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«Improving Energy Efficiency and Promoting Renewable Energy in the Agro-Food and Other Small and Medium Enterprises (SMEs) in Ukraine»

NATIONAL RENEWABLE ENERGY ACTION PLAN

drawn up in accordance with the template for national renewable energy action plans as set out in Directive 2009/28/EC of the European Parliament and of the Council

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DEFINITIONS AND ABBREVIATIONS

AF	Alternative Fuels
RES	Renewable Energy Sources
FER	Fuel and Energy Resources
FEC	Fuel and Energy Complex
NERC	National Energy Regulatory Commission
EU	European Union
HPP	Hydroelectric Power Plant
micro-HPP[1]	Micro hydroelectric power plant with installed capacity not exceeding 200 kW
mini-HPP[1]	Mini hydroelectric power plant with installed capacity of more than 200 kW but not exceeding1 MW
small HPP[1]	Smallhydroelectric power plant with installed capacityof more than1 MW but not exceeding 10 MW
large HPP	Large hydroelectric power plant with installed capacity exceeding 10 MW
GHG	Green House Gases
SPP	Solar Power Plant
GDP	Gross Domestic Product
BAU	Bioenergy Association of Ukraine
CMU	Cabinet of Ministers of Ukraine;
SAEE	State Agency on Energy Efficiency and Energy Saving of Ukraine
SSU	State Standard of Ukraine (DSTU)
MECIU	Ministry of Energy and Coal Industry of Ukraine
WPP	ind Power Plant
WPI	wind Power Installation
UES	United Energy System
REI	Requirements for Electrical Installations
PS HPP	Pumped - storage hydroelectric power plant
NPP	Nuclear Power Plant;
TL	Transmission Line
HUS	Housing and Utilities Sector
ENTSO-E	European Network of Transmission SystemOperators for Electricity
DCL	DC line
TS	Technical Specifications
FS	Feasibility Study

[1]The definition is set forth in the Law of UkraineOn amendments to the Law of Ukraine On electricity regarding the promotion of electricity production from renewable energy sources N 5485-VI of 20.11.2012.

ETBE	Ethyl Tertiary Butyl Ether
IGD	Industry Guidance Document
ISS	Industry-specific Standard (in Ukrainian - GSTU). At present ISS = Corporate Standard (CS), in Ukrainian - SOU
GFEC	Gross Final Energy Consumption
TFEC	Total Final Energy Consumption

1. Summary of national renewable energy

The use of renewable energy sources (RES) is one of the most important lines in the energy policy of Ukraine oriented towards saving of traditional fuel and energy resources and improving the state of environment. Higher share of RES use in the energy balance of Ukraine would result in higher diversification of energy sources thus contributing to strengthening of the country's energy independence.

Currently, the annual technologically attainable RES potential of Ukraine is up to 98 million tons of reference fuel that is nearly 50% of Ukraine's current total energy consumption. The main lines of RES use in Ukraine are wind energy, solar energy, hydro energy, biomass energy, geothermal energy, environmental energy in heat pump applications.

Ukraine is an energy deficit country importing some 70% of natural gas for own consumption. At the same time, the domestic economy's energy intensity is 3-4 times higher than that of developed economies thus making Ukraine extremely sensitive to the terms and conditions of natural gas importation and preventing ensuring normal living standard for population and normal operation of budget-funded institutions.

The main factors underlying the need to develop renewable energy in Ukraine:

- lack of sufficient volumes of own fossil fuels, dependence on their imports, growing deficit of conventional energy sources, growing world prices for energy sources and problems with foreign supply;
- negative condition and trends in the fuel and energy sector, specifically, low efficiency of conventional fuel and energy use and high degree of fixed assets wear;
- environmental problems, specifically, the need to comply with international commitments on reduction of hazardous emissions;
- Ukraine's state policy oriented towards integration into the European Union that requires achieving a high share of renewable energy use.

Institutional and technological restructuring of Ukraine's economy and its energy sector along with establishing institutional, regulatory and economic mechanisms will facilitate higher use of RES potential in Ukraine.

The process of renewable energy use gains momentum in our country year by year. The definition of alternative and renewable energy sources for the first time was fixed at the legislative level in Ukraine in the Law "On Energy Saving" dated 1 July 1994. This law envisages tax incentives for manufacturers of energy saving equipment, machinery and materials, measurement devices, energy consumption monitoring and control systems and enterprises that use the equipment operated by alternative and renewable energy sources.

The Law of Ukraine "On Alternative Energy Sources" was adopted in 2003. This law defines legislative, economic, environmental and institutional framework for the use of RES and encourage their extended use in the fuel and energy sector. The law defines alternative energy sources as renewable energy sources including solar, wind, geothermal energy, wave and tide energy, hydro energy, biomass energy, gas from organic wastes, gas from sewage treatment facilities, biogas and secondary energy resources including blast furnace and coke oven gases, coal bed methane, recovery of waste energy potential of technological processes.

The effective Energy Strategy of Ukraine for the period till 2030 adopted in 2006 establishes that RES development should be considered as an important factor for strengthening energy security

and reducing manmade impact of the energy sector on environment. The large-scale use of RES potential in Ukraine is not only of domestic, but also of international importance as a significant factor to prevent global climate change at our planet, in general, and improve the general state of energy security in Europe, in particular. In particular, the Strategy envisages that the development of renewable energy will bring a significant effect due to lower use of conventional energy sources, reduction of hazardous and greenhouse gas emissions, improvement of the general state of environment.

Despite rather dynamic development of legislative and regulatory framework facilitating higher share of RES use, the development of this sphere had been rather slow before 2009. The most power plants that use RES were built by private companies and farms. The state encouraged it at the legislative level but it did not invest significant capital into construction of these plants (except the Integrated Programme for Construction of Wind Power Plants, which targets have not been achieved).

The Verkhovna Rada of Ukraine passed the Law "On Amending the Law of Ukraine "On Electricity Industry" with Regard to Encouraging the Use of Alternative Energy Sources" in 2009. The legislative act introduced a special "green" tariff for electricity generated with the use of wind, solar, biomass energy and by small hydro power plants. The prices per one kWh of each type of electricity generated from alternative sources are established on the monthly basis by the National Energy Regulatory Commission (NERC). The "green" tariffs rates are established based on the capability ensure economic efficiency. According to the Procedure of Setting, Revising and Cancelling of "Green" Tariff for Economic Entities approved by NERC, the established "green" tariff shall be effective till 1 January 2030.

The legislation on the RES use has been improved in the recent years. In particular, the effective Law "On Electricity Industry" envisages a guarantee of electricity origin – a document to be issued by the body authorized by the Cabinet of Ministers of Ukraine by request of an electricity generator that proves that the share or specified volume of electricity is generated from alternative energy sources (except blast furnace and coke oven gases, and including the use of hydro power only from micro, mini and small hydro power plants) including for electricity generated from certain types of biomass and biogas. The mechanism of issuing a guarantee of electricity origin has been developed and a relevant regulatory document is pending approval.

At the same time, the Law of Ukraine "On Electricity Industry" established not only the "green" tariff, but also the so called "priority" procedure of payment for electricity generated from RES. The state-owned enterprise "Energorynok" perform full settlements on monthly basis operating as a wholesale supply of electricity. This means that the electricity purchase from a manufacturer is guaranteed and a manufacturer gets full payment for the electricity sold to the wholesale electricity market of Ukraine in monetary form without application of any types of debts set-off from the electricity bills. Therefore, the state has ensured full cash payment at the legislative level.

The state tax policy is an important lever in regulation of the renewable energy development. In particular, the Tax Code envisages VAT exemption on importation to the customs territory of Ukraine of the equipment for renewable energy, lower land tax rate for renewable energy enterprises, exemption from profit tax for primary activities of energy sector companies generating electricity from renewable sources only. At the same time, the introduction of the local content, which prescribes domestic origin of the certain scope of works and materials in renewable energy facilities to make them eligible for the green tariff (increasing from 15% to 50% during 3 years) supposing to encourage domestic manufacturers require extra coordination

of the processes of renewable energy facilities construction with the development of machine-building, instrument-making industry, etc.

With regard to individual segments of renewable energy, we can mention accelerated expanding (at the annual level of 50-100%) of wind and solar electricity industry. At the same time, the biomass energy is not enough used as compared to the international practices. At the same time, biomass has great potential in Ukraine as the sources of renewable energy. According to the concept of bioenergy development drafted by the Bioenergy Association of Ukraine, the use of biomass may grow from current 0.7% to 4% of the total energy consumption in 2020 and 10% in 2030 which is consistent with the biomass consumption level in EU-27 countries. According to the Association's experts, the problems on the way to achieving these targets are green tariff rates for electricity from biogas, requirements to the share of local content in equipment, materials and services in the total values of the projects, complexity of application of tax and customs preferences, lack of the green tariff for electricity produced via co-firing of biomass with fossil fuels, etc.

The "green" tariff law was partly extended to cover the electricity obtained from biogas and solid household waste as late as at the end of 2012 (applicable from April 2013). At the same time, the share of biofuels in motor fuels used in transport was fixed legislatively The Energy Strategy of Ukraine envisages also the use of biodiesel fuel, however in longer-term perspective; the draft state standard for this type of fuel is at the stage of approval at the moment.

Underdeveloped local electricity networks are most often mentioned among technological problems hampering renewable energy development. Modernization and strengthening of power transmission lines and power stations require significant investments. And in future there will be not enough compensating capacities.

As we know, the use of renewable sources of energy has its weaknesses. Overall expert opinions demonstrate the fact that renewable sources of energy are not fully environment friendly. The expertise proved the need to analyze renewable sources of energy impact on environment. The problem of environmental impact of renewable energy sources is relevant for Ukraine too. For instance, today, according to the ecologists, in order to avoid negative impact on environment small hydro power plants in Zakarpatya region should operate exclusively in natural run-off mode. Decision-making on the issues whether to build hydro power plants on mountain rivers should include responsible attitude and recognize importance of the above problem.

The State Target Economic Program for Energy Efficiency and Developing of Energy Generation from Renewable Energy Sources and Alternative Types of Fuel for 2010-2015 has been in effect since March 2010. The Program envisages creating conditions for approximating energy intensity of the gross domestic product (GDP) of Ukraine to the level of developed countries and the European Union standards, 20% reduction of the gross domestic product energy intensity during the effective period of the Program as compared to 2008 (3.3% annual reduction), improved efficiency of the fuel and energy use and strengthening competitiveness of the national economy, optimization of the country's energy balance structure via reducing the share of the fossil fuel imports, in particular, natural gas imports and their replacement with alternative energy sources.

In 2011, the Government of Ukraine made a decision to redraft the Energy Strategy till 2030. As a forecast document intended for a long-term perspective, the Energy Strategy of Ukraine needs to be updated periodically. Besides that, since the previous draft of this document was approved, some changes in the economy and energy sector of Ukraine occurred that directly and significantly influence the perspectives of fuel and energy sector development. As of today, a

draft of "Amended Energy Strategy of Ukraine for the Period till 2030 in the Sphere of Electricity Industry" (authors – the Ministry of Energy and coal Industry of Ukraine and Effective Governance Foundation, under the instruction) has been prepared. This document focuses on the strategy of electricity sector development, dealing as well with related sectors, coal industry development, in particular. A baseline year for calculations of fuel and energy demand is 2010. According to the draft amended Strategy, the electricity demand in Ukraine according to the baseline scenario will exceed 2010 level by 50%. Mainly, it will be the result of increasing consumption in industry (by 55%) and in services sector (by 100%). The forecast of increasing electricity consumption is made taking into account the effect of energy saving measures implementation. RES share is forecasted to increase in the total balance of installed capacities up to about 10% to 2030, which according to the baseline scenario constitutes around 10-12 GW (including large hydropower plants), with output of 23-28 TW-hour. It is below the commitments of Ukraine to the Energy Community. But the Strategy states that the RES use values can be increased providing that qualitative technological breakthrough occurs that will result in significant reduction of total energy prime cost to the level of conventional generation cost.

According to the baseline scenario, total thermal energy consumption should increase up to 271 million GCal by 2030. This implies intensive implementation of energy efficiency improvement measures and heat consumption reduction by ~25%. The baseline scenario of electricity demand supposes reduction of GDP electricity intensity approximately by 40%. To get to this level it is necessary to achieve 20% reduction of specific electricity consumption. In the baseline scenario for transport sector development, the aggregate domestic demand for main light-oil products will constitute about 17.4 million tons in 2030 (including petrol – 6.3 million tons, diesel fuel – 10.1 million tons, gas – 1.0 million tons), electricity consumption in transport sector will reach 14 billion kW-hour. To achieve these figures it is necessary to improve the efficiency of fuel consumption by 25-30%. The above indicated energy efficiency figures were taken as the basis for Table 1.

As these figures are indicative for the period till 2030, the intermediate values for the period till 2020 for drafting of the National Renewable Energy Action Plan (Table 1) are calculated based on this final goal.

Ukraine became a full member of the Energy Community on 1 February 2011. According to the decisions of the Community, Ukraine committed to ensure minimum 11% share of RES-produced energy in the final consumption in 2020.

In September 2010, Ukraine signed the Protocol on Accession to the Treaty establishing the Energy Community which was further ratified by Law of Ukraine No. 2787-VI of 15 December 2010. Pursuant to the Law, Ukraine became a full-fledged participant in the Energy Community (EnC).

In October 2012, the Energy Community Ministerial Council enacted Decision D/2012/04/MC-EnC on the implementation of Directive 2009/28/EC in the Energy Community and amending Article 20 of the Energy Community Treaty. Pursuant to the Decision, each Contracting Party shall bring into force the laws, regulations and administrative provisions necessary to comply with Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (the so-called Renewable Energy Directive – RED) by 1 January 2014. RED establishes mandatory national targets for energy from renewable sources, primarily, to the end of providing guarantees to investors and promoting development of state-of-the-art technologies and innovations in this domain. And it imposes rather strict requirements on sustainability of biofuel production and reduction of GHG emissions. Following

Decision D/2012/04/MC-EnC, Ukraine committed to achieve 11% share of energy from renewable sources in gross final consumption of energy by 2020. This commitment will be a powerful driver for further development of the use of RES in Ukraine.

Total eletrical capacity of renewable energy facilities in Ukraine was 650 MW as of the end of 2012, including total capacity of wind power plants – 194 MW, solar power plants – 372 MW, small hydropower plants – 73 MW, biomass- and biogas-based electricity generation facilities – 10 MW. Thermal capacity exceeded 420 MW, mostly due to the use of biomass. And, the use of RES not regulated by NERC pricing policy is not included here (consumption of biomass by households, individual wind machines, etc.).

Pursuant to the Law of Ukraine "On Amending Certain Laws of Ukraine concerning Production and Use of Motor Fuels Containing Biocomponents" No 4970-VI of 19 June 2012, the **mandatory** content of bioethanol in motor petrols produced and/or sold within the territory of Ukraine in 2014-2015 shall be minimum 5% (by volume), starting with 2016 it shall be minimum 7%.

According to the Ministry's of Energy and Coal Industry of Ukraine data, the national consumption of light oil products was equal to about 10 million tons (4.2 mln tons of petrol and 6 mln tons of diesel fuels). Therefore, even the rough estimates demonstrate that in order to meet the requirements of this Law, Ukraine must produce minimum 225 ths tons of bioethanol in 2014 and minimum 314 ths tons of bioethanol starting with 2016.

