USELF
Программа финансирования альтернативной энергетики в Украине

Development of Renewable Energy in Ukraine : Current Status and Prospects

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Workshop“EBRD-USELF: Development and financing of renewable energy projects in Ukraine -
example for local banks?”

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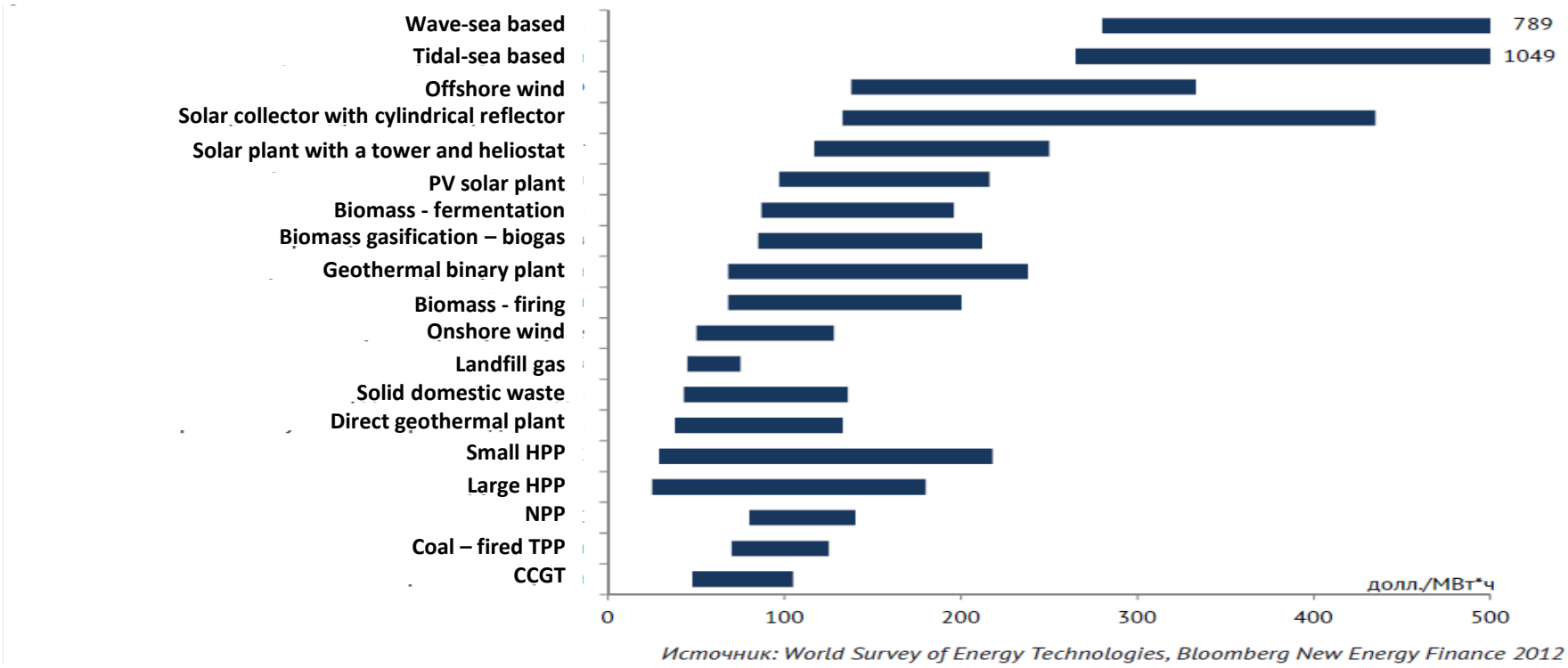
European Bank
for Reconstruction and Development

Contents

- Why is it necessary to encourage investments in the development of the renewable energy source power plants
- What incentive mechanisms for investment in the development of the renewable energy source power plants are used in Ukraine
- What is the current state of the development of the renewable energy source power plants in Ukraine
- What problems are there that preventing the development of the renewable energy source power plants in Ukraine
- What are the prospects for the development of the renewable energy source power plants in Ukraine

Why do the renewable energy source projects require support?

