

RES IN BULGARIA: CURRENT SITUATION AND MARKET PERSPECTIVES

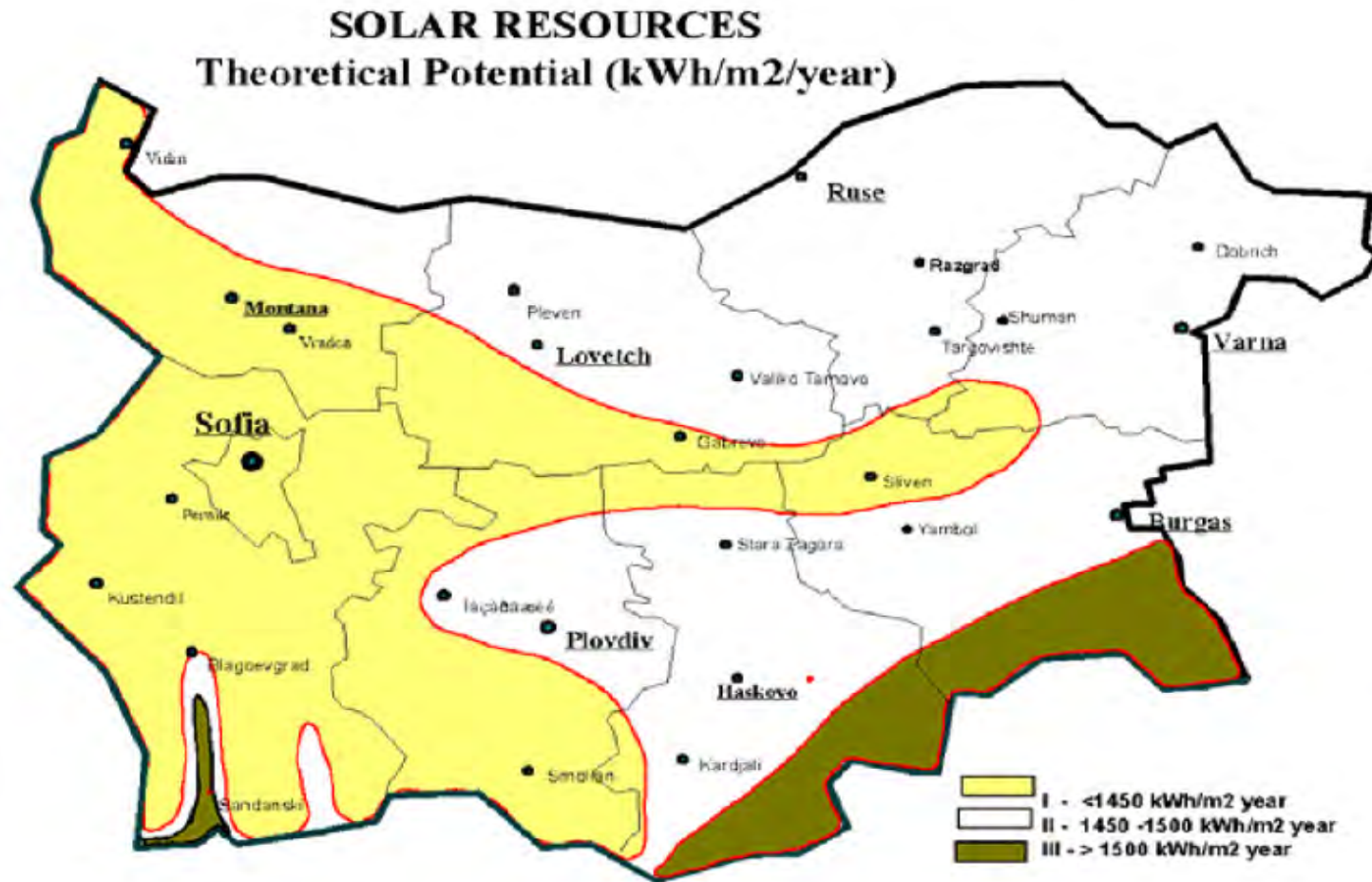
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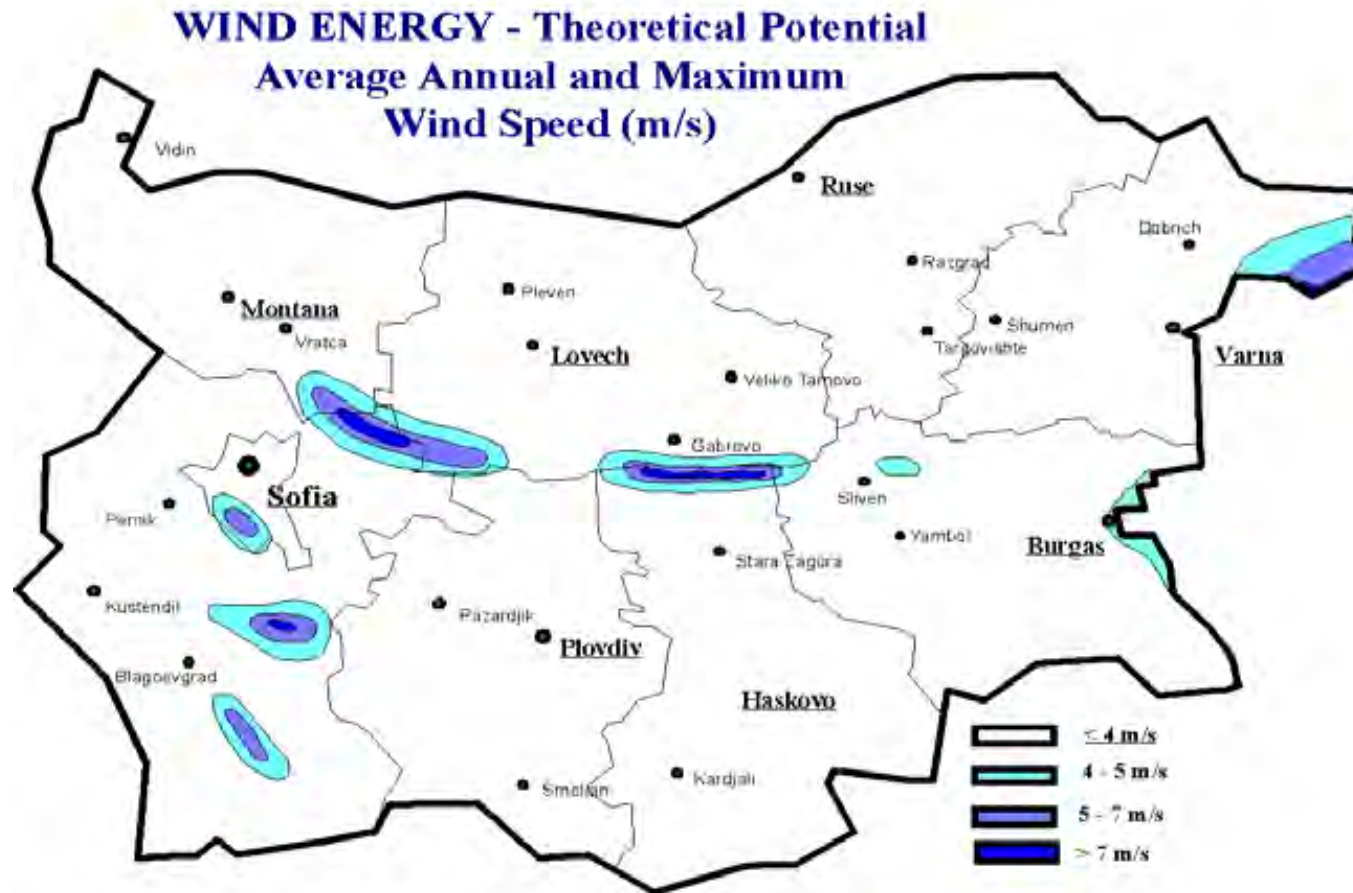
RES POTENTIAL: Solar energy

Data analysis shows that Bulgaria's territory could be divided into three solar zones shown in the picture below:



RES POTENTIAL: *Wind Energy*

Among other countries, Bulgaria also offers potential for construction of wind farms, more specifically along the coastal line and at mountainous places with altitude of 1000 meters or more.



