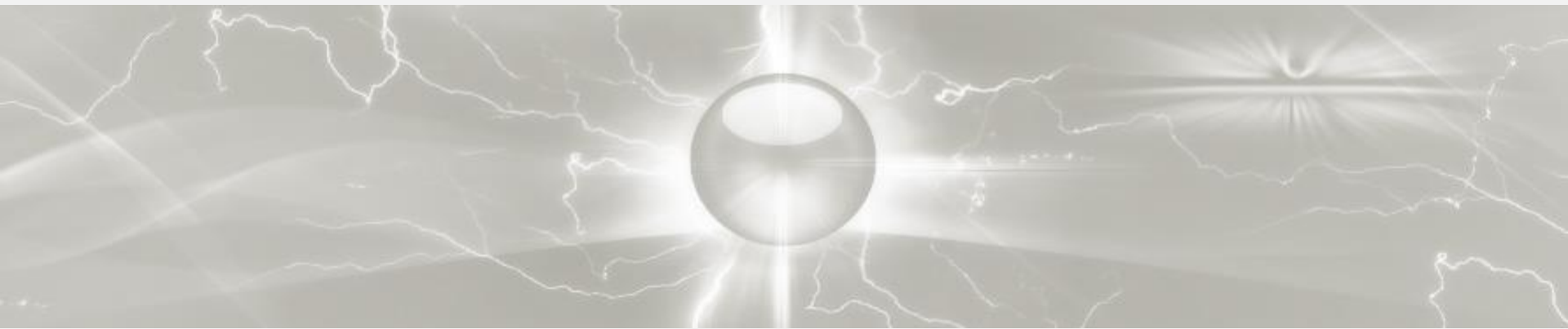


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# Renewable Energy Sector in Ukraine



## Unlocking Country's Potential

26 August 2013



# Ukraine's Wind Potential



Average wind speed at 100 m exceeds 7 m/s in many locations in Crimea, Odessa, Kherson, Mykolayiv and Zaporizhyya regions as well as in the mountain regions in the west of Ukraine

