in tariffs for micro and small installations

**EU and Government funds** - EUR 9 billion have been allotted to support the low CO2 emission economy in Poland. Additionally, the government aids the RES in the form of various programmes.

**Banks** - usually offer financing of energy projects to 70 % with a 15-year credit period.

## 3. Permits and authorizations

Requirements depend on the type and size of the power plant. Basic requirements are:

- Building permit
- Local Zoning Plan an act of local law which defines the purpose and the conditions of land development
- Decision on environmental conditions of the permit for realization of the project

# 4. Competitiveness

Poland is an attractive country in terms of renewable energy, especially wind energy investments. In the World Investment Report by the United Nations Conference on trade and development (UNCTAD), Poland was ranked 13th as the most prospective host economies for foreign direct investments in 2014-2016 and moved up to 26th place in the Renewable Energy Country Attractiveness Index (RECAI) of June 2015.

#### 5. Grid connection

The transmission grid, operated by "PSE S.A.", consists of 257 power lines of 14,069 km in length. Over 40 entities act as distribution system operators, of which the 5 largest control 852,000 km of power lines and serve 17 million clients.

#### **B. LEGAL FRAMEWORK**

# Real rights required

Under Polish law the legal title to the land must be obtained for the entire infrastructure of the power plant. There are four ways to hold the legal title to the land:

- ownership right
- perpetual usufruct
- limited right in rem (usufruct, transmission easement),
- civil law contract (i.e. leasing, lease contract).

## Ownership right

An ownership right ensures the right to:

- possess
- use
- dispose

within the limits set by the:

- law
- principles of community life
- the socio-economic purpose of the right.

#### Perpetual usufruct

A perpetual usufruct consists of:

- the right to use the real estate in the manner specified in the agreement, for example, the right to erect a building and other facilities, establishing a manufacturing plant.
- disposal.

The duration of a perpetual usufruct is limited by the agreement, to a maximum of 99 years.

## Conventional and statutory right of usage and easements

**Usage (usufruct)** - a non-transferable limited real right which gives the user the right to use the real estate and collect profits from it

Easement - generally one of two main types:

- land easement
- transmission easement.



#### Civil law contract

A lease contract is the most frequently used form of obtaining a legal title to real estate for renewable energy power plants such as wind or photovoltaic power stations.

# C. SUPPORT SCHEME/GREEN CERTIFICATES

# Issues that might impede/delay the investment process

The following issues have to be taken into consideration when planning a renewable energy park in order to avoid any delays or even cancellation of the project:

- potential changes of law (in particular regarding support systems)
- potential difficulties associated with obtaining a grid connection
- environmental requirements
- necessary permits

## Legal provisions / Support scheme

Act dated 20 February 2016, on Renewable Energy Sources (Journal of Laws of 2015, Item 478) and further amendmends.

New support scheme based on auction system was first intended to be introduced from the beginning of 2016. Because of a change in government and its potential plans to subsequently change the Act, the introduction of the system was delayed until 1 July 2016.

# Green certificates / Auction system

All new RES installations that would start production of electricity before 1 July 2016 will have the possibility to be granted Green Certificates for the next 15 year period. Existing RES installations have a right to be granted Green Certificates for a 15-year period from commissioning.

The auction system's most important features are:

- Every year the Polish Ministry of the Economy (Energy) will decide the volume of energy from renewable energy sources that will be sold through auctions,
- not less than 25% of energy sold has to be produced by small installations (with total installed power of less than 1 MW),
- the auction energy volume produced by RES installations working with less than 4,000 hours per year will be limited to the amount announced each year by the Ministry of the Economy (Energy),
- the price for auction winners will be awarded for a period of 15 years and indexed each year by CPI inflation,
- the maximum bid prices (reference prices) will be published by the Ministry of the Economy (Energy) each year for every type of RES producer (18 types are currently defined).

## Updates

Changes in the Renewables Act are expected as the officials associated with the Ministry of Energy have suggested that biogas installations should be granted more support and that they plan to change regulations regarding the location and construction of onshore wind farms.