RES POTENTIAL: *Biomass*

Wood processing waste:

Indicators	Coniferous trees	Broadleaved trees	Total
Unused annual quantities of branches and twigs, d m ³ /yr.	131 450	183 517	314 967
Average volume content of dry matter, t/m ³	0.45	0.53	-
Quantities of dry matter, t/yr	59 152	97 264	156 416
Quantities of workable matter (40% absolute humidity), t/yr.	98 587	162 107	260 694
Lower calorific value, kcal/kg	2 517	2 489	-
Energy equivalent, toe/yr.	24 819	40 345	65 164

Solid agricultural waste:

Types of solid agricultural by-products	Total quantities, t/yr.	Estimated share of available % unused quantities	Available unused quantities, t/yr
Straw	2 714 500	20	542 900
Maize stems	1 799 680	60	1 079 808
Sunflower stems	1 270 000	60	762 000
Vine prunings	170 000	80	136 000
Fruit tree prunings	58 900	80	47 120
Tobacco stems	50 000	80	40 000

RES POTENTIAL: *Hydro Energy*

Approximately 95 % of the whole electricity generated by RES in 2008 comes from HPPs (*Information source: MEE Report for RES 2008*).

The theoretical hydro potential in Bulgaria is more than 26.5 TWh per year (~2280 ktoe); most of the analysis shows that there are real opportunities to be installed new HPPs with total generated electric energy of 10 TWh (~860 ktoe) per year and more.

The electricity produced by RES during the period 2005 – 2008 is given in the table below:

RES Type	Dimension	2005	2006	2007	2008
HPPs > 10 MW	GWh	3 788.3	3 718.1	2 367.8	2 242.2
Small HPPs	GWh	548.2	520.1	504.5	527.3
Wind	GWh	4.5	19.8	46.8	122.2
PV	GWh	0.0	0.0	0.1	0.2
Total	GWh	4 341.0	4 258.0	2 919.1	2 891.9

**Information source: MEE*

BG INDICATIVE TARGETS

Currently the renewable electricity represents between 7% and 8% of the national power consumption, depending on the climate conditions and the available water for hydro power plants (most of it comes from the large-scale HPPs owned by NEK).

Bulgarian indicative targets regarding RES development are the following:

- *by 2010 to achieve 11% share of renewable power generation, related to the national electricity consumption*
- *by 2020 to achieve 16% share of renewable power generation, related to the national electricity consumption*

Technology	Prognosis GWh/y	
	Up to 2010	Up to 2015
Biomass	4420	6514
Biogaz	57.84	1764
Biofuel	166.3	650
HPP	2813	3248
Wind	2134	4468
Geothermal	408	3145
PV	7	43
Solar Thermal	71.4	779

REGULATORY FRAMEWORK (1)

The support mechanisms for producing electricity generated from all types of RES technologies (excepts hydro with install capacity > 10 MW) are stipulated in the Renewable and Alternative Energy Sources and Biofuels Act (RES Act), last amended by SG 98/14.11.2008.

Key objectives of the RES Act are:

- ✓ encouragement of the development and usage of RES technologies for electricity generation;
- ✓ encouragement of the development and usage of technologies for bio-fuels production and generation;
- ✓ environment protection measures;
- ✓ creation of better conditions for stable development on national and regional level;
- ✓ enhancement of the capacity of small and middle size companies producing energy from RES and bio-fuels.