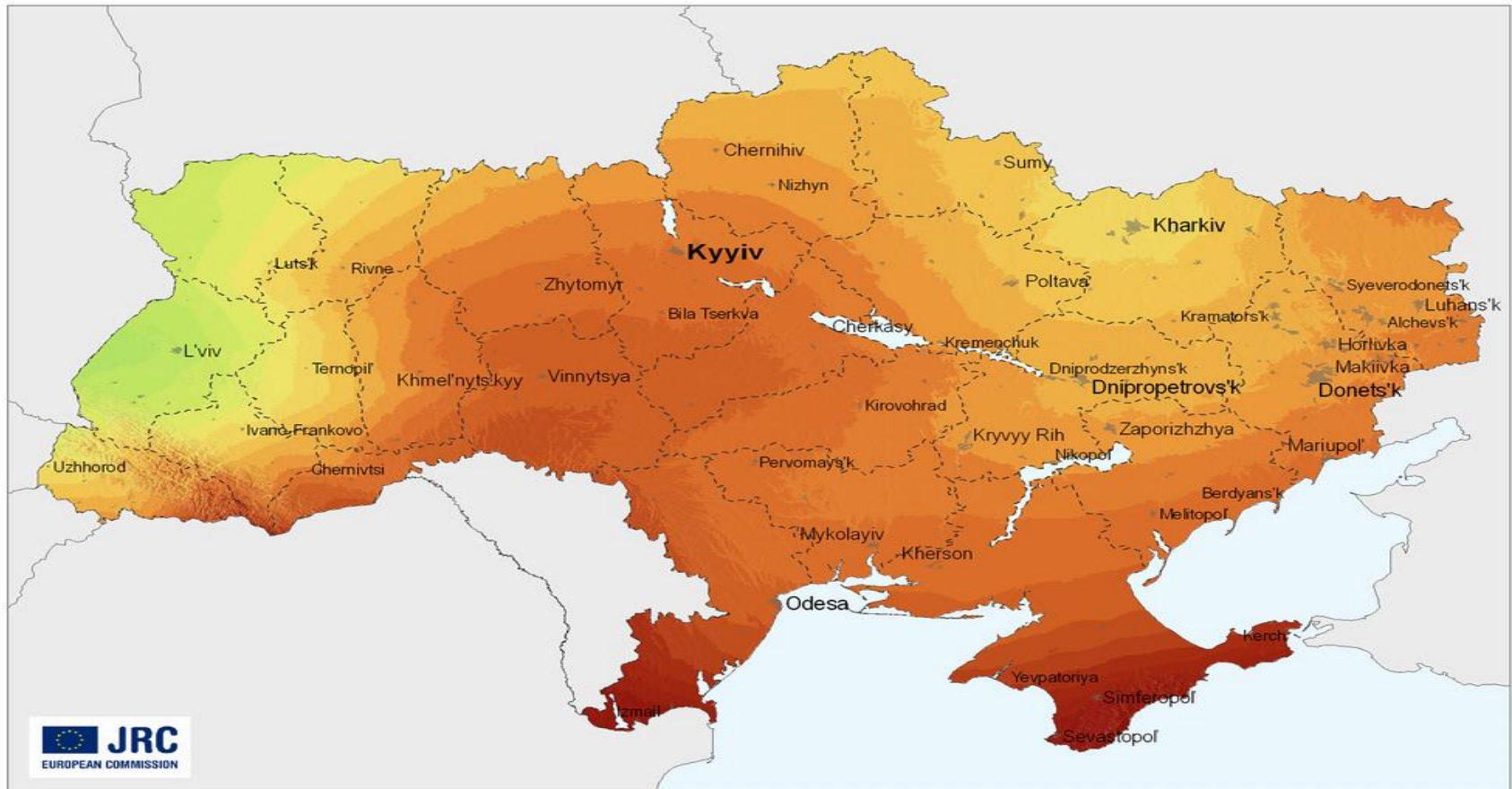
## Areas with High Wind Potential

Crimea	3 700 MW
Mykolayiv region	3 600 MW
Kherson region	3 500 MW
Zaporizhyya region	3 200 MW
Donetsk region	2 000 MW
<b>TOTAL</b>	<b>16 000 MW</b>

# Ukraine's Solar Potential

Global irradiation and solar electricity potential  
Optimally-inclined photovoltaic modules

Ukraine



Yearly sum of global irradiation [kWh/m<sup>2</sup>]

<1150 1200 1250 1300 1350 1400 1450 1500 1550>



<863 900 938 975 1013 1050 1088 1125 1163>

Yearly electricity generated by 1kW<sub>peak</sub> system with performance ratio 0.75 [kWh/kW<sub>peak</sub>]

Authors: M. Šúri, T. Cebecauer, T. Huld, E. D. Dunlop  
PVGIS © European Communities, 2001-2008  
<http://re.jrc.ec.europa.eu/pvgis/>