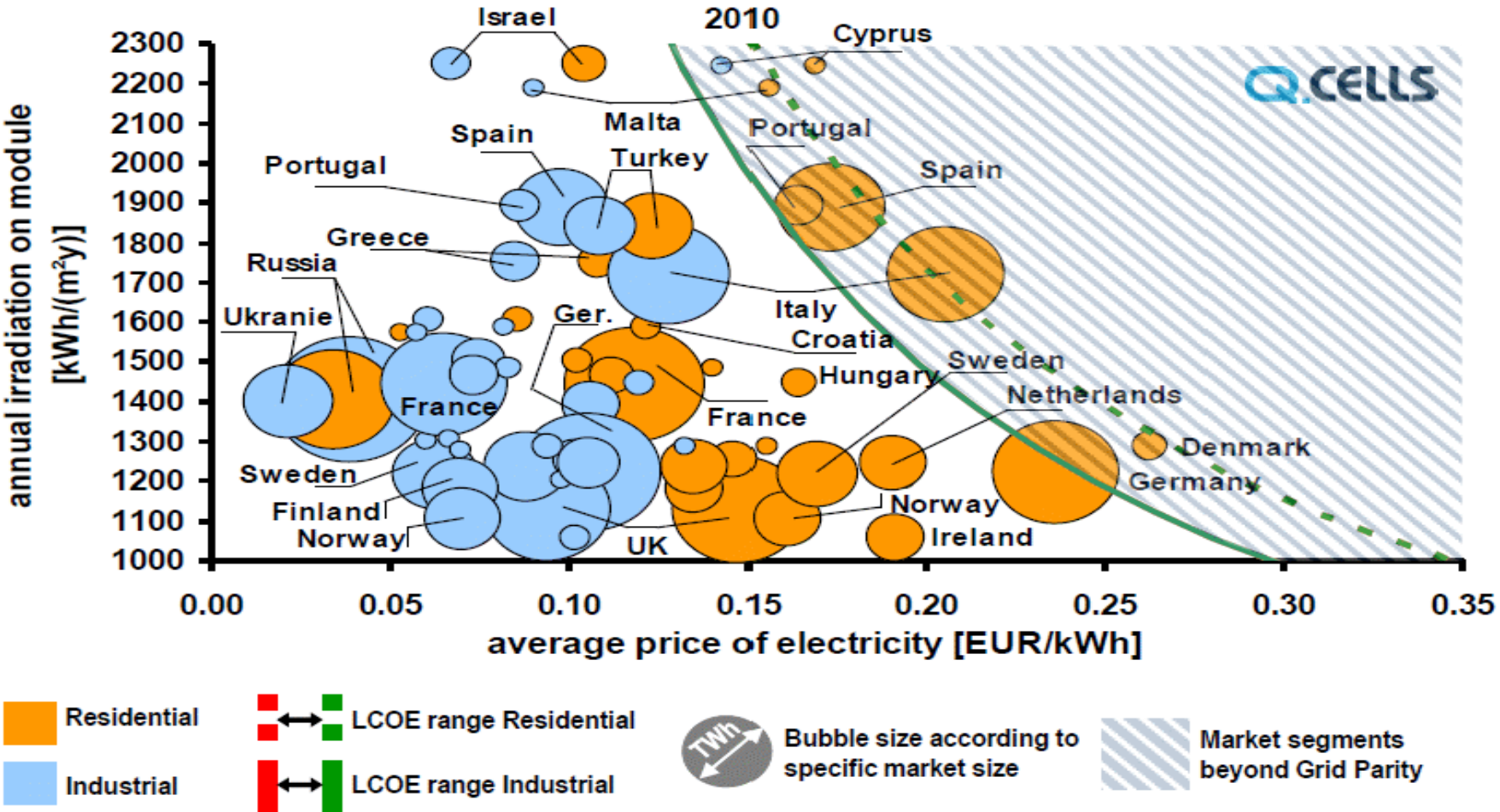
Specific discounted costs of electricity generation using various generation technologies (data for mature markets)



As of today the renewable energy source power plants are mainly expensive as compared with the power plants using conventional fossil fuels

Forecast of Grid Parity for Solar Power Plants

- Due to reduction of the cost of technologies the cost of “renewable” electricity is gradually coming down.
- In some countries the cost of electricity generated with the use of renewable energy sources became and in other countries can become comparable in the short term to the cost of electricity for the ultimate customers (having reached the so-called Grid Parity).
- In case of further reduction the costs of “renewable” electricity generation can become comparable to the costs of electricity generated by conventional power plants.



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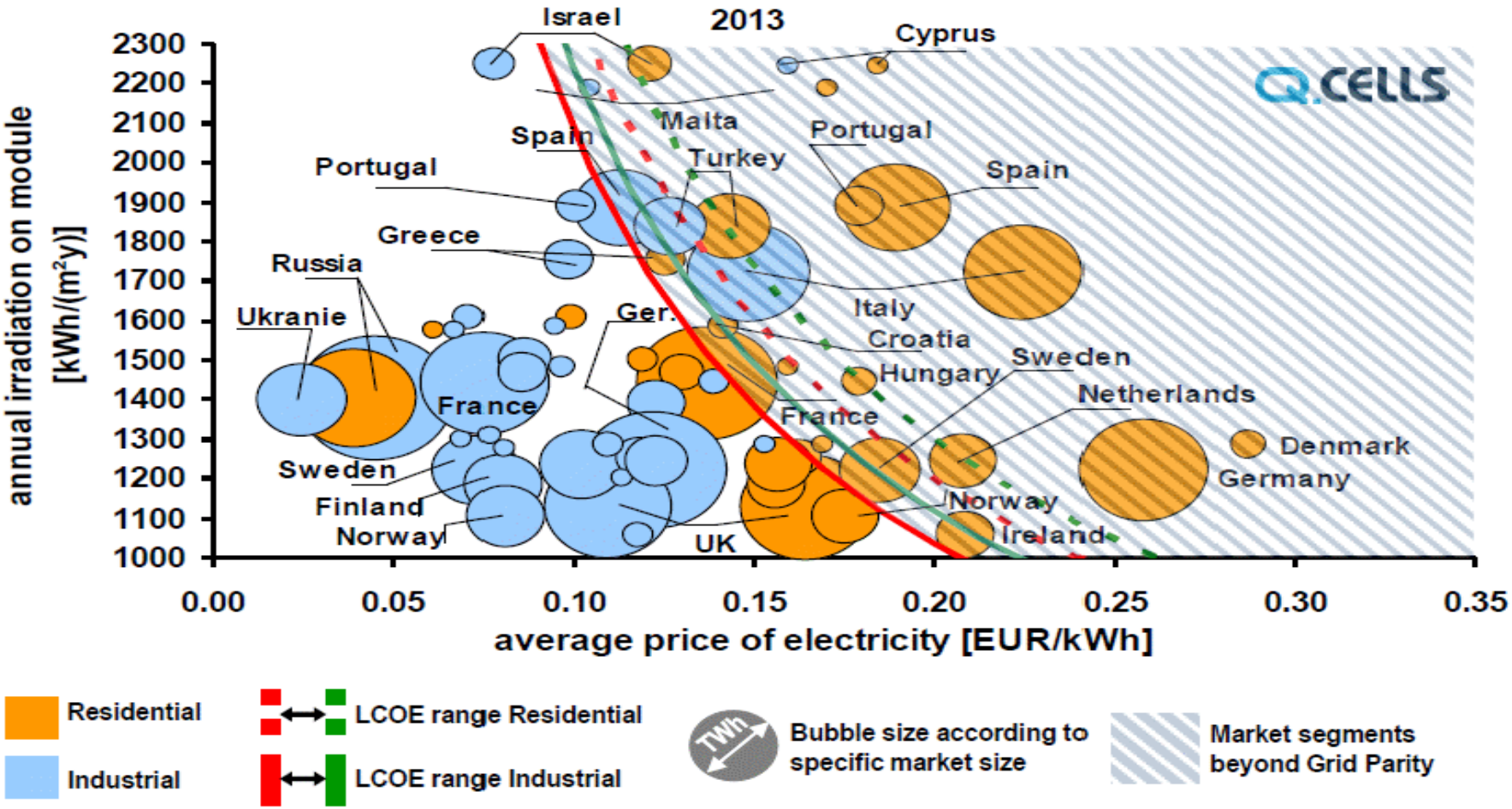