For reference: According to the Ministry of Agrarian Policy, Ukraine produced approximately 9.7 ths tons of bioethanol in 2011. The bioethanol output in 2012, according to various estimates, was in the range from 50 to 70 ths tons. Commercial production of biodiesel is not available in Ukraine.

The following conclusions may be made about the overall status and prospects of RES use development:

1. Ukraine has political and economic preconditions and available technical potential for development of the renewable energy.

2. The general status of the regulatory legislative framework is aimed at ensuring development of renewable energy.

3. There is a significant potential to raise foreign investments into renewable energy development. However Ukrainian deficient judicial system deprives prospective foreign investors of proper legal protection with regard to their investments within the territory of Ukraine. In this regard, the issue related to guaranteeing protection of foreign investments attracted to the renewable energy sector must be resolved at the level of legislation and accompanied with real reform of the judicial system.

4. Development of the renewable energy will strengthen the energy and economic independence of our country, reduce its dependence on imports of conventional energy resources, contribute to environmental protection, and decrease the energy intensity of the gross domestic product.

5. In order to avoid hazardous impact on the environment, before construction of installations generating energy from renewable sources, it is necessary to fix in legislation a mechanism for mandatory state expert assessment aimed at analysis of impact of the RES use on environment.

6. The National Renewable Energy Action Plan of Ukraine till 2020 should address the following issues:

   - priority implementation of investment projects on RES use, which are largely ready for implementation and may as soon as possible provide saving of conventional fuel and energy resources;

   - organizing of equipment production for renewable energy needs and their implementation in various regions of Ukraine including creation of demonstration and pilot facilities;

   - reforms in the production sphere towards creation of specialized productions for designing, manufacturing, implementation and operation of equipment for RES use and consumption, creation of novel types of renewable energy equipment and technologies to increase RES use efficiency and reduce the costs of energy equipment;

   - creation of informational and analytic base of modern equipment and state-of-the-art technologies, development of scientific research and design base, training and retraining of engineers and technical personnel, establishment of certification framework and regulatory framework for all the lines of RES development, state policy of economic incentives and improvement of the legislative framework, financing mechanisms etc.

2. Expected Final Energy Consumption for the Period 2010-2020

The 2009 energy consumption data in Tables 1, 2, 3, 4a, 4b, 7, 10 a,10 b,11, 12 is reflecting the data for 2009 compiled and published by the State Statistical Service of Ukraine rather than the biomass consumption data for 2009 and 2010 based on the biomass consumption survey conducted for the Energy Community. However, with the adoption of Ministerial Council Decision 2012/04/MC-EnC related to implementation of Directive 2009/28/EC in the Energy Community, Ukraine committed to an 11% RES target in 2020 and the NREAP is structured to meet this target.
In the same time, Ukraine is bound by the Ministerial Council Decision 2013/02/MC-EnC on implementation of the rules in energy statistics in accordance with Regulation(EC) 1099/2008 and Directive 2008/92/EC and, therefore, the compilation of the energy balance based on improved energy consumption surveys, mostly for biomass consumption is expected in the coming years.

The dynamics of final energy consumption growth is taken from the draft new version of the Energy Strategy of Ukraine till 2030. The targets from the reference scenario of electricity industry development and some other industries (in particular, the use of thermal energy of environment) are used for the levels of 2015 and 2020; while the interim values for heating, transport and energy efficiency indicators are taken from the forecast data of the reference scenario till 2030.

Since “Heating” section (Table 1) covers total final energy consumption except transport and electricity, the targets herein differ from the targets of thermal energy supply specified in the above draft Energy Strategy; the statistic data from the Energy Balance of Ukraine (issued by the State Statistics Service of Ukraine) are used in this section. Account is taken of the fact that the fuel and energy consumption balance includes non-energy use of fuel as well; the tables below demonstrate only consumption for energy purpose. The data of base year of 2009 are based on the abovementioned energy balance of Ukraine. Account is taken of the fact that this year’s figures demonstrate the reduced consumption as compared to neighboring years (except transport).

According to the Energy Balance of Ukraine for 2009, the Total Final energy sorces Consumption (TFC) made up 67,555 ktoe, plus the losses – 3,452 ktoe, minus the non-energy use – 4,269 ktoe, thus Gross Final Energy Consumption (GFEC) was equal to 66,738 ktoe. This total includes the transport consumption of 12,396 ktoe where 8 943 ktoe are incorporated according to Directive 2009/28/EC, clause 3(4)(a). The electricity output, according to the Ministry's of Energy statistics, was equal to 169,5 TW·h or 14,577 ktoe including 786 ktoe for consumption in transport (including 49 ktoe for pipeline transport). The consumption in heating is calculated as the rest of final consumption minus the consumption in electricity and transport[2]

Table 1. Expected gross final energy consumption of Ukraine in heating and cooling, electricity and transport up to 2020 taking into account the effects of energy efficiency and energy saving measures 2010-2020 (ktoe)

No.	2009	2013		2014		2015	
	base year	reference scenario	additional energy efficiency	reference scenario	additional energy efficiency	reference scenario	additional energy efficiency
1. Heating ([1])	40,551	46,550	44,800	47,790	45,570	48,620	45,910
2. Electricity ([2])	13,791	16,390	15,950	17,390	16,780	17,890	17,110
3. Transport ([3])	8,943	9,310	9,050	9,620	9,260	9,950	9,480
4. Gross final energy consumption ([4])	63,285	72,250	69,800	74,800	71,610	76,460	72,500

No	2016		2017		2018		2019		2020	
	reference scenario	additional energy efficiency	reference scenario	additional energy efficiency	reference scenario	additional energy efficiency	reference scenario	additional energy efficiency	reference scenario	additional energy efficiency
1.	49,510	46,280	50,460	46,680	51,460	47,100	52,520	47,540	53,780	48,020
2.	18,400	17,440	18,930	17,770	19,470	18,100	20,030	18,430	20,710	18,830
3.	10,290	9,700	10,650	9,930	11,030	10,170	11,440	10,420	11,910	10,680
4.	78,200	73,420	80,040	74,380	81,960	75,370	83,990	76,390	86,400	77,530

([1]) It is the final energy consumption of all energy commodities except electricity for purposes other than transport, plus the consumption of heat for own use at electricity and heat plants and heat losses in networks (items "2. Own use by plant" and "11.Transmission and distribution losses" of Regulation (EC) No 1099/2008).
([2]) The gross electricity consumption is national gross electricity production, including autoproduction, plus imports, minus exports.
([3]) Transport consumption as defined in Article 3(4)(a) of Directive 2009/28/EC. Renewable electricity in road transport for this figure should be multiplied by a factor of 2.5, as indicated by Article 3(4)(c) of Directive 2009/28/EC.
([4]) As defined in Article (2)(f) of Directive 2009/28/EC. This comprises final energy consumption plus network losses and own use of heat and electricity at electricity and heating plants (this does not include consumption of electricity for pumped hydro storage or for transformation in electrical boilers or heat pumps at district heating plants).

In Ukraine the share of fuel for aviation consumption is lower than 6.18% of total consumption (Community average), therefore according to Article 5(6), consumption for aviation is not calculated separately.

[2] More detailed explanation is given in Annex 1

3. Renewable energy targets and trajectories

3.1. National overall targets

Table 2. National overall target for the share of energy from renewable sources in gross final consumption of energy in 2009 and 2020 (figures in A and B are transcribed from Annex I, Part A to Directive 2009/28/EC)

A. Share of energy from renewable sources in gross final consumption of energy in 2009 (S_{2009}) (%)	3.8
B. Target of energy from renewable sources in gross final consumption of energy in 2020 (S_{2020}) (%)	11.0
C. Expected total adjusted energy consumption in 2020 (from Table 1, last cell) (ktoe)	77,530
D. Expected amount of energy from renewable sources corresponding to the 2020 target (calculated as B x C) (ktoe)	8,530

3.2. Sectoral targets and trajectories

The data of reference year 2009 is based on the energy balance of Ukraine, except for heat energy of environment (~40 ktoe) which is not reflected in this balance.

According to the data of the State Statistic Office, in 2009 RES input to the energy was: 1,443 ktoe (biofuel), HPS – 1,026 ktoe (electricity) and 4 ktoe (solar and wind), beside this 42 ktoe was produced by heat pumps, totally 2,505 ktoe or 3.8% of final consumption of heat, electricity and fuel for transport.

Table 3. National 2020 target and estimated trajectory of energy from renewable sources in heating and cooling, electricity and transport (%)

	2009	2013	2014	2015	2016	2017	2018	2019	2020
RES-H&C ([1])	3.4	6.0	6.5	7.1	8.0	8.8	9.7	10.8	12.2
RES-E ([2])	7.1	7.2	7.6	8.3	8.7	9.4	10.2	10.9	11.5
RES-T ([3])	1.5	2.3	4.1	5.0	6.5	7.5	8.2	9.0	10.0
Overall RES share([4])	3.8	5.6	6.1	6.8	7.5	8.2	9.0	9.9	11.0
Of which from cooperation mechanism ([5])	-	-	-	-	-	-	-	-	-
Surplus for cooperation mechanism([5])	-	-	-	-	-	-	-	-	-

As in Part B of Annex I to the Directive	2011-2012	2013-2014	2015-2016	2017-2018		2020
	S_{2009} + 20% (S_{2020}-S_{2009})	S_{2009} + 30% (S_{2020}-S_{2009})	S_{2009} + 45% (S_{2020}-S_{2009})	S_{2009} + 65% (S_{2020}-S_{2009})		S_{2020}
RES minimum trajectory(%)	5.3	6.0	7.0	8.5		11.0
RES minimum trajectory (ktoe)	3,630	4,240	5,110	6,360		8,530

([1]) 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. Line (A) from Table 4a divided by line (1) of Table 1.

([2]) 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. Row (B) from Table 4a divided by row (2) of Table 1.

([3]) 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 petrol; diesel; biofuels used in road and rail transport and electricity in land transport (as reflected in row 3 of Table 1). Line (J) from Table 4b divided by row (3) of Table 1.

([4]) Share of renewable energy in gross final energy consumption. Row (G) from Table 4a divided by row (4) of Table 1.
([5]) In percentage point of overall RES share.

Table 4a. Calculation table for the renewable energy contribution of each sector to final energy consumption (ktoe)

	2009	2013	2014	2015	2016	2017	2018	2019	2020
(A) Expected gross final consumption of RES for heating and cooling	1,473	2,695	2,955	3,277	3,690	4,095	4,575	5,140	5,850
(B) Expected gross final consumption of electricity from RES	980	1,140	1,275	1,427	1,525	1,670	1,840	2,000	2,175
(C) Expected final consumption of energy from RES in transport	52	90	174	221	298	351	395	445	505
(D) Expected total RES consumption([1])	2,505	3,925	4,404	4,925	5,513	6,116	6,810	7,585	8,530
(E) Expected transfer of RES to other Member States									
(F)) Expected transfer of RES from other Member States and 3rd countries									
(G) Expected RES consumption adjusted for target (D) - (E) + (F)	2,505	2,925	4404	4,925	5,513	6,116	6,810	7,585	8,530

([1]) According to Article 5(1) of Directive 2009/28/EC gas, electricity and hydrogen from renewable energy sources shall only be considered once. No double counting is allowed.

Table 4b. Calculation table for the renewable energy in transport share (ktoe)

	2009	2013	2014	2015	2016	2017	2018	2019	2020
(C) Expected RES consumption in transport ([1])	52	90	174	221	298	351	395	445	505
(H) Expected RES electricity in road transport ([2])	52	60	64	71	78	86	95	105	115
(I) Expected consumption of biofuels from wastes, residues, non-food cellulosic and lingo-cellulosic material in transport([2])	0	30	110	150	220	265	300	340	390
(J) Expected RES contribution to transport for the RES-T target: (C) + (2,5 - 1) x (H) + (2 - 1) x (I)	130	210	380	477	635	745	837	942	1 068

([1]) Containing all RES used in transport including electricity, hydrogen and gas from renewable energy sources, and excluding biofuels that do no comply with the sustainability criteria (cf. Article 5(1) last subparagraph). Actual values are indicated without using the multiplication factors.
([2]) actual values without using the multiplication factors.

4. Measures for achieving indicative targets

4.1. Overview of all strategies and measures for promoting the use of energy from renewable sources

Table 5. Overview of all strategies and measures

Measure name and reference source	Measure type (*)	Expected outcome (**)	Target group and/or activity types (***)	In progress or scheduled	Commencement and completion of a measure implementation
Energy Strategy of Ukraine for the period up to 2030 Order of the Cabinet of Ministers of Ukraine dated 15.03.2006 No. 145-p. The draft Strategy has been updated, but it was not yet approved.	Regulatory	Determination of priorities and ways of Ukrainian fuel and energy sector development, realization of potential balances of production and consumption of fuel and energy types, including those generated from non-conventional and renewable sources.	Public authorities, business entities of all ownership forms, general public, project organizations, investors, end users	In progress	2006- 2030
Resolution of the Cabinet of Ministers of Ukraine dated 01.03.2010 No. 243 On Approval of the State Target Economic Program for Energy Efficiency and Development of Energy Production from Renewable Energy Sources and Alternative Types of Fuel for the period of 2010-2015	Regulatory Financial	Creation of preconditions for decrease of GDP energy intensity within the program implementation period by 20% as compared to 2008 (by 4% annually) and optimization of Ukraine's energy balance structure by increase of RES and AFT share	Public authorities, business entities of all ownership forms, general public, project organizations, investors, end users	In progress	2010-2015
Order of the Cabinet of Ministers of Ukraine dated 19.02.2009 No. 254-p On Implementation of Investment Projects related to Construction of Wind Power Stations in Autonomous Republic of Crimea and Mykolayiv region.	Regulatory Financial	Regarding implementation of investment projects related to construction of wind power stations in Autonomous Republic of Crimea and Mykolayiv region	Public authorities, project organizations, investors, end users	In progress	from 2009
The Concept of the State Target Scientific and Technical Program for Development of Biological Fuel Types Production and Use Approved by the Order of the Cabinet of Ministers of Ukraine dated 12.02.2009 No. 276-p	Regulatory	Provides for increase of biofuel share in the overall energy balance up to 5-7%, as well as twofold enhancement of environmental security level.	Public authorities, business entities of all ownership forms, general public, project organizations, investors active in the sphere of cattle breeding		2010-2014
Concept of the State Target Economic Program	Regulatory	Use of efficient energy and	Public authorities,		2010-2015