0 50 100 200 km

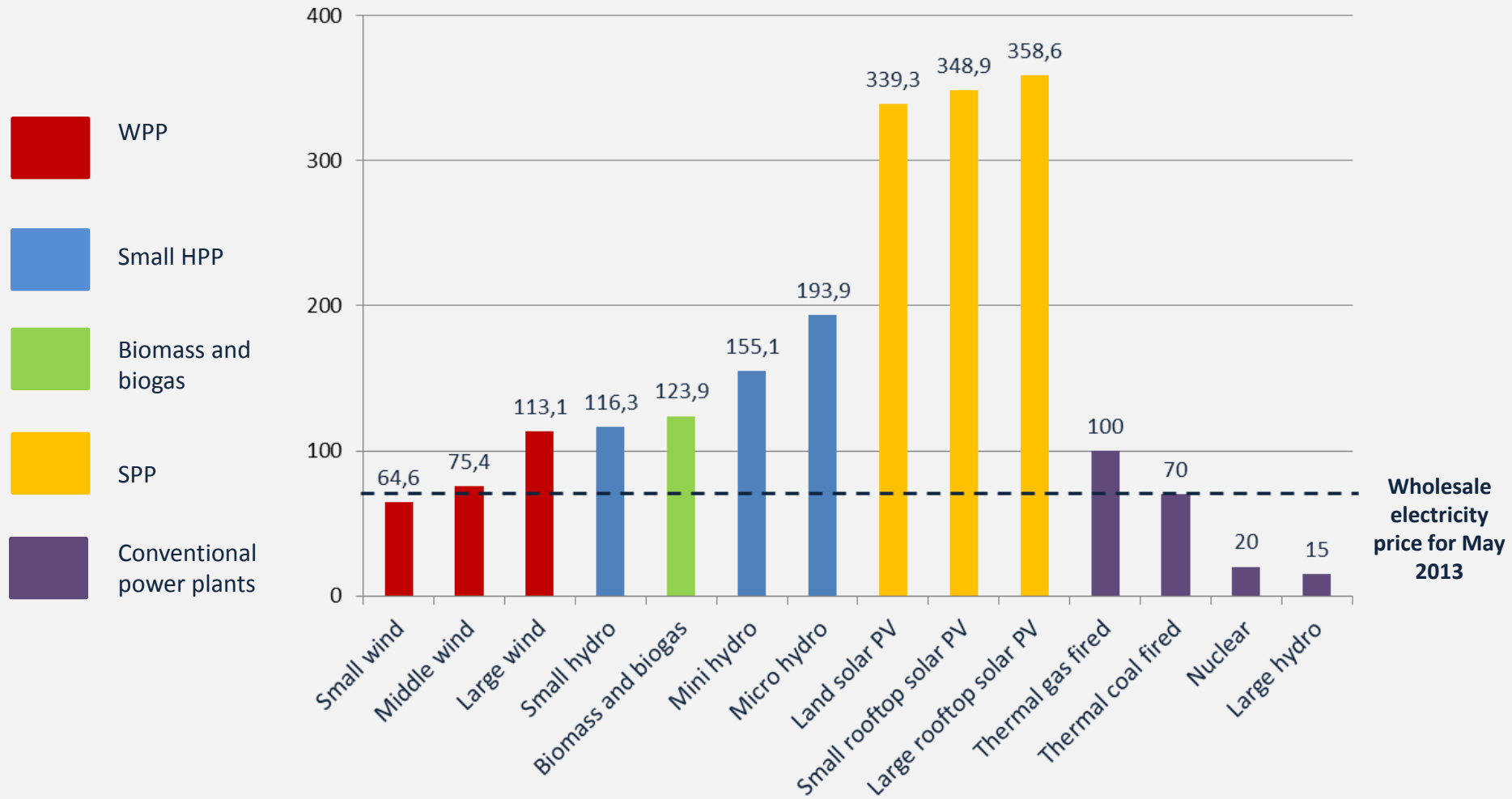
# Green Tariff Regulatory Framework

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- New Green Tariff Law (amendments to the Electricity Law) came in force in April 2009
- Special feed-in (green) tariffs were established for wind, solar, biomass, biogas, small hydro (<10 MW) and geothermal power plants
- Green tariffs are fixed until 2030 with guaranteed electricity off-take by the Wholesale Electricity Market Operator (under existing “single buyer” market model)
- Green tariffs are revised on a monthly basis to follow changes in UAH/EUR currency exchange rate (with guaranteed “minimum floor” set in EUR)
- Green tariffs are applied to new construction projects as well as renewable power plants operated before approval of the Law (except for large hydro power plants)
- Green tariff system was tested in real life – National Electricity Regulatory Commission approved green tariffs for many renewable energy producers, including wind, solar, and small hydro plants with total installed capacity exceeding 900 MW
- Reduction of green tariffs by 10%, 20% and 30% for RES plants commissioned after 2014, 2019 and 2024 respectively
- Local content requirement – 30% starting July 2013 and 50% starting July 2014 (for solar, wind and small hydro projects) with additional conditionality (“fixed shares”)
- PPA is signed and green tariff is approved after the renewable power plant has been commissioned

# Green Tariffs for Different RES Power Plants

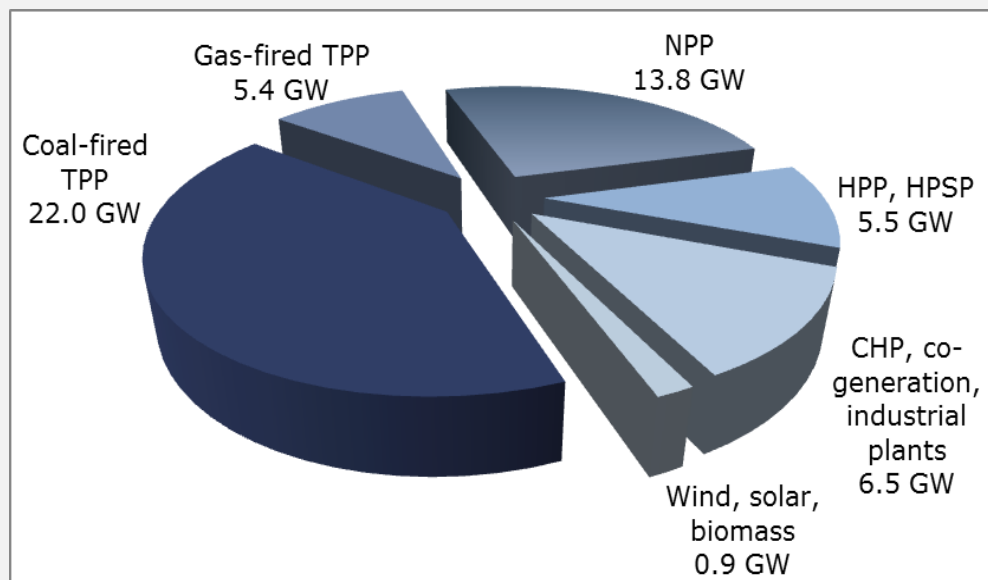
Electricity tariffs for different RES e power plants (minimum guaranteed green tariffs for RES power plants put into operation from 01/04/2013 to 31/12/2014) vs. tariffs for conventional power plants, EUR/MW·h