#### D. ISSUES AND PROFITABILITY

# Profitability

On average, operational costs of wind farms are relatively low (3-4% of investment outlays annually). The amount of outlays depends on the type of applied technology and the location of the power plant. Current outlays in the purchase and installation of turbines and construction works (including electrical works) amount to approximately EUR 1.36 million per MW. Total investment outlays reach EUR 1.7 million per MW. Investment outlays are mainly the costs of turbines, which represent 65% to 75% of the total value of preparing and erecting a farm on land (EUR 1.1 million per MW). Moreover, the investor bears, among others, the costs of construction works (EUR 68, 180 per MW), project preparation (EUR 68, 180 per MW), and connection to the grid (EUR 45, 454 per MW).

According to the regulation of the Minister of the Economy published on 13 November 2015, the reference (maximum) auction price for onshore wind was set at EUR 87. Investors' expectations are that the price on first auction will be lower than this. 36% of the surveyed market representatives (in a poll organized by TPA Poland) chose the range EUR 77-82. 24% of those questioned indicated a price exceeding EUR 82 and 30% stated an amount lower than EUR 77 (other respondents did not answer the question).

The average price of electricity (MWh) in the third quarter of 2015, quoted by the reached Energy Regulatory Office, reached EUR 39.26 per MWh. On the other hand, the average Green Certificate price on the Polish Power Exchange as of December 2015 was EUR 32.67 per MWh.



#### 1. Overview and trends

## Wind energy sector trends

Frequent legislative changes have led to a declining interest in renewables. The electricity produced from renewable sources reached a total installed capacity of 5.127 MW in 2015 (wind farms: 3,129 MW, photo-oltaic panels: 1,312 MW, microhidropower plants: 583 MW and biomass projects: 103 MW).

Installed capacity (November 2015): 5,127 MW. Mandatory quota of renewable energy 2016: 12.15%

The targets for production of energy from renewable sources by 2020 for all EU countries were set in EU Directive 2009/28/EC. The share of renewable energy in the total gross energy consumption in Romania by 2020 should amount to 24%, a target that, according to information provided by the Romanian Energy Regulatory Authority ("ANRE"), was already reached by 2014.

## 2. Funding situation

#### **EU Financing**

Approx. EUR 100 billion is needed per year to meet the EU's 2020 energy efficiency objectives. The EU has developed support schemes and initiatives to accelerate energy efficiency investments and the financial resources for the period 2014-2020 have been doubled compared to the previous period.

#### **EEA Grants**

In 2015 the Norwegian Ministry of Foreign Affairs announced that Norway and the EU have concluded an agreement for a new period of the EEA and Norway Grants, with the funding period increased from 5 to 7 years. Norway Grants amount to EUR 179.1 million/year, while the EEA Grants amount to EUR 221.2 million/year for the period 2014-2021.

#### **Banks**

are also an important source of financing for wind energy and corporate finance projects. When obtaining bank financing, there are a few criteria that have to be fulfilled, such as equity, location, permits, planning and technology. Since the financial crisis, banks have been reluctant to risk capital because of a lack of confidence and the need to hold more capital against risks caused by regulations imposed to reinforce the banking system. The Energy Union is introducing two new financing instruments, the Private Finance for Energy Efficiency and the Natural Capital Financing Facility, combining EIB loans with financing under the EU LIFE Programme for Environment and Climate Action.

#### 3. Permits and authorizations

The construction of a renewable energy plant always requires a building permit, irrespective of its installed capacity. Generally, the local public administration is competent to issue the building permit; however, in specific cases the permit shall be issued by the president of the county council, with the consent of the mayor of the respective town or commune.

The building permit is issued within 30 days upon submitting the complete documentation to the competent authority. The process of obtaining the complete documentation requires various other permits and approvals that will vary depending on the location and specific technical documentation and real rights over the project land.

The setting-up authorisation, independent from the building permit, is required for energy projects with installed capacity >1 MW and issued by ANRE within 30 days from submission of the complete documentation. Where the installed capacity lies between 500 kW and 1 MW, an authorisation is not necessary, but ANRE must be provided with data on the investment project and with regular reports on the development status. For an installed capacity <500 kW, no notification is necessary.

# 4. Competitiveness

A decrease in the number of Green Certificates ("GC") and a delay in the delivery of GC to producers had a negative impact. Of initial estimates for installations of 1,200 MW (wind parks) and 750 MW (photovoltaic projects), by the end of 2014, barely over 400 MW in wind parks had been installed, 3 times less than estimated, representing an investment of EUR 1.3 billion, instead of the estimated EUR 2.7 billion.