The support mechanism for RES includes the following key measures:

- Preferential prices /feed-in tariffs/ of the electricity produced by RES;
- Mandatory purchasing of the “green energy” long term PPA;
- Priority grid connection of the RES sites.

REGULATORY FRAMEWORK (2)

Feed-in tariffs

Preferential tariffs for RES-based energy are set by the State Energy and Water Regulatory Commission (SEWRC). SEWRC is obliged to determine and publish the preferential prices annually by March 31st.

The preferential prices are set on the basis of:

- 80% of the average price of electricity sold by the public retailers in the preceding year; and
- a price premium, decided by SEWRC for each RES type on the basis of the Ordinance on regulating the electricity prices /Price Ordinance/. The premium for the following calendar year cannot be less than 95% of the premium amount in the previous calendar year.

At decision of the preferential prices SEWRC is considering the following general criteria:

- ✓ type of technology,
- ✓ installed capacity
- ✓ available resources of the primary energy source
- ✓ the preferential prices of RES-based electricity (except for technologies applied by HPPs and wind farms) are set by SCEWR under observation of:
 - the investment costs for the technology
 - the production costs
 - the rate of return on capital for each technology type under consideration of the specific risk.

REGULATORY FRAMEWORK (3)

Preferential prices for RES issued by SEWRC under Resolution №C-04/30.03.2009

No	RES TYPE	DIMENSION	80% AVER	PREMIUM	TOTAL PRICE
1	HPPs < 10 MW	€/MWh	32.93	20.76	53.69
2	Wind PPs ≥ 0.8 MW and with yearly operation < 2250 h	€/MWh	32.93	63.71	96.63
3	Wind PPs ≥ 0.8 MW and with yearly operation > 2250h	€/MWh	32.93	55.02	87.94
4	Wind PPs < 0.8 MW with asynchr. gen.	€/MWh	32.93	41.21	74.14
5	PV installations < 5 kWp	€/MWh	32.93	387.87	420.79
6	PV installations ≥ 5 kWp	€/MWh	32.93	353.10	386.03
7	Biomass - wood waste	€/MWh	32.93	78.02	110.95
8	Biomass - agricultural waste	€/MWh	32.93	51.95	84.87
9	Biomass - energy cultures	€/MWh	32.93	62.68	95.61

**Average selling price of Public Retailers for 2008 is 41.16 €/MWh*

REGULATORY FRAMEWORK (4)

Mandatory purchase of RES electricity

- The Public Supplier and the Public Retailers are obliged to purchase the entire quantity of RES electricity, for which a certificate of origin is issued. Exceptions are foreseen for quantities generated for the purposes of self-consumption or traded on the free market.
- Certificates of origin are issued by SCEWR pursuant to the Ordinance on Conditions and Order of Issuing Certificates of Origin.
- The mandatory purchase of RES-based energy is performed under power purchase contracts (PPA) with the following terms:
 - 25 years for electricity, generated by geothermal or solar energy sources
 - 15 years for electricity, generated by HPPs with installed capacity up to 10 MW and for electricity, generated from other RES
- These terms for the mandatory purchase shall be applied as follows:
 - for all existing electricity RES producers, except for HPPs with installed capacity which exceeds 10 MW - after re-negotiations, but not later than by 31 March 2009
 - for all new electricity RES producers, except for HPPs with installed capacity which exceeds 10 MW - as from the start of electricity generation, but not later than by 31 December 2015.

REGULATORY FRAMEWORK (5)

Priority grid connection

The transmission and/or the distribution companies are obliged to connect preferentially any producer of electricity from RES, that meet the specific requirements for grid connection, as provided for in the Regulation on connecting electricity producers and consumers to the electrical grid (Ordinance №6).