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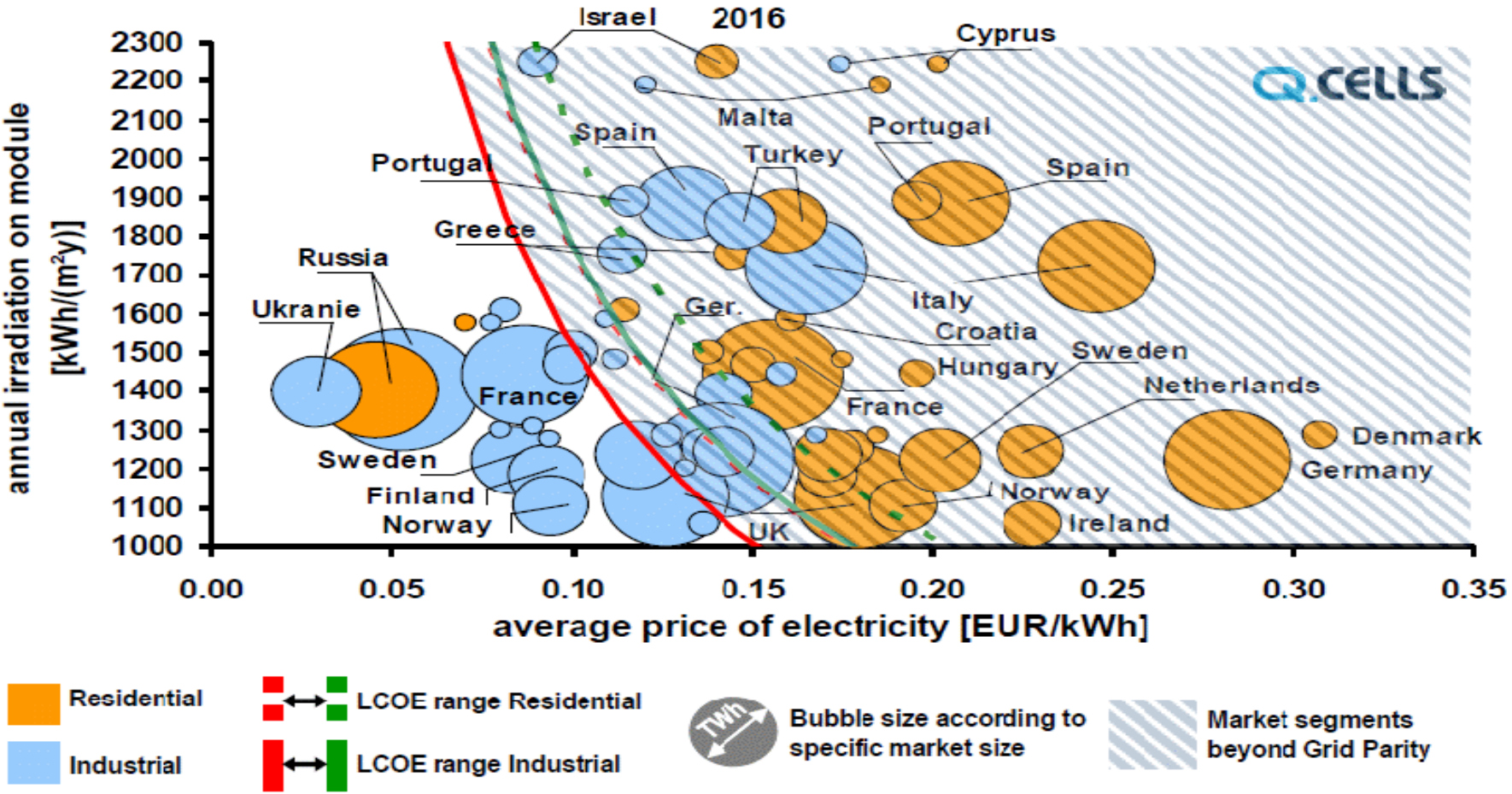

