

# Report on Promotion of the Use of Energy from Renewable Sources and Consumption in Ukraine in 2014-2015

1. The sectoral and overall shares of energy from renewable sources in the preceding two calendar years (n-1; n-2, for example, 2013 and 2012) (*article 22(1) a of the EU Directive 2009/28/EC*).

Calculations of the shares of energy from renewable sources in Ukraine in 2014-2015 were based on the program SHARES.

**Table 1. The sectoral (electricity, heating and cooling, and transport) and overall shares of energy from renewable sources<sup>1</sup>**

	2014	2015
RES in heating and cooling <sup>2</sup> (%)	3.37	4.57
RES in electricity <sup>3</sup> (%)	7.40	7.92
RES in transport <sup>4</sup> (%)	1.80	1.85
Overall share of RES <sup>5</sup> (%), including:	3.9	4.87
<i>Borrowings as part of intergovernmental cooperation<sup>6</sup> (%)</i>		
<i>Excess for intergovernmental cooperation<sup>7</sup> (%)</i>		

**Table 1a. Estimated share of renewable energy sources in gross final consumption of energy by sectors (thousand toe.)<sup>8</sup>**

	2014	2015
(A) Gross final consumption of RES for heating and cooling	1 409.0	1 534.5
(B) gross final consumption of electricity from RES	1 057.7	1 054.0
(C) Gross final consumption of energy from RES in transport*	143.2	130.8
(D) Gross total consumption of energy from RES <sup>9</sup>	2 609.9	2 719.3
(E) transfer of RES to other third countries and Energy Community Contracting Parties		
(F) transfer of RES from other Energy Community Contracting Parties and third countries		
(G) RES consumption adjusted for target (D)-(E)+(F)		

\*- with coefficient for electricity RE in rail transport -2.5

<sup>1</sup> Facilitates comparison with tables 3 and 4a of NREAP.

<sup>2</sup> Share of renewable energy in heating and cooling: gross final consumption of energy from renewable sources for heating and cooling (as defined in Articles 5(1)b) and 5(4) of Directive 2009/28/EC divided by gross final consumption of energy for heating and cooling. The same methodology as in Table 3 of NREAPs applies.

<sup>3</sup> Share of renewable energy in electricity: gross final consumption of electricity from renewable sources for electricity (as defined in Articles 5(1)a) and 5(3) of Directive 2009/28/EC divided by total gross final consumption of electricity. The same methodology as in Table 3 of NREAPs applies.

<sup>4</sup> Share of renewable energy in transport: final energy from renewable sources consumed in transport (cf. Article 5(1)c) and 5(5) of Directive 2009/28/EC divided by the consumption in transport of 1) petrol; 2) diesel; 3) biofuels used in road and rail transport and 4) electricity in land transport (as reflected in row 3 of Table 1). The same methodology as in Table 3 of NREAPs applies.

<sup>5</sup> Share of renewable energy in gross final energy consumption. The same methodology as in table 3 of NREAPs applies.

<sup>6</sup> In percentage points from the overall share of renewables.

<sup>7</sup> In percentage points from the overall share of renewables.

<sup>8</sup> Facilitates comparison with table 4a of NREAP.

<sup>9</sup> According to article 5(1) of Directive 2009/29/EC, gas, electricity and hydrogen from renewable energy sources shall only be considered once. No double counting is allowed.

Slower growth of the share of renewable sources in power sector is a result of the following:

1. Occupation of the Autonomous Republic of Crimea (starting from April 2014, no electricity has been supplied to the National Grid by the RES facilities located in Crimea; their total capacity is 494.87 MW, including 87.768 MW of wind farms, and 407.09 MW of solar power plants).
2. Escalation of the conflict in the country's east (hence variable performance of wind farms with the total capacity of 138.3 MW in the area of conduct of the Anti-terroristic operation).
3. Introduction of an emergency in the electricity market during 2014-2015.
4. Cancellation of tax benefits for producers of power from renewable energy sources.
5. Economic downturn during 2014 - 2015 and as a consequence investment climate deterioration in Ukraine led to:
  - a rise in credit interest rates that discourages investment;
  - a rise in interest on the insurance risks;
  - necessity for bailment against the loan guarantee that may exceed the principal amount of the loan;
  - drastic devaluation of local currency.

**Table 1.b. Total actual share (installed capacity, gross production of electricity) of each RES technology of Ukraine in achievement of mandatory targets for 2020 and indicative interim trajectory of achievement of the share of renewable sources in power generation<sup>10</sup>**

	2014		2015	
	MW	GW*h	MW	GW*h
Hydro power stations:	5 851	9 321.4	5 883	6 970.5
Not pumped-storage units <sup>(11)</sup>	4 665	8 478.1 (11 509.6)	4 697	5 397 (11 163.8)
<i>Less than 1 MW</i>	30	110.2	32	82.8
<i>1-10 MW</i>	54	173.8	58	104.0
<i>More than 10 MW</i>	4 581	8 194.1	4 607	5 210.1
<i>Pumped-storage</i>	1 186	843.3	1 186	1 573.6
<i>Combined<sup>12</sup></i>	-	-	-	-
Geothermal	-	-	-	-
Solar:	411	429	432	476.5
<i>photovoltaic</i>	411	429	432	476.5
<i>On concentrated solar energy</i>	-	-	-	-
Wind <sup>(13)</sup> :	411	1 130 (776.6)	426	1 084 (951.5)
<i>onshore<sup>(14)</sup>:</i>	411	1 130 (776.6)	426	1 084 (951.5)
<i>Off-shore</i>	-	-	-	-
Biomass <sup>15</sup> :	66	130	69	145
<i>solid</i>	52	90.7	52	80.6
<i>biogas</i>	14	39.3	17	64.4
<i>bioliquids</i>	-	-	-	-
<b>TOTAL (normalised)</b>	<b>6 739</b>	<b>11 010.4 (13 688.5)</b>	<b>6 810</b>	<b>8 676.0 (14 310.4)</b>
<b>Without pumped-storage hydro stations (normalised)</b>	<b>5 553</b>	<b>10 167.1 (12 845.2)</b>	<b>5 624</b>	<b>7 102.5 (12 736.8)</b>
<i>Of which in CHP</i>	20	48.0	41	98.0

Without RES facilities located in Crimea, their total capacity is 494.87 MW, including 87.768 MW of wind farms, and 407.09 MW of solar power plants

<sup>10</sup> Facilitates comparison with table 10a NREAP.

<sup>11</sup> Normalised in accordance with Directive 2009/28/EC and Eurostat methodology.

<sup>12</sup> According to new Eurostat methodology.

<sup>13</sup> Normalised in accordance with Directive 2009/28/EC and Eurostat methodology.

<sup>14</sup> Normalised in accordance with Directive 2009/28/EC and Eurostat methodology.

<sup>15</sup> Takes into consideration only biomass complying with applicable sustainability criteria, see article 5(1) of Directive 2009/28/EC, last subparagraph.

