

A “Green light” for renewable energy in Ukraine:

Results and forecast for enterprises and energy market operation using a “green” tariff

Current National legislation regarding the alternative energy (ruling)

- Law of Ukraine "On alternative energy sources"
- Law of Ukraine "On alternative types of fuels"
- Law of Ukraine "On electricity"
- Law of Ukraine "On energy savings"
- Law of Ukraine "On combined generation of heat and power (co-generation) and use of waste potential"
- Other regulatory acts

State authorities in the field of alternative energy (ruling)

- Cabinet of Ministers of Ukraine (CMU)
- Ministry of fuel and energy of Ukraine (MFE)
- National electricity regulatory commission of Ukraine (NERC)
- National Agency of Ukraine on Efficient Use of Energy Resources (NAER)
- State inspection on use of power plants and grid (SIPPG)

Current incentive mechanisms for the development of alternative energy

- Establishment of a “green” (feed-in) tariff for electricity, generated from alternative energy sources
- Legislated obligation of the wholesale energy market (WEM) to purchase the whole volume of electricity, generated from alternative sources
- Formation of the state energy savings fund
- Tax and customs benefits
- Soft loans
- State subsidies

Additional factors for alternative energy development

- Possibility to sell through direct contracts (prototype of “green” certificates) with consumers or at WEM (obligatory purchase)
- Obligation of energy suppliers to connect alternative energy generators to the grid (according to CMU Resolution № 126 dated 19 February 2009 “On peculiarities of connection of energy facilities which generate electricity using renewables, to electricity grid”)

NERC's role in alternative energy regulation

NERC is the main body carrying out the state regulation in the power sector of Ukraine

The authority of NERC in the sphere of alternative energy was established by the Laws of Ukraine "On electricity", "On combined generation of heat and power (co-generation) and use of waste potential", and Decree of President No. 335/98 "Issues of National electricity regulation commission of Ukraine" dated 21 April 1998

On April 1, 2009 the parliament of Ukraine adopted the Law of Ukraine No. 1220-VI "On introducing amendments to the Law of Ukraine "On electricity" regarding the incentive to use alternative energy sources", according to which a model of differentiated ("feed-in") tariffs should be applied for economic entities that generate electricity using alternative energy sources according to every type of renewable energy and for every energy facility in operation until 2030.

Pursuant to the aforementioned Law of Ukraine, by its Resolution No. 828 dated July 16, 2009, NERC introduced changes into Procedure of approval, revision and revocation of "green" tariff for economic entities, approved by Resolution No. 32 dated January 22, 2009, which corresponds to the current Law.

NERC's role in alternative energy regulation

The main authority of NERC in alternative energy sector is:

- To approve the “green” tariff for electricity produced from alternative energy sources
- To form and register alternative energy facilities
- To publish annually information regarding the costs for connection of renewable energy facilities to the grid
- To issue licenses for electric generation, transmission and supply by approving guidelines, conditions and rules separately for each type of licensed activity according to the Law of Ukraine “On electricity”
- To issue licenses for generation of electricity and heat , which are produced by co-generation facilities
- To set tariffs for electricity and heat, which are produced by co-generation facilities
- To establish rules of connection of co-generation facilities to the grid

NERC's role in alternative energy regulation

Internal documents that guide NERC's mandate in the alternative energy sector:

- NERC Resolution No. 3 dated February 8, 1996 "On approval of Conditions and Rules of entrepreneurial activity in power generation"
- NERC Resolution No. 1305 dated October 6, 1999 "On approval of Guidelines on issuance of licenses by National Electricity Regulatory Commission of Ukraine for certain types of entrepreneurial activity"
- NERC Resolution No. 32 dated January 22, 2009 "On the procedure of approval, revision and revocation of a "green" tariff for economic entities (in edition of NERC Resolution No. 828 dated July 16, 2009)

