



Renewable Energy: Status, Opportunities and Perspectives in Ukraine





National Renewable Energy Action Plan until 2020

- developed in line with Directive №2009/28/EC on the promotion of the use of energy from renewable sources
- approved by Order of the Cabinet of Ministers of Ukraine №902-p dated October 1, 2014



Goal: 11% share of energy from renewables in final energy consumption by 2020



Targets of the National Renewable Energy Action Plan



Power Generation

Category of Electric Power Generation Facility	2009		2015		2016		2020	
	<i>Mega watt</i>	<i>GW*h</i>	<i>Mega watt</i>	<i>GW*h</i>	<i>Mega watt</i>	<i>GW*h</i>	<i>Mega watt</i>	<i>GW*h</i>
Photoelectric power plants	0	0	432	475	1 250	1 310	2 300	2 420
Wind power plants	76	41	426	974	1 350	3 240	2 280	5 900
Hydroelectric power plants, including:	4 549	11 430	4 668	6 772	4 987	12 440	5 350	13 340
< 10 MW	49	30	87	171	107	240	150	340
> 10 MW	4 500	11 400	4 581	6601	4 880	12 200	5 200	13 000
Bioenergy plants	0	0	52	141	380	1 680	950	4 220
Geothermal power plants	0	0	0	0	10	56	20	120
Total:	4 625	11 471	5 578	8362	7 977	18 726	10 900	26 000



Targets of the National Renewable Energy Action Plan



Heating and Cooling

Types of renewable energy	2009		2014		2016		2020	
	<i>thou t o.e.</i>	<i>thou. Gcal</i>	<i>thou t o.e.</i>	<i>thou. Gcal</i>	<i>thou t o.e.</i>	<i>thou. Gcal</i>	<i>thou t o.e.</i>	<i>thou. Gcal</i>
Geothermal	0	0	30	300	36	360	50	500
Solar	0	0	140	1400	160	1 600	200	2 000
Bioenergy	1 433	14 330	2 280	22 800	3 100	31 000	5 000	50 000
Heat pumps	40	400	130	1300	280	2 800	600	6 000
<u>TOTAL:</u>	1 473	14 730	2 580	25 800	3 576	35 760	5 850	58 500



Targets of the National Renewable Energy Action Plan



Transport



Energy inputs from renewable sources	2009		2014		2016		2020	
	<i>thou.</i>	<i>GW*h,</i>	<i>thou.</i>	<i>GW*h,</i>	<i>thou.</i>	<i>GW*h,</i>	<i>thou.</i>	<i>GW*h,</i>
	<i>t o.e.</i>	<i>thou. t</i>	<i>t o.e.</i>	<i>thou. t</i>	<i>t o.e.</i>	<i>thou. t</i>	<i>t o.e.</i>	<i>thou. t</i>
Electricity from renewable sources	52	606	65	755	78	909	115	1 340
Bioethanol	0	0	16	24	200	313	320	500
Biodiesel	0	0	0	0	20	23	70	80
<u>TOTAL:</u>	52		81		298		505	

In 2015-2016 it is necessary to build two bioethanol production plants,
with the capacity of 100 thousand tons each



The electricity generation from renewables, GWh

Type	2014		2015		required increase
	targets	fact	targets	fact	
Hydro:	12045	8 475	12215	6772,6	1125
< 1MW	65	103,9	75	36,2	55
1MW –10 MW	130	158	140	135,4	70
> 10MW	11850	8 213,10	12000	6601	1000
Geothermal	30	-	44	-	76
Solar:	900	429	1050	475	1370
Wind	1680	1130	2400	974	3500
Biomass:	150	130	1100	141	3120
solid	105	90,7	770	77	2180
biogas	45	39,3	330	64	940
Total	14805	10 164	16809	8362,6	9191