**Table 1c. Gross actual share (final consumption of energy<sup>16</sup>) of each technology of renewable energy of Ukraine to achieve mandatory targets for 2020 and indicative interim trajectory of achievement of the share of renewable energy in heating and cooling systems (thousand toe)<sup>17</sup>**

	2014	2015
Geothermal (excluding low temperature geothermal heat in heat pump applications)	-	-
Solar	0.1	0.1
Biomass <sup>18</sup> :	1408.3	1533.8
<i>solid</i>	1408.1	1525.2
<i>biogas</i>	0.2	8.6
<i>bioliquids</i>	-	-
Renewable energy from heat pumps, including: - aerothermal - geothermal - hydrothermal	0.6	0.6
<b>TOTAL</b>	<b>1409.0</b>	<b>1534.5</b>
<i>Of which district heating</i> <sup>19</sup>	-	-
<i>In households</i> <sup>20</sup>	1069.2	1096.1

**Table 1d. Gross actual share of each technology of renewable in [Contracting Party] for achievement of mandatory goals for 2020 and indicative interim trajectory of achievement of the share of renewable energy in transport sector (thousand toe.)<sup>21, 22</sup>**

	2014	2015
Bioethanol / bio-ETBE	42.4	35.1
<i>Of which biofuels</i> <sup>23</sup> <i>under article 21.2</i>	-	-
<i>Including imported</i> <sup>24</sup>	-	-
Biodiesel	-	-
<i>Of which biofuels</i> <sup>25</sup> <i>under article 21.2</i>	-	-
<i>Including imported</i> <sup>26</sup>	-	-
Hydrogen from renewable sources	-	-
Electricity from renewable sources (with coefficient 2.5 for electricity RE in rail transport)	46.8 (100.8)	41.2 (95.7)
<i>All electricity in road transport</i>	-	-
<i>RE in rail transport (with coefficient 2.5)</i>	36 (90)	36.31 (90.8)
<i>RE in all other transport modes</i>	10.8	4.9
<i>Including motor transport</i>	-	-
<i>Of which non-auto transport</i>	-	-
Other (biogas, vegetable oils etc.) – indicate	-	-
<i>Including biofuel</i> <sup>27</sup> <i>under article 21.2</i>	-	-
<b>TOTAL (with coefficient 2.5 for electricity RE in rail transport)</b>	<b>89.2 (143.2)</b>	<b>76.3 (130.8)</b>

<sup>16</sup> Includes direct use and centralized district heating under article 5.4 of Directive 2009/28/EC.

<sup>17</sup> Facilitates comparison with Table 11 of NAP RE.

<sup>18</sup> Takes into consideration only biomass that fulfills applicable sustainability criteria, see article 5(1) of Directive 2009/28/EC, last paragraph.

<sup>19</sup> District heating and (or) cooling in the overall volume of consumed energy from renewable sources for heating and cooling.

<sup>20</sup> In the total volume of consumed energy from renewable sources for heating and cooling.

<sup>21</sup> Takes into consideration only biofuels that fulfills applicable sustainability criteria, see article 5(1), last paragraph.

<sup>22</sup> Facilitates comparison with Table 12 of NAP RE.

<sup>23</sup> Biofuels that are included in article 21(2) of Directive 2009/28/EC.

<sup>24</sup> From the whole amount of bioethanol /bio-ETBE.

<sup>25</sup> Biofuels that are included in article 21(2) of Directive 2009/28/EC.

<sup>26</sup> From the whole amount of biodiesel.

<sup>27</sup> Biofuels that are included in article 21(2) of Directive 2009/28/EC.

**2. Measures taken in the previous two calendar years and (or) planned on the national level to promote generation of energy from renewable sources, taking into consideration the indicative trajectory towards the achievement of the national targets included in the national renewable energy action plan. (Article 22(1) a of Directive 2009/28/EC)**

**Table 2. Overview of key policy actions and measures**

Name and identification of measures	Type of measure*	Anticipated result**	Target group and (or) type of activity ***	In place or planned ****	Measure's start and end dates
<b>2014</b>					
Setting up special exhibition “Bioenergy” as part of the National Fair “Agro-2014”	Awareness building	Raised awareness of modern biofuels production technologies, machinery and equipment	- Enterprises using renewable sources of energy, - Enterprises producing biological raw material	In place	04-07 June 2014
Cabinet of Ministers of Ukraine’s Regulation of 09.07.2014 № 293 «On Stimulating replacement of natural gas in heating supply area»	Regulatory	Creation of environment conducive for boosting of renewable energy in heating	Investors, Stakeholders from renewable heating sector.	In place	Effective as of: 01.10.2014
Cabinet of Ministers of Ukraine’s Regulation of 10.09.2014 № 453 “On Stimulating replacement of natural gas during generation of heat energy for entities and organizations financed by central and local budgets”	Regulatory	Creation of environment conducive for boosting of renewable energy in heating	Investors, Stakeholders from renewable heating sector.	In place	Effective as of: 01.10.2014  Termination on 01.10.2019

Order of the Ministry of Energy and Coal of 29.09.2014 № 680 «On approval of Procedure of preparation by the system operator of a Plan to develop the Unified Energy System of Ukraine for the following ten years and the Procedure of publication of the Development plan for the following ten years», registered with the Ministry of Justice of Ukraine on 01.12.2014 as № 1532/26309	Regulatory	Planning of electrical grid development and build-up of capacities in electricity sector, specifically from renewable sources of energy	Investors, producers of electricity from renewable sources	In place	Effective as of: 19.12.2014
Government program to support purchase of “Non-gas” boilers. (Cabinet of Ministers of Ukraine Regulation of 01.10.2014 № 491 "On amendments to the Procedure of using funds allocated in the central budget for energy saving and energy efficiency measures”)	Financial	Encourage the households to purchase boilers operated on any types of fuels and energy (other than natural gas)	Producers and vendors of boilers generating heat from electricity and alternative types of fuels. Households.	in place	Effective as of: 09.10.2014 In effect until: 31.12.2016
Regulation of the National Energy Market Regulation Commission (NERC) of 27.02.2014 № 170 «On approval of the procedure of sale, metering and paying for electricity generated from sunlight by power generation installations of households», registered with the Ministry of Justice of	Regulatory	Establishment of transparent terms of sales and purchase of electricity generated from sunlight; facilitate protecting of consumer rights to produce and sell	Private households that generate electricity from solar energy	in place	Effective as of: 09.10.2014

Ukraine on 26.05.2014 № 539/25316		power generated from solar energy			
Conduct of VII International Industry Fair "Energy Efficiency, Renewable energy – 2014".	Awareness building	Educating the society on the need to use fuels, energy resources, and renewable sources of energy sensibly and efficiently.	Investors, end consumers (generation of energy and fuels from renewable sources of energy).	In place	4-7 November 2014
Conduct of VI International Investment business forum on energy efficiency and renewable energy.	Awareness building	Educating the society on the need to use fuels, energy resources, and renewable sources of energy sensibly and efficiently.	Investors, end consumers, authorities (generation of energy from renewable and alternative sources of fuels).	In place	November 4-7, 2014
<b>2015</b>					
Adopted the Law of Ukraine of 04.06.2015 № 514-VIII "On Amendments to certain laws of Ukraine related to ensuring competitive conditions of generating electricity from alternative sources of energy".	Regulatory	Creation of favorable conditions for boosting of renewable power	Investors, entities from renewable power sector	in place	Effective as of: 16.07.2015.
Adopted the Law of Ukraine of 09.04.2015 № 329-VIII "On Natural Gas Market"	Regulatory	Creation of favorable conditions for boosting biogas production (access for biogas producers to gas transportation system)	Investors, entities in biogas production sector	in place	Effective as of 01.10.2015
Adopted the Law of Ukraine of 09.04.2015 № 320-VIII "On Amendment of certain laws of Ukraine on decentralization of authorities in the area of architect and building control and improvement of city –	Regulatory	Improvement of city planning activities, simplification of permit procedures in construction sector and	Investors, entities from renewable energy sector	in place	Effective as of: 01.09.2015

planning legislation		improvement of the system of the public architect and building control and supervision.			
Adopted the Law of Ukraine of 16.07.2015 № 626-VIII “On amendments to certain laws of Ukraine related to utilities sector”	Regulatory	Creation of conditions for effective and loss-free operation of business entities in heat supplying area	Investors, business entities in renewable heat sector	in place	Effective as of: 25.07.2015
Regulation of NERC of 20.07.2015 № 2044 “On establishment of fixed minimal rates of “green” tariff for electricity for households”, registered with the Ministry of Justice of Ukraine 05.08.2015 as № 941/27386	Regulatory	Creation of favorable conditions for installation of solar and wind power units in households	Households, generating electricity using wind and solar power installations	in place	Effective as of: 25.08.2015.
Regulation of NERC of 20.07.2015 № 2043 “On establishment of fixed minimal rates of “green” tariff for electricity for business entities”	Regulatory	Creation of favorable conditions for development of renewable power	Investors, entities from renewable power sector	in place	Effective as of: 28.07.2015.
Regulation of NERC of 30.09.2015 № 2493 “On Approval of the Code of Gas Transportation System”, registered with the Ministry of Justice of Ukraine 06.11.2015 as № 1378/27823	Regulatory	Creating transparent mechanisms of granting access for biogas producers to connect to gas transportation systems	Investors, entities in biogas production sector	in place	Effective as of: 27.11.2015