for Development of Cattle Breeding for the Period up to 2015 Approved by the Order of the Cabinet of Ministers of Ukraine dated 23.12.2009 No. 1687-p		resource saving technologies (biogas production from cattle breeding wastes, efficient consumption of electric power etc) in production of cattle breeding products.	business entities of all ownership forms, general public, project organizations, investors active in the sphere of cattle breeding		
Program for Renewable Energy Development in Rivne, Kharkiv, Zakarpattya, Dnipropetrovsk, Volyn, Zaporizhya, Sumy and Donetsk regions.	Regulatory	Regarding implementation of investment projects related to development of renewable energy sources within the region.	Public authorities, business entities of all ownership forms, general public, project organizations, investors.	In progress	2011-2015
Program for Renewable Energy Development in Kherson Region up to 2030	Regulatory,	Regarding implementation of investment projects related to development of renewable energy sources within the region.	Public authorities, business entities of all ownership forms, general public, project organizations, investors.	In progress	up to 2030
Law of Ukraine On Alternative Energy Sources dated 20.02.2003 No. 555-IV	Regulatory	Defines legal, economic, environmental and organizational basis for the use of alternative energy sources, as well as promoting the increase of their use in fuel and energy sector.	Use of RES	In progress	from 2003
Law of Ukraine On Energy Saving dated 01.07.1994 No. 74/94-BP	Regulatory	Defines legal, economic, social and environmental basis for energy saving by all enterprises, complexes and organizations located within the territory of Ukraine, as well as by all citizens.	Public authorities, project organizations, investors, end users	In progress	from 1994
Law of Ukraine On Electric Energy dated 16.10.1997 No. 575/97-BP	Regulatory, financial	Defines legal, economic and organizational basis for activities in the sphere of electric power generation and governs relations related to production, transmission,	Public authorities, project organizations, investors, end users	In progress	from 1997 up to 2030 – in terms of the Green Tariff

		supply and use of energy, ensuring energy safety of Ukraine, application of the Green Tariff in renewable energy sector, guaranteed connecting to the Unified Energy System of Ukraine at the expense of electric power suppliers, Government guarantees as to purchase of electric power from renewable sources at the Green Tariff			
Law of Ukraine On Heat Supply dated 02.06.2005 No. 2633-IV	Regulatory	Defines legal, economic and organizational basis for activities at heat supply facilities and governs relations related to production, transmission, supply and use of heat energy in order to ensure energy safety of Ukraine, enhancement of energy efficiency of heat supply systems operation, creation and improvement of heat energy market	Public authorities, project organizations, investors, end users	In progress	from 2005
Law of Ukraine On Combined Production of Heat and Electric Energy (Cogeneration) and Use of Faulting Energy Potential dated 05.04.2005 No. 2509-IV	Regulatory	Defines legal, economic and organizational basis for activities of entities in the sphere of energy saving as related to cogeneration installations, governs relations related to specific features of production, transmission and supply of electric and heat energy from cogeneration installations	Public authorities, project organizations, investors, end users	In progress	from 2005
On Approval of Procedure for Qualification of		Approval of procedure for	Project organizations,	Scheduled	Project

Cogeneration Installation. Ministry for Economic Development (draft)		qualification of cogeneration installation	investors, end users		
Law of Ukraine on Tax Code of Ukraine dated 02.12.2010 No. 2755-VI	Regulatory, financial	Exemption (for the period up to 2020 inclusive) from profit tax of enterprises producing electric power from renewable sources, tax exemption upon import to the customs territory of Ukraine of equipment for production of electric energy from renewable sources	Public authorities, project organizations, investors, end users	In progress	from 2010
Law of Ukraine On Private Public Partnership Verkhovna Rada of Ukraine; Law dated 01.07.2010 No. 2404-VI	Regulatory	Provision of public support, creation of incentives for technological modernization of industrial enterprises and creation of new facilities for energy generation from renewable energy sources.	Public authorities, investors, end users	In progress	from 2010
Order of the Cabinet of Ministers of Ukraine dated 03.08.2011 No. 733-p on Approval of Action Plan for Fulfillment of Obligations under the Energy Community Treaty	Regulatory	Action plan for fulfillment of obligations under the Energy Community Treaty	Public authorities, project organizations, investors, end users	In progress	from 2011
On Approval of Action Plan for Implementation of Certain EU Directives in the Sphere of Renewable Energy Sources and Alternative Types of Fuel, Draft Order of the Cabinet of Ministers of Ukraine	Regulatory,	Action plan for implementation of certain EU directives in the sphere of renewable energy sources and alternative types of fuel	Public authorities	The project is under approval procedure	project
Law of Ukraine On Lands in Energy Industry and Legal Status of Special Areas of Energy Facilities dated 09.07.2010 No. 2480-VI	Regulatory,	Legal and organizational basis for provision and use of land plots for placement of energy facilities, establishment and compliance with legal regime of special areas of energy facilities in order to ensure continuous operation of such	Public authorities, project organizations, investors, end users	In progress	from 2010

		facilities, efficient land use, as well as safe life activities and protection of population and commercial facilities from potential accidents effect.			
Draft Law of Ukraine on Basis of Electric Energy Market Operation in Ukraine dated 06.06.2012 No. 10571	Regulatory, financial	Regulates relations between electric power market players occurring within the process of such market operation and sale and purchase of electric power, as well as with regard to services provided on such market.	Public authorities, project organizations, investors, end users	project	project
Resolution of the Cabinet of Ministers of Ukraine dated 24.09.2012 No. 878 on Issues Related to Application of Certificates of Origin for Goods in Order to Confirm their Ukrainian Origin and Determination of a Share of Raw Materials, Materials, Fixed Assets, Works and Services of Ukrainian Origin in the Cost of Construction of Electric Power Facilities Generating Electric Energy with the Use of Renewable Energy Sources	Regulatory	Issues related to application of certificates of origin for goods in order to confirm their Ukrainian origin and determination of a share of raw materials, materials, fixed assets, works and services of Ukrainian origin in the cost of construction of electric power facilities generating electric energy with the use of renewable energy sources	Public authorities, project organizations, investors, end users	In progress	from 2012
Procedure for determination of a share of raw materials, materials, fixed assets, works and services of Ukrainian origin in the cost of construction of the relevant electric power facility generating electric energy with the use of RES NERC, 2013	Regulatory	Procedure for determination of a share of raw materials, materials, fixed assets, works and services of Ukrainian origin in the cost of construction of renewable energy facilities	Public authorities, project organizations, investors, end users	project	from 2013
Law of Ukraine on Alternative Types of Fuel dated 14.01.2000 No. 1391-XIV.	Regulatory	Legal, social, economic, environmental and organizational basis for production	Public authorities, project organizations, investors, end users	In progress	from 2000

		(generation) and use of alternative types of fuel, as well as promoting the increase of their use share up to 20 per cent of total fuel consumption in Ukraine within the period up to 2020.			
Law of Ukraine on Land Lease dated 06.10.1998 No. 161-XIV.	Regulatory	Relations in the area of land lease	Public authorities, project organizations, investors, end users	In progress	from 1998
Law of Ukraine on Foreign Investment Regime dated 19.03.1996 No. 93/96-BP.	Regulatory, Financial	Defines specific features of foreign investment activity within the territory of Ukraine subject to objectives, principles and provisions of Ukraine legislation	Public authorities, project organizations, investors	In progress	from 1996
Law of Ukraine on Regulation of Urban Management Activities dated 17.02.2011 No. 3038-VI	Regulatory	Legal and organizational basis for urban management activities and ensuring sustainable development of territories subject to the state, public and private interests	Public authorities, project organizations	In progress	from 2011
Rules for Connecting Electrical Installations to Power Supply Networks, as approved by the Resolution of the Cabinet of Ministers of Ukraine dated 17.01.2013 No. 32	Regulatory	The rules govern relations within the process of connecting newly constructed, reconstructed or technical reequipped power installations of customers (except for cogeneration installations) to power supply networks.	Public authorities, project organizations, investors, end users	In progress	from 2013
Rules for Connecting Wind Power Stations to Power Supply Network, as approved by the Order of the Ministry for Energy and Coal Industry dated 28.10.2009 No. 570	Regulatory	The rules provide for mechanism of connecting and transmission by power supply network of energy generated by wind farms with rated capacity of at least 100 MW.	Public authorities, project organizations, investors, end users	In progress	from 2009

Rules for Electric Energy Use, as approved by the Regulation of the Cabinet of Ministers of Ukraine dated 31.07.96 No. 28.	Regulatory	The rules govern relations within the process of sale and purchase of electric energy between producers and suppliers of electric power and consumers (at retail market of electric power).	Public authorities, project organizations, investors, end users	In progress	from 1996
Requirements as to Wind and Solar Photovoltaic Power Stations with Production Capacity over 150 kW for Connecting to External Power Supply Networks (under consideration)	Regulatory	Define principal technical and functional requirements, which should be complied with by wind and photovoltaic power stations with nominal capacity exceeding 150 kW in connection point, when wind and photovoltaic power station is connected to power supply networks of general use, in order to ensure sustainable and continuous operation of power supply networks.	Public authorities, project organizations, investors, end users	project	project
Resolution of the Cabinet of Ministers of Ukraine dated 4.05.2008 No. 444 on Issues Related to Import of Energy Saving Materials, Equipment, Installations and Components to the Customs Territory of Ukraine	Regulatory, Financial	Procedure for import of energy saving materials, equipment, installations and components to the customs territory of Ukraine	Public authorities, project organizations, investors	In progress	from 2008
Resolution of the Cabinet of Ministers of Ukraine dated 29.04.1999 No. 753 on the Procedure of Issuing by the National Energy Regulation Commission of Licenses for Carrying out Activities related to Production, Transmission and Supply of Electric Energy, Combined Production of Heat and Electric Energy, Production of Heat Energy at Cogeneration Plants and Installations with the Use of Non-conventional or Renewable Energy	Regulatory	Procedure for licenses issue	Public authorities, project organizations, investors	In progress	from 1999

Sources.					
Resolution of NERC dated 13.06.1996 No. 1543 on Approval of Terms and Conditions and Rules for Carrying Out Business Activities related to Transmission of Electric Power by Local Power Supply Networks	Regulatory	Terms and Conditions and Rules for carrying out business activities related to transmission of electric power by local power supply networks	Public authorities, project organizations, investors, end users	In progress	from 1996
Resolution of NERC dated 19.05.2011 No. 882 on Approval of the Procedure for Control of Licensees Compliance with Terms and Conditions and Rules for Carrying Out Activities related to Production, Transmission and Supply of Electric Energy, Combined Production of Heat and Electric Energy, Production of Heat Energy at Cogeneration Plants and Installations with the Use of Non-conventional or Alternative Energy Sources	Regulatory	Procedure for control of licensees compliance with terms and conditions and rules for carrying out activities	Public authorities, project organizations, investors, end users	In progress	from 2011
Resolution of NERC dated 21.01.2006 No. 47 on Approval of Rules for Connecting Cogeneration Installations to Power Supply Networks	Regulatory	Rules for connecting cogeneration installations to power supply networks	Public authorities, project organizations, investors, end users	In progress	from 2006
Resolution of the Cabinet of Ministers of Ukraine dated 08.12.2010 No. 1256 On Approval of the List of Projects in Priority Areas of Social-Economic and Cultural Development (National Projects). Energy of Nature national project	Financial, Regulatory	Construction of the system of wind farms, solar power plants and small hydropower plants, production of alternative solid fuel	investor	In progress	2010-2015

(*) Indicate whether the measure is (mostly) regulatory, financial or soft (e.g., informational campaign).
(**) Will the expected outcome ensure change of behavior, rated capacity (MW; tons/year), generated energy (ktoe)
(***) Target group: investors, end users, state administration, schedulers, architects, installation company, etc? Or what is the target activity/sector: biofuel production, use of mull for energy generation, etc)?

4.2. Certain Measures in Pursuance of Articles 13, 14, 16 and Articles 17-21 of Directive 2009/28/EC

4.2.1. Administrative Procedures and Territorial Planning (Article 13(1) of Directive 2009/28/EC)

(a) List of applicable national and, if any, regional statutory/regulatory acts concerning authorization system, certification, licensing and territorial planning applicable to electric power stations and infrastructure of electric power transmission and distribution networks related thereto;

Procedure	Governed by
Negotiation with local government bodies and environmental authorities of issues related to allocation of land plot for placement of renewable energy facility	- Resolution of the Cabinet of Ministers of Ukraine dated 31.03.04 No. 427 on Approval of the Procedure for Selection of Land Plots for Placement of Facilities - Law of Ukraine on Principles of Urban Management, No. 2780-XII dated 16.11.1992 - Land Code of Ukraine, No. 2768-14 dated 25.10.2001
Negotiation with NEC Ukrenergo State Enterprise or with regional power distribution company of issues as to connecting the relevant facility to power supply networks and obtaining of technical specifications	- Resolution of the Cabinet of Ministers of Ukraine dated 19.02.09 No. 126 on Specific Features of Connecting to Power Supply Networks of Electric Energy Facilities Generating Electric Energy with the Use of Alternative Sources - Order of the Ministry for Energy and Coal Industry dated 28.10.2009 No. 570 registered by the Ministry of Justice of Ukraine on 29.12.2009 No. 1263/17279 on Approval of Rules for Connecting Wind Power Stations - GKD (Industry Guidance Document) 341.003.001.001-2000 Connecting Wind Power Facilities to Power Supply Networks. Procedure and Requirements
Conceptual study for renewable energy facility	- Order of the Ministry of Regional Construction dated 07.07.2011 No. 109 registered by the Ministry of Justice of Ukraine on 22.07.11 under No. 912/19650 on Approval of the Procedure for Granting of Town Planning Terms and Restrictions for Development of a Land Plot, their Structure and Content - DBN (State Construction Standard) A 2.2-3-2012 Structure and Content of Construction Project Documentation - Resolution of the Cabinet of Ministers of Ukraine dated 19.02.2009 No. 126 on Specific Features of Connecting to Power Supply Networks of Electric Energy Facilities Generating Electric Energy with the Use of Alternative Sources
Preparation of design estimate documentation in accordance with DBN (State Construction Standard) A 2.2-3-2012	- Resolution of the Cabinet of Ministers of Ukraine dated 27.04.2011 No. 557 on Procedure of Awarding IV and V Complexity Category to Construction Facilities - Order of the Ministry of Regional Construction dated 16.05.2011 No. 45 registered by the Ministry of Justice of Ukraine on 01.06.2011 No. 651/19389 on Approval of the Procedure for Development of Design Documentation for Facilities Construction - DBN (State Construction Standard) A 2.2-3-2012 Structure and Content of Construction Project Documentation - GKD (Industry Guidance Document) 341.003.004.001-2000 Technical and Economic Justification of Investments in Construction of Wind Power Stations - GKD (Industry Guidance Document) 341.003.001.002-2000 Wind Power Stations Design Rules
Expert examination of construction project pursuant to the Law of Ukraine on Regulation of Urban Management Activities (comprehensive	- Law of Ukraine on Ensuring Sanitary and Epidemic Security of Population, No. 4004-XII dated 24.02.1994 - Law of Ukraine on Labor Protection, No. 2694-XII dated 14.10.1992 - Law of Ukraine on Environmental Expert Examination, No. 45/95-BP dated 09.02.1995