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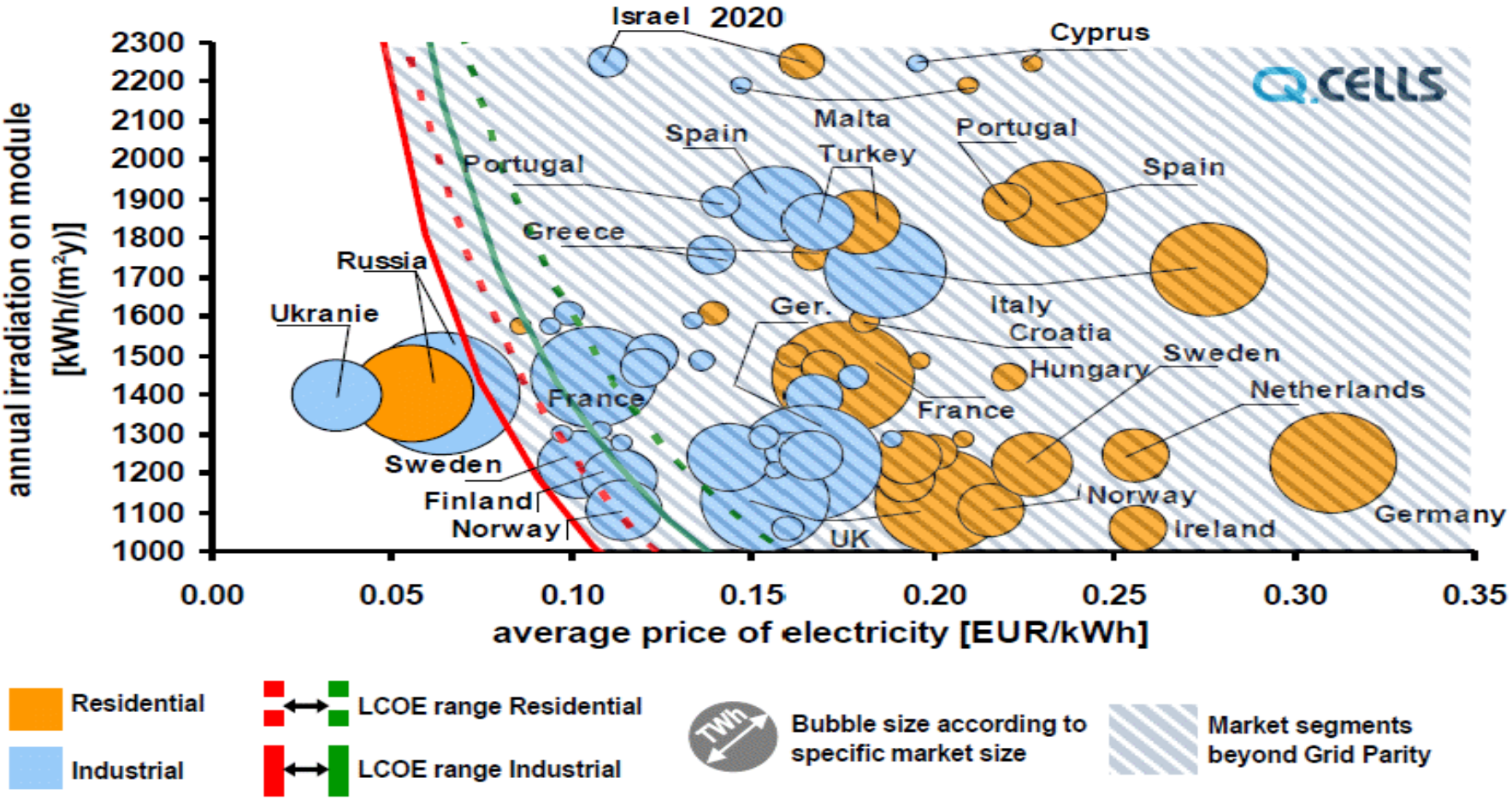


What kind of mechanisms of support of investments in the renewable energy source power plants are used in Europe

Support mechanisms

- ✓ Power purchase on special tenders
- ✓ Special tariffs or premium over market price
- ✓ Green certificates, with minimum guaranteed price of purchase
- ✓ Liberation from payment or special conditions of payment of imbalance
- ✓ Priority dispatching
- ✓ Priority connection and access to electric grids
- ✓ Reduced grid connection charge
- ✓ Refund or reduction of tax payments

Sources of financing

- ✓ Tax payments
- ✓ Special fees
- ✓ Electricity tariffs for ultimate customers
- ✓ Wholesale prices of electricity

With the use of support mechanisms 19 EU countries produced 9% of electricity in 2010 (at the peak of promotion of RES), while Ukraine produced less than 0.5% in 2012.

Role of renewable energy source power plants in IPS of Ukraine before introducing the support mechanisms

Over 3 years of operation of incentive mechanisms in Ukraine the installed capacity of “green” power plants has increased more than 5 times, and electricity generation has grown almost 3 times as much.

	Installed capacity of power plants as of **1.01.2010**	Installed capacity of power plants as of **1.01.2013**	Electricity generation in **2009**	Electricity generation in **2012**
TPP	63.5 %	63 %	45.3 %	48.6 %
NPP	26.1 %	25.7 %	47.9 %	45.5 %
HPP	10.2 %	10.1 %	6.7 %	5.5 %
including small HPP (up to 10 MW)	0.1 %	0.1 %	0.1 %	0.1 %
WPP	0.2 %	0.5 %	0 %	0.1 %
SPP	0 %	0.6 %	0 %	0.2 %
Biomass	0.00 %	0.01 %	0.00 %	0.01 %
Biogas	0 %	0 %	0 %	0 %
Total	**52 958 MW**	**53 778 MW**	**173 103 million kW•h**	**198 120 million kW•h**
including “green” ones	**0.2 %**	**1.2 %**	**0.2 %**	**0.4 %**

Legislation and mechanisms of support of renewable energy source power plants in Ukraine

Basic Legislative and Other Acts

- Law of Ukraine "On Power Sector"
- Tax Code of Ukraine
- Rules for the Wholesale Electricity Market of Ukraine

Support Mechanisms

✓ **In process of construction**

- Reimbursement of expenses for connection of renewable energy source power plants to electric grids*
- Relief from VAT and import levy while importing equipment into the customs territory of Ukraine for the renewable energy source power plants having no counterparts in Ukraine *

