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ENERGY EFFICIENCY & RENEWABLE ENERGY SOURCES

Current state of play in renewables in Bulgaria

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Current state of play in renewables in Bulgaria

Overview



Hydro

- ✎ 2795 MW total installed capacity as of end-2006; 943 MW pumped-storage;
- ✎ 2563 MW turbines and 943 MW pumped storage owned by NEK;
- ✎ NEK is developing the 80 MW Tzankov Kamak project with VA Tech Hydro;
- ✎ HPP Svoge with capacity of 25 MW developed as a PPP between Petrolvilla and Svoge municipality
- ✎ 104 MW controlled by EdF;
- ✎ Private owners of significant capacity currently not selling;
- ✎ 40.25 MW for future privatization upon clarifying asset ownership/use issues;
- ✎ There is an opportunity to consolidate the numerous micro-hydro development projects;
- ✎ Greenfield investment in dams for drinking water is also an opportunity

Wind

- ✎ Bulgaria has potential wind-power capacity of 2200-3400 MW (estimates vary);
- ✎ According to NEK's estimates, achieving 16% of the total energy consumption from RES implies a need of 1450 MW installed wind capacity
- ✎ Mostly second-hand turbines installed to date;
- ✎ > 700 MW connections requested from NEK in northeast Bulgaria;
- ✎ ~10 projects of significant scale (>30 MW) announced by credible developers;
- ✎ Natura 2000 and Bern convention could block the earliest projects, all of which fall within the Via Pontica bird migration route.

Solar

- ✎ attractive tariff (EUR 399.83/MWh for capacities below 5 kW and EUR 367.11/MWh for capacities above 5 kW)
- ✎ only small projects to date

Biomass

- ✎ Dalkia is carrying out feasibility study in Varna for a biomass facility using straw as raw material for energy production
- ✎ Svilozha operates a facility for burning of wood waste left over from its cellulose plant



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Why wind power in Bulgaria

High potential for development

- ✧ **Growing demand for renewable energy worldwide and in Bulgaria**
 - Climate change
 - Intensifying pressure on global energy resources (growing demand)
 - Competitiveness
- ✧ **Existing and potential future power shortage on the Balkans due to:**
 - Strong economic growth in the region
 - Lack of sufficient generation capacity
- ✧ **EU quota for Bulgaria on renewables:**
 - RES to account for 11% of gross power consumption in Bulgaria after 2010 and 16% after 2020
 - Hydropower:
 - large-scale hydro – almost fully exploited technical and economic potential;
 - > 300 small hydro projects licensed in the past several years – little space left for development;
 - According to NEK's forecasts, estimated need for additional renewables-based capacities of 839 MW till 2010 – wind and solar energy to take the growth lead
- ✧ **Unexploited opportunities:** only several small wind farms currently operating in the country
- ✧ **Favorable regulatory framework (in the EU and Bulgaria)**