expert examination)	- Law of Ukraine on Fire Safety, No. 3745-12 dated 17.12.1993 - Law of Ukraine on Energy Saving, No. 74/94-BP dated 01.07.1994 - Resolution of the Cabinet of Ministers of Ukraine dated 23.06.1994 No. 431 on the Procedure for State Expert Examination (Verification) of Technological, Design and Technical Documentation for Manufacturing of Production Facilities in terms of their Compliance with Labor Protection Regulatory Acts - Resolution of the Cabinet of Ministers of Ukraine dated 11.05.2011 No. 560 on Approval of Construction Projects and their Expert Examination - Resolution of the Cabinet of Ministers of Ukraine dated 31.10.1995 No. 870 on the Procedure for Submission of Documents for State Environmental Expert Examination - Regulation of the Cabinet of Ministers of Ukraine dated 15.07.1998 No. 1094 on State Energy Saving Expert Examination - Order of SAEE dated 09.03.1999 No. 15 registered by the Ministry of Justice of Ukraine on 06.05.1999 under No. 292/3585 on Approval of Guidelines on the Procedure of Documents Submission and State Energy Saving Expert Examination - Order of the Ministry of Health dated 09.10.2000 No. 247 registered by the Ministry of Justice of Ukraine on 10.01.2001 under No. 4/5195 on Approval of Temporary Procedure for State Sanitary and Hygiene Expert Examination
Ensuring construction, preparatory works and construction	- Resolution of the Cabinet of Ministers of Ukraine dated 13.04.2011 No. 466 on Some Issues Related to Preparatory and Construction Works
Verification and testing of equipment	- Law of Ukraine on Electric Energy, No. 575/97-BP dated 16.10.1997 - Resolution of the Cabinet of Ministers of Ukraine dated 13.04.2011 p. No. 461 on Issues Related to Commissioning Completely Constructed Facilities - Resolution of the Cabinet of Ministers of Ukraine dated 19.02.2009 No. 126 on Specific Features of Connecting to Power Supply Networks of Electric Energy Facilities Generating Electric Energy with the Use of Alternative Sources - Order of the Ministry for Fuel and Energy dated 28.10.2009 No. 570 registered by the Ministry of Justice of Ukraine on 29.12.2009 No. 1263/17279 on Approval of Rules for Connecting Wind Power Stations - GKD (Industry Guidance Document) 341.003.003.001-2000 Wind Power Sector, Wind Power Stations, Requirements to Acceptance Tests Scope and to Provision of Documents and Technical Means
Commissioning of renewable energy facility	- Resolution of the Cabinet of Ministers of Ukraine dated 13.04.2011 No. 461 on Issues Related to Commissioning Completely Constructed Facilities
Connecting renewable energy facilities to power	- Law of Ukraine on Electric Energy, No. 575/97-BP dated 16.10.1997

supply networks and voltage supply	- Resolution of the Cabinet of Ministers of Ukraine dated 19.02.2009 p. No. 126 on Specific Features of Connecting to Power Supply Networks of Electric Energy Facilities Generating Electric Energy with the Use of Alternative Sources - Order of the Ministry for Energy and Coal Industry dated 28.10.2009 No. 570 registered by the Ministry of Justice of Ukraine on 29.12.2009 No. 1263/17279 on Approval of Rules for Connecting Wind Power Stations - GKD (Industry Guidance Document) 341.003.001.001-2000 Connecting Wind Power Facilities to Power Supply Networks. Procedure and Requirements - GKD (Industry Guidance Document) 341.003.003.001-2000 Wind Power Sector, Wind Power Stations, Requirements to Acceptance Tests Scope and to Provision of Documents and Technical Means
Obtaining license for of electric power production	- Resolution of the Cabinet of Ministers of Ukraine dated 29.04.1999 No. 753 on the Procedure of Issuing by the National Energy Regulation Commission of Licenses for Carrying out Activities related to Production, Transmission and Supply of Electric Energy, Combined Production of Heat and Electric Energy, Production of Heat Energy at Cogeneration Plants and Installations with the Use of Non-conventional or Renewable Energy Sources. - Resolution of NERC dated 06.10.1999 No. 1305 registered by the Ministry of Justice of Ukraine on 28.10.1999 under No. 738/4031 on Approval of Guidelines on the Procedure of Issuing by the National Energy Regulation Commission of Licenses for Carrying out Certain Business Activities
Registration of Wholesale Electric Power Market membership	- Agreement between the Members of Wholesale Electric Power Market of Ukraine as of 15.11.1996
Green Tariff Fixing	- Law of Ukraine on Electric Energy, No. 575/97-BP dated October 16, 1997; - Resolution of the Cabinet of Ministers of Ukraine dated 24.09.12 No. 878 on Issues related to application of certificates of origin for goods in order to confirm their Ukrainian origin and determination of a share of raw materials, materials, fixed assets, works and services of Ukrainian origin in the cost of construction of electric power facilities generating electric energy with the use of renewable energy sources; - Resolution of the National Energy Regulation Commission dated 15.06.12 No. 749, registered by the Ministry of Justice of Ukraine on 02.10.12 under No. 1678/21990 on Approval of the Procedure for determination of a share of raw materials, materials, fixed assets, works and services of Ukrainian origin in the cost of construction of electric power facilities generating electric energy with the use of alternative energy sources; - Resolution of the National Energy Regulation Commission dated 22.01.09 No. 32 on Approval of the Procedure for Fixing, Revision and Termination of the Green Tariff for Business Entities

(b) Responsible Ministry/bodies and their powers commissioned in this sphere

National Energy Regulatory Commission of Ukraine

- Issues licenses for electric energy production and cogeneration, controls compliance with license provisions
- Establishes the "green" tariff ratio for individual economic entities
- Ratifies the Agreement of Electricity wholesale market for (EWM)

State agency for energy efficiency and energy saving of Ukraine

- Ensures implementation of state policy in the sphere of efficient use of fuel and energy resources, energy saving, renewable energy sources and alternative types of fuel
- Responsible for ensuring the increasing share of renewable energy sources and alternative types of fuels in energy balance of Ukraine.

Ministry of Energy and Coal Industry of Ukraine

- Ensures normative legal regulation in fuel and energy complex;
- Monitors market of gas, oil, non-conventional types of energy sources and types of energy feedstock and their products;
- Approves industry development programs of fuel and energy complex and controls their implementation;
- Organizes and performs standardization procedures in fuel and energy complex.;
- Approves investment programs of licensees for electric energy transfer and supply;
- Makes forecast balance of electric energy of integrated energy system of Ukraine

Ministry of energy and coal industry of Ukraine (through State Enterprise «NEC "UKRENERGO")

- Supplying technical specifications and setting up contracts on connecting to electric grids of renewable energy facilities with capacity more than 70 MW

Ministry of ecology and natural resources of Ukraine

- Endorsement of environmental expertise for projects of renewable energy facilities construction.

Ministry of Regional Development, Construction and Housing and Communal Services of Ukraine

- Endorses the procedure of development of project documentation for facilities construction.
- Develops License provisions for certification of installation and construction works of IV-V categories of complexity;
- Coordinates the process of construction and putting into operation facilities through activity of State Architectural-Construction Inspection of Ukraine

State Agency of Land Resources of Ukraine

- Registers title of property for land (ownership, rent, servitude, superficies)

Ministry of Infrastructure of Ukraine

- Approves programs of implementation of energy saving technologies, non-conventional and renewable energy sources, alternative types of fuel in sub-branches (rail transport, underground railway, automobile transport, sea and rive rtransport, aircrafts)

It is important to note that currently there is no separate government body responsible for RES use in transport in Ukraine. Such responcibility is shared between different institutions.

(c)Provision is made for reconsider in order to take relevant actions outlined in Article 13(1) of Directive 2009/28/EC to (date)

Not provided so far

(d) Summary of the existing and planned measures at regional/local levels (where relevant)

As of today, despite significant increase in renewable energy sources use, there is only one program at regional/local level - "Program of renewable energy development in Kherson region to 2030", approved by Kherson region state administration on 22 February, 2013.

The main strategic goal of the Program is establishing structural and technological framework for step-by-step capacity building for switching from traditional energy resources to renewable energy sources. The program involves construction of 14 solar power stations and 9 wind power stations on the territory of Kherson region with total capacity 1 285 MW.

In Autonomous Republic of Crimea, Zaporizhzhya, Vinnytsya, Poltava and Sumy regions renewable energy development measures are included in regional programs for energy saving.

In Zaporizhzhya region under the implementation of "Regional program for increasing energy efficiency in Zaporizhzhya region for the period of 2010-2015", wind energy development was defined as priority in the program of development of renewable energy sources. It is planned to construct wind power stations with total capacity 3200 MW in this region by 2030. Much attention is also paid to biomass use for heat supply for community and public sector (installation of straw-burning heat generators, pellet and briquette boilers) and solar energy development.

(e) Are there unnecessary obstacles or non-proportionate requirements detected related to authorization, certification and licensing procedures applied to plants and associated transmission and distribution network infrastructure for the production of electricity, heating or cooling from renewable sources, and to the process of transformation of biomass into biofuels or other energy products? If so, what are they?

The main obstacles for putting into operation renewable energy facilities are:

- a lot of authorization documents needed for obtaining "green tariff", lack of opportunity to get authorization documents on the principle of "single point of contact";
- complicated procedure and indeterminacy of time framework for public authorities actions on tax exemption for import of equipment and materials for construction of renewable energy power stations;
- absence of officially approved exhaustive list of documents that are required for becoming a member of Electricity wholesale market of Ukraine;
- complications with meeting the requirements of local component for renewable energy facilities construction due to weakness of industrial sector producing equipment for renewable energy sector;
- no chance to obtain "green tariff" for power stations that combine use of traditional and renewable energy sources;
- government guarantee for support based on "green tariff" can only be applied for power stations which are already put into operation, thus investors don't have due guarantee at the stage of construction;
- there is no approved procedure of making agreements with Subsidiary Enterprise "Energorynok" for electric energy sale.

(f) What level of administration (local, regional and national) is responsible for authorizing, certifying and licensing renewable energy installations and for spatial planning? (If it depends on the type of installation, please specify.) If more than one level is involved, how is coordination between the different levels managed? How will coordination between different responsible authorities be improved in the future?

Subordinate regulation of construction and operation of renewable energy installations is regulated by authorities on the national level:

- National Energy Regulatory Commission of Ukraine (NERC);
- Ministry of Energy and Coal Industry of Ukraine (MECIU);
- Ministry of Ecology and Natural Resources of Ukraine;
- Ministry of Regional Development, Construction and Housing and Communal Services of Ukraine;
- State Agency of Land Resources of Ukraine

and local administration in the issues of change of targeted land use.

The effective measure for improving coordination between different responsible authorities can be the establishment of "single point of contact" on the matters of renewable energy facilities construction.

(g) How is it ensured that comprehensive information on the processing of authorization, certification and licensing applications and on assistance to applicants made available? What information and assistance is available to potential applicants for new renewable energy installations on their applications?

Information for potential applicants for construction of new renewable energy facilities is available through National Energy Regulatory Commission of Ukraine (NERC) web-site (http://www.nerc.gov.ua), NERC Newsletter, Ministry of Energy and Coal Industry of Ukraine web-site (http://mpe.kmu.gov.ua), personal consultations of the applicant in relevant state agency.

(h) How is horizontal coordination facilitated between different administrative bodies, responsible for the different parts of the permit? How many procedural steps are needed to receive the final authorization/license/ permit? Is there a one-stop shop for coordinating all steps? Are timetables for processing applications communicated in advance? What is the average time for obtaining a decision for the application?

Obtaining license for electric energy generation or co-generation, as well as obtaining decision on "green tariff" from NERC is a one-step procedure.

NERC decides on either granting or non-granting license during 30 days period since the date of application.

Decision on approval and setting the rate of "green tariff" is compiled as a resolution of NERC during 30 calendar days period since the date of application.

The schedule of document processing is communicated to the applicant in advance.

(i) Do authorization procedures take into account the specificities of the different renewable energy technologies? If so, please describe how. If they do not, do you envisage taking them into account in the future?

As of today the procedure of approval for different renewable energy technologies is the same. The differences in the procedure only depend on the capacity of power installations for renewable electric energy generation: under 10 KW, under 10 MW, 10-70 MW, more then 70 MW.

(j) Are there specific procedures, for example simple notification, for small-scale, decentralized installations (such as solar panels on buildings or biomass boilers in buildings)? If so, what are the procedural steps? Are the rules publicly available to citizens? Where are they published? Is the introduction of simplified notification procedures planned in the future? If so, for which types of installation/system? (Is net metering possible?)

There is no requirement to obtain license for electric power generation for small decentralized installations (solar panels installed of roofs of buildings) with capacity under 10 KW.

Rules for connecting decentralized installations to power supply networks are currently being developed. Due to this fact Oblenergo do not issue technical specifications for connecting to power supply networks to the owners.

Use of biomass boilers with small capacity for private households is not regulated by current legislation. It is only necessary that such equipment is certified for use in Ukraine.

These rules were published at NERC web-site, NERC Newsletter, still the level of public awareness on these matters in not sufficient.

(k) Where are the fees associated with applications for authorization/licenses/permits for new installations published? Are they related to the administrative costs of granting such permits? Is there any plan to revise these fees?

License fee for introduction of new types of activities in energy sector is performed according to the Resolution of the Cabinet of Ministers of Ukraine dated 13.07.1995 No 516 „About payment of license fee for obtaining and renewal of licenses for specific types of business activities by National Energy Regulatory Commission of Ukraine" and depends on stated type and scope of activity. Payments for considering applications for obtaining licenses are only partially connected with administrative charges. Data regarding payments made for considering applications for obtaining licenses are not openly published. Other information regarding decrees, resolutions and specific orders and letters issued by NERC during relevant month period, as well as regulatory acts of legislative and executive authorities regulating activities in electric energy sector, gas sector and municipal services market of Ukraine, and also the information provided by Derzhenerhonahlyad (State Energy Supervision) are published in " NERC Newsletter "

(l) Is official guidance available to local and regional administrative bodies on planning, designing, building and refurbishing industrial and residential areas to install equipments and systems using renewable energy sources in electricity and heating and cooling, including in district heating and cooling? If such official guidance is not available or insufficient, how and when will this need be addressed?

As of today there is no official guidance to local administrative bodies on planning, designing, building and refurbishing industrial and residential areas to install equipments and systems using renewable energy.

It is expected that such guidance will be prepared in the framework of introduction of a training course for retraining specialists at the renewable energy Chair of the NTU "Kyiv Polytechnic Institute" and Institute of renewable energy of NAS of Ukraine.

(m) Are there specific trainings for case handlers of authorization, certification and licensing procedures of renewable energy installations?

Management and employees of NERC improve their technical knowledge and skills through participation in:

- The European Union programs - INOGATE, TAIEX (Technical Assistance Information Exchange), Twinning;
- Partnership Program in the sphere of energy regulation with US National Association of regulatory utility commissioners (NARUC);
- Training workshops and trips in the framework of Black Sea regional initiative in the sphere of regulation;
- Work of Energy Regulators Regional Association (ERRA).

4.2.2. Technical specifications (Article 13(2) of Directive 2009/28/EC)

(a) To benefit from support schemes do renewable energy technologies need to meet certain quality standards? If so, which installations and what quality standards? Are there national, regional standards that go beyond European standards?

Ukraine pursues policy of harmonizing technical standards with relevant standards of the European Union. The effective national standards in renewable energy domain do not establish requirements higher than European ones.