# 5. Grid connection

Renewable energy plants will be connected to Romania's grid in the next period, including wind farms (40 MW), photovoltaic power plants (18 MW) and biomass power plants (15 MW).

The forecast for the next period indicates a high use of the Romanian grid on the borders with Serbia and Hungary, therefore an important objective in 2016 is to provide the necessary infrastructure for electricity trade in the region by increasing the exchange capacity of the western parts of the grid interface.



# Real rights required

A building permit is needed to build any facility for the production of energy and it is granted only if a specific in rem right to the land on which the plant is to be erected is proved. The in rem right may be proved either with an ownership title to the land or with a superficies right to the land.

# Ownership right

The ownership right offers the owner an absolute right to use, encumber and sell the owned real property without limitation in time, which includes the right to build on the property any building or other type of structure, either permanent or temporary.

# Superficies right

A superficies right consists of:

- the right to have or to erect a building on, under or above the land owned by another person;
- the ownership right to the building;
- the right to use the land pertaining to the building.

The duration of a superficies right is limited to a maximum of 99 years, with a prolongation option.

# Conventional and statutory right of usage and easements

For access to the energy plant during and after the finalisation of the construction works or for the path of electric cables that cross third parties' properties, the investor must hold rights of easement to the lands crossed.

#### C. SUPPORT SCHEME/GREEN CERTIFICATES

## Issues that might impede/delay the investment process

Issues to be taken into consideration: public property; restitution claims/ litigations affecting the lands; instatement of ownership title; interdictions to sell the land; historical monument status; archaeological status; lack of urbanism certificate.

# Legal provisions

The renewable energy support scheme is mainly regulated by Law 220/2008 on the promotion system for the energy generation from renewable energy sources ("Law 220") and developed in secondary legislation.

## **Green certificates**

The renewable energy support scheme, entailing a quota obligation and a GC trading system, benefits the producers of renewable electricity generated from units with installed power of 10 MW or less, provided that the power units are either accredited by ANRE or commissioned or retrofitted by the end of 2016.

#### Updates

The mandatory quota system of GC acquired by producers is used as a mechanism to promote the production of energy from renewable sources. The value of the GC is an additional income for producers, in exchange for the "clean" energy they provide. The GC postponed temporarily by G.E.O. no. 57/2013 shall be recovered by the producers as of 1 April 2017 for hydro and solar power plants, and as of 1 January 2018 for wind power plants.

#### D. ISSUES AND PROFITABILITY

#### Tax issues

For further information please consult our brochure, "Investing in Romania".

# Profitability

The profitability of wind projects is substantially affected by the GC system. The price of GC mainly depends on the value of the substitution fee and the economic conditions, ranging between EUR 27-55/GC. The market liquidity results from the obligation of the companies that sell electricity to end customers to purchase and redeem GC in line with the prescribed minimum quotas of energy from renewable sources as part of the total energy sales.

Downsides: reduced quota of 12.15%; 12-month validity of a GC; tax computation on the granting date, not the sale date.



#### 1. Overview and trends

Serbia accepted the commitment to transpose European Directives in the field of renewable energy sources (the "RES"), including EU Directive 2009/28/EC, setting the target for RES by 2020 to 27%. Currently, the total installed RES capacity is 53.2 MW and is structured as follows:

- Wind: 0.5 MW;
- Photovoltaic: 9.8 MW;
- Small hydro: 33.2 MW;
- Biogas: 4.9 MW.

According to the National Action Plan on Use of RES from 2013, Serbia plans to install additional 1.092 MW until 2020, as follows:

- Wind: 500 MW:
- Photovoltaic: 10 MW:
- Small hvdro: 188 MW:
- Biogas: 30 MW.

# 2. Funding situation

The support scheme in the form of feed-in tariffs for electricity producers from RES is recognised under the Energy Law adopted in 2014. However, implementing legislation which will replace the relevant incentive measures decree from 2013 and which stated the feed-in tariff for producers from each RES has still not been adopted, although it was expected by the end of 2015.