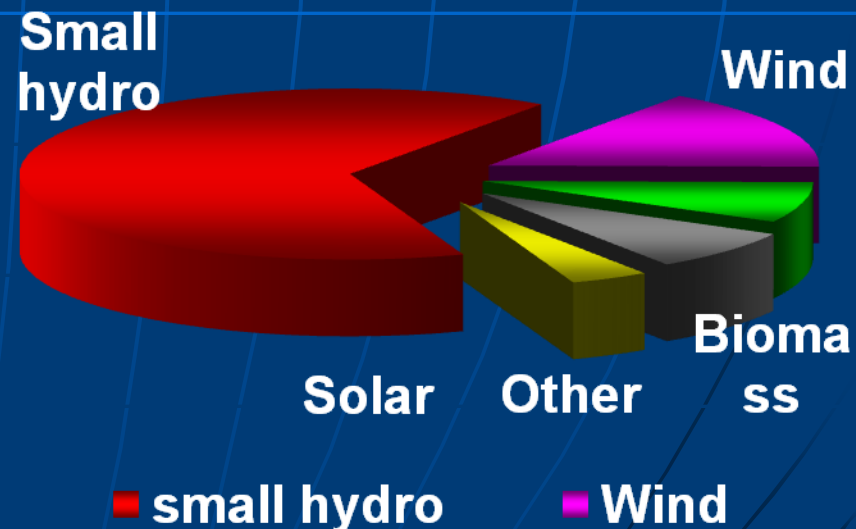
NERC's role in alternative energy regulation

As of February 23, 2011, the following companies applied for and received a "green" tariff from NERC:

Number of facilities – generators of electric energy	Type of alternative source			
	Solar	Wind	Hydro	Biomass
	6	5	2	2

There are 57 enterprises in the Register of those electricity facilities that use alternative energy sources. Among them:

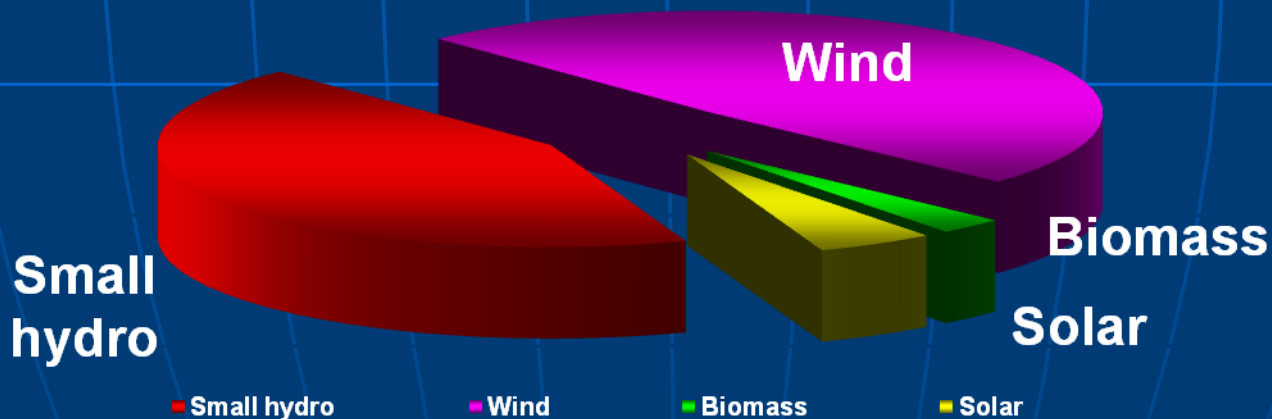
- 8 facilities use wind energy
- 4 facilities use biomass (biogas) energy
- 2 facilities use energy of the waste potential of technological processes
- 39 facilities use energy of the small rivers
- 1 facility uses mining gas
- 3 facilities use solar energy



NERC's role in alternative energy regulation (planned indicators in alternative energy sector)

According to the documents submitted by alternative energy producers to NERC as of February 23, 2011, the total installed capacity of generating equipment is as follows:

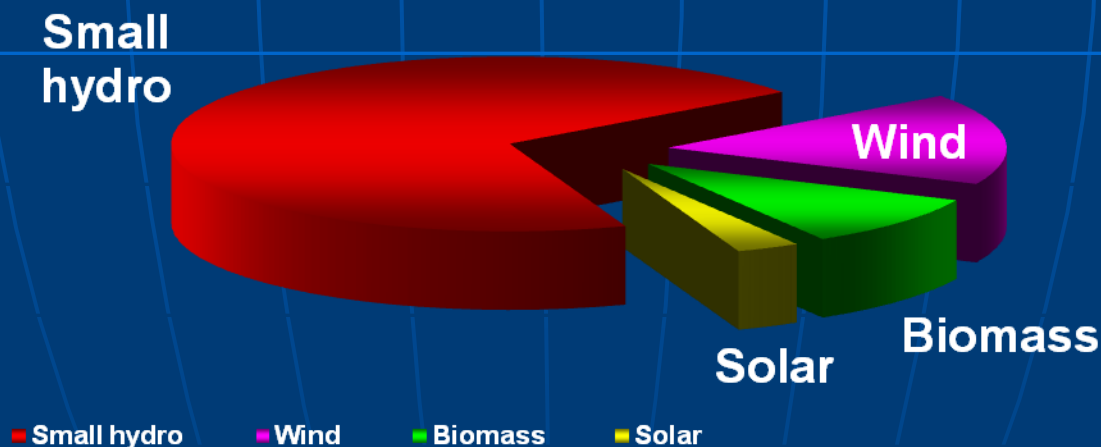
- **total installed capacity of generating equipment that produces electricity from renewable energy sources, 156,094 MW, including:**
- **Installed capacity of the small hydro plants - 67,78 MW;**
- **Installed capacity of the wind power plants - 76,58 MW;**
- **Installed capacity of the biomass energy plants - 4,2 MW;**
- **Installed capacity of the solar energy plants - 7,535 MW.**



NERC's role in alternative energy regulation (planned indicators in alternative energy sector)

According to the documents submitted by alternative energy producers to NERC as of February 23, 2011, the following targets have been established for the current year:

- Effective output of electricity generated from renewables **294 650 000 kW/h**, including:
- Generated by small hydropower plants - 214 079 000 kW/h;
- Generated by wind power plants – 51 415 000 kW/h;
- Generated by biomass based plants – 29 147 000 kW/h;
- Generated by solar plants – 9 234 000 kW/h.



NERC's role in alternative energy regulation

(Level of optimum penetration of renewable generation)

Countries such as Germany, Spain, Czech Republic and others, have started to revise the respective state policies of support for the sector of alternative energy regulation due to abrupt increase of electricity costs for end users.

Technologies of alternative energy, which are more expensive in comparison with others and bring certain social losses for society, should only be applied in the case, when such losses are compensated in other areas of economy (development of new industries, employment, etc.)

When costs of alternative energy reach critical levels (levels at which the final tariff paid by consumer becomes a real barrier and cannot be further increased in the future) an issue of limitation of the state support will arise.

In such case, an issue of defining the optimum level of penetration of renewable energy generation into the country energy system arises!

NERC's role in alternative energy regulation (Level of optimum penetration of renewable generation)

When defining the optimum level of penetration of renewable sources generation, it is necessary to take into consideration:

- Imbalance charges *when connecting new generation from alternative sources;*
- *Definition of the instruments of regulation of effective output and frequency in energy system;*
- *Analysis of statistical and dynamic stability of energy system;*
- *Further technological development of alternative energy sector (reducing capital investments per unit of production, increasing equipment efficiency);*
- *An issue of the best combination of traditional energy generation technologies with renewable generation technologies, taking into consideration specificity of the regional resources and the state of energy system.*

NERC's role in alternative energy regulation

- The Commission has established the following fixed minimum "green" tariffs (equivalents in national currency) By NERC Resolution No. 857 dated July 23, 2009:

1 USD = cca 8 Hryvnia)

Fixed minimum "green" tariff, in kop/kW/h		
Electricity, generated from the wind energy		
Capacity up to 600 kW	Capacity 600 kW- 2000 kW	Capacity more than 2000 kW
70,15 (0.08 USD)	81,84 (0.10 USD)	122,77 (0.15 USD)
Electricity, generated from the biomass energy		
134,46 (0.17 USD)		
Electricity, generated from the solar energy		
Surface facilities	By roof facilities, capacity more than 100 kW	By roof facilities, capacity under 100 kW
505,09 (0.63 USD)	484,05 (0.60 USD)	463,00 (0.58 USD)
Electricity, generated from the small hydro power plants		
84,18 (0.11 USD)		

NERC in alternative energy regulation

- A fixed minimum value of the "green" tariff for economic entities is set by recalculation of the value of the "green" tariff in Euro, which is done according to the rules of this Law, as of January 1, 2009 according to the official exchange rate of the National Bank of Ukraine at the indicated date (article 17-1 of the Law of Ukraine "On electricity")
- Value of the "green" tariff cannot be less than a fixed minimum value of the "green" tariff at each date of setting retail rates for consumers shall be recalculated into national currency according to official exchange rate of the National Bank of Ukraine at such date (article 17-1 of the Law of Ukraine "On electricity")
- 1.6. Value of the "green" tariff can not be less than fixed minimum "green" tariff, at each date of setting the retail rates for consumers should be recalculated into the national currency according to official exchange rate of the National Bank of Ukraine at such date (NERC Resolution No32 dated 22.01.2009 "On approval of the procedure for establishment, revision and cancelling of the "green" tariff for economic entities")

Provided that $\frac{N_{EURO.XX.XX.XXXX}}{N_{EURO.01.01.2009}} > 1,$ $B_{TARIFF.XX.XX.XXXX} = B_{TARIFF.01.01.2009} \times \frac{N_{EURO.XX.XX.XXXX}}{N_{EURO.01.01.2009}}$

Provided that $\frac{N_{EURO.XX.XX.XXX}}{N_{EURO.01.01.2009}} \leq 1,$ $B_{TARIFF.XX.XX.XXXX} = B_{TARIFF.01.01.2009}$

NERC in alternative energy regulation

Additional regulations that should be taken into account when planning and implementing the projects in alternative energy sector in Ukraine are as follows:

- Coefficient of the “green” tariff of electricity, produced by energy facilities that were set in operation (or significantly modified) after 2014, 2019 and 2024 shall be reduced by ten, twenty and thirty percent respectively from its base value, as defined by Part 7 of Article 171 of the Law “On electricity”

Starting from January 1, 2012, share of the raw materials, materials, capital assets, works and services of Ukrainian origin in the construction cost of corresponding energy facility, which generates electricity from renewable resources, should not be less than 30 percent, and starting from January 1, 2014 – 50 percent

Starting from January 1, 2012, the use of the solar modules in energy facilities, where the share of raw material and materials of Ukrainian origin in production is not less than 30 percent

Indicated limitations with the lapse of time will reduce financial load on the end user (in case of marginal price per capacity unit) and provide development of the relevant infrastructure (production of generation equipment, service, etc.) on the territory of Ukraine

Development of alternative energy in the Black Sea region:

Solar energy

As of February 23, 2011, two legal entities which generate electricity from the solar energy on the Crimean peninsula have applied to NERC and received "green" tariffs:

- "Crimea Solar 1" Ltd;
- "Crimea Solar 2" Ltd;
- "Crimea Solar 3" Ltd;
- "Crimea Solar 4" Ltd;
- "Crimea Solar 5" Ltd.