✓ **In process of operation**

- Special "green" tariff"
- Mandatory purchase by the wholesale market of the total amount of electricity supplied by the renewable energy source power plants (priority dispatching)
- Guaranteed access to electric grids
- Payment for electricity supplied to the wholesale market in full and on a priority basis by cash
- Income tax exemption on revenues from sales of electricity generated by renewable energy source power plants till 2011

✓ **In process of construction and operation**

- Tax exemptions for the tax on the land plots for arrangement of renewable energy source power plants (only 25% of the standard tax rate are paid)

✓ **Legal guarantee of invariability of promotion conditions**

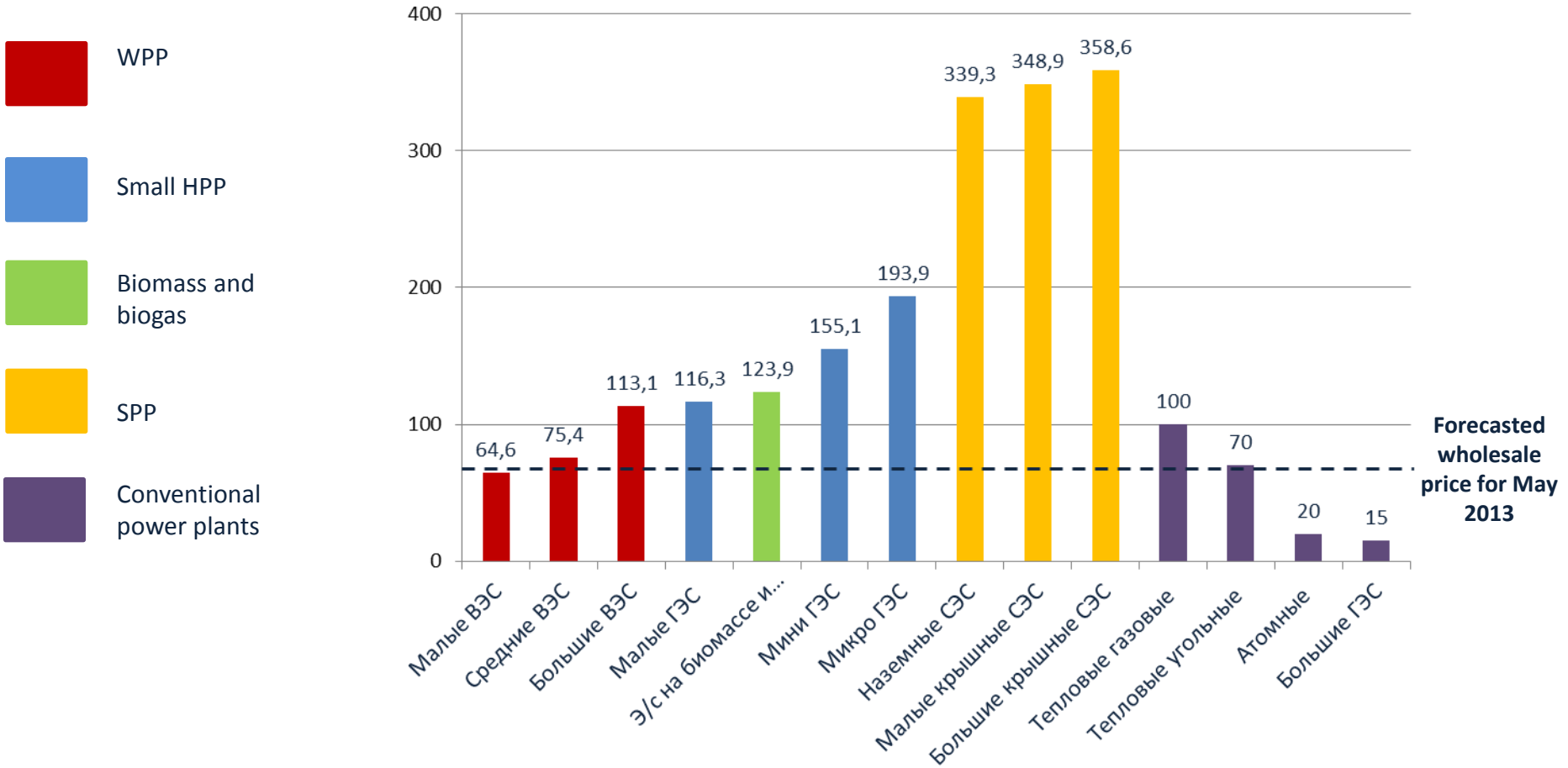
- Maintenance of promotion regime applicable at the date of facility commissioning in case of changes in legislation.