Wind energy	
Wind energy. Wind mills and wind power plants. Terms and definitions.	SSU (DSTU) 3896-99 (dated 01.07.00)
Wind energy. Wind electrical units. General technical requirements. Generalize requirements to design documentation.	SSU (DSTU)4037-2001 (dated 01.01.02)
Wind energy. Wind power plants. General technical requirements. Generalize requirements to develop WPP projects.	SSU (DSTU)4051-2001 (dated 01.04.02)
Wind energy. Wind electrical units. Testing methods. Provides the possibility to standardize WEU testing methods.	SSU (DSTU)4225-2003
Wind-driven lift pumps. General technical requirements.	SSU (DSTU)4407:2005 (dated 30.05.2005) .
Low power wind electrical units. General technical requirements. General technical requirements to low power wind electrical units (WEU).	SSU (DSTU)4859:2007 (05.11.2007)
Harmonized foreign	
Wind turbine generator systems. Part 1: Safety requirements. (IEC 61400-1:1999, IDT). It covers WTGS with wind turbine swept area equal or more than 40 m^2.	SSU (DSTU)IEC 61400-1-2001 dated 01.07.02
Wind turbine generator systems. Part 2: Safety requirements for mini wind turbines. (IEC 61400-2:1996, IDT). It covers mini WTGS with wind turbine swept area less than 40 m^2.	SSU (DSTU)IEC 61400-2-2001 dated 01.01.03.
Wind turbine generator systems. Part 11: Methods of measuring acoustic noise. It provides the opportunity to assess the level of WTGS acoustic noise.	SSU (DSTU)IEC 61400-11-2001 dated 01.07.04. IEC 61400-11:1997, IDT
Wind turbine generator systems. Part 12: Testing wind turbines to identify their energy characteristics. It establishes methods of measurement for energy performance characteristics of an individual wind turbine generator system (hereinafter - WTGS) and their application to test WTGS of all types and sizes connected to power grid. It evaluates WTGS absolute and performance characteristics.	SSU (DSTU)IEC 61400-12-2001 dated 01.07.03 IEC 61400-12:1998, IDT
Wind turbine generator systems. Part 13: Measurement of mechanical loads. It gives the opportunity to identify mechanical WTGS loads.	SSU (DSTU)IEC /TS 61400-13-2003 dated 01.07.05. IEC 61400-13:2001, IDT
Wind turbine generator systems. Part 21: Power quality characteristics measurement and assessment of wind turbines connected to grid. It provides for introducing a unified methodology to assess characteristics of wind turbine energy quality.	SSU (DSTU)IEC 61400-21-2001 dated 01.07.04. IEC 61400-21:2001, IDT.
Wind turbine generator systems. Part 22: Wind turbine certification. IDT. It provides the opportunity to certify WPP equipment.	SSU (DSTU)IEC /TS 61400-22-2003 IEC 61400-22:1999.
Wind turbine generator systems. Part 23: Full testing of rotor blade structures. It characterizes WEU reliability.	SSU DSTU IEC /TS 61400-23-2003 IEC 61400-23:2001, IDT.
Wind turbine generator systems. Part 24: Protection of wind turbines. It generalizes and systematizes methods of WT	SSU (DSTU)IEC 61400-24-2001 dated 01.07.03 IEC 61400-

protection against lightning.	24:2000, IDT
Sectoral regulatory documents	
Wind energy. Wind electrical units. Procedure of acceptance testing for pilot samples.	IGD 3-001-2000
Wind power units. Fundamental principles of складання та монтажу. This industry guidance document (IGD) covers horizontal and vertical-axe wind power units and establishes the procedure and main provisions for assembling, installing, testing, commissioning, integrated test and break-in of WPUs on site.	IGD 3-002-2000 Kyiv 2001.
Wind energy. Wind power units. Procedure for launching of commercial production.	IGD 3-003-2000
Wind energy. Wind power units. Capacity performance test.	IGD 3-004-2000
Connecting wind energy facilities to power grids.	IGD 341.003.001.001-2000
Guidelines for designing of wind power plants.	IGD 341.003.001.002-2000
Wind energy. Wind power plants. Requirements to the scope of acceptance testing, complete set of documents and equipment.	IGD 341. 003.003.001-2000
Wind energy. Supplement to the Guidelines on registration of technological disturbances at electricity industry facilities and in the united power system of Ukraine. IGD34.08.551-99. Investigation and registration of technological disturbances at WPPs.	IGD341.003.003.002-2000
Wind energy. Sites for wind power plants. Selection requirements. This regulatory document forms requirements to selection of potential sites for building wind power plants (WPPs) in a selected area.	IGD341.003.003.003-2000
Wind energy. Wind power plants. Model job descriptions.	IGD341.003.003.004-2000
Standard number of wind power plant employees.	IGD341.003.003.005-2000
Sites for wind power plants. Meteorological study of wind characteristics. This regulatory document establishes the procedure for meteorological research at the stages preceding feasibility study of investments into a new construction of wind power plants in the territory of Ukraine.	IGD341.003.003.006-2000 dated 2000-11-12.
Labor safety regulation for the works on wind power plants.	IGD241.003.003.007-2001
Feasibility study of investments into construction of wind power plants.	IGD341.003.004.001-2000
Institutional structure of wind power plant management. Recommendations.	IGD341.003.004.002-2000
Solar energy	
Energy saving. Alternative and renewable energy sources. Solar collectors. Testing methods. It characterizes SC's performance.	SSU (DSTU)4034-2001
Solar-heating systems and components thereof. Solar collectors. Part 1. General technical requirements.	SSU (DSTU)EN 12975-2001
Solar-heating systems and components thereof. Solar collectors. Part 1: General technical requirements. It is used for drafting SHS technical documentation.	SSU (DSTU)EN 12975-1-2001

Waste potential and environmental energy	
Air-water heat pumps for public utilities. General technical requirements i testing methods. It provides the possibility to assess quality and reliability of heat pumping units.	SSU (DSTU)3859-99 dated 01.01.01.
Network air conditioners and heat pumps. Testing and quality assessment. It provides the possibility to assess quality and reliability for utility heating.	SSU (DSTU)ISO 13253-97
Geothermal energy	
Energy saving. Renewable energy sources. Geothermal units. General technical requirements. It is used for drafting design documents.	SSU (DSTU)Development stage
Bioenergy	
Energy saving. Renewable energy sources. Biogas units. General technical requirements. It is used for drafting design documents.	SSU (DSTU) 4516:2006 01.01.2007
RES in Transport	
Motor fuel. Methyl ethers of fatty acids, oils and fats for diesel engines. Technical requirements	SSU (DSTU) 6081:2009
Methyl ethers of fatty acids, oils and fats for diesel engines. Requirement and evaluation methods	CS (SOU) 24.14-37-561:2007
Diesel biofuel. Production and use. Safety requirements	CS (SOU) 73.1-37-706:2007
Bioethanol. Technical specifications (developed by order of Ministry of agrarian policy and food of Ukraine and came into effect on January 1, 2011)	SSU (DSTU) 7166:2010
Motor petrol. Technical specifications (stipulates bioethanol share in petrol up to 5%)	SSU (DSTU) 4063-2001
At present in Ukraine there are no technical specifications / standards related to wehicles or engines.	

4.2.3. Buildings (Article 13(3) of Directive 2009/28/EC)

The housing stock of Ukraine makes up 10.2 million houses of total area 1,066.6 million m², including 238.2 thousand buildings (2.3 % of total national housing stock) being in communal ownership, their total area is 67.5 million m^2. Ukraine accounts for 60.7 thous. slum and failing residential houses (0.6% of total number), their total area makes up 5.1 million m^2, where 145.7 ths people permanently reside.

The housing stock of the first mass series (1960s-1970s years of construction) comprises nearly 72 million m² and requires either replacement or reconstruction. In fact, each fourth urban citizen resides in the premises being in poor technical condition, low operation quality that have outlived their operation life. Gas losses in the process of heating the buildings of the first mass series makes up 600 million m3. Inefficient use of electricity in the water and waste water sector reaches almost 2 billion kW·h.

Low comfort, low energy efficiency of the residential houses of the first mass series, their significant wear and tear and obsolescence demand addressing the problem of overhauling (reconstructing) the housing stock with the use of state-of-the-art energy saving technologies, materials and equipment.

Public utilities and other consumers annually consume nearly 10 billion kW·h of electricity and 8.5 billion m3 of natural gas. Energy costs per unit of output are 2-3 times higher than in other countries.

Characteristics of the housing resource of Ukraine as of 01.01.2012					
Residential buildings by year of construction		**Percentage of equipped flats, %**		**Percentage of housing stock by**	
years	**%**	**Supply systems**	**%**	**Patterns of ownership**	**%**
before 1919	4.6	Water supply	59.6	Private	93.0
1919—1945	11.8	Sewage system	57.5		
1946—1960	25.1	Heating	62.1	Community	5.6
1961—1970	24.1	Gas supply	83.2		
1971-1980	16.2	Hot water supply	43.1	State-owned	1.4
1981—1990	10.8				
1991 and later	7.4				

The construction and housing sector consumes 75 million t fuel equivalent, that is nearly 30% of annual fuel consumption[3]. The housing stock and other social facilities consume 85% of energy resources.

8,250 enterprises of all patterns of ownership provide heat supply to populated areas in Ukraine[4]. 32,725 boiler houses are in operation for heating purpose with their aggregate capacity of 130,618.7 Gcal·h, including:

By capacity:

under 3 Gcal·h – 27,791
from 3 to 20 Gcal·h – 3,948
from 20 to 100 Gcal·h - 781
100 Gcal/h and over - 205.

By fuel:

solid fuel-fired – 9,720
liquid fuel-fired - 456
gas-fired – 22,120
other - 429.

The total number of installed boilers is 75,831 including 16,254 (21.4%) have been in operation for over 20 years. The length of heat supply pipelines, two pipe, is 34,625.5 km including time-worn and wrecking – 5,491.4 km that is 15.8% of the total length of the networks.

District heating enterprises comprise 29 thous. boiler houses in critical state. Over 23% of the boilers have being operating more than 20 years. A lot of boilers (38%) are low efficient – coefficient of efficiency is 65-75%.

The housing and utilities sector of Ukraine consumes almost 30% of Ukraine's total fuel consumption. The sector annually consumes nearly 10.0 billion kW·h of electricity, nearly 14.0 billion m³ of gas, approximately 1.5 million t of coal. This is the only consumer group in Ukraine that has not reduced its total consumption in XXI century. At the same time the energy consumed per unit of output and utility services more than 1.5-fold exceeds the indicators

[3]The primary reasons of loss-making (low profitability) of enterprises and organizations in the housing and utility sectorin 2004 – 2010: Auditor's reportof the StateControlling and Auditing Service of Ukraine. – K., 2011 – 83 p.
[4]State Statistics Committee's data as of 01.04.2010

demonstrated by other countries. For instance, for reference, per 1 sitizen in the existing buildings with centralized heat supply calculating per 1 m2 of area in Ukraine it is spent 1.5-fold more energy than in the USA and 2.5-3-fold more than in Sweden.

One of the most pressing problems in the sector is inefficient and ineffective use of fuel and energy by public utilities. So, thermal energy losses during a year makes up on average 13 million Gcal that is 11% of the total thermal energy generated, in other words, over 2.1 billion m³ of natural gas are wasted. Heat losses in engineering networks per year makes up 12.9% of total heat sold, 17.5% - in Dnipropetrovsk region, 16.9% in Chernihiv region, 16.8% in Sumy region, 15.6% in Kherson region, 14.8% in Zakarpattia region, 13.1% in Cherkasy region, 18.2% - in Kyiv.

This is, primarily, due to poor technical condition of public utilities facilities, where the depreciation of fixed assets is over 50%. By expert estimations, Energy saving measures in the housing and utilities sector have potential to decrease consumption of:

- gas in generation, transportation and supply of heat in the housing and utilities sector on average by 22%;
- electricity in water supply and waste water drainage systems by 15-20%.

Analysis of heat losses and consumption of natural gas used for production of lost thermal energy in district heating schemes demonstrates that the production losses (in boiler houses) reach up to 22 %, transportation of heat up to 25 %, however the highest overconsumption of natural gas falls on generation of heat lost by consumers – up to 30 %.

National Program of Housing and Utilities Sector Reforms and Development for 2009-2014 is effective in Ukraine as approved by Regulation No.1869-IV dated 24.06.2004.

The main tasks of the Program are technical re-equipment of the housing and utilities sector, reduction of specific values of energy and assets required for production (delivery) of housing and utilities services including formation of effective and transparent mechanism of promoting the use of alternative energy sources and fuels.

The Program envisages the measures in heat production, transportation and supply domains, delivery of district heating and hot water supply services including with the use of alternative energy sources and fuels.

The regulatory, scientific and technical basis underlying the measures in the scope of this Program is to be harmonized with the national standards and other regulatory acts in the housing and utilities with the European Union directives and standards.

The Program is funded from the state budget, local budgets, companies and other sources consistent with the legislation as well as on the account of introduction of the special taxation regime where housing and utilities services and/or heating services are subject to VAT.

Funds from the state budget shall be directed to fund the measures on implementation of the pilot projects in the housing and utilities sector to improve the system of housing stock management, reduction of specific indicators of the use of energy and assets including the launch of alternative energy sources and fuels.

Ministry of Regional Development, Construction, Housing and Utilities of Ukraine prepared a budget request and submitted it to the Ministry of Finance, where they propose to allocate UAH 14.9 billion for performance in 2013 of the measures under the National Program of Housing and Utilities Sector Reforms and Development for 2009-2014, including UAH 309 million for pilot projects in the sector. The request includes the funds envisaged by the Law of Ukraine "On the National Program of Housing and Utilities Sector Reforms and Development for 2009-2014" for a relevant year and the funds that were not allocated under the Program in previous years.

The Law establishes the plans to allocate UAH 5.1 billion from the state budget for 2013. However, the national program has been continuously underfunded thus hampering the sector reforms as the measures planned by the Program often are not completed. In particular, the list includes technical re-equipment measures, creation of energy management system in housing and utilities sector, monitoring of drinking water quality and drinking water supply system state, launch of technological water counting, launch of the housing and utilities services quality management, development of heat supply schemes in urban areas, installation of modern sensor equipment and water and heat consumption regulation, launch of pilot projects with the transfer of sectoral enterprises to alternative energy sources and fuels, etc.

In 2009-2012 the Project "Reform of Urban Heat Supply in Ukraine" was implemented in Ukraine. International Resources Group (IRG) was founded in February 2009 by USAID and implemented the Project.

The Ministry of Regional Development, Construction, Housing and Utilities was the main partner of the Project. Individual project components were implemented with the participation of the Ministry of Fuel and Energy, Ministry of Finance, Ministry of Economy as well as the National Electricity Regulatory Commission, the State Energy Efficiency Committee and Association of Energy Efficient Cities of Ukraine.

PMT project of cooperation with the government of Ukraine and local authorities was directed to perform system changes in the heat supply sector at 3 levels: national, regional and sectoral.

PMT Project partner cities were as follows: Alchevsk, Vinnytsia, Voznesensk, Dzhankoi, Dolyna, Yevpatoriya, Ivano-Frankivsk, Kamenets-Podilskyi, Kovel, Komsomolsk, Korosten, Kramatorsk, Krasnoperekopsk, Kremenchuk, Kurakhove, Lutsk, Lviv, Mohyliov-Podilskyi, Myrhorod, Nikopol, Novohrad-Volynskyi, Pavlohrad, Poltava, Romny, Rivne, Rubizhne, Sevastopol, Simferopol, Slavutych, Kherson, Khmelnytskyi, Chervonohrad, Chernivtsi, Chernihiv and Chuhuyiv.

