



Public Private Partnerships And The Municipal Role In Wind Projects in Bulgaria



**5016 Newport Ave.
Suite 1, Bethesda, MD
20816 USA**



**135 Rakovski Street
Entrance 2, Floor 5
Sofia 1000 Bulgaria**



USAID | BULGARIA
FROM THE AMERICAN PEOPLE



The Opportunity for PPP in Bulgaria

- Member of EU since 1 January 2007
- National program encouraging RE source development
- Growing regional market to export power
- EU requirement of 22% of electricity consumption to be met by RE by 2020
- Currently Bulgaria has >1% met by RE



Advantages of Using PPP As a Procurement Mechanism

- Provides access to skills unavailable to the Municipality
- Construction begins quickly
- Private Sector brings innovation
- Contractor has the responsibility for risk management
- Contractor has the responsibility to maintain the asset
- Municipality has no obligation to pay if contractor fails to deliver
- Municipality can focus on on delivery of services and not on management of assets



Questions To Ask

- Will the municipality support the project?
- Is the project financially viable?
- Must the project be competitively bid?
- Are the risks acceptable (financial, legal, political)?
- Is the policy/regulatory framework well defined?



Implemented Public Private Partnerships In Bulgaria

- Rehabilitation, reconstruction and operation of two power plants (Maritsa East I and III)
- Water services delivery in the Sofia metropolitan region
- Solid waste disposal in Stara Zagora



Roles and Responsibilities

EnCon Services

- Conduct wind resource assessment
- Perform project structuring and development
- Develop project milestones and monitoring plan

Project Developer

- Arrange interconnection to national grid
- Secure financial and legal conditions for implementation



Roles and Responsibilities

EnCon Services/Project Developer

- Establish joint venture with Municipality
- Establish PPP structure for Municipality/Developer to own/operate the wind farm
- Write business plan
- Capacity building, public awareness and public outreach

Turbine Manufacturer

- Technical assistance for turbine selection/installation
- Construction oversight, start-up, acceptance testing, O&M training/certification



General Configuration of Wind Farm

- 4.5 MW (three 1.5 MW turbines)
- Connection to 20kV distribution system through a 20/0.69 kV, 1.6 MVA step-up transformer
- Turbine Siting:
 - 10 rotor diameters in windward direction (approx. 770 meters)
 - 3 rotor diameters in lateral direction (approx. 230 meters)

Bulgarian Energy Efficiency and Renewable Energy Credit Line (BEERECL) Wind Farms

No.	Wind Project REUP	Project sponsor	No Wind Turbines	Type Wind Turbines	Installed Capacity Each	Total Installed Capacity
1	#22 REUP - Karvama	Argos Ltd	2 second hand	Turbowinds T48	600kW	1200kW
2	#50 REUP - Karvama	Wind Energie Varna Ltd	2 second hand	Vestas V39; Nordtank NTK41	500kW	1000kW
3	#52 REUP - Karvama	ST Degrets - Tsvetanka Ilieva	1 second hand	Bonus MK3	450kW	450kW
4	#53 REUP - Karvama	ST Evklips - Nikolay Rashev	2 second hand	Vestas V44	600kW	1200kW
5	#55 REUP - Sliven	Yoana Ltd	1 second hand	Micon NM60	1000kW	1000kW
6	#56 REUP - Sliven	Nachevi 90 & Co	1 second hand	Micon NM60	1000kW	1000kW
7	#57 REUP - Sliven	Rubicon Shipping Ltd	1 second hand	Micon NM60	1000kW	1000kW
8	#67 REUP - Karvama	Wind Energie Varna Ltd	1 second hand	Vestas V39	500kW	500kW
9	#74 REUP - Karvama	Energy Invest Jsc	4 second hand	Vestas V44	600kW	2400kW
10	#76 REUP - Karvama	Winlight Ltd	2 second hand	Nordtank NTK41	500kW	1000kW
11	#77 REUP - Karvama	GS Electric Ltd	4 second hand	Bonus MKIV	600kW	2400kW
12	#81 REUP - Karvama	Wind Energie Varna Ltd	2 second hand	Vestas V39	500kW	1000kW
13	#82 REUP - Karvama	Windhopper Ltd	1 second hand	Vestas V39	500kW	500kW
14	#84 REUP - Karvama	ST Degrets - Tsvetanka Ilieva	1 second hand	Vestas V39	500kW	500kW
15	#90 REUP - Varna	Eco Energy VV Ltd	5 second hand	Take TW600	600kW	3000kW
16	#91 REUP - Karvama	Argos Ltd	1 new	Nordex N60	1300kW	1300kW
17	#93 REUP - Varna	Eco Energy 2006 Ltd	1 second hand	Take TW600	600kW	600kW
18	#96 REUP - Pleven	Welga Ltd	1 new	Nordex N90	2500kW	2500kW
19	#102 REUP - Sliven	Eco Farm Ltd	2 new	Vensys 64	1200kW	2400kW
20	#103 REUP - Varna	Eco Energy BG Ltd	4 second hand	Vestas V39; Nordtank NTK41	500kW	2000kW
21	#106 REUP - Karvama	Dynamic Group Ltd	1 new	Vensys 64	1200kW	1200kW
22	#107 REUP - Troyan	Troyan Energy Ltd	2 new	Nordex N60	1300kW	2600kW
23	#112 REUP - Karvama	Wind Sis	1 new	Fuhrlander FL MD 77	1500kW	1500kW
24	#113 REUP - Karvama	Nimex	1 new	Leithwind 77	1500kW	1500kW
25	#119 REUP - Kableschkovo	ST Radial	2 second hand	Nortank NTK41	500kW	1000kW
26	#120 - Karvama	CID Atlas Ltd.	1 new	Nordex N60	1300kW	1300kW
	Total		47 Turbines			35.75 Megawatts



Tariffs for Wind Power

- Old Turbines (capacity up to 10 MW):
 - 120 leva/MWh (EUR 61.5/MWh)
- New Turbines:
 - 175 leva/MWh (EUR 89.7/MWh) - up to 2,250 operating hours annually
 - 156 leva/MWh (EUR 80.0/MWh) – above 2,250 operating hours annually



Financial Analysis of Selected BEERECL Wind Farms

<u>Turbine</u>	<u>MW/Unit</u>	<u>Number</u>	<u>Hub Height (m)</u>	<u>IRR (%)</u>	<u>Payback (Years)</u>
Nordex N90	2.5	One	80	11.16	9.21
Vensys 64	1.2	Two	85	12.11	8.12
Vensys 64	1.2	One	85	12.4	7.73
Nordex N60	1.3	Two	60	15.27	6.9