** Practical application is limited due to imperfect implementation mechanism.*

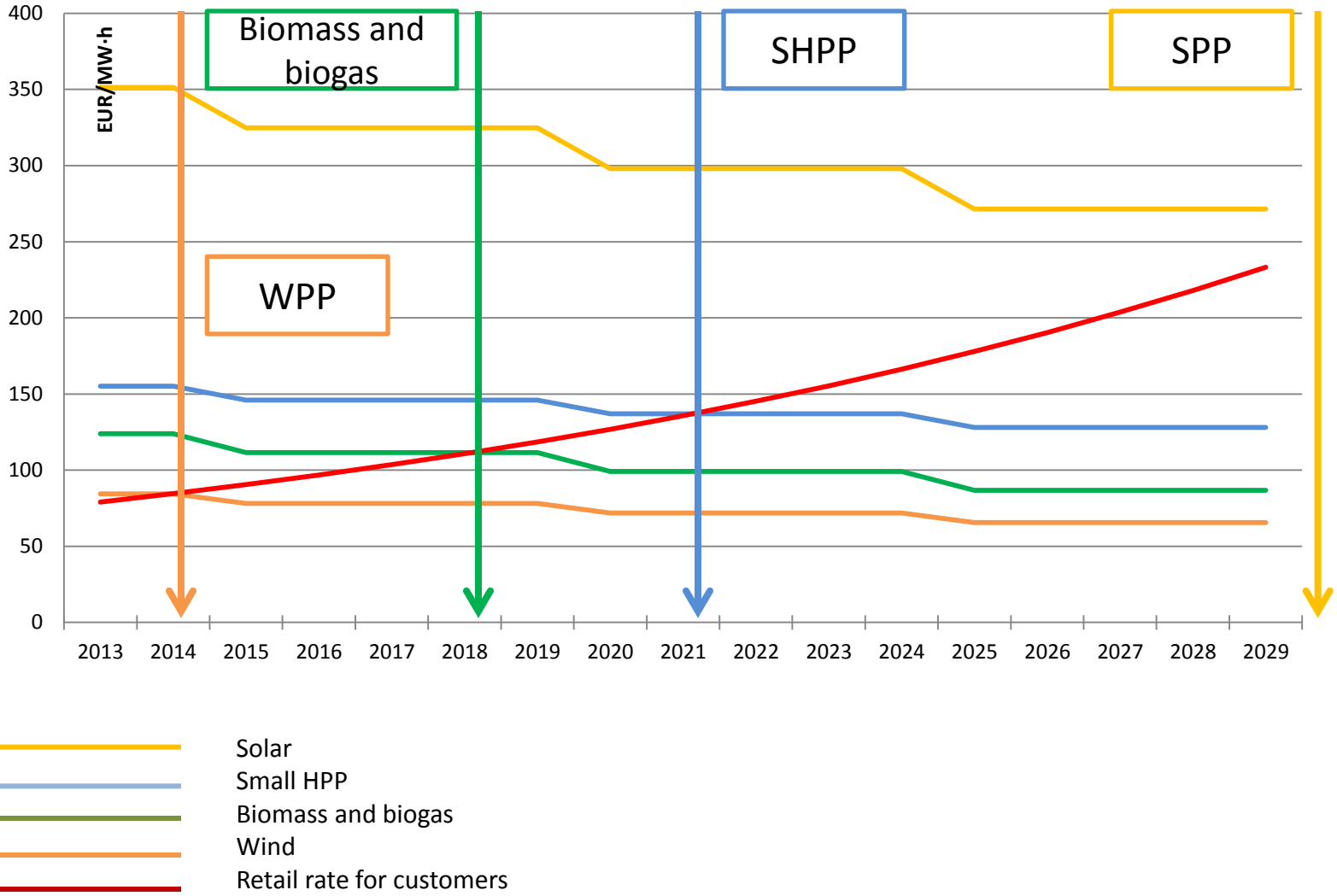
“Green tariff” for renewable energy source power plants

Green tariff is guaranteed till 31 December 2029

Electricity supply tariffs for different power plants using the renewable energy sources (minimum guaranteed rates) as compared with conventional power plants (for the power plants put into operation from 1 April 2013 through 31 December 2014), EUR/MW·h



Planned reduction of the green tariff for the power plants put into operation starting from 2015 as compared to the tariff for customers



Is the renewable energy expensive?

The 2012 results: renewable energy source power plants in the wholesale market

No.	Groups of power plants	Amount of electricity supplied		Cost of electricity supplied		Average price of electricity, UAH/MW·h
		million kW•h	%	million UAH (including VAT)	%	
1.	All power plants	180 513	100.0	98 018	100.0	543
2.	Renewable energy source power plants	833	0.5	2 652	2.7	3 183
3.	(1) - (2)	179 679	99.5	95 367	97.3	531

Evaluation of benefits collected by renewable energy sources (RES) power plant in 2012:

Cost of electricity supplied by RES power plants at green tariffs	**2.7 billion UAH**
Cost of electricity supplied by RES power plants at average tariff	**0.5 billion UAH**
Difference (1)	**2.2 billion UAH**
Net profit of operators of RES power plants at a 30 % rate of return (2)	**0.8 billion UAH**
(1) + (2)	**3.0 billion UAH**

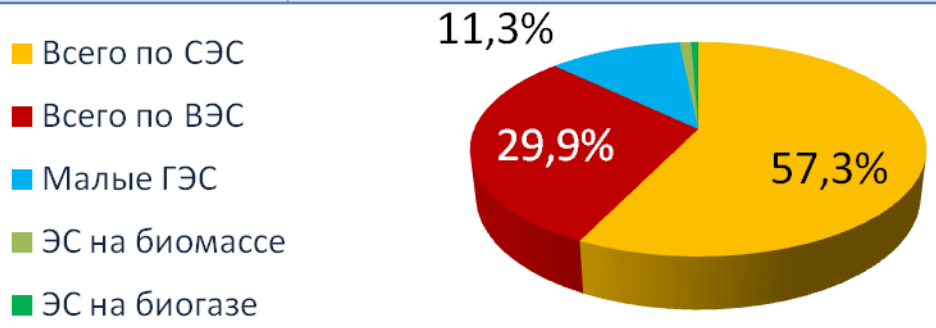
Is the renewable energy expensive?