Concepts of municipal energy plans were drafted in the framework of project implementation for the stakeholder cities. The plans include the transfer of the portion of boiler houses to RES.

4.2.4. Information provisions (Articles 14(1), 14(2) and 14(4) of Directive 2009/28/EC)

(a) Reference to existing national and or regional legislation (if any) concerning information requirements according to Article 14 of Directive 2009/28/EC:

The system of information supply to the citizens is formed in Ukraine at the national and local levels. The system guarantees access of population to various information including the information on development of renewable energy sources and launch of efficient technologies in all economic sectors.

Access to public information in Ukraine is regulated by the basic law of Ukraine "on Information" dated 02.10.1992 r No. 2658-1. The Law regulates the relations on formation, collection, receipt, storage, use, dissemination, preservation and protection of information in Ukraine and establishes the main areas of the state information policy: provision of access to information to any person; ensuring equal opportunities to create, collect, receive, store, use, disseminate, preserve, protect information; creation of conditions to form information society in Ukraine; ensuring openness and transparency of public authorities' activities; creation of information systems and networks, e-government development; ongoing updating, improvement and storage of national information resources; ensuring information safety of Ukraine.

According to the Law, all stakeholders such as consumers, entrepreneurs, professionals on equipment installation, architects, heating, cooling and equipment system suppliers and electricity and means of transportation that may consume energy generated from renewable sources are granted the opportunity to freely get, use, disseminate, store and protect information.

At the same time, exercise of the right to information should not violate public, political, economic, social, spiritual, environmental and other rights, freedoms and lawful interests of other citizens, rights and interests of legal entities.

The Law of Ukraine "On Access to Public Information" No.2939-VI took effect on 13.01.2011. The goal of this Law is also to ensure transparency and openness of public authorities and to create mechanisms for exercising each individual's right for access to public information.

Decree of the President of Ukraine No.547/2011 "The Matters of Access to Public Information to be Ensures by Executive Authorities" took effect on 05.05.2011. The goal of the Decree is to ensure unconditional performance by executive authorities of the Law of Ukraine "On Access to Public Information". Following the decree, monitoring of compliance with the Law of Ukraine "On Access to Public Information" by executive authorities and monitoring of court judgments made due to violation of the right to get public information.

Cabinet of Ministers of Ukraine issued Resolution No.583 "The Matters of Compliance with the Law of Ukraine dated 25.05.2011 "On Access to Public Information" by the Secretariat of the Cabinet of Ministers of Ukraine, national and local executive authorities".

SAEEE issued order No.36 "On Approval of the List of Public Information Types which are in disposal of SAEEE and the List of SAEEE Proprietary Information", which, specifically, supposes that public information about SAEEE work plans and reports of works completion. Information about meetings, conferences, workshops, roundtable discussions conducted by SAEEE. Information on drafting bills, wordings of regulatory acts developed by the Agency and subject to public debates. Information about the Register of Alternative Fuels and Monitoring of Implementation of Sectoral, Regional Energy Efficiency Improvement Programs and Programs of Fuel and Energy Consumption Reduction by Budget-Funded Organizations. Regional administrations ensure wider public awareness on the development and implementation of energy efficiency improvement regional programs, including developing the use of renewable energy sources and alternative fuels.

So, consumers, entrepreneurs, specialists on development and supply of equipment and other interested individuals and legal entities may apply to SAEEE, regional administrations to get necessary information on the matters related to development of alternative energy and energy saving. Much information may be obtained on annual forums and conferences of systemic nature, in particular, Ukrainian bioenergy forum that has been annually held for 5 years already, International Investment Business Forum on Energy Efficiency and Renewable Energy – 4 years, etc.

The legislation to implement Directive 2009/28/EC is at the stage of drafting.

(b) Responsible body/(ies) for dissemination of information at national/regional/local levels:

There is no provisions in the legislation of Ukraine, which would clearly outline responsibility for dissemination of information at national/regional/local level as concerns requirements to information provision of information according to Article 14 of Directive 2009/28/EC. The works on the legislation to transpose provisions of Directive 2009/28/EC are under way.

Public awareness campaign as to economic, environmental and social advantages of the efficient use of fuel and energy, renewable energy sources and alternative fuels and participation in training activities in this domain are the tasks entrusted to SAEEE.

Besides that, various governmental institutions, commercial enterprises, non-governmental organizations in Ukraine collect and provide information on development of renewable energy, use of renewable energy and technologies on this basis, perform various awareness and training events.

Examples of these activities are provided in (g).

(c) Summary of the existing and planned measures at regional/local levels (where relevant):

The events aimed at raising public awareness in renewable energy, use of the units to generate energy from RES and principles of funding renewable energy projects are presented in (g).

(d) Please indicate how information is made available on supporting measures for using renewable energy *sources in electricity, heating and cooling and in transport to all relevant actors (consumers, builders, installers,* ***architects, suppliers of relevant equipment and vehicles). Who is responsible for the adequacy and the publishing of this information? Are there specific information resources for the different target groups, such as end consumers, builders, property managers, property agents, installers, architects, farmers, suppliers of equipment using renewable energy sources, public administration? Are there information campaigns or permanent information centres in the present, or planned in the future?***

SAEEE website (http://saee.gov.ua), as governmental institution responsible for raising public awareness of economic, environmental and social advantages of efficient use of fuel and energy, renewable energy sources and alternative fuels and participation in training activities in this domain, present information grouped by user activities, specifically: business, regional communities, consumers and public. The website also contains the section of information for children's audience. Sectoral magazine "Energy saving" is issued. Information materials are placed on the websites of popular social networks. SAEEE is responsible for reliability of the information within the limits of applicable legislation of Ukraine.

At present, Ukraine lacks individual information resources for differing target groups such as end users, construction organizations, asset management organizations, asset sales managers, assembling organizations, architects, farmers, suppliers of equipment for the use of renewable energy sources, governmental administrations.

Pursuant to CMU's Resolution No. 243 dated 01.03.2010 , the State Target Economic Program of energy efficiency and development of energy carrier generation from renewable sources of energy and alternative fuels for 2010-2015 is implemented in Ukraine. One of the program components is implementation of the measures to form conscientious attitude in the society to the need to improve energy efficiency, develop and use renewable energy sources and alternative fuels.

Examples of awareness raising events on development of renewable energy in Ukraine are presented in (g). However, today no relevant permanent information centres have been established in Ukraine to promote and develop renewable energy, although the works in this area are under way.

(e) Who is responsible for publishing information on the net benefits, costs and energy efficiency of equipment and systems using renewable energy sources for heating, cooling and electricity? (Supplier of the equipment or system, public body or someone else?)

This is responsibility of equipment or system supplier to publish information on the net benefits, costs and energy efficiency of equipment and systems using renewable energy sources for heating, cooling and electricity if the supplier is the only source of information. Unreliability of the equipment manufacturer's information may be establish to the satisfaction of the court if the advantages and price of the equipment are stated as advertising.

The Law of Ukraine "On Advertising" envisages that the main principles of advertising are as follows: legality, correctness, reliability, application of forms and means that do not cause damage to consumers of advertising. Public retractions of unfair and unlawful advertising takes may be published either on voluntary basis or by court's judgment.

If a governmental body or other person is the source of information, they are subject to the other liability, as their information is based on equipment or system supplier's (developer's) information and they may be brought to responsibility for the lack of adequate expert assessment of equipment or system supplier's (developer's) information.

Relevant governmental bodies shall be responsible for reliability of information at regional/local level, if it has been published in official periodicals issued by local authorities.

(f) How is guidance for planners and architects provided to help them to properly consider the optimal combination of renewable energy sources, high efficiency technologies and district heating and cooling when planning, designing, building and renovating industrial or residential areas? Who is responsible for that?

The legislation of Ukraine does not define a responsible institution to provide guidance for planners and architects to help them to properly consider the optimal combination of renewable energy sources, high efficiency technologies and district heating and cooling when planning, designing, building and renovating industrial or residential areas.

In practice, local self-governments are responsible as they approve district heating systems and Ministry of Regional Development and Construction which coordinates activities of local self-governments in this domain and develops public-private partnership principles.

(g) Please describe the existing and planned information, awareness raising and training programmes for citizens on the benefits and practicalities of developing and using energy from renewable sources. What is the role of regional and local actors in the designing and managing these programmes?

The State Statistics Service of Ukraine is responsible for collection of statistical data on development of the renewable energy in Ukraine in the limits of its powers. Regulatory, methodological information on collection and processing of statistical data in Ukraine is placed at the organization's website http://www.ukrstat.gov.ua/.

SAEEE, in the scope of its activities, has developed the database of research and technology of energy saving technologies and projects (http://nddkr.saee.gov.ua) and energy efficient equipment and renewable energy equipment database of domestic manufacturers (http://saee.gov.ua/baza-vitchiznyanix-virobnikiv).

SAEEE of Ukraine, according to its powers, collect information, perform information dissemination activities to raise public awareness about economic, environmental and social advantages of efficient use of fuel and energy, renewable energy sources and alternative fuels and participate in education activities in this domain; it ensures establishment of the system of monitoring over efficient use of fuel and energy, renewable energy sources and alternative fuels; maintains alternative fuel register. "Promoting Renewable Energy in Ukraine via the "Green" Tariff" manual is in free access at SAEEE's website. The manual has been prepared under the Program of International Financial Corporation (IFC) "Promoting Investment in Resource Efficiency" and "Investment Climate in the Agrarian Sector of Ukraine" IFC Project.

The State Agency on Investments and Management of National Projects in Ukraine created the information portal InvestUkraine (http://investukraine.com), one of its sections is devoted to the implementation of the national project "New Energy", where the information is published on the opportunities to implement renewable energy projects (wind, solar, bioenergy) in Ukraine.

A the regional level in Ukraine, regional energy efficiency programs have been developed. They envisage public awareness and education events to promote the use of renewable energy technologies. SAEEE is in charge of monitoring the status of implementation of the regional and sectoral energy efficiency improvement programs. For instance, to implement "Energy Efficiency Program of Luhansk Region for 2011 – 2015", the range of events are performed to promote energy saving and use of renewable energy sources. The program of energy efficiency for Chernihiv region also envisages drafting of relevant district programs. As an example we can cite "Korop District Energy Efficiency Program for 2013-2015" incorporating the public awareness events to demonstrate the opportunities to use renewable energy sources. As an example of public awareness events in the course of the implementation of energy efficiency program in Zaporizhia region, we can cite a specialized exhibition-conference

"EcoTechnologies. Alternative Energy", annual energy saving weeks where public awareness events are performed on the use of renewable energy sources.

In the scope of the implementation of the energy efficiency program in AR of Crimea, Simferopol hosts an interregional specialized exhibition "Crimea. Construction Industry. Energy saving". "Kazantyp-ECO" annual forum is performed in Shcholkine including research and practices conference and exhibition fair of energy efficient technologies and renewable energy technologies. In the Donetsk region, the range of public awareness events were performed in the course of the implementation of the regional energy efficiency program in 2012: the workshop "Green Economy: Opportunities and Prospects" was held in the scope of "Architecture and Construction" exhibition intended for deputy mayors and heads of district public administration, top managers of industrial enterprises and public utilities, structural units of the regional public administration; public consultations were held in the framework of USELF Program devoted to the theme "Strategic Environmental Analysis of the Program of Alternative Energy Funding in Ukraine" for public authorities and self-governments, scientists, general public, business interested in development of alternative energy. While implementing the regional energy efficiency program in Mykolayiv region, Mohyla Black Sea State University held research/practice conference "Nature Conservation Aspects of the Use of Renewable Energy Sources in Ukraine" in 2012.

The Institute of renewable energy of the National Academy of Sciences of Ukraine (www.ive.org.ua) developed the information atlas of renewable energy potential in Ukraine, which materials are used by governmental and commercial institutions to assess and develop renewable energy facilities projects in Ukraine. They also hold public awareness events on regular basis inter alia an annual research/practice conference "Renewable Energy in 21st Century", workshops, etc.

The public awareness component of UNIDO/GEF "Improving energy efficiency and promoting renewable energy in the agro-food and other small and medium enterprises (SMEs) in Ukraine" (http://www.reee.org.ua/en) envisages issuing of a series of public awareness materials, holding the range of public awareness events based on the project deliverables.

"Energy Efficient Universities" and "Greencubator EnergyCamp" Projects and "Greencubator" NGO are public awareness and educational events aimed at promoting the ideas of the use of renewable energy RES technologies in architecture, transport, households, legal issues of the use of renewable energy.

"Support to Sustainable Production and Use of Biomass in Ukraine" Project (project partners: GIZ (International Cooperation Association of Germany) and the Institute of Economic Research and Political Consultations) deliver training to Ukrainian partners on the role, operation and implementation of sustainable biomass certification systems. The manual for farmers and traders has been developed.

Moreover, the Institute of Economic Research and Political Consultations started in 2009 the cooperation project with the Federal Ministry of Food, Agriculture and Consumer Protection of Germany "Promoting the Use of Renewable Resources for Energy Purpose in Ukraine". The Agency for Renewable Energy Sources (FNR) starting with) 01 January 2009 has been providing support to promote production of renewable energy sources to the end of their energy use via provision of informational services and promoting extension of the existing contacts and establishing new business contacts.

Several associations for development of renewable energy are in operation in Ukraine. They also provide information support in this domain. For illustrative purpose, we can mention Ukrainian Bioenergy Association placing at its website (http://www.uabio.org/en/) information on the industry development and advanced technologies. The Association annually holds an international conference "Energy from Biomass". Ukrainian Wind Energy Association (UWEA,

www.uwea.com.ua) has been operating in Ukraine focusing its activities on wide-scale development of wind power industry in Ukraine, engaging SMEs to this process. The Association also closely cooperated with the international institutions on wind energy development (European Wind Energy Association, World Wind Energy Association), partakes in the public awareness events, annually publishes review of the Ukraine's wind power marketplace.

Priority activities of the European-Ukrainian Energy Agency (http://euea-energyagency.org) are energy efficiency (with subgroups in the construction sector, district heating, industry and energy from wastes), bioenergy (including biomass and biogas), wind and solar energy, "smart networks", project funding and Treaty establishing the Energy Community. The Agency's website contains information on the renewable energy markets, energy efficiency and renewable energy legislation, methodologies. The Agency holds an annual "European-Ukrainian Energy Day".

Since 2011 Ukraine has acceded to "European Energy Efficiency Week" action. The event includes holding public awareness events in the cities of Ukraine such as "Energy Efficiency: Ukrainian and European Cities Practices", "Energy Day", mobile exhibition "Energy Efficient Construction", public awareness event "Renewable Energy and Energy Efficiency in the Oil and Gas Sector".

Arzinger law firm has drafted and published several books on development of renewable energy in Ukraine: "Biogas Production and Use in Ukraine" (in Russian) written by Biogasrat e.V. in partnership with Arzinger., "Energy Law Guide" (in Russian and in English), author - Wolfram Rehbock. All books are accessible at the company's website (http://arzinger.ua) and available for downloading free of charge.