Renewable heat power consumption, ktoe

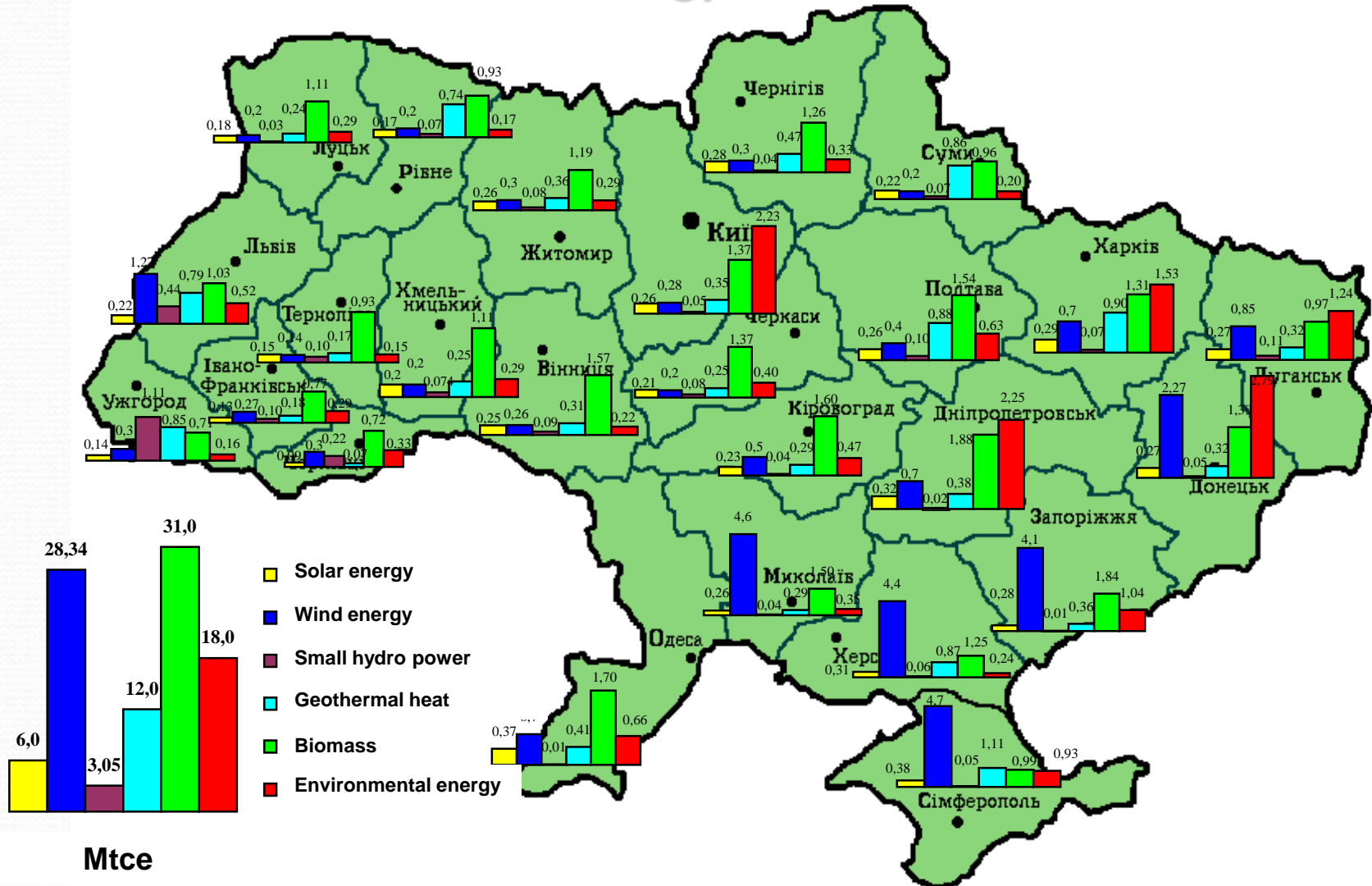
Type	2014	2014	required increase
	targets	fact	
Energy from Geothermal and Heat pumps	160	0,6	649,4
Solar	140	0,09	199,91
Biomass	2280	1664,7	3335,3
Total	2580	1665,39	4184,6

Renewable energy consumption in the transport sector, ktoe

Type	2014	2014	required increase
	targets	fact	
Bioethanol	110	41	279
Biodiesel	0	0	70
Renewable electricity	64	41,7	73,3
Total	174	82,7	422,3