Regulation of NERC of 30.09.2015 № 2494 “On Approval of the Code of Gas Distribution System”, registered with the Ministry of Justice of Ukraine 06.11.2015 as № 1379/27824	Regulatory	Creating transparent mechanisms of granting access for biogas producers to connect to gas distribution systems	Investors, entities in biogas production sector	In place	Effective as of: 27.11.2015
Government program of thermal modernization of residential buildings in Ukraine (CMU’s Regulation of 17.10.2011 № 1056 «On Certain Issues of Usage of Funds in the Area of Energy Saving and Energy Efficiency, as amended, and CMU’s Regulation of 01.03.2010 № 243 «On Approval of the Government Target Economic Program of Energy efficiency and development of the area of generating energy from renewable sources and alternative types of fuels for 2010-2016»)	Financial	Encourage the population to implement EE measures	Manufacturers and vendors of equipment producing heat energy from renewable sources, households, home owners associations, housing cooperatives	in place	Effective as of: 06.05.2015 Termination: 31.12.2016
Setting up special exhibition “Resource potential for generation of biological types of fuels and Renewable Sources of Energy” as part of the National Fair “Agro-2015”	Awareness building	Raising awareness of modern technologies, machinery and equipment for production of biofuels	- Enterprises using renewable sources of energy; enterprises, producing biological raw material	in place	June 03-06, 2015
Conduct of VIII International Industry Fair "Energy Efficiency, Renewable energy – 2014".	Awareness building	Educating the society on the need to use renewable sources of energy	Investors, end consumers, authorities (generation of energy from renewable and alternative sources of fuels).	In place	November 10-13, 2015
Conduct of VII International Investment business forum on energy efficiency and	Awareness building	Educating the society on the need to use	Investors, end consumers, authorities	In place	November 10-13, 2015

renewable energy.		renewable sources of energy.	(generation of energy from renewable and alternative sources of fuels).		
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\* Indicate if the measure is (predominantly) regulatory, financial or soft (i.e. information campaign).

\*\* Is the expected result behavioral change, installed capacity (MW; t/year), energy generated (ktoe.)?

\*\*\* Who are the target persons: investors, end users, public administration, planners, architects, installers etc.? Or what is the target sector/area of business activity: biofuel production, energetic use of animal manure etc.?

\*\*\*\* Does this measure replace or complement measures contained in Table 5 of NREAP?

According to the action plan for the implementation of Directive 2009/28/EC, the official websites of ministries and regional administrations regularly post up-to-date information on the support and incentives for the production of energy from renewable sources, as well as the benefits, prices and energy efficiency of equipment and systems that use renewable energy sources.

Central and local authorities and government bodies report to NERC quarterly on the efforts taken to promote renewable energy, and on the meetings, round tables, public hearings, forums, and conferences conducted, and on social advertising run for purposes of increasing the country's output of energy from renewable sources and alternative fuels.

Also, with help of international technical assistance projects, in 2014-2015 a number of manuals and guidelines were prepared covering technical, legal, institutional, environmental, financial, economic and social aspects of implementing projects in the area of renewable energy. These include:

- Guidelines for the selection of technologies "Best available technologies for housing and utilities sector of Ukraine", 2016 (USAID «Municipal Energy Reform Project in Ukraine);
- Practical Guide "Putting together proposals of clean energy projects", 2015 (USAID «Municipal Energy Reform in Ukraine Project ");
- Practical Guide "Bioenergy projects from concept to implementation", 2015 (a USAID Project "Local alternative sources of energy: Mirhorod");
- Practical Guide "Preparation and implementation of projects on substitution of natural gas with biomass in heat production in Ukraine", 2015 (prepared by a public organization "Renewable Energy Agency" (REA) as part of the USAID «Municipal Energy Reform Project in Ukraine")
- A series of guidance materials for delivery of refreshment training courses in the field of energy supply, on the use of local renewable energy sources at enterprises and in residential sector, 2015 (UNIDO / GEF Project "Improving energy efficiency and promoting renewable energy in the agri-food and other small and medium-sized enterprises (SMEs) in Ukraine").

**2.a. Please describe progress made in evaluating and improving administrative procedures to remove regulatory and non-regulatory barriers to the development of energy from renewable sources (Article 22(1)e of Directive 2009/28/EC)**

During 2014-2015, the following regulatory documents were enacted to promote renewable energy and improve administrative procedures:

1. NERC Regulation of 27.02.2014 №170 "On approval of the Procedure of sale, metering and payments for electricity produced from solar power facilities (generating facilities) of households" was adopted pursuant to the Law of Ukraine "On Electricity Sector", which prescribed that the electricity produced from solar power facilities (generating facilities) of households (household consumers of electricity) with the installed capacity less than 10 kW, shall be purchased by energy suppliers at "green" tariff in the amount exceeding monthly consumption of electricity by such private households.

The mentioned NERC Regulation focuses on the relationships between consumer- physical person, the supplier of electricity at regulated tariff and the power transmission organization at the time of sale and purchase of the electricity generated from solar energy by installations run by private households.

On July 16, 2015, amendments to the Law of Ukraine "On Electricity Sector" came into effect aimed at making sure that electricity from the sunlight / or wind energy, produced by generating facilities with installed capacity up to 30 kW is purchased and properly paid for; however not more than in the amount authorized for consumption under the electricity use agreement.

With the purpose of bringing certain provisions of the "Procedure of sale, metering and payments for electricity produced from solar power facilities (generating facilities) of households" in accordance with the applicable legislation, NERC adopted a Regulation № 229 of 25.02.2016 "On Amendments to The Procedure of sale, metering and payments for electricity produced from solar power facilities (generating facilities) of households" (registered with the Ministry of Justice on 24.03.2016 №442 / 28572).

2. According to the Law of Ukraine "On principles of operation of electricity market of Ukraine", the Procedure of preparation by the system operator of the Unified Energy System's Development plan for the next 10 years, was drafted and approved by Order of the Ministry of Energy and Coal of 29.09.2014 № 680. The said procedure sets forth the process of preparation, scope, structure, input data and deadlines for putting together the Unified Energy System's Development plan for the next 10 years.

The Development plan integrates the following:

- Analysis of the Ukraine Unified Energy System's (UES) performance for the most recent years;
- Electricity and capacity balance forecasting;
- Forecasts of intergovernmental exchange of electric power and capacity;
- Volumes of required installed capacity of power stations (with breakdown by type generating facilities, types of fuel (source of energy, including renewable (alternative) energy sources and regions of their location);
- Information on desirable (sensible) regions (places) of location of new generating facilities with the forecasted connection to the existing intergovernmental, mainstream and/or local electrical grids;

3. The Law of Ukraine of 04.06.2015 № 514-VIII "On amendments to certain laws of Ukraine to ensure competitive terms of production of electricity from alternative sources of energy" resulted in a reform in application of the "green" tariff, specifically:

- "local component" requirement was cancelled and a premium for utilization of equipment produced in Ukraine was introduced;
- "Green" tariff for geothermal power installations and for wind power installations of private households up to 30kW was introduced;
- Rate of the "green" tariff for electricity generated from biomass and biogas was raised;

- The scope of the definition “biomass” was expanded enabling producers of electricity from solid waste and agri and forestry waste to qualify for green tariff.