In case of non-observance of the mentioned above principals the following administrative penalties are foreseen in the RES Act:

- A penalty of BGN 50 000 (EUR 25 560) is to be imposed on energy companies failing to meet their obligation to connect with priority new RES electricity producers. In case of second failure the initial penalty would be tripled.
- The term for the connection shall not exceed the term, specified by the producer for commencing the RES power plant. A penalty amounting to BGN 30 000 (EUR 15 340) is to be imposed on energy companies failing to meet the term for connection.

What is the position of DISCOs:

- No effective mechanism for joint compensation of the extra-costs coming from purchasing of the RES electricity at preferential prices (the “green” component is expected to be implemented till the end of 2009);
- Too much uncovered costs for electrical grid development;
- Big number of applications coming from the “phantom” projects.

PROJECTS & STATISTICS (1)

RES projects subject to licensing (with install capacity > 5 MW per site)

Licensees under condition /before construction/	HPPs	Wind	PV
Number of Application for Licensee	3	15	2
Install Capacity as per the Applications /MW/	16.2	1423	51
Number of issued Licensee	2	10	1
Install Capacity as per the issued Licensees /MW/	7	1032	26

**According to the information of SEWRC for 2008*

PROJECTS & STATISTICS (2)

RES projects in process of development /install capacity < 5 MW/

- PV installations: 10 projects with install capacity between 1.5 - 5 MW
- Wind PPs: 8 projects with install capacity between 0.25 - 2.6 MW
- Small HPPs: 15 projects with install capacity between 0.35 – 5 MW
- Biomass: 7 projects up to 5 MW for heating (steam and hot water)

****Most of the projects are financed by the EBRD credit line***

PROJECT DEVELOPMENT: KEY PROCEDURES

Example for PV installation /between 9-15 months/:

- ✓ Company registration /SPV/ and land acquisition or setting up law of estate
- ✓ Solar energy audit: plot analysis; solar radiation; specific yield; proposal for technology
- ✓ Preparation of Detailed Development Plan
- ✓ Licence for production of electrical energy /if the installation is more than 5 MWp/
- ✓ Preliminary contract for interconnection with the transmission/distribution company
- ✓ Technical designing of the PV installation
- ✓ Construction Permit from the respective municipality
- ✓ Final interconnection contract with the transmission/distribution company
- ✓ Engineering: Delivery, construction/installation, physical grid connection and testing
- ✓ Obtaining Certificate of Origin, issued by SEWRC
- ✓ Contract for purchasing of the electric energy at preferential prices with Public Supplier /NEK/ or the respective Public Retailer /CEZ, EVN or E.ON/

CONCLUSION

Advantages to invest in RES projects in Bulgaria

- Considerable energy potential and expedient climate conditions
- Available appropriate plots and reasonable prices of the land
- Relatively low regulatory risk due to the well developed legal framework:
 - Guaranteed PPA for electricity purchasing at preferential prices: 25 years for geothermal or solar energy sources and 15 years for HPPs with installed capacity up to 10 MW and for other RES
 - Attractive level of the feed-in tariffs and transparent pricing mechanism
 - Priority connection to the electrical grid

Potential barriers:

- Certain reluctance of the DISCOs to connect RES sites because of the missing effective mechanisms for compensation of the extra costs for purchasing the expensive “green” energy as well as the costs for grid development (when the substation upgrade is needed);
- Green Certificate market is not developed yet.

ABOUT 2EC Ltd. (1)

Euro Energy Consulting Ltd. /2EC/ is a private company, established in 2009 on the initiative for business partnership in the field of Bulgarian energy sector. Behind the company are the 14-years experience of the consultancy company BB&T in the development of large-scale infrastructure projects as well as the experience of the shareholders working last decade very close with all energy institution in the country: MEE, SEWRC, NEK and DISCOs.

The scope of the services includes:

- Development of RES Projects
- Power market services
- CO₂ services (near future)
- Common energy services



THANK YOU FOR YOUR ATTENTION!

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