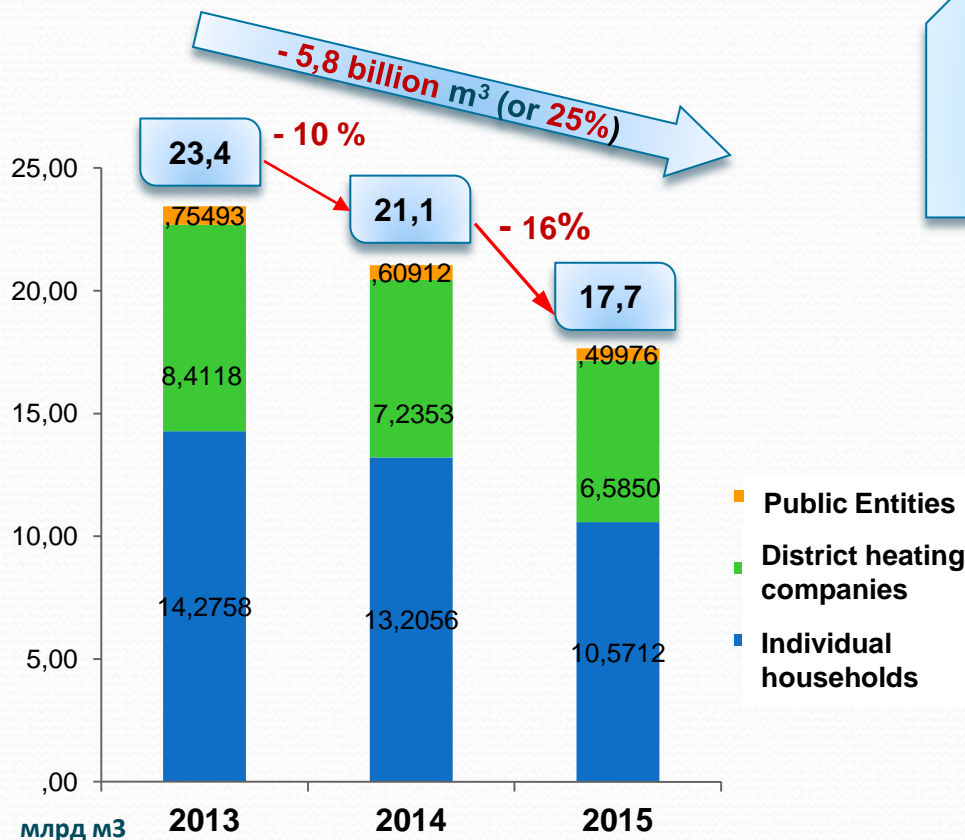
Total technically recoverable energy potential of renewable energy sources of Ukraine





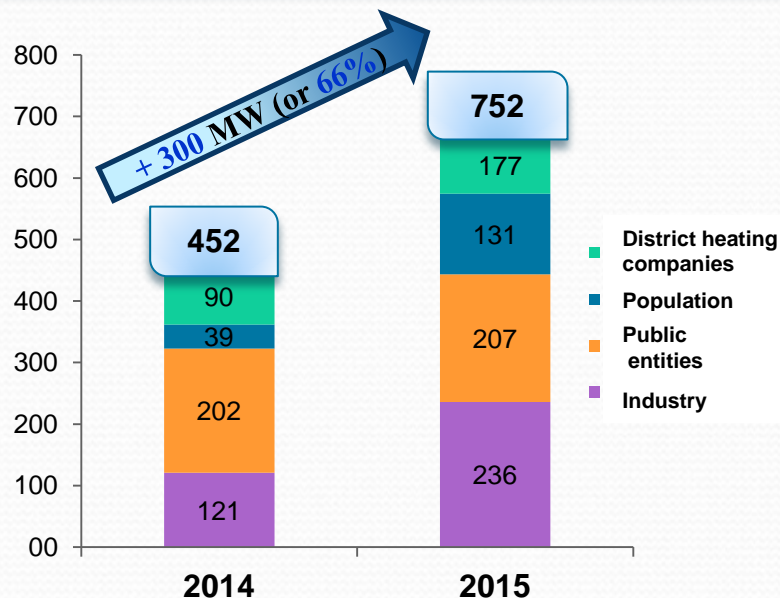
Key priority: Substitution of Natural Gas

Reduction of gas consumption for the years 2013/2014/2015 *



Dynamics of natural gas replacement during 2014/2015 years **

introduced 1,204 MW of new heat power capacity, including **452 MW** – in 2014, **752 MW** – in 2015.
 Investments ~ **2,2 bln UAH**, possibility of annual replacement of gas ~ **416 mln m³**



*According to "Naftogaz Ukraine" (Excluding ARC, Luhansk and Donetsk regions).

**according to regional state administrations



Required Investment for National Renewable Energy Action Plan implementation

The amount of investment required

Electricity
Heating and cooling
Transport

billion EURO

8

6

0,6



Total

**EURO 16
billion**

The Investment, inter alia, will be directed to the following measures:

- Construction of plants for pellet production in Ukraine.
- Construction of plants for production of boilers (capacity from 7 kW up to 5 MW) that work on biofuel.
- Construction of second generation bioethanol plants.
- Energy crops production in Ukraine.
- Construction of cogeneration plants in Ukraine.
- Waste recycling plants.