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Wind Projects

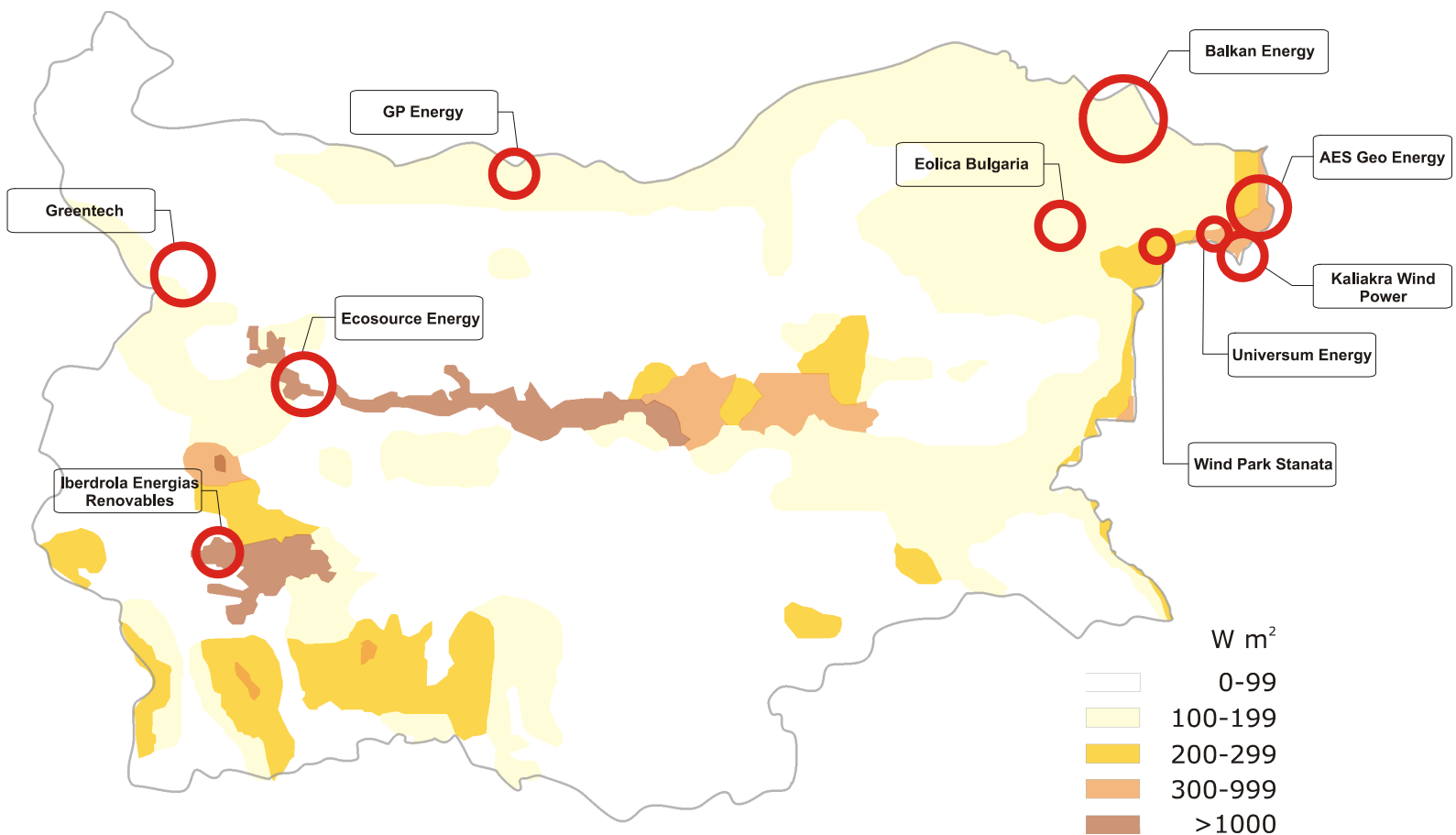
Sizable, announced projects

Company (Foreign investor)	Project location	Project capacity
WPD	near village Sokolovo	45 MW
AES Geo Energy Ltd. (AES, USA)	Kavarna region	100-120 MW
Balkan Energy AD	Dobrin, Krushari and General Toshevo (Dobrich district)	200 MW
Ecosource Energy Ltd.	West Balkan mountain (near Murgash peak)	100 MW
Eolica Bulgaria AD (Generacion Inversiones Internacional Ltd., Spain)	near the town of Suvorovo (North-East Bulgaria)	60 MW
Greentech (Greentech Energy Systems, Denmark)	village of Georgi Damianovo (in the region of Montana town)	116 MW
GP Energy (Terna, Greece)	villages Somovit, Dolni Vit, Gigen and Iskar (Guliantsi municipality)	50 MW
Iberdrola Energias Renovables (Iberdrola, Spain)	near the town of Rila	50 MW
Kaliakra Wind Power Ltd. (Mitsubishi, Japan)	near village of Bulgarevo (Kavarna municipality)	33 MW
Universum Energy Ltd.	village of Bulgarevo (Kavarna municipality)	60-70 MW
Wind park Stanata (WE2, Germany)	village of Odartsi (Dobrich region)	32.5 MW

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Wind Projects

Sizable, announced projects



Legal framework

EU legislation

EU legislation

Directive 2001/77/EC

- Overall target of 12% for the share of renewables in gross domestic energy consumption of the whole EU by 2010
- Priority of renewable sources over thermal and nuclear ones for network access
- Authorizes the provision of state aid and financing to support RES development
- Guarantees of origin available from October 2003