To fulfill requirements of the said Law of Ukraine, the following secondary legislation was adopted:

- Regulation of NERC of 10.12.2015 № 2934 “On Approval of Changes to Standard Power Purchase Agreement (PPA) between the government company “Energorynok” and business entities producing electricity from alternative sources of energy;

- Regulation of NERC of 20.07.2015 № 2043 “On establishment of fixed minimal rates of “green” tariff for electricity for business entities”;

- Regulation of NERC of 20.07.2015 № 2044 “On establishment of fixed minimal rates of “green” tariff for electricity for households”, registered with the Ministry of Justice of Ukraine 05.08.2015 as № 941/27386

4. In order to create conditions for the effective operations of economic entities in the heat supply sector, and to enable them cover their costs and modernize and renovate their heating facilities, the Law of Ukraine of 16.07.2015 № 626-VIII “On Amendments to Certain Laws of Ukraine in the Area of Public Utilities” was adopted stipulating that the tariffs for heating and other housing services should be set at a level equal, as a minimum, to economically justifiable costs incurred in connection with their production.

Also, to encourage heat generating companies supplying energy to households and public and municipal institutions and organizations, shift from gas to alternative fuels, the Government adopted Regulations № 453 of 10.09.2014 and № 293 of 09.07.2014.

According to the CMU’s Regulation № 453 of 10.09.2014 "On stimulating replacement of natural gas in the production of thermal energy for institutions and organizations financed from the state and local budgets", NERC should make sure that thermal energy is supplied by heat-generating plants using any type of fuel and energy (other than gas) to budgetary institutions and organizations, at tariffs not lower than the level of the current tariff for thermal energy produced using natural gas and supplied to budgetary institutions and organizations.

CMU’s Regulation № 293 of 09.07.2014 "On stimulating the replacement of natural gas in heat supply area" prescribes, that heat-generating companies that produce energy for households from alternative sources, shall be compensated for the difference between an investment-attractive tariffs for production of heat energy and the established tariffs for heat energy for households, produced using natural gas.

5. The Law of Ukraine of 09.04.2015 № 320-VIII “On Amendment of certain laws of Ukraine on decentralization of authorities in the area of architectural and building control and improvement of city – planning legislation” was adopted with the purpose to improve town-planning activity, streamline permit procedures in construction, and advance the system of architectural control and supervision. This law, specifically, effected the following:

- improved the procedure of filing a declaration on completion of preparatory and building works by establishing the exhaustive list of grounds for turning it down;
- cut the turnaround time for issue of technical specifications from 15 days (and in some cases this period was 30 working days) to 10 days from the date of filing of the respective application.

***Regulatory framework for ensuring compliance with sustainability criteria in the production of biomass for liquid and gaseous biofuels, as specified by the above directive 2009/28/EC.***

Producers of biological raw material for biofuels production, intending to export this raw material to EU countries, go through a certification procedure to prove their compliance with sustainability criteria, as per Directive 2009/28/EC. Applicable certification schemes are relevant for Ukraine and either have been approved or are in the process of approval by the EU Commission (ISCC, KSB, NTA 8080, BioOrace).

Meanwhile, where biomass for biofuel production is sold in the domestic market, going through any certification scheme is not mandatory and may be done on a voluntary basis depending on the contractual terms.

To provide regulatory framework to underpin compliance with sustainability criteria, the Ministry of Agrarian Policy arranged for the development of appropriate draft standards in 2014.

Specifically, a draft Standard of Organizations of Ukraine (SOU) “Sustainable production of biomass and biofuel. Part 1 “Sustainable production of biomass. General requirements” was prepared. This standard meets requirements of European Standard BS EN 16214-1 Sustainability criteria for the production of biofuels and bioliquids for energy application. Principles, criteria, indicators and verifiers. Part 1: Terminology”.

In 2014, the said draft SOU was registered with the Registry of regulatory documents of the Ministry of Agrarian Policy of Ukraine under entry number SOU 01-37-954:2014.

However, due to coming into force in 2015 of a new version of the Law of Ukraine “On Standardization”, the work on preparation of industry standards for agribusiness was terminated.

The draft at hand was finalized in the format of a recommendation and was posted on the Ministry of Agricultural Policy’s website.

Currently, as part of the Ministry of Agricultural Policy’s cooperation with the UNIDO/GEF Project “Improving Energy efficiency and promoting renewable energy in the agro-food and other small and medium enterprises (SMEs) in Ukraine”, it was decided to include into the national plan of standardization a project to harmonize local sustainability criteria for the production of energetic biofuels and bioliquids with the European standard EN 16214.

**2.b. Please, describe measures taken to ensure the transmission and distribution of electricity produced from renewable energy sources, and to improve the framework or rules for bearing and sharing of costs, related to grid connection and grid reinforcements. (Article 22(1)f of Directive 2009/28/EC)**

According to Article 12 of the Law of Ukraine "On Electricity Sector", the National Commission, that performs state regulation of energy and utilities (NERC), while approving investment programs and sources of funding for electricity transmission organizations, takes into account the cost of connecting to the grid of the facilities generating electricity from alternative sources, according to the procedure of financing of connection of power installation to the electricity networks.

The National Commission, that performs state regulation of energy and utilities (NERC), shall annually publish information on the expenses associated with connection to the grid of power facilities that generate electricity using alternative energy sources.

In addition, in accordance with Article 24 of this Law, energy supplier, engaged in the transmission of electricity using their own networks, may not deny access to these networks for entities that produce energy from alternative energy sources. Energy supplier engaged in the transfer of electricity using their own networks, should include into their investment programs the costs of connecting to their networks of energy facilities producing electricity from alternative energy sources.

**3. Please, describe the introduction and functioning of support schemes and other measures to promote energy from renewable sources and any developments in the measures used with respect to those set out in your National renewable energy action plan. (Article 22(1)b of Directive 2009/28/EC)**

Two main tools to promote energy from renewable sources in Ukraine are:

- “green” tariff for energy produced from alternative sources;
- tax exemptions and customs duties benefits.

**The Law of Ukraine “On Electricity Sector”** provides for establishing a “green” tariff to promote generation of energy from alternative sources (except for blast-furnace and coke-oven gases, and in case of hydro energy, the energy produced by micro-, mini and small hydro power stations).

“Green” tariff is a special tariff at which electricity generated from alternative sources of energy is purchased from energy generating facilities including by respective commissioned phases of construction of power stations (launch complexes).

“Green” tariff applies to electricity produced from solar, wind, biomass, biogas and hydro energy.

For business entities and private households generating energy using alternative sources, the tariff will be in effect until January 1, 2030.

In 2015, amendments to the Law of Ukraine “On Electricity Sector” to a significant extent revisited “green” tariff treatment.

### Reform in application of “green” tariff

On 16.07.2015 the Law of Ukraine № 514-VIII “On Amendments to certain laws of Ukraine related to ensuring competitive conditions for generating electricity from alternative sources of energy” came into effect, which amended the Law of Ukraine “On Electricity Sector”, which in particular:

- establishes “green” tariff for electricity generated from renewable sources of energy at an acceptable level aligned with experience of the EU countries,
- ensures formation of a new, promising and innovative sector of renewable energy.
- promotes better investment appeal of the country, improves environmental situation and lessens energy dependence of Ukraine.