According to NERC resolutions No 1276 and No 1277 dated September 23, 2010, No 208 and No 209 dated February 10, 2011, the following "green" tariff have been approved for above -mentioned companies for the period from September 23, 2010 and between February 10, 2011 – January 1, 2030:

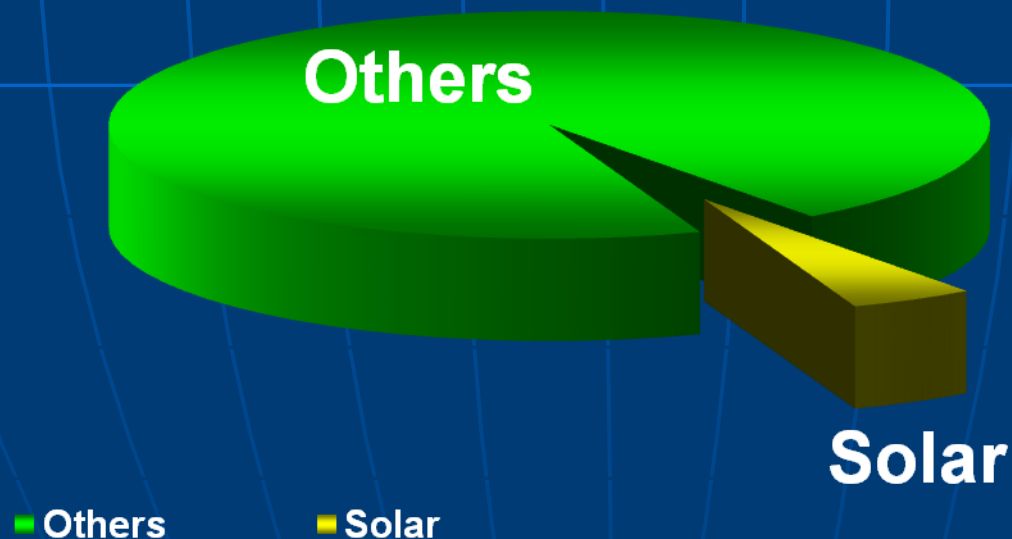
505,09 kop / kW/h (excl VAT). (=0.63 USD)

Tariffs for enterprises are established at the level of fixed minimum "green" tariff value (its equivalent in the national currency according to NERC Resolution No 857 dated July 23, 2009) due to the fact, that on the date of tariff approval official NBU exchange rate of hryvnia to euro was less than on January 1, 2009.

Development of alternative energy in the Black Sea region: Solar energy

Total installed capacity of the generation equipment,
producing electricity from alternative sources is 156,094
MW, including:

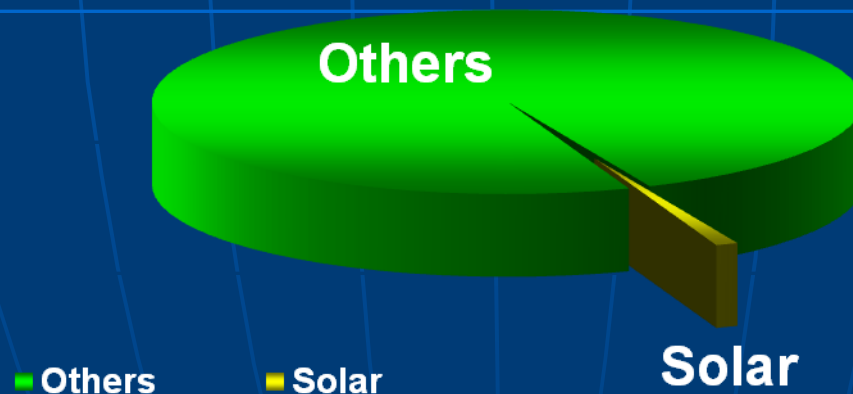
- Installed capacity of solar plants in the Crimea - 7,5 MW.



Development of alternative energy in the Black Sea region: Solar energy

Productive supply of electricity, generated from renewables in 2010 was 181 292 000 kW/h, including:

- from solar plants located on the Crimean peninsula – 508,000 kW/h.



Development of alternative energy in the Black Sea region: Wind energy

- As of January 1, 2010, total installed capacity of the wind power plants in united power system of Ukraine was about 83,9 MW:

Tarkhankut WPP - 15,5 MW;

Donuzlav WPP - 17,2 MW;

Saky WPP - 20,8 MW;

East-Crimean WPP - 1,6 MW;

Prisnovodenska WPP - 5,6 MW;

Novoazovska WPP - 21,8 MW;

Shodnitskaya WPP - 0,8 MW;

Adjigolskaya WPP - 0,6 MW.