The range of governmental and nongovernmental organizations such as EBRD, GIZ, DAAD hold both public awareness and educational events on development of renewable energy and use of renewable energy sources on regular basis.

As an example of the local authorities role in development and management of development programs we can mention "Energy Efficient Cities of Ukraine" Association, which holds public awareness events on development of sustainable energy in the context of "Mayors' Agreement" of Ukraine to inform and motivate individuals, businesses and other stakeholders to use renewable energy sources and on the opportunities of local energy generation with the use of RES.

The following public awareness events are held annually in Ukraine: international exhibitions "Energy efficiency. Renewable energy", "GreenExpo", "Ukrainian Energy Forum", international conference "Energy from Biomass" devoted to informing target groups of public, business, individuals on the use of renewable energy technologies and systems.

4.2.5. Certification of installers (Article 14(3) of Directive 2009/28/EC)

Experts (engineers) on installation of the systems that use biomass, heat pumps, geothermal surface energy, photovoltaic solar power and thermal solar power are subject to certification in the framework of the accredited training programs.

Several key academic technical institutions such as National University KPI, Priazovsky State Technical University (Mariupol-based), Kherson National Technical University, Dniprodzerzhynsk State Technical University, Donetsk National Technical University, Zaporizhya State Engineering Academy has been delivering training under specialization 7.05070107 (7.090504) "Alternative and renewable energy sources", major 6.050701 "Electrical engineering and electrical technologies" (0905 Energy Industry) since 1996.

Relevant curricula are subject to approval by the Ministry of Education and Science of Ukraine, in particular for the following subject “biomass boilers and reactors”, “thermal power plants”, “thermal energy industry”, “thermal physics”.

Qualification requirements to construction and assemblage organization employees:

- Chief Engineer or equivalent expert: higher education in relevant area (master’s, specialist’s degree). Experience as a lower level engineer should be: for masters – minimum 2 years, for specialists – minimum 3 years. Specialization by education: according to economic entity’s activity type;
- Chief of Construction Site: complete, incomplete or basic higher education in relevant area (master’s, specialist’s, bachelor’s or junior specialist’s degree). Experience as a lower level manager: for masters or specialists – minimum 2 years, for bachelors or junior specialists – minimum 3 years;
- contractor of the works: complete, incomplete or basic higher education in relevant area (specialist’s, bachelor’s or junior specialist’s degree). Experience as a building site foreman – minimum 2 years. Specialization by education: according to economic entity’s activity type;
- foreman of construction and assemblage works: complete, incomplete or basic higher education in relevant area (specialist’s, bachelor’s or junior specialist’s degree). Experience as a building site foreman – minimum 2 years. Specialization by education: according to economic entity’s activity type;
- Civil Engineer: basic of incomplete higher education in relevant area (bachelor’s or junior specialist’s degree). Specialization by education: according to economic entity’s activity type;
- Other professionals, experts – according to economic entity’s organizational chart.

Welder’s qualification should meet the requirements of the Rules of Welder Attestation as approved by order of the State Committee of Ukraine on Supervision over Labor Safety dated 19.04.1996, No. 1 registered with the Ministry of Justice of Ukraine on 31.05.1996, No. 262/1287.

As of today there is no national system of advanced training for the employees who install equipment in the sphere of RES in Ukraine. National University "Kyiv Polytechnic Institute KPI" is planning to start such program (advanced training for RES specialists) starting from 2015, based at the Department of electric energy and automatics.

Still it should be pointed out that private companies engaged in wind and solar electric plants construction have special advanced trainings for the employees in the sphere of RES at companies' own expenses, but their training programs are aimed at specific types of equipment used.

(a) Reference to existing national and/or regional legislation (if any) concerning certification or equivalent qualification schemes for installers according to Article 14(3) of the Directive 2009/28/EC:
(b) Responsible body/(ies) for setting up and authorizing certification/qualification schemes by 2012 for installers of small-scale biomass boilers and stoves, solar photovoltaic and solar thermal systems, shallow geothermal systems and heat pumps:
(c) Are such certification schemes/qualifications already in place? If so, please, describe.
(d) Is information on these schemes publicly available? Are lists of certified or qualified installers published? If so, where? Are other schemes accepted as equivalent to the national/regional scheme?
(e) Summary of existing and planned measures at regional/local levels (where relevant).

4.2.6. Development of power industry infrastructure (Article 16(1) and Articles 16(3) - (6) of the Directive 2009/28/EC)

(a) References to current national laws and regulations regarding the requirements to power supply networks (Article 16):

The Law of Ukraine "On Power Industry" (dated Oct. 16, 1997 № 575/97-VR). This law regulates the relations arising during production, transmission, supply, and use of energy, state supervision over safe performance of works at power industry objects irrespective of their form of ownership, safe operation of power equipment and state supervision over the regimes of heat and electric energy consumption.

The Law of Ukraine "On Power Industry Lands and Legal Regime of Special Zones of Power Industry Objects" (dated July 9, 2010 № 2480-VI).This Law defines legal and organizational framework on allocation and use of land plots for placement of power industry objects, establishment of and compliance with legal regime for lands of special zones of power industry objects to secure break free functioning of these objects, rational use of lands, as well as safety of vital activity and protection of population and business entities from the impact of possible breakdowns.

***Rules for the use of electric power* (*approved by the Resolution of the Cabinet of Ministers of Ukraine dated July 31, 1996 N 28*)**.These rules regulate the relations that arise during the sale and purchase of electric power between the producers or suppliers of electric power and electric power consumers (in retail electric power market).

The rules for connecting electric installations to electric networks/power grid (approved by the Resolution of the Cabinet of Ministers of Ukraine dated January 17, 2013 № 32).These rules regulate the relations that arise during the connection of newly built, reconstructed or technically re-equipped electric installations of customers (except co-generating installations) to the power grid.

Resolution of the Cabinet of Ministers of Ukraine "On Specifics of Connecting to the Grid the Objects of Power Industry, which Produce Electric Power with the Use of Alternative Sources" (dated February 19, 2009 p. N 126).This Resolution specifies organizational and technical measures on creating conditions for transmission of electric power to local electric networks from the point of connection of electric installation generating electric power with the use alternative sources and with power capacity up to 10 MW.

Rules for connecting wind power plants to electric network/power grid (approved by the order of the Ministry of Energy and Coal Industry of Ukraine(hereinafter – MinPalyvEnergo) dated October 28, 2009 N 570).These rules establish the mechanism for connection and transmission to electric networks the power generated by wind power plants with power capacity no less than 100 MW.

Requirements to wind power plants and photovoltaic power plants with power capacity over 150 kW regarding their connection to external electric networks (under consideration).This document stipulates the key technical and functional requirements to be met by wind power plants and solar photovoltaic power plants with nominal capacity over 150 kW at the point of connection, if a wind power plant and a solar photovoltaic power plant is connected to the public grid/electric networks in order to secure stable and break free operation of electric networks.

National standards:

GOST 13109-97. Quality standard for electric power within general use power supply systems.This standard establishes the indicators and quality norms for electric power in electric networks of general use power supply systems with alternate three-phase and single-phase current with 50 Hz frequency at the points to which electric networks owned by different electric

power consumers or electric users/receivers are connected

DSTU (i.e. national standard of Ukraine) 4037-2001 Wind power engineering. Windmills. General technical requirements. Makes it possible to generalize the requirements to design documents.

DSTU 4051-2001 Wind power engineering. Wind power plants. General technical requirements.This standard applies to wind power plants, which generate electric power for general use electric network/public grid through the use of windmills. This standard establishes the main requirements to the design of a wind power plant, its placement, systems, equipment, and safe operation. It also generalizes the requirements to the development of wind power plant designs.

DSTU IEC 61400-21-2001 (IEC 61400-21:2001, IDT) Wind turbine generator systems. Part 21: Measurement and assessment of quality characteristics of the energy generated by wind turbines connected to the network.Makes it possible to introduce the unified methodology for assessing quality characteristics of energy generated by wind turbines.

DSTU Wind power engineering. Wind power plants. Connection to electric power system(under consideration).The standard establishes organizational procedure for and technical requirements to connection and transmission to electric networks of energy generated by wind power plants, which construction or reconstruction is expected in Ukraine. The standard applies to wind power plants with power capacity over 150 kW, which are connected to local or main power networks of general use, which operate within the Unified Energy System of Ukraine (UESU).

DSTU Solar power engineering. Sites for photovoltaic power plants.Connection to electric power system(under consideration).The standard includes technical requirements to the schemes for connecting photovoltaic power plants to the electric power network and major requirements to the operation within electric power system.

Industry-specific standards:

Norms for technological design of power supply systems and electric power networks 35 kW and higher (under consideration).These norms establish the unified general approach to the development and design of power supply systems and electric power networks. This document includes the requirements to and recommendations on improving the reliability of power supply to consumers, and selection of modern equipment to be used in electric power networks. For the first time the norms on design of power supply systems include the requirements to connection and schemes for power output of power plants, which use the alternative sources of energy, as well as requirements to the protection of environment.

COУ-H EE.20.178-2008 Schematic circuit diagrams of distribution installations for voltage ranging from 6 kW to 750 kW of electric substations. Instruction.This document includes instructions and recommendations on the use of schematic circuit diagrams of substations and distribution installations in power supply networks intended for general use with voltage over 6 kW. It also includes recommendations on schematic circuit diagrams of central substations of wind power plants with power capacity up to 500 MW.

IGD 34.20.178:2005 Designing of power supply networks for voltage ranging from 0.4 to 110 kW. Recommendations.This document includes recommendations on designing of new, as well as reconstruction and technical re-equipment of existing objects of power supply networks for general use with voltage ranging 0.4 - 110 kW.

IGD 341.003.001.001-2000 Connection of wind power engineering objects to power supply networks.This document establishes the key technical requirements on connecting windmills and wind power plants with installed capacity up to 70 MW to power supply networks.

IGD 341.003.001.002-2000 Rules for designing wind power plants.This document, like the previous one, refers to wind power plants with installed capacity up to 70 MW, which are mostly connected to power distribution network. It includes recommendations on building internal power plant's network and possible schemes of connection to power supply network.

IGD 341. 003. 003. 001- 2000 Wind power engineering. Wind power plants. Requirements to the scope of acceptance tests, documentation and equipment.This normative document specifies the requirements to the scope of acceptance tests for wind power plants, technical and operation related documents, as well as to equipping wind power plants with individual protective equipment and measuring devices.

Recuirements for electric installations (REI).These rules include a set of standard technical documents that regulate the requirements to the establishment of the main structures (electric installations) of power supply networks intended for general use. Specifically, REI include the following specialized documents (Chapters):

- *Chapter 2.3 REI 2008 Cable lines with voltage up to 330 kW;*
- *Chapter 2.4 REI 2006 Overhead transmission lines with voltage up to 1 kW*
- *Chapter 2.5 REI:2006 Overhead transmission lines with voltage over 1 kW and up to 750 kW;*
- *Chapter 4.1 REI:2008 Distribution installations and substations with voltage up to 1 kW and direct current voltage up to 1.5 kW;*
- *Chapter 4.2 REI:2008 Distribution installations and substations with voltage over 1 kW.*

СОУ Н МПЕ 007-2008 Rules of mutual relations between state owned enterprise "National Energy Company "UkrEnergo" and subjects (objects) of power industry under conditions of parallel operation within the Unified Energy System of Ukraine. The rules define legal and organizational issues of operational and technological relations between system operator "National Energy Company "UkrEnergo" and subjects (objects) of power industry under conditions of parallel operation. Currently the rules are being adjusted to expand their validity to power plants that generate electric energy from renewable sources.

(b) How the development of transmission and distribution networks aimed at the integration of target volume of electric energy generated from renewable sources while preserving the reliability of operation of power supply system is secured? How this requirement is reflected in the plan schedules of transmission and distribution network operators?

The development of power supply networks associated with integration of renewable energy sources to the volume established by the Energy Strategy is secured by implementation of the Law "On Power Industry" and "State Target Economic Program for Energy Efficiency and Development of Energy Inputs Production from Renewable Energy Sources and Alternative Types of Fuel over the Period of 2010-2015".

Pursuant to the Law "On Power Industry", power suppliers that carry out the activity on transmission of electric energy through the use of their own networks must envisage in their investment programs the expenditures on connection of power industry objects, which generate electric energy from alternative sources of energy.

In accordance with this law, at the end of 2012 the National Commission for State Regulation in the Area of Power Industry revised the structure and levels of tariffs for the majority of licensees with regard to the transmission of electric energy by local networks due to the need to connect renewable power generation objects.

Expenditures on connection of renewable power generation objects are included in the investment programs of power supply companies, which are available at the official web sites of power supply companies:

Public JSC "ZaporizhzhyaObleEnergo":

- 2012. Construction of overhead/aerial transmission line 150 of the line Л**І** 421/4 from transmission tower №241 of the line Л**І**421/422 to central power distribution station-150 of wind power plant "Botievo" in Pryazovsky district of Zaporizhzhya oblast.
- 2013. Construction of overhead transmission line 150 kW from substation **ПС** "Melitopolska -330" to overhead transmission line 150 kW of central distribution station -150 kW "Botievo wind power plant" in Pryazovsky and Melitopolsky districts of Zaporizhzhya oblast. II start-up complex.

Private JSC "OdesaOblEnergo":

- Reconstruction of power supply networks (substation **ПС** 110 kW Artsyz, overhead transmission line 110 kW Chervony-Yar-Kiliya, Artsyz-Charvony Yar, Artsyz–Srtumok, substation **ПС** 110 kW Strumok and others) associated with installation of solar power stations:

Private JSC "DTEK KrymEnergo":

- 2011. Reconstruction of substation **ПС** 110 kW "Mityaeve" and "Vodovod" for connection of solar power station with 130 MW power capacity.
- 2012. Reconstruction of substation **ПС** 110 kW "Nyzhniohirsk", "Zhavoronky" and overhead transmission line 110 kW Feodosiya-Stary Krym to connect solar power station, which is currently under construction, with power capacity of 285 MW.

Construction and reconstruction of power supply networks, transformer yards, and substations to connect objects that generate electric energy from renewable energy sources is one of the measures envisaged by the "State Target Economic Program for Energy Efficiency and Development of Energy Inputs Production from Renewable Energy Sources and Alternative Types of Fuel over the Period of 2010-2015".

Reliability of power supply system's operation during the connection of renewable power generation objects is achieved by determining the optimal scheme for connection to power supply networks in accordance with current technical standard documents effective in power industry.

(c) What is the role of smart power grids/smart networks, information technologies instruments and power storage objects? How will their development be guaranteed?

The creation of smart power grids is the requirement of regulation "Standards for technological design of power supply systems and electric networks 35 kW and higher". Measures of network operators aimed at compliance with this requirement are the constituent part of their annual development programs.

In Ukraine the unified technology for storing electric energy, which is used at the level of the unified electric power system, is associated with pumped storage power plants.