Expenses on support of RES power plants in Ukraine as compared to EU countries

Countries (2010)	Expenses on support, million EUR	Amount of electricity produced with the use of support mechanisms, million kW·h	Gross energy consumption, million kW·h	Share of renewable energy obtained support in gross energy consumption
Ukraine (2012)	**285**	**833**	**188.436**	**0.4%**
France	1.511	17.528	444.100	3.9%
Germany	9.512	82.285	529.000	15.6%
Hungary	247	2.428	42.566	5.7%
Italy	3.427	30.552	330.000	9.3%
Luxemburg	14	139	6.600	2.1%
The Netherlands	690	8.999	106.900	8.4%
Norway	15	1.610	120.556	1.3%
Portugal	752	13.465	49.900	27.0%
Romania	37	677	41.300	1.6%
Slovenia	36	718	12.000	6.0%
Spain	5.371	61.044	260.600	23.4%
Sweden	483	17.260	131.200	13.2%
Great Britain	1.438	21.913	328.300	6.7%

Current ratio between different renewable energy source power plants

Groups of power plants	Installed capacity at the beginning of 2013			Electricity production in 2012		
	MW	% as per group	% as per result	million kW·h	% as per group	% as per result
SPP Activ Solar	348.583	93.8	53.7	329.073	98.6	42.0
Other ground SPP	22.817	6.1	3.5	4.477	1.3	0.6
Roof-top and facade SPP	0.163	0.0	0.0	0.04	0.0	0.0
Total for SPP	371.563	100.0	57.3	333.59	100.0	42.5
“New" WPP	110	56.7	16.9	198.725	77.2	25.3
“Old" WPP	83.836	43.3	12.9	58.776	22.8	7.5
Total for WPP	193.836	100.0	29.9	257.501	100.0	32.8
Small HPP	73.453	100	11.3	171.943	100	21.9
Biomass power plants	6.2	100	1.0	17.662	100	2.3
Biogas power plants	3.955	100	0.6	3.538	100	0.5
Total	649.007		100.0	784.234		100.0



Source: NAER

Main factors hindering development of the renewable energy market for electricity production

Factor	Types of projects concerned	Solution approach
Subsidized electricity tariffs for residential customers, subsidized natural gas tariffs for ultimate customers and teplokomunenergos [utility enterprises], partial inclusion of investment and other expenditures in the cost of electricity generated by conventional power plants	All types	Liberalization of energy market and reduction of tariffs to economically sound level
Under-high level of green tariff	Biomass and biogas	Review of green tariff coefficients
Local content	Wind, biogas, biomass, solar	Review of legislation on local content
Lack of possibility for making long-term feedstock supply contracts	Wood-based biomass	Review of legislation and business practice of state forest sector
Lack of possibility for the use of biomass products, only waste is permitted to use	Biomass and biogas	Review of legislation
Lack of green tariff	Co-combustion of renewable and conventional sources of energy	Review of legislation
Environmental constraints	Small HPP	Individual approach to projects
Difficulties in the implementation of permitting procedures	All types	Simplification of permitting procedures and harmonization of practice of their application
Lack of flexing generating capacities, particularly in some parts of the power system	Wind and solar	Reconstruction and new construction of electric grids and flexing generating plants, implementation of practice and regular power system planning
Impossibility to approve the green tariff before starting financing of project	All types	Review of legislation
Difficulties in application of tax exemptions when importing equipment	All types	Simplification of procedures and harmonization of practice of their application
Selective approach while reimbursing costs of connection	All types	Harmonization of practice of application, development and approval of bylaws

Local Content

In consequence of premature introduction of the local content most of projects will deal with lack of equipment and exclusively high prices for it

Local content requirements (not applied to the power plants the construction of which began before 1 January 2012 and to small HPP projects)

Solar projects

Component content elements	Operations to be carried out on the territory of Ukraine	Fixed share in the cost of the power plant, %
Polycrystalline silicon	Production	32
Single-crystal, multi-crystal or pseudo-crystalline ingots	Production	13
Single-crystal and pseudo-crystalline plates	Production	7
Photovoltaic cells	Production	20
Photovoltaic modules	Assembly	23
Construction works	Performance	5
Total		100

In order to obtain the green tariff, it is necessary to ensure:
30% - for the power plants put into operation starting from 1.06.2013
50% - for the power plants put into operation starting from 1.06.2014

Wind projects

Component content elements	Operations to be carried out on the territory of Ukraine	Fixed share in the cost of the power plant, %
Blades	Production	15
Tower	Production	15
Nacelle	Assembly	30
Main frame	Production	5
Main shaft	Production	5
Rotor	Production (casting)	5
	Assembly	5
Construction works	Performance	20
Total		100

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Biomass burning projects

Component content elements	Operations to be carried out on the territory of Ukraine	Fixed share in the cost of the power plant, %
Turbine	Production	25
Boiler	Production	35
Construction works	Performance	40
Total		100

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30% - for the power plants put into operation starting from 1.06.2013
50% - for the power plants put into operation starting from 1.06.2014