#### Banks:

In order to attract further interest from banks to support the RES projects, it is important that the implementing legislation adopted pursuant to the Energy Law is seen as bankable.

## 3. Permits and authorizations

The following are the main permits required for the construction and operation of an RES power plant:

- Energy permit;
- Construction permit;
- Use permit;
- Energy license.

# 4. Competitiveness

Due to the slow process of obtaining the necessary permits and the fact that the previous model, PPA and the implementing legislation are seen as non-bankable by financiers, the RES energy sector has not yet been developed to its full potential. However, investors are competing to position themselves bearing in mind the low quota envisaged for solar and wind power plants (10 MW and 500 MW, respectively). Investors interested in producing energy from wind have already reserved approx. 470 MW.

#### 5. Grid connection

The grid connection is controlled by the TSO "Elektromreže Srbije". The transmission system comprises approx. 9,400 km of power lines of 400 kV, 220 kV and 110 kV and transformer stations and is interconnected with all neighbouring countries.

There are plans to further modernise and enlarge the transmission system according to the plan for development by 2024.



# Real rights required

Under Serbian law, one of the legal preconditions for the issuance of a construction permit is that the applicant submits sufficient evidence that it has appropriate title to the land on which the construction is supposed to take place. Such evidence includes ownership of the land and other rights to the land recognised by the law as a legal basis for issuance of the construction permit.

#### Ownership right

The ownership right under Serbian law offers the owner an absolute right to:

- use
- build
- encumber and
- sell

Necessary permits, easements and other encumberments on land can restrict this right.

## Other rights to the land

Other rights to the land recognised by the law as a legal basis for the issuance of the construction permit include easements over the land, leases or documents of consent issued by owners/users of the land.

# Conventional and statutory right of usage and easements

- If the power plant is to be constructed on agricultural land, the construction of the power plant would require either the conversion of the agricultural land into construction land and/or obtainment of an approval by the ministry in charge of agriculture prior to the commencement of construction.
- The investor must hold rights of easement to the lands crossed by access ways or by cables.

#### C. SUPPORT SCHEME/GREEN CERTIFICATES

# Issues that might impede/delay the investment process

Some of the main issues that have to be taken into consideration when planning a renewable energy park in order to avoid any delays or even cancellation of the project:

- obtaining the necessary right over the land;
- obtaining necessary permits;
- securing a grid connection;
- obtaining financing.

# Legal provisions

The Serbian Energy Law adopted in 2014 contains the legal framework for the application of the support scheme in the form of feed-in tariffs. Implementing legislation on incentive measures pursuant to the Energy Law has still not been adopted.

## **Green certificates**

A guarantee of origin is issued to the RES producer and represents a generation of 1 MWh. Such guarantees are transferrable. Guarantees of origin issued in other countries are also valid in Serbia, under certian conditions. Feed-in tariffs are used to support production from RES and are guaranteed for a period of 12 years.

## **Updates**

Feed-in tariffs are to be revised every 3 years and may also be annually adjusted each February per inflation in the Eurozone.

#### D. ISSUES AND PROFITABILITY

# Tax issues

For further information please consult our brochure, "Investing in Serbia".

#### Profitability

Any investment expenditure analysis must account for the preparation, design costs and costs of obtaining the relevant permits/approvals for the project. These costs include, but are not limited to:

- Developing the technical design;
- Drafting the feasibility study;
- Erecting measuring masts and wind density measurements;
- Performing a study on the impact of the wind farm on the natural environment and local community;
- Administrative proceedings for obtaining relevant permits/approvals.



#### 1. Overview and trends

EU Directive 2009/28/EC imposes a 14% renewable energy quota for Slovakia as a minimum. In 2012, the production of electricity from renewables amounted to 10.6% of the gross consumption and 9.9% in 2011. The proportion of renewables of the total installed capacity was, as of the end of 2012, approx. 9.8% (incl. 99 MW of small hydro power plants), in 2014 approx. 11.2% (excl. hydro power plants).