# Place of Renewables in Generation Mix

RES power plants	Installed Capacity as of 01/07/2013	Electricity Production in H1 2013
	MW	million kW·h
SPP of Activ Solar	474.0	231.3
Other ground SPP	95.2	14.7
Roof-top and facade SPP	0.3	0.1
<b>Total – Solar PV</b>	<b>569.5</b>	<b>246.1</b>
WPP of DTEK	92.3	140.2
WPP of Wind Parks of Ukraine	130.0	130.9
Other WPP	108.1	45.8
<b>Total – Wind</b>	<b>330.4</b>	<b>316.9</b>
<b>Total – Small Hydro</b>	<b>74.0</b>	<b>158.0</b>
<b>Total – Biogas/Biomass</b>	<b>7.3</b>	<b>13.5</b>
<b>TOTAL – RES POWER PLANTS</b>	<b>981.0</b>	<b>734.4</b>

Ukraine's Generation Mix as of 01/07/2013



# Opportunities and Challenges for RES Development

## Incentives and Opportunities

### I.1.OPPORTUNITIES

- High RES potential in many regions
- Many projects are currently under development for all types of RES
- High level of Green Tariffs for most of RES types
- Sufficient time for payback of investments (green tariff is set until 2030)

### I.2. INCENTIVES

- Hedging against local currency devaluation (pegging green tariffs to UAH/EUR rate fluctuations )
- Guaranteed electricity off-take by the Wholesale Electricity Market Operator
- Obligation of network owners to connect RES plants
- Certain tax exemptions (income tax, import duties and VAT)

## Challenges and Risks

### II.1.RISKS

- Complication permitting and licensing procedures (land, EIA, grid connection, etc.)
- Inability to sign Power Purchase Agreement at the beginning of project development (green tariff is approved and PPA is signed at the end of the project cycle after construction phase)

### II.2.CHALLENGES

- High cost of borrowing due to low country rating
- Absence of clear guidelines from the Government regarding level of capacity that can be absorbed by grid
- Announced reform of electricity market with planned transition from effective single buyer model to bilateral contracts and uncertainty of transition period

# Major Barriers for RES Development

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- Local content requirement creates barrier to use main equipment (wind turbines, solar panels, etc.) supplied by reputable international producers in the absence of developed domestic industry. This limits ability of developers to raise financing for the projects and increases project CAPEX
- No studies published by the TSO to confirm grid constraints and impact from construction of RES plants on the grid stability
- No studies performed by the Government to assess green tariff affordability and define appropriate level of RES to keep electricity prices from uncontrolled growth
- Given tariff affordability considerations and grid constraints, experts estimate the reasonable limit for renewable capacity in Ukraine before 2020 at the level up to 3,000 MW
- Current green tariff system provides incentives for construction of large solar and wind parks, while there are less incentives for small and medium size projects which are more sustainable and cause less impact on the grid



# Financing of RES Projects

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- Limited debt financing from the Ukrainian and Russian banks is available, but is expensive and can be provided maximum for 5 years
- International financial institutions such as EBRD and IFC are considered as primary source for debt financing by the majority of developers, while large developers also use export financing schemes
- USELF program created by the EBRD and the CTF for financing of small and medium size RES projects proved to be successful (EUR 70M – overall size of the program / 90+ applications received / 6 loan agreements signed with several more to follow by the end of 2013)
- Foreign developers and domestic business groups are the most active equity investors of RES projects (with focus on wind and solar power plants). Interest from international strategic investors and funds is currently limited due to country risks
- Domestic agricultural companies start showing active interest in biomass and biogas projects

# Existing Opportunities

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- Many renewable project owners in Ukraine are looking for equity investors
- Debt financing is available from IFIs to experienced international players for implementing renewable energy projects in Ukraine
- Partnerships with local developers are possible and will allow quick project development or access to already developed portfolios (wind and solar)
- Focusing on small and medium size projects is efficient strategy for testing the market and getting necessary local experience
- Biomass, biogas and small hydro projects have good growth potential
- EBRD considers launching USELF-2 program in 2014 to continue financing small and medium size renewable energy projects

# Contact Information

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