Pursuant to the draft Energy Strategy of Ukraine until 2030, the following projects are envisaged:

- 2011-2015. – completion of the first stage of Dnistrovska pumped storage power plant, and Tashlytska pumped storage power plant;
- 2015-2020. – construction of the second stage of Tashlytska pumped storage power plant;
- 2015-2020. – construction of the second stage of Dnistrovska pumped storage power plant;

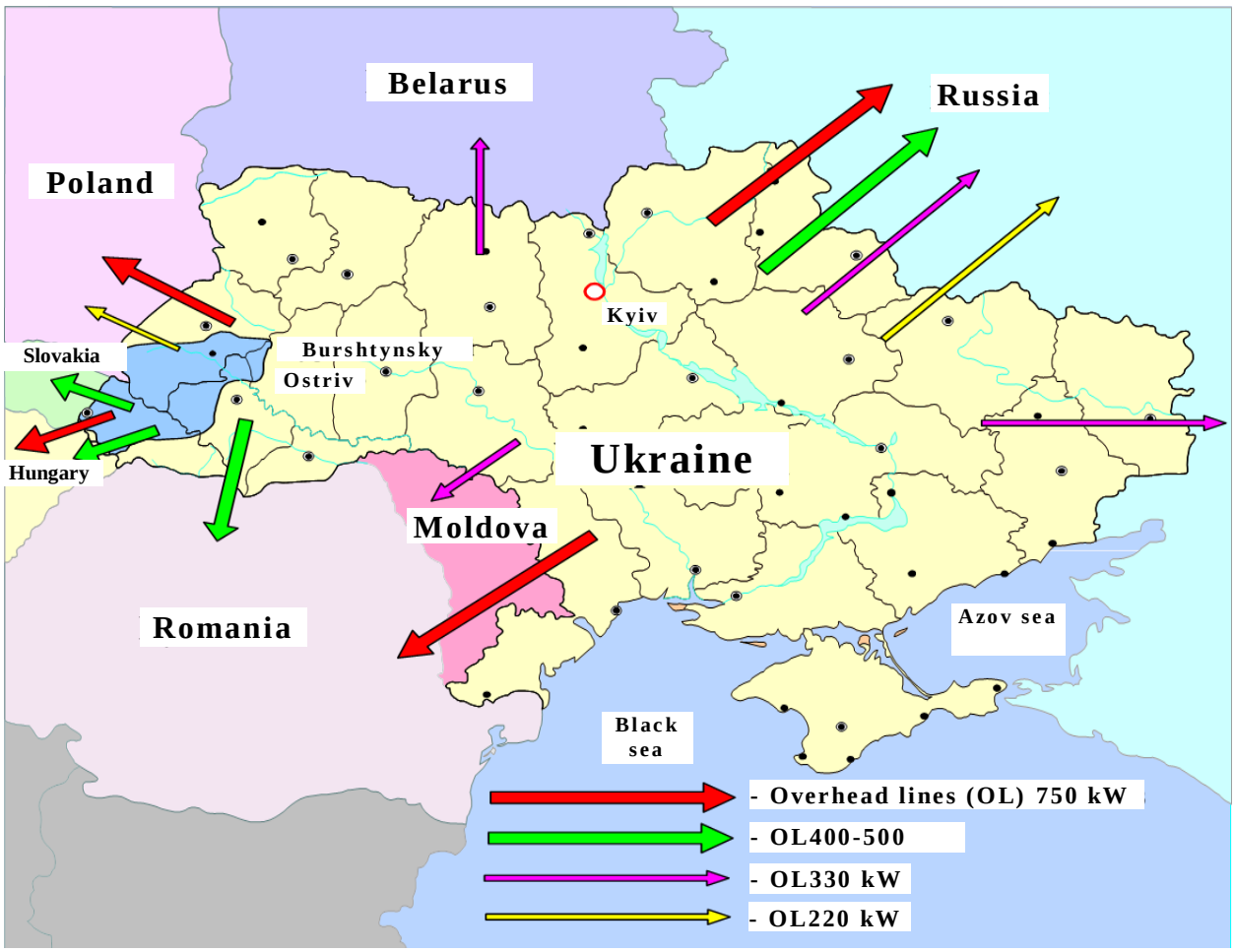
- Continued construction of Kanivska pumped storage power plant with power capacity of 1000 MW (the fists hydroelectric set to be put into operation in 2015);

(d) Has the strengthening of capacity of unified power networks with neighboring countries been planned? If yes, what inter-system power transmission lines, of what capacity and when will be built?

The Unified Energy System of Ukraine, through international power transmission lines, is connected to the power systems of Russian Federation, Moldova, Belarus, Poland, Slovakia, Hungary, and Romania (see figure anf table below).

Currently the Unified Energy System of Ukraine is operating in parallel regime with UPS/IPS **СЕС/ОЕС**, except "Burshtynsky Ostriv", which is synchronized with the European network of transmission system operators for electricity (ENTSO-E).

Transfer capacity of inter-state networks, which connect Ukraine with Russian Federation, Belarus and Moldova, and operate in parallel regime with the Unified Energy System of Ukraine makes it possible to significantly increase the volume of export. However, the increase of export potential to ENTSO-E countries is limited due to the lack, in the first place, of possibility for large scale synchronous operation of the Unified Energy System of Ukraine with the system of ENTSO-E countries. Export to ENTSO-E is currently carried out from a separate section of the Unified Energy System of Ukraine (the so-called "Burshtynsky Ostriv"), as well as to a separate area Zamost in Poland. Synchronous operation with ENTSO-E requires improvement of the technical level of Ukrainian power plants and their systems for regulating frequency and capacity in accordance with the European standards. Reconstruction volume of these systems is too large (according to "UkrEnergo", it will require about 35 blocks of combined heat and power plants with single/individual capacity of 200-300 MW) and cannot be undertaken in the near future. Construction of direct current links for securing the regime of parallel operation has been found inexpedient. Therefore, available large transfer capacity of existing inter-state high voltage power lines 750 kW Khmelnytska nuclear power plant (NPP)-Zheshuv (Poland) and South-Ukrainian NPP-Isakcha (Romania) cannot be used.



Scheme of interstate power connections of the power system of Ukraine.

Interstate power transmission lines of Ukraine and possibilities of electric energy export to neighboring countries

Country	Number of overhead transmission lines by the class of voltage					Transfer capacity of power transmission line, bln. kW·h per year	Export in 2012, bln. kW·h
	750 kW	400 - 500 kW	220 - 330 kW	110 – 0.4 kW	Total		
Hungary	1	1	2		4	5[5]/49[6]	4,85
Romania	1	1			2		
Slovakia		1		1	2		
Poland	1		1		2		
Moldova			7	18	25	1,5	0,85
Belarus			2	6	8	6,1	4,05
Russian Federation	1	3[7]	10	18	32	26,3	0,00

Existing interstate transmission networks make it possible to export up to 83 bln. kW·h per year. However, due to the lack of possibility for synchronous operation with power system of ENTSO-E countries, in 2012 Ukraine exported only 9 bln. 745.3 mln.kW·h (see Table 1).

Draft Energy Strategy until 2030 stipulates that one of the tasks for the development of transmission networks is the creation of new and strengthening of existing system creating ties

5 In case of operation through "Burshtynsky Ostriv" only
6 In case of operation in parallel regime with ENTSO-E
7 One 400 kW direct current power transmission line

both within separate energy regions of Ukraine, and between the regions and power systems of other countries.

Therefore, considering insignificant utilization of existing transnational ties, such strengthening will be carried out, first of all, through restoration and reconstruction of existing transmission networks.

(e) How the issue on accelerating the procedures for approval of networks' infrastructure is addressed? What is current situation? What is the average time for the receipt of permit? How this issue will be resolved? (Please, specify current status and respective laws and regulations, identified shortcomings and plans on improving the procedure along with the schedule of implementation of actions and expected results).

The procedure for development of networks' infrastructure and its approval is as follows:

Schemes for the development of transmission networks 220 – 750 kW are elaborated as part of the general scheme for perspective development of the Unified Energy System of Ukraine (UESU).

Recommended duration of perspective period, which is considered during elaboration of UESU development scheme, is 15 year perspective period with detailed description of the first 5 years of the development period. Scheme revision period – once every 5-7 years. The customer ordering the scheme is the state-owned enterprise NEC "UkrEnergo", which is the system operator of the Unified Energy System of Ukraine. Adjustment (technical and economic monitoring) of UESU development scheme is performed once every 1-2 years.

Schemes for the development of regional electric power systems are developed for 10 year perspective period with detailed assessment of the first 5 years. The customer ordering the scheme is regional subdivision of the state-owned enterprise NEC "UkrEnergo". Adjustment of schemes for the development of regional power systems is performed once every 2-3 years.

Schemes for the development of distribution (local) power networks with voltage up to 150 kW are developed for 10 year perspective period with detailed assessment for the first 5 years. The customers ordering the scheme is local power supply company.

Power network objects envisaged by the approved schemes, are included in the investment programs of ordering customers, which are planned for each current year.

Procedures for approval of infrastructure (schemes) of networks for connection of wind power engineering objects are governed by the "Rules on Connection of Wind Power Plants to the Electric Power Networks" approved by the Ministry of Energy and Coal Industry of Ukraine dated October 28, 2009. Pursuant to the Law of Ukraine "On Power Industry", at the beginning of 2013 the National Commission for State Regulation in Power Industry must finalize the procedure for approval of connection of renewable power generation objects of all types and approve model documents and methodology on calculating the fee payable for connection.

Under the rules, which applied only to the connection of wind power plants, a person planning to generate electric energy from the wind must receive technical specifications regarding the connection. The producer preliminary orders and receives the feasibility study on connection to power networks, which assess the possibility for connection, equipment and other requirements. Networks' owner must adopt the decision within 15 business days. In practice, the feasibility study for connection may be returned by power network owner for further refinement if it does not meet technical requirements for power plant's operation within the power network. This can significantly delay the issue of technical specifications and development design documents.

The term for consideration of design documents and their agreement with power network owner should not exceed 15 business days.

Some provisions on connection to the power network are stipulated in licensing requirements for enterprises that transmit electric power through their networks.

(f) How the coordination between the procedures for approval of networks' infrastructure and other administrative planning procedures is secured?

In accordance with regulation "Norms of technological design for power supply systems and electric power networks 35 kW and higher", projects on the development of power supply systems and electric power networks include projects on heat supply for cities, districts, and industrial enterprises; draft schemes on the development of power networks of industrial hubs and large cities; draft schemes of external power supply to large power consumers: chemical and metallurgical plants, electrified railways, oil and gas pipelines etc. At the level of local power network the above norms recommend the performance of such works on formation of schemes for the development of power networks of large cities, industrial hubs or separate large power consumers, which refine configurations, schemes and analyze the regimes of power supply networks.

In accordance with the above, the development of power networks is directly related to the development of cities and industrial objects.

Pursuant to the resolution of the National Commission for State Regulation of Power Industry (NCSRPI) №1052 dated July 26, 2007, power supply organizations must have their investment programs approved by NCSRPI.

Programs include only those infrastructure projects that will be approved in accordance with legislation for the period of programs implementation.

(g) Do the new installations for power generation from renewable energy sources enjoy the priority right for connection or have the reserve been created to secure the possibility of their connection?

Yes. This right is exercised through respective guarantees specified in the Law of Ukraine "On Power Industry", specifically "Power suppliers that engage in activity on transmission of power through the use of their own networks, may not deny access to these networks to business entities generating power through the use of alternative sources of energy".

(h) Are there any renewable power generation installations, which are ready for operation but not connected due to the limitation of network capacity? If yes, what measures will be taken to resolve the issue? When the issue will be resolved?

Based on the procedures for connection of renewable power generation installations to the network, the above situation is practically impossible in Ukraine.

At the stage of site selection for construction of renewable power generation installation, the possibility for connection to power networks is checked on a mandatory basis.

At the stage of development of the scheme for connection of renewable power generation installation, the possibility of power output and delivery to the power network is considered in more detail. If it is impossible to deliver to the network the entire capacity of power generating installation, system operator may offer to change the point of connection or propose to develop respective measures on enhancing transfer capacity of the network. If such measures are impossible to implement, it will be proposed to adjust the capacity of power generating installation.

Given the above, the situation when power generating installation is ready for operation but not connected to the network due to the limitation of network capacity is impossible.

(i) Have power transmission system operators established and made public the rules on distribution of costs and accountability for technical adaptation of a network? If yes, where? What are the guarantees that the rules have been developed on the basis of fairness, transparency, and non-discrimination? Are there special rules for power producers from periphery areas and regions with low density of population?(The rules for distribution of costs establish what share of costs is covered by the producer that wants to connect to the network, and what share is covered by the operator of power transmission network. The rules for distribution of costs determine how the

required costs are distributed among the producers that connect to the network later and benefit from the improvement of old power lines or construction of new lines).

Ukrainian legislation does not directly stipulate that connection to the power network of power stations that use alternative sources of energy should be free of charge. Pursuant to the law on power industry, power suppliers that transmit electric power through their own local networks may not deny access to their networks to the producers generating power from the alternative sources of energy. Similar provisions are stipulated by the Rules on connection of cogeneration units to the power networks approved by the resolution of NCSRPI № 47 dated January 21, 2006. In addition, power suppliers must envisage in their investment programs the costs related to connection of power plants using alternative sources of energy to their networks, and during the approval of such programs NCSRPI must envisage in the investment programs of networks' owners the costs on full connection of such power plants. It is worth noting, that the law on power industry does not directly specify that connection to the power network is free of charge and just mandates that such costs are envisaged in the investment programs of local networks' owners.

By resolution №1052 dated July 26, 2007 NCSRPI approved the procedure for consideration and approval of investment programs. Pursuant to the resolution, the investment program is usually approved for one calendar year. The procedure stipulates the stage for submission of investment program, the stage for approval of investment program, the stage for investment program implementation. As a general practice, programs must be provided for approval by NCSRPI in advance in accordance with the schedule approved by NCSRPI.

In accordance with the above document, financing of activities related to reconstruction of network objects (works related to connection to the network are likely to fall under this category) must be included in the investment program if all required documents (design documents and sometimes also the feasibility study) are approved in accordance with current legislation. Thus, owners (licensees) of local power networks may include reconstruction related costs in their investment programs, but have to substantiate these costs on the basis of provided design documents.

Connection to the network can be carried out at the expense of the owner of local network, however this is only possible if respective costs were included in the investment program of the owner of local power networks.

At the same time, on June 22, 2012 Ukrainian Parliament adopted the Law of Ukraine № 5021-VI "On Amendment of Certain Laws of Ukraine Regarding Payment for Connection to the Networks of the Subjects of Natural Monopolies". Most of its provisions come into force as of January 1, 2013. Pursuant to this law connection of power stations generating electric power from alternative sources of energy must be financed in the following way:

- 50% – at the expense of funds envisaged in power transmission tariffs;
- 50% – at the expense of revocable/refundable financial assistance provided by the producer to power transmission organization. The term for repayment of financial assistance is determined by NCSRPI in accordance with the Procedure for financing services on connection of power installations to the power networks and may not exceed 10 years.

It is worth noting that the above Law № 5021-VI defines the connection of power installation as a service on creation of technical capability for the transfer of power generated by customer's power installation and complying with respective capacity, quality and reliability indicators to the power networks (including newly built networks) of power transmission organization. This means that it is power transmission organizations that must develop power networks, including all required structures, reconstruction, modernization and perform other works related to connection to the