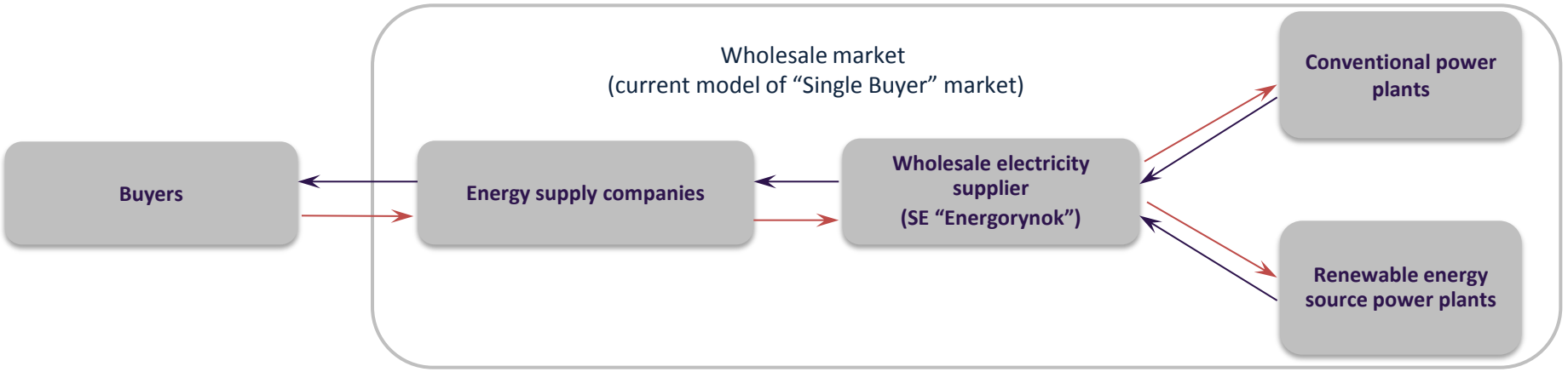
Biogas burning projects

Component content elements	Operations to be carried out on the territory of Ukraine	Fixed share in the cost of the power plant, %
Digester	Production	35
Cogenerator	Production	35
Construction works	Performance	30
Total		100

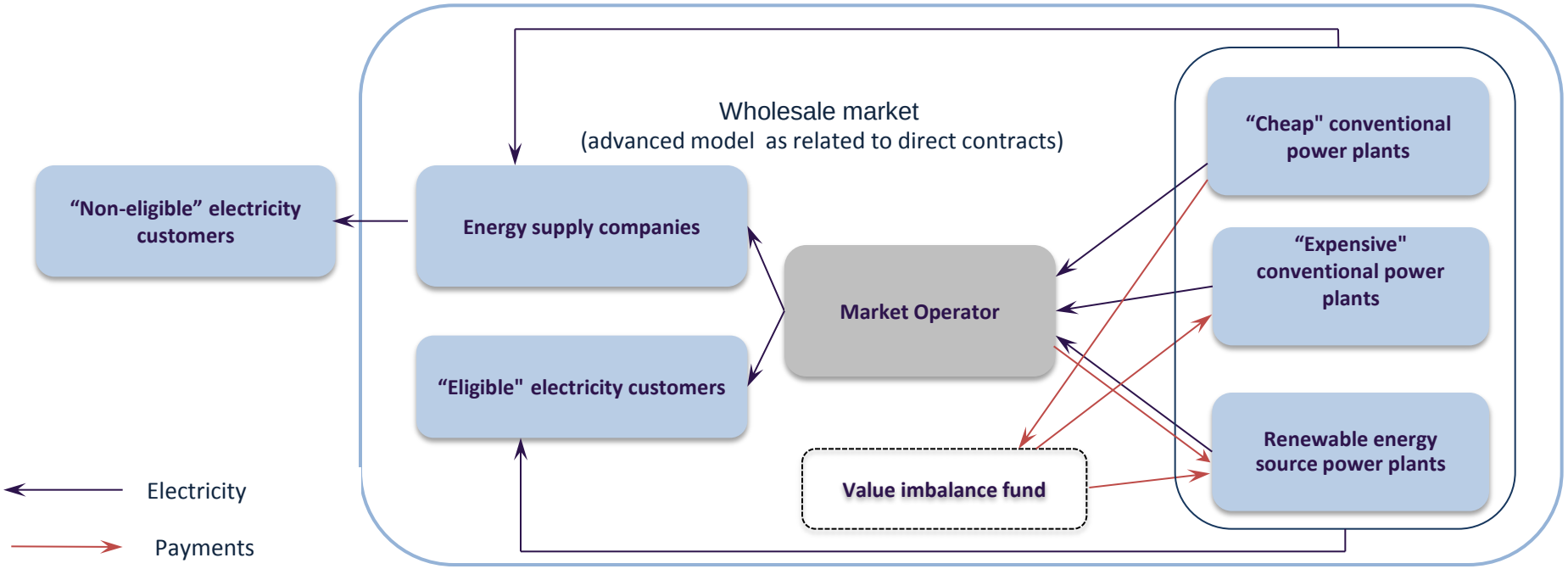
In order to obtain the green tariff, it is necessary to ensure :
30% - for the power plants put into operation starting from 1.01.2014
50% - for the power plants put into operation starting from 1.01.2015

Current and long-term contractual relations for electricity sale

Current Single-Buyer Model



Advanced Model of Direct Contracts



Renewable Energy Source Development Plans

Ukraine has considerable potential for the use of renewable energy sources

	Directions of RES development	Annual technically achievable energy potential, million toe
1.	Wind energy	28,0
2.	Solar energy, including	6.0
2.1.	- electric	2.0
2.2.	- thermal	4.0
3.	Small hydropower	3.0
4.	Bioenergy, including:	31.0
4.1.	- electric	10.3
4.2.	- thermal	20.7
5.	Geothermal heat-power engineering	12.0
6.	Environmental energy (heat pumps)	18.0
Total volume of replacement of conventional fuel and power resources		**98.0**

Source: NAER

Preliminary updated energy strategy provides for the priority development of wind and solar power plants

Forecast of electricity generation from RES

TW-h	2010	2015	2020	2025	2030
Wind power generation	0.1	0.6	1.9	3.8	**7.4**
Solar power generation	<0.1	0.3	0.8	1.4	**2.6**
Small HPP	0.2	0.4	0.7	1.3	**2.1**
Bioenergy generation	<0.1	<0.1	0.2	0.2	**0.3**
Generation from other RES	<0.1	<0.1	<0.1	0.1	**0.2**
Total, production from RES	**<0.4**	**<1.4**	**3.6**	**6.8**	**12.6**

Source: Preliminary updated energy strategy for the period until 2030

In case of the implementation of these plans a share of renewable energy source power plants will be about 10% by 2013 in the total balance of installed capacities, which is much lower than the target share of renewable energy sources in the EU energy balance – 20% of the volume of electricity consumption till 2020

Thank you for attention!

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