In addition, this law:

1. Introduces “green” tariff for electricity generated by wind power stations of private households.
2. “Green” tariff for solar/wind power stations applies to units with the capacity up to 30 kW and is subject to revision due to exchange rate fluctuations.
3. New rates of green tariffs are established for solar energy and bioenergy units that will be commissioned after 01.07.2015. (Please see table with “green” tariff rates attached).
4. “Green” tariff is introduced for electricity produced by geothermal plants at 15.0 €/kW·hour.
5. The term “biomass” is brought in compliance with the Directive of the European Parliament and the Council 2009/28/EC, enabling power generated both from waste, and from products of agriculture and forestry, to qualify for ‘green’ tariff.
6. Local component requirement was dropped; instead 5% and 10% premiums were introduced for deployment of Ukrainian-made equipment to the extent of 30% to 50%, respectively. The premium is in effect until 2030, but it does not apply to energy generating facilities commissioned after 2025.
7. A common formula for “green” tariff calculation was introduced for all types of energy: the peak load factor was excluded from “green” tariff calculation formula for solar power and for power generated by micro, mini and small Hydro power plants.
8. Due to exchange rates fluctuations, “green” tariff is to be revised quarterly on the basis of the average Central bank’s official exchange rate.
9. Rates of “green” tariff shall be linked to Euro exchange rate as long as the “green” tariff is in effect (up to 2030), however shall not apply to power facilities commissioned after 2025.
10. Guaranteed purchases by the WEM apply only to net generation (excluding the amount of energy consumed by a power generating facility for its own needs).

### Green Tariff Rates

Type of power station	Capacity of power station and other factors impacting rate of green tariff	Tariff for commissioned facilities				
		€/kW·h				UAH/kW·h
		from 01.07.15p to 31.12.15p	from 01.01.16p to 31.12.16p	from 01.01.17p to 31.12.19p	from 01.01.20p to 31.12.24p	from 01.01.25 to 31.12.29p
Wind power stations	Capacity up to 600 kW inclusive	5,81		5,17	0,49	
	Capacity from 600 kW to 2 000 kW	6,78		6,03	0,57	
	Capacity over 2 000 kW	10,17		9,04	0,86	

Solar power station	Overground power stations	16,96	16,00	15,02	13,51	1,30
	Power stations on rooftop and/or facades of buildings	18,04	17,23	16,37	14,75	1,42
Bioenergy power stations	Biomass is a non-fossil biologically renewable substance of organic origin, in the form of products, waste and residues. Biogas is a gas derived from biomass.	12,38			11,14	1,07
Geothermal power station	Geothermal energy	15,02			13,51	1,30
Hydro power stations	Micro hydro power stations (up to 200 kW inclusive)	17,44			15,72	1,51
	Mini HPS (from 200 kW to 1000 kW)	13,94			12,54	1,21
	Small HPS (up to 10 000 kW inclusive)	10,44			9,42	0,90
Households' power stations	Solar power installations up to 30 kW	20,03	19,00	18,09	16,26	1,57
	Wind power stations up to 30 kW	11,63			10,44	1,01

The following tax and customs benefits and exemptions were in effect in 2014:

1. Tax on land plots (within and beyond boundaries of populated areas), allocated for energy facilities generating electricity from renewable sources of energy, was charged in the amount of 25 % of the established rate;

2. Electricity generated from renewable sources was exempt from a surcharge on top of effective tariff for electricity and heat energy;

3. On a temporary basis, until January 1, 2020, the following were also exempt from tax:

- Biofuel producers' profit from sales of biofuel;
- Profit of enterprises they earned from cogeneration operations and /or from production of heat energy using biological types of fuel;
- Profit of producers of machinery, equipment, and appliances specified in article 7 of the Law "On Alternative Types of Fuel" used for manufacturing and reconstruction of technical and transportation vehicles, including self-propelled agriculture machinery and energy installations that use biological fuels, if this revenue was received from sale of the said machinery, equipment and appliances, manufactured on the territory of Ukraine.

4. On a temporary basis, until January 1, 2020, exempt from tax was profit of enterprises received from their operations on recovery and use of coal mine methane, according to the law of Ukraine "On Coal Mine Methane";

5. Starting from January 1, 2011, enterprises in power industry received a 10-year exemption from tax on profit from sales of electricity, generated from renewable sources.

6. Companies that sell on the customs territory of Ukraine goods of their own make, listed in the CMU's Regulation, enjoyed 80% exemption from tax on profit generated from such sale. The list of the goods includes:

- Equipment operating on renewable sources of energy;
- Energy efficiency equipment and materials, and appliances, deployment of which results in savings and efficient use of fuel and energy resources;
- Equipment for production of alternative types of fuel.

These benefits were cancelled by the Law of Ukraine of 31.07.2014 № 1621-VII “On Amendments to the Tax Code of Ukraine and certain other legislative acts of Ukraine” and the Law of Ukraine of 28.12.2014 № 71-VIII “On Amendments to the Tax Code of Ukraine and certain legislative acts of Ukraine related to tax reform”

From the beginning of 2015, the following tax and customs benefits remained in effect for businesses operating in the area of renewable sources of energy and alternative types of fuel:

1. According to subparagraph 213.2.8 of paragraph 213.2 of article 213 of the Tax Code of Ukraine, excise is not levied on sale of electricity generated by qualified CHPs and/or using renewable sources of energy.

2. According to paragraph 2 subparagraph 2 of Section XX of the Tax Code of Ukraine, the following transactions shall be exempt from VAT, on a temporary basis, until January 1, 2019:

a) supply of machinery, equipment, and appliances, identified in article 7 of the Law of Ukraine "On Alternative Types of Fuel", within the territory of Ukraine;

b) import of goods listed in the Ukrainian Classifier of Goods of the Foreign Economic Activity, determined by article 7 of the Law of Ukraine "On Alternative Types of Fuel", machinery, equipment, and appliances, used for reconstruction of existing and construction of new facilities designed for production of biofuels and for manufacture and reconstruction of technical and transportation vehicles with the purpose of consumption of biofuels, unless such goods are produced and have analogues in Ukraine, and technical and transportation vehicles, including self-propelled farming machinery, fueled by biofuel, unless such goods are manufactured in Ukraine.

3. Subparagraph 17 of paragraph 1 article 282 of Section IX of the Customs Code of Ukraine stipulates exemption from customs duty during import to or export from the customs territory of Ukraine, of technical and transportation vehicles, including self-propelled farming machinery, operating on biofuels and listed in the Ukrainian Classifier of Goods of the Foreign Economic Activity, determined by article 7 of the Law of Ukraine "On Alternative Types of Fuel", unless such goods are manufactured in Ukraine.

4. Subparagraph 5 of paragraph 4 of Section XXI of the Customs Code of Ukraine provides for temporary, until January 1, 2019, exemption from customs duty at the time of imports to the customs territory of Ukraine and placement into customs mode of import - machinery, equipment, and appliances, used for reconstruction of existing and construction of new facilities designed for production of biofuels and for manufacture and reconstruction of technical and transportation vehicles with the purpose of consumption of biofuels, which are listed in the Ukrainian Classifier of Goods of the Foreign Economic Activity, determined by article 7 of the Law of Ukraine "On Alternative Types of Fuel", unless such goods are produced and have analogues in Ukraine.

The procedure of importing into the customs territory of Ukraine of machinery, equipment, appliances, technical and transportation vehicles, used for development of production and promoting consumption of biological fuels was approved by the CMU’s Regulation of May 18, 2011 № 581.