Installed capacity in key renewables sources as of the end of 2014 (source: National Control Centre of Slovakia):

Photovoltaic energy sector: 531 MW

Wind energy sector: 3 MW
Hydro sector: 2,536 MW\*
Biomass sector: 254 MW
Biogas sector: 103 MW

Breakdown of electricity production from renewables (excl. hydro power plants) in 2014:

- Biomass 49.8%; Photovoltaic 26.4%; Biogas 19.1%; Other 4.3%; Wind 0.3%
- In total, these sources generated 1,803 GWh of electricity in 2014

Hydro power plants produced 4,572 GWh of electricity in Slovakia in 2014. In 2014, the overall production of electricity in Slovakia totalled 27,254 GWh.

Note: (\*) Thereof 1,652.7 MW attributable to hydro power plants owned by the Slovenské elektrárne company. The hydro sector installed capacity also includes pumped storage power plants of 1,017 MW.

#### 2. Funding situation

The support scheme in the form of feed-in tariffs for electricity producers from RES is recognised under the Energy Law adopted in 2014. However, implementing legislation which will replace the relevant incentive measures decree from 2013 and which stated the feed-in tariff for producers from each RES has still not been adopted, although it was expected by the end of 2015.

#### Banks

In order to attract further interest from banks to support the RES projects, it is important that the implementing legislation adopted pursuant to the Energy Law is seen as bankable.

#### 3. Permits and authorizations

In Slovakia, the following permits and authorizations should usually be obtained in order to operate renewable energy sources in line with the national legislation:

- Building permit
- Licence from the Regulatory office for Network Industries (ww.urso. gov.sk)
- Connection agreement to a distribution grid
- Specific permits and authorization dependent upon the type and size of an installation

# 4. Competitiveness

In 2015, several investors in renewables were removed from a support scheme not allowing them access to the feed-in tariff system. Controversy arose as this step was taken retroactively via a new administrative obligation – a notification process – which some operators failed to fulfil. This abrupt change might have economically endangered some operators. Covenants of financing banks providing the necessary leverage to the projects could be broken and stricter loan conditions could be imposed for the coming years, ultimately changing the return for owner. Moreover, it might have led to a deterioration of the the position of sellers in renewable projects during the sale process. Due to the stable regulatory environment the only consequence could be a lower exit value. The development of new projects has likely been negatively affected as investors have lost confidence in the stability of the legal framework.

#### 5. Grid connection

The transmission system operator in Slovakia is the Slovenska elektrizacna prenosova sustava, a.s. company (SEPS, www.sepsas.sk). The system lines is 2,859km long:

thereof length of 400 kV power lines: 1,953 km
thereof length of 220 kV power lines: 826 km
thereof length of 110 kV power lines: 80 km

The transmission system has more than 7,000 towers. In 2014, a total of 29,604 GWh of electricity was transmitted through the system.



The following legal documents govern renewables in Slovakia principally:

- Act No. 309/2009 on support of renewable energy sources and high efficiency CHP and amending certain laws
- The Regulatory Office for Network Industries resolutions setting conditions of the support scheme
- National Action Plan for renewable energy

# C. SUPPORT SCHEME/GREEN CERTIFICATES

Regional grid operators are obliged to prioritize renewable energy installations for connection to the grid. Mandatory off-take by a regional distribution system operator for "the electricity price on loss" (stable prices for 15 years). The price on loss represents the arithmetic mean of electricity prices for the purpose of covering losses of all regional distribution grid operators and is calculated on the basis of the schemes determined by the Slovak Regulation Office. Feed-in tariffs are set by the Regulatory Office for Network Industries.

#### D. ISSUES AND PROFITABILITY

#### Tax issues

For further information please consult our brochure, "Investing in Slovakia".

# Profitability

In Slovakia, the profitability of the energy industry is 11.5%, based on figures of the top 70 companies published in Trend Top Raking 2014.

The trend is clearly towards biomass.

Due to the Act No. 309/2009 small plants (< 10 kWp) are excluded from entrepreneurial activities.





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- reviews of accounting books with respect to arranged procedures





CHP Combined heat and power CPI Consumer price index

EA Energy act

EIB European Investment Bank

GC Green certificates
GO Guarantees of origin

GWh Gigawatt hour Kilovolt kV kW Kilowatt kWp Kilowatt peak MW Megawatt MWh Megawatt hours αWM Megawatt peak NAP National action plan

PPA Power purchase agreements

PV Photovoltaic

RES Renewable energy sources

RES-E Renewable energy sources - electricity



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