EU's New Energy Policy

- Share of 20% of RES in the overall EU energy consumption by 2020;
- 10% for the share of biofuels in overall EU petrol and diesel consumption for transport purposes by 2020.
- 20% reduction in greenhouse gas emissions by 2020 compared to 1990 levels

Kyoto Protocol and EU Emissions Trading Scheme

- EU – shared overall target of 8% reduction of GHG below the 1990 levels

Legal framework

Bulgarian legislation

Local legislation

Law on Renewable and Alternative Energy Sources and Biofuels

- Preferential tariff for electricity produced from RES for projects in operation by Dec. 31, 2010 – 2 components
 - 80% of the average electricity sales price achieved by public or end-user suppliers in the preceding calendar year
 - Price premium determined by State Energy and Water Regulatory Commission (SEWRC) – no less than 95% of previous year premium;
- Obligatory offtake of RES electricity (for projects in operation by Dec. 31, 2010) - 12-year power purchase contracts
- Connection to the transmission and distribution grid within 3 years of applications

SEWRC Ordinance on regulation of electricity prices

- Preferential tariff for electricity produced from RES – 2 components:
 - 80% of the average electricity sales price achieved by public or end-user suppliers in the preceding calendar year (to be amended in accordance with Law on Renewable and Alternative Energy Sources and Biofuels)
 - Price premium determined by SEWRC depending on the type of technology, size of installed capacity, and resource availability of the primary energy source

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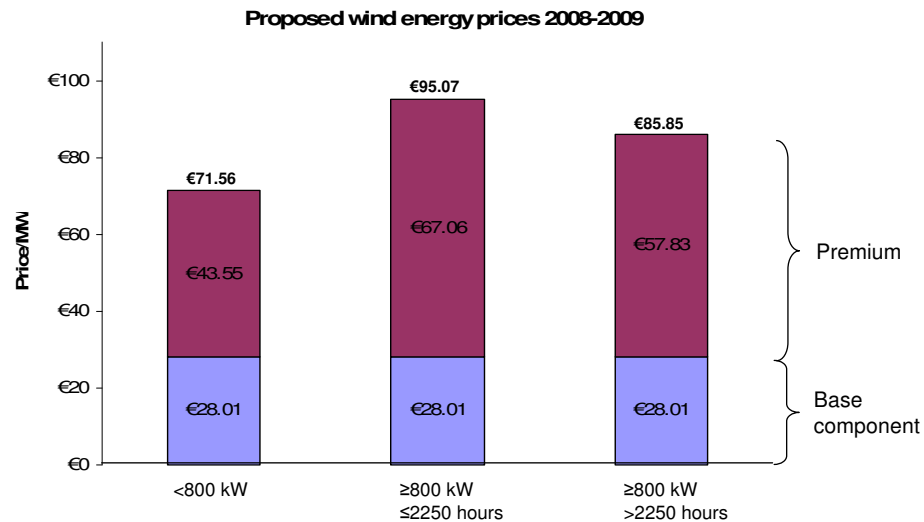
Feed-in tariffs

Favourable legislation

Special tariff for wind generated electricity set by SEWRC

Feed-in tariff for wind is made up two components:

- base component equal to BGN 54.79 (EUR 28.01) per MWh calculated as 80% of the average electricity end-user sales price for 2007
 - average electricity end-user sales price for 2007
BGN 68,49 (EUR 35.02) per MWh
- a premium which depends on the capacity of each generator and the number of full operating hours



Comparison with EU price levels:

- Compatible with EU prices for electricity produced from new wind turbines
- In the very low range of EU prices for electricity produced from older turbines

Key challenges for wind power developers in BG

Wind resource assessment

- Lack of wind atlas for Bulgaria
- IEC class III sites predominate
- Theft of met masts or parts thereof

Site acquisition

- Difficulty of identifying landowners
- Widely dispersed ownership of land (few large plots)
- Unreasonable expectations of landowners and some developers
- Difficulty to secure site exclusivity
- Unclear/changing legal framework for municipal pasture land
- Lengthy procedures for use of forest land

Grid connection

- TSO not fully equipped to handle a large wind load
- Plans for gas turbines to smooth production for the grid are at a very early stage
- Incomplete or insufficient transmission grid in some attractive wind areas

Tariffs/offtake

- Limited visibility on future tariff escalation