**Table 3. Renewable energy support systems in 2015**

Year of implementation of RES support system (2015)		Overall energy generation, toe	Per unit support, €/toe	Total support amount, (M €)*
<b>1. Overall annual estimated support to electricity generation sector:</b>		151 499,4	1 585,8	240 246
<i>a. Solar power</i>				
Tools	Difference between “green” tariff and wholesale market price	40 864,6	3 755,6	153 471
<i>b. Wind power</i>				
Tools	Difference between “green” tariff and wholesale market price	83 738,7	741,2	62 066
<i>c. Biomass power</i>				
		6 604,8	837,5	5 532



Tools	Difference between “green” tariff and wholesale market price			
<i>6. Biogas power</i>				
Tools	Difference between “green” tariff and wholesale market price	5 537,8	838,2	4 642
<i>2. Hydropower generated by small hydro power stations</i>				
Tools	Difference between “green” tariff and wholesale market price	14 753,5	985,2	14 536

\*Calculations were based on the exchange rate: Euro 100 = UAH 2598.6

**3.1. Please provide information on how supported electricity is allocated to final customers for purposes of Article 3(6) of Directive 2003/54/EC. (Article 22(1)b, Directive 2009/28/EC)**

**4. Please provide information on how, where applicable, the Member State has structured its support schemes to take into account renewable energy applications that give additional benefits in relation to other, comparable applications, but may also have higher costs, including biofuels made from wastes, residues, non-food cellulosic material, and ligno-cellulosic material. (Article 22(1)c, Directive 2009/28/EC)**

Article 22(1) c of Directive 2009/28/EC mentions that the support schemes for use of renewables that give additional benefits, should be introduced if there is a need.

At this time, no such schemes are designed in Ukraine.

**5. Please provide information on the functioning of the system of guarantees of origin for electricity and heating and cooling from renewable energy sources and the measures taken to ensure the reliability and protection against fraud of the system. (Article 22(1)d, Directive 2009/28/EC)**

The CMU’s Regulation of 24.07.13 № 771 approved the Procedure of issuance, usage and termination of guarantees of origin for electricity for business entities generating electricity from alternative sources of energy.

Currently, the authority to issue “guarantees of origin” certificate is vested with the National Commission of State Regulation of energy efficiency, which lacks technological capabilities and resources to build an electronic register to keep records of the issuance, use and termination of the guarantees, and does not have oversight functions to undertake appropriate verifications.

In order to obtain detailed information required to arrange issue of the guarantees of origin and ensure operation of the related software, the Agency sent an inquiry to the Association of Permit Authorities (APA). In addition, the Agency is considering a possibility of obtaining funding from international organizations to implement issuing guarantees of origin in Ukraine and obtain advice from the EU countries on how to develop terms of reference of the project and detailed step-by-step process of issuing guarantees of origin for electricity.

**6. Please describe developments in the preceding 2 years in the availability and use of biomass resources for energy purposes. (Article 22(1)g, Directive 2009/28/EC)**

Please refer to **Tables 4 and 4a** for more detailed information on available biomass resources.



Biomass from household solid waste, **					-	-	-	-	-	-	-	-
Waste of animal and plant origin												
<b><i>Biomass supply for transport:</i></b>												
Common arable crops for biofuels (please specify main types)					-	-	-	-	-	-	-	-
a) sugar beets during production of sugar and bioethanol from molasses, thousand tons	4407	3068,0			-	-	-	-	-	-	-	-
Energy crops (grasses etc.) and short rotation trees (please specify main types)	-	-	-	-	-	-	-	-	-	-	-	-
Other (please, specify)	-	-	-	-	-	-	-	-	-	-	-	-

\* Amount of raw material if possible in m3 for biomass from forestry and in tons for biomass from agriculture and fishery and biomass from waste.

\*\* The definition of this biomass category should be understood in line with table 7 of part 4.6.1 of Commission Decision C (2009) 5174 final establishing a template for National Renewable Energy Action Plans under Directive 2009/28/EC.

**Table 4a. Current domestic agricultural land use for production of crops dedicated to energy production (ha)**

Land use	Area (ha)	
	2014	2015
1. Land used for common arable crops (wheat, sugar beets etc.) and oil seeds (rapeseed, sunflower etc.). (Please specify main types)	984 167 (for production of energy)	
<i>Sugar beets (*) for production of biofuel (Molasses is a sugar beet process' by-product used for production of bioethanol)</i>	Total area of sugar beets production is 330200 ha, Of this, for production of bioethanol – 111 667 ha	For production of bioethanol – 77 672 ha
<i>Sunflower (*) for production of energy (husks are used to generate heat energy for the needs of oil-crushing plants in agribusiness sector)</i>	Overall area of production sunflower is 5 212 200 ha, of which estimated for production of energy 860 000 ha	For production of energy – 865 000 ha (estimated)
<i>Wheat (*) for production of energy (straw is used for production of solid biofuel to generate heat energy)</i>	125 000	41 500
2. Land used for short rotation trees (willows, poplars). (Please specify main types)	3600	3610
<i>Willow (**)</i>	3600	3610
3. Land used for other energy crops, such as grasses (reed canary grass, switch grass, miscanthus), sorghum. (Please specify main types)	580	580
<i>Miscanthus (**)</i>	500	500
<i>Sorghum (**)</i>	80	80

Note (\*) Table 4 includes only crop growing areas, which were actually used for growing of sunflower, sugar beets and wheat, the respective volumes of which (and/or their waste and by-products) used for production of biofuel, electricity and heat energy are indicated in Table 3.

(\*\*) Indicated volumes of grown bioenergy crops (willow and miscanthus) are based on the quick-look data provided by scientific institutions of the National Academy of Sciences and the Ministry of Agricultural Policy of Ukraine, which run pilot research plantations for growing seeding material, and by business entities growing these crops for sale or as the basis for manufacture of solid biofuel. The said quick-look data may be subject for adjustment once formal statistical reporting is introduced.

***As regards volumes of production of liquid types of biological fuel and volumes of used biomass in agribusiness sector***

In the period between 2010 and 2014, the following eight companies began producing bioethanol and its components:

- State-owned enterprise “Naumisky Distillery”;
- State-owned enterprise “Gaisynsky Distillery”;
- State-owned enterprise “Ivashkivsky Distillery”;
- State-owned enterprise “Ukrspirt” (Luzhanske and Khorostkivske Facilities);
- State-owned enterprise “Barskiy Distillery”;
- State-owned enterprise “Chervonenkivsky Food Products Factory”;

- State-owned enterprise “Zarubynsky Distillery”;
- KhDV “Uzinsky Sugar Plant”.

Although there was no stable demand from oil refineries, in the period from 2011 to 2013, production of bioethanol and components on its basis increased 26 times. In fact, in 2013, the production of bioethanol and components amounted to 53.8 thousand tons or 6.7 million deciliters, and sales reached 52.7 thousand tons or 6.6 million dal, which is 1.8 times more than in 2012 year.

However, in 2014, due to some unregulated aspects of treatment of circulation of these products by the State Fiscal service, the production and sale of ethanol and components on its basis decreased against 2013 by 50% (to 21.8 thousand tons of bioethanol and additives).

Ukrainian state-owned agribusinesses use primarily molasses, a by-product of sugar process, for production of bioethanol. In 2014, 21.8 thousand tons of bioethanol and fuel additives were produced from 93.74 thousand tons of molasses resulting from processing of 2,343.5 thousand tons of sugar beets (based on a technology where sugar is produced as primary product and molasses as a byproduct).

This amount of sugar beets was grown on about 49.2 thousand ha of exclusively agricultural lands.

Also, it should be noted that in Ukraine ethanol for vehicles is produced from raw materials that fully comply with the sustainability criteria of Directive 2009/28 / EC.

### ***Biodiesel production.***

In the period between 2010-2014, the acreage planted with rapeseeds (the main raw material for production of biodiesel) in Ukraine ranged annually between 547000 ha and 996000 ha, while collected harvest ranged between 1204 million tons and 2351 million tons.

However, most of the rapeseed is currently exported to the EU countries, since domestic companies do not have capacities to process rapeseed for biodiesel.

Lately, introduction of excise for biofuels led to complete termination of production of biodiesel and other types of biofuels in Ukraine. Specifically, in 2015 excise on biodiesel was established on the same level as for diesel from fossil oil, i.e. EUR 102 /tons.