Development of alternative energy in the Black Sea region.

Wind energy

NEC "Ukrenergo" has issued technical specifications for connecting the following wind power plants with the total capacity of 1 150 MW to electricity grid, including:

- ***Wind power plant "Nova-Eco-1" with 100 MW capacity;***
- ***Wind power plant "Nova-Eco-2" with 200 MW capacity;***
- ***Wind power plant "West Crimean WPP" Ltd with 250 MW capacity;***
- ***Wind power plant "Greus" Ltd (Bahchisaray district) with 200 MW capacity;***
- ***Wind power plant "Korus" Ltd (Belogorsky district) with 200 MW capacity;***
- ***Wind power plant "Soran" Ltd (Belogorsky and Sovietsky districts) with 200 MW capacity.***

Development of alternative energy in the Black sea region:

Wind energy

NEC "Ukrenergo" has received an approval for terms of reference for pre-design works on developing generation scheme of 11,244 MW by the wind power plants:

Crimea (4129 MW):

- wind power plant "Concord Group" Ltd with 100MW capacity (Leninsky district);
- wind power plant "Concord Group" Ltd with 350 MW capacity (Sovietsky district);
- wind power plant "Evra" Ltd with 167 MW capacity (Skvortsovo, Simferopol district);
- wind power plant "Evra" Ltd with 232 MW capacity (Karyerny, Saky district);
- wind power plant SE "MNTC of the windpower under IVE NAS of Ukraine" with 100MW capacity (Sudak district);
- wind power plant "PlanECO" Ltd with 200 MW capacity (Krasnoperekopsk district);
- wind power plant "PlanECO" Ltd with 200 MW capacity (Djankoy district);
- wind power plant "Ohotnikovskaya wind power plant" Ltd with 500 MW capacity (Saky district);
- wind power plant "Takil" Ltd with 180 MW capacity (Kerch peninsula);
- wind power plant "Newest energy technologies" Ltd with 400 MW capacity (Sovietsky district);
- wind power plant "Sefir" Ltd with 400 MW capacity (Pervomaysky district);
- 6 wind power plants with total capacity of 1300MW are foreseen by the plans of National agency of Ukraine on Efficient Use of Energy Resources.

Development of alternative energy in the Black Sea region:

Wind energy

Nikolayev region (1 100-1 500 MW)

- wind power plant "Yuzhnoukrainskaya WPP" with 300 MW capacity and project increase up to 700 MW;
- wind power plant "Tiligulskaya WPP" with 500 MW capacity (Berezanskiy district);
- one wind power plant with total capacity of 300MW is foreseen by the plans of Agency of Ukraine on Efficient Use of Energy Resources.

Kherson region (400 MW)

- wind power plant "Genichesk WPP" with 300 MW capacity (Genichesk district);
- wind power plant "Greenway Energy" with 100 MW capacity (Genichesk district).

Odessa region (900 MW)

- wind power plant "Artsyz WPP" Ltd with 400 MW capacity (Artsyz district);
- wind power plant "Pokrovskaya WPP" Ltd with 200 MW capacity (Belyaevskiy district);
- wind power plant "PlanECO" Ltd Tatarbunar WPP 150 MW;
- wind power plant "PlanECO" Ovidiopol WPP 150 MW.

Development of alternative energy in the Black Sea region:

Wind energy

- According to conclusions of the Institute of Renewable Energy under the National Academy of Sciences of Ukraine and "Ukrenergomash," a state company, the total capacity of the wind power plants (WPP) by 2030 should be around 16 000 MW with the following distribution by areas:

№	Regions	WPP capacity at the end of 2030	
		MW	%
1	Crimea	3 700	23,1
2	Nikolayev region	3 600	22,5
3	Kherson region	3 500	21,9
4	Zaporozhye region	3 200	20,0
5	Donetsk region	2 000	12,5
	Total	16 000	100,0

Thank you for your attention!