The volume of electricity generated from solar energy electric power facilities of private households

2014

**21 households
40 664 kWh**



2015

**244 household
410 268 kWh**





Key points of The Law of Ukraine due to development of renewables

1. "Green" tariff is calculated according to the in order to avoid the risk of inflation.
2. "Green" tariff for electricity produced from biomass and biogas increased by 10%.
3. Introduced "green" tariff:
 - for geothermal electrical installations;
 - for private household solar and wind turbines up to 30 kW.
4. The requirement on local equipment is cancelled and introduced premium for usage of Ukrainian equipment.
5. The power produced from biomass (including products from agriculture and forestry) will receive the "green" tariff at level of 12.38 cents/kWh. This would correspond to the Directive of European Parliament and Council 2009/28/EC of 23 April 2009.

New edition of Draft Law «On Amendments to Law of Ukraine «On Peat Power Supply» to transfer authority on setting tariffs and licensing of business activities du to production of energy from alternative energy sources»

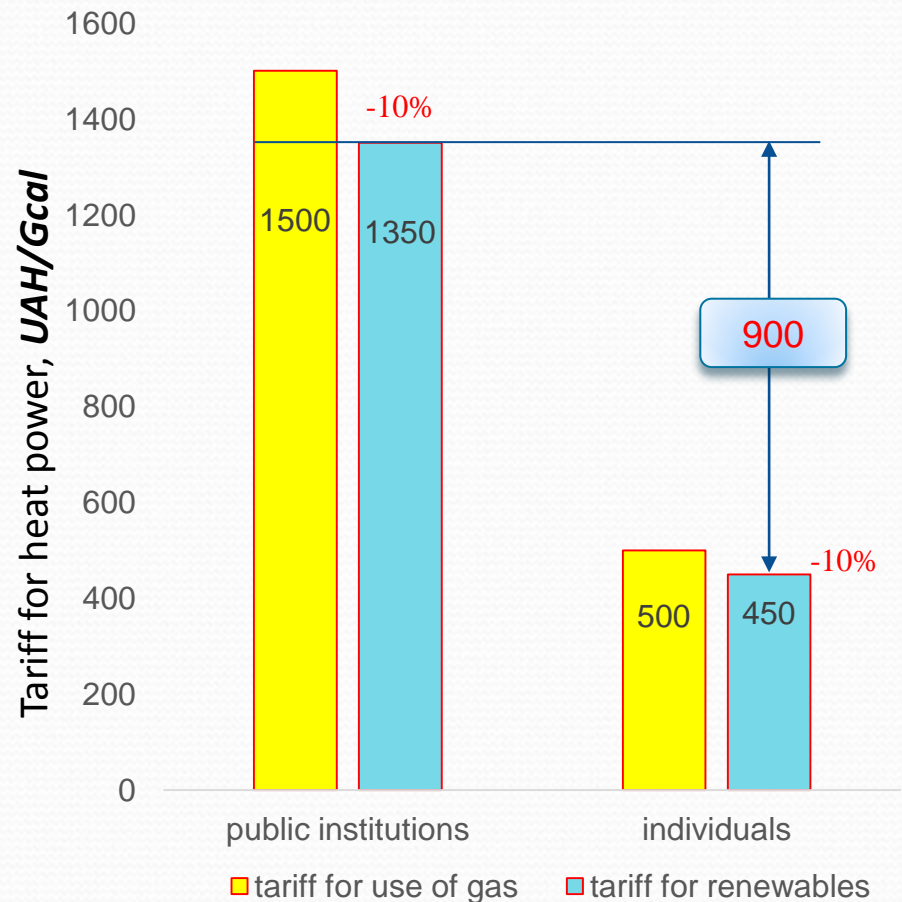
The main proposed changes:

licensing of economic activities due to **production, transportation and supply** of heat power produced from alternative sources is made by **local authorities**

establishing tariffs by local authorities for **heat power produced from alternative sources on level 0.9** as for the current tariff for heat produced with natural gas for public institutions and individuals

compensation of **difference between tariffs** for heat power produced from alternative sources for **households** and tariffs for **public institutions** for heat generated from alternative sources in accordance to **Order approved by the Cabinet of Ministers of Ukraine**

The principle of compensation and setting tariffs for heat energy produced from alternative sources



900

- compensation from the budget



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