## ***7. Please provide information on any changes in commodity prices and land use within your Member State in the preceding 2 years associated with increased use of biomass and other forms of energy from renewable sources? Please provide where available references to relevant documentation on these impacts in your country. (Article 22(1)(h) of Directive 2009/28/EC)***

*When assessing commodity price impacts, it is suggested to consider at least the following commodities: common food and feed crops, energy wood, pellets.*

### **According to the Ministry of Agrarian Policy.**

The total area of forest in Ukraine is 10.4 million ha, including wooded area of 9.6 million ha. The bulk yield of forest is 2.1 Bn m<sup>3</sup>. The percent of forest area in Ukraine is 15.9%.

The forests of Ukraine are managed by different government authorities. In addition to Ukraine State Forestry Agency, overseeing more than 73% of forests, forests are also managed by local authorities (12%), and other ministries and agencies (7%). Moreover, almost 8% of forests have not been provided to anyone for use and are considered reserve lands.

Average annual change in standing volume (or gains) of forests in Ukraine is 35 million m<sup>3</sup>, and its utilization in 2014 amounted to 60 %. (in EU counties – up to 80 %).

The volume of harvested liquid wood from all types of cuts in Ukraine over the last year was 18.3 million m<sup>3</sup> (companies of the State Forestry Agency – 15.0 million m<sup>3</sup>), including from felling - 8.2 million m<sup>3</sup> (companies of the State Forestry Agency – 7.4 million m<sup>3</sup>).

Volumes in forest utilization as final felling did not exceed allowable final cuts, which was 9.2 million m<sup>3</sup> for the whole of Ukraine and 7.5 million m<sup>3</sup> for companies of the SFA.

The SFA made an inventory of all types of wood materials, including volumes of technically and technologically inaccessible wood.

The annual stock of wood that can be used for energy in the industry is about 2.9 million m<sup>3</sup>, including:

- illiquid wood – 1.3 million m<sup>3</sup>;
- firing wood - 0.3 million m<sup>3</sup>;
- Technical raw stock of hardwood, not used in another production – 1.3 million m<sup>3</sup>.

Ukraine's total area is 603.628 thousand km<sup>2</sup> or 60.4 million hectares. Thanks to the huge suitable territory and abundance of agricultural land, relatively low population density and relatively favorable climate conditions, the country has excellent starting conditions for generating, selling and using of bioenergy.

Assessment of the potential of land on which bioenergy crops could be grown took into consideration the sustainability requirements. According to experts, in Ukraine there are 3.3 million ha of drained land, of which 30% (1 million ha) cannot be currently involved in the cultivation of crops due to malfunctioning drainage systems. Perennial energy crops are not demanding to soil and climatic conditions, therefore these lands could be used for their cultivation.

In addition, Ukraine's land stock includes eight million ha of unproductive lands not used for growing food and feed crops. A portion of these lands (1 million ha) could be used for growing perennial bioenergy crops such as: energy willow, miscanthus, switch grass and others.

To date, energy crops such as energy willow, miscanthus and switch grass take about 5000 hectares. The yielding capacity has not been achieved yet because they have been grown for rather short period.

Growing bioenergy crops on 8 million ha of unproductive lands available in Ukraine will both enable to eliminate the need to purchase imported gas, and build a strong export potential of biofuels (briquettes, pellets). Given the existing stock of seeds and planting material, it is planned to annually expand the area under bioenergy crops by 50000 ha.

#### **Indicative potential of average annual production of biomass that may be used for production of biofuel**

Potential production of biodiesel (oil-bearing crops)		
Feedstock	Availability of biomass,(ha/t)	mln.t. of standard fuel
• Rapeseed	1013/1873	
• Sunflower	4192/6363	0,78
• Soy	622/1043	
Bioethanol production potential (sugar and starch containing crops)		
• Molasses	600-800 thous.tons	
• Corn	2089/10486	
• Food/feed wheat	7716/22342//7853/23681	2,33
• Silage corn	357/6776	
• Sorghum	15,4/335	
• Sugar beets	319,7/10067	
Biogas production potential		
• Livestock and Poultry manure, t	21,0	5,63
• Fermentation of treated waste water sludge		0,21
• Solid waste landfills		0,77
• from silage corn	5 million ha 180 centners/ha	2,00
From sugar beet tops	300 thousand ha	
Potential production of pellets and briquettes		
• Straw of grain crops	10-25 million tons	10,3
• Husk of oil crops		9,97
• Energy crops		14,58
• Waste of forestry	0.5 million tons	0,37

• Agri forest m <sup>3</sup>	36710	0,26
• State Forestry Agency of Ukraine M <sup>3</sup>	7.9 million	2,1
• Peat		0,77
Total		50,07

In the course of the last decades, sugar beet acreage contracted drastically, from 1.6 million ha in 1990 to 333 thousand ha in 2014. This has affected the crop rotation patterns and farming practices in general. Therefore, the potential of sugar beet as a feedstock for biogas production in Ukraine is estimated as grown on the area of 1 million ha. This is sufficient to produce over 5 Bn m<sup>3</sup> of biomethane.

An equally effective and promising crop for biogas production in Ukraine is sugar sorghum, which contrary to sugar beets could be grown in the arid Southern regions of Ukraine. Over 100 tons of sugar containing biomass (with 18% of sugar content in juice) could be harvested from one hectare planted with sugar sorghum. This will allow to potentially yield about 22 m<sup>3</sup> of biogas per ha. The early harvesting time of sugar sorghum grown for energy purposes makes it a good precursor to winter crops. By estimates, the crop could be grown on about 500000 ha in Ukraine, enough to produce about 5.5 billion m<sup>3</sup> of biomethane.

**8. Please, describe the development and share of biofuels made from wastes, residues, non-food cellulosic material, and ligno-cellulosic material. (Article 22(1)l of Directive 2009/28/EC)**

**Table 5. Production and consumption of biofuels under Article 21(2) (thousand t.o.e.)**

Biofuels under articles 21(2) <sup>28</sup>	2014	2015
Production – fuel of type X (indicate)		
Consumption – fuel of type X (indicate)		
Total production art. 21.2 biofuels		
Total consumption art. 21.2 biofuels		
Share of biofuels under Art. 21.2 in the overall RES in transport sector, %		

**9. Please provide information on the estimated impacts of the production of biofuels and bioliquids on biodiversity, water resources, water quality and soil quality in your country for the preceding two calendar years. Please provide information on how these impacts were assessed, with references to relevant documentation on these impacts within your country. (Article 22(1)j of Directive 2009/28/EC)**

According to the State Forest Agency volumes of liquid wood harvested from all kinds of cuts in Ukraine in 2015 amounted to about 19.3 million m<sup>3</sup> (State Forestry Agency - 15.9 million m<sup>3</sup>), including from final felling – 8.4 million m<sup>3</sup> (State Forestry Agency - 7.4 million m<sup>3</sup>).

Volumes of forest utilization as final felling did not exceed allowable cut, which was 9.3 million m<sup>3</sup> for Ukraine in general, 7.9 million m<sup>3</sup> for the State Forestry Agency.

Forest management enterprises that are supervised by the State Forestry Agency of Ukraine harvested about 8.4 million m<sup>3</sup> of firewood, including 4.5 million m<sup>3</sup> of wood fuel, and 3.9 million m<sup>3</sup> of firewood for technological needs. To satisfy needs for energy, about 3.5 million m<sup>3</sup> of wood annually is sold to households, institutions and organizations, social enterprises and businesses in the domestic market.

The annual supply of wood that can be additionally used for energy in the industry is estimated at 3.3 million m<sup>3</sup>.

Forest restoration measures in Ukraine were taken on the area of 60400 ha.

Enterprises of the State Forestry Agency undertook the restoration measures on the area of 51000 ha, in particular, created 34000 ha of artificially generated stands, preserved natural regeneration on the area

<sup>28</sup> Biofuels made from wastes, residues, non-food cellulosic material and lingo-cellulosic material.

of 17000 ha and planted new forest on the area of 2400 ha.

To ensure creation of highly productive and durable forest plantations, 289 million units of standard planting material were grown in nurseries of the State Forestry Agency.

The area of forests created in 2015 is 1.1 times larger than the area of clean felling in 2014.

It is therefore reasonable to suggest that the domestic forestry follows the principles of sustainable forest management and of expanded restoration of forests.

According to the Ministry of Agriculture and Food.

Article 17 of Directive 2009/28 / EC of sets forth the basic sustainability criteria of biomass used to produce biofuel liquids for transport or for generation of heat and electricity. These criteria include the reduction of greenhouse gas emissions, protection of areas with high biodiversity and soils with high carbon content (e.g. peat bogs, meadows and wetlands).

Likewise, the current Ukrainian legislation requires protection of areas with high biodiversity and soils with high carbon content (e.g. peat bogs, meadows, and wetlands).

In particular, the Land Code of Ukraine, Laws of Ukraine "On Land Protection", "On Environmental Protection", "On the Natural Reserve Fund of Ukraine", "On Flora", "On fauna" and the Water Code of Ukraine prohibit to use lands with high biodiversity, peat bogs, meadows, and wetlands not to their purpose.

In particular, under Article 20 of the Land Code of Ukraine, a change in the purpose of land is only possible if there is a respective decision of either central and/or local government authority according to their scope of responsibility.

As per Article 23 of the Land Code, growing of any agricultural products (including raw material for biofuel production) takes place on land suitable for agriculture and determined on the basis of the state land cadaster. Owners and users of the agricultural land use their land plots exclusively in line with the requirements posed for use of land of a certain type, established by Articles 31, 33-37 of the Code.

Notwithstanding, the legislation of Ukraine provides for an opportunity to alienate land parcels if the latter are recognized lands of natural and preservation fund or as serving other conservation purposes.

Thus, the basic requirements of Directive 2009/28 /EC with regard to sustainability criteria compliance are partially regulated by the laws of Ukraine.

According to the official annual newsletters "The Structure, Dynamics and Distribution of Land Resources of Ukraine" and according to the State Land Cadaster of Ukraine for 2008 and 2014:

The total area of agricultural land was:

- 42868.7 ha in 2008;

- 42744.5 ha in 2014.

The area of drained (reclaimed) lands was:

- 3307.3 ha in 2008;

- 3306.7 ha in 2014.

The reduction of the total area of agricultural land and drained (reclaimed) land demonstrates that no expansion of agriculture lands at the expense of natural and preservation lands took place in any region of Ukraine, and neither land with high biodiversity or soil with high carbon content were driven away from their purpose to cultivate biomass instead.

## **10. Please estimate net greenhouse gas emission saving due to the use of energy from renewable sources. (Article 22(1)k of Directive 2009/28/EC)**

*For the calculation of net greenhouse gas emission savings from the use of renewable energy, the following methodology is suggested:*

- *For biofuels: In accordance with Article 22(2) of Directive 2009/28/EC.*



- For electricity and heat it is suggested to use the EU wide fossil fuel comparators for electricity and heat as set out in the report on sustainability requirements for the use of solid and gaseous biomass sources in electricity, heating and cooling<sup>30</sup>, if no later estimates are available.

If a Member State chooses not to use the suggested methodology for estimating the net greenhouse gas emission savings, please describe what other methodology has been used to estimate these savings.

**Table 6. Estimated GHG emissions savings from the use of renewable energy (t CO2-eq)**

Environmental aspects	2014	2015
<b>Total estimated net GHG emission saving from using renewable energy</b> <sup>29</sup>		
- Estimated net GHG saving from the use of renewable electricity		
- Estimated net GHG saving from the use of renewable energy in heating and cooling		
- Estimated net GHG saving from the use of renewable energy in transport		

**11. Please report (for the preceding two years) and estimate (for the following years up to 2020.) the excess/deficit production of energy from renewable sources compared to the indicative trajectory which could be transferred to / imported from other Contracting Parties and /or third countries, as well as the estimated potential for joint projects, until 2020 (Article 22(1), m Directive 2009/28/EC)**

**Table 7. Actual and estimated excess and/or deficit (-) production of renewable energy compared to the indicative trajectory which could be transferred to/from other Contracting Parties, Contracting Parties and/or third countries in Norway (ktoe), in [contracting country] (ktoe)<sup>30, 31</sup>**

	2014	2015	2016	2017	2018	2019	2020
Actual/estimated excess or deficit production (Please distinguish per type of renewable energy and per origin/destination of import/export)	0						

**11.1. Please provide details of statistical transfers, joint projects and joint support scheme decision rules.** Where the Contracting Party decided to fulfill article 8 and/or article 9 of the Decision of the Council of Ministers, it should report the measures it took to arrange for an independent external audit, subject to article 13 of the Decision of the Council of Ministers.

The National Renewable Energy Action Plan for the period until 2020 does not provide for statistical transfers of energy generated from renewable sources.

**12. Please provide information on how the share of biodegradable waste in waste used for producing energy has been estimated, and what steps have been taken to improve and verify such estimates. (Article 22(1)n of Directive 2009/28/EC)**

Please note that in the first progress report (2014 report) Contracting Parties are invited to outline their intentions with regard to the questions addressed in Article 22(3 a-c). In addition, Contracting Parties are also welcome to provide any other information considered relevant to the specific situation of developing renewable energy of each Contracting Party.

<sup>29</sup> The contribution of gas, electricity and hydrogen from renewable energy sources should be reported depending on the final use (electricity, heating and cooling or transport) and only be counted once towards the total estimated net GHG savings.

<sup>30</sup> Please use actual figures to report on the excess production in the two years preceding submission of the report, and estimates for the following years up to 2020. In each report Contracting Party may correct the data of the previous reports.

<sup>31</sup> When filling in the table, for deficit production please mark the shortage of production using negative numbers (e.g. -x ktoe)

The principal document that establishes classification of waste in Ukraine is the State waste classifier DK 005-96, approved by order №89 of the State Standard Agency of Ukraine on February 29, 1996. This document defines waste as any substances, materials and items created as a result of human activity with no further use at source of generation or detection, and the holder of which disposes of or intends to dispose of it by means recycling or removal.

Also, order №39 of the Ministry of Housing and Utilities of 16.02.2010 approved Guidelines to determine the morphological composition of solid waste, aimed at introducing common approaches to explore and establish amounts of various components in solid waste, so that modern efficient waste treatment technologies could be implemented in populated areas and long-term forecasts of generated volumes of recyclable materials within solid waste could be made.

Solid waste in Ukraine is disposed of by the waste incinerating facility located in Kyiv. In addition, an incineration plant operates in Kharkiv oblast and two more mobile incineration installations operate in the city of Kharkov.

According to official statistics, 312.3 million tons of waste were generated in 2015 in Ukraine (excluding Crimea and zone of the counterterrorist operation), of which 1086.25 thousand tons were burned to generate energy.

According to the categories of the waste materials that were burned for energy, biomass amounted to 794.92 thousand tons, including:

- Paper and cardboard – 31.6 tons;
- Wood waste – 349419.5 tons;
- Waste of animal origin and mixed food waste – 466.2 tons;
- Waste of plant origin – 445005.6 tons.

Therefore, the share of biodegradable waste in waste used for producing energy is 73.2%.

Conversion of energy units into tons of oil equivalent, presented in this report, was done according to Table A3.4 Conversion Equivalents between Units of Energy of «Energy Statistics Manual», developed by the energy statistics department of the International Energy Agency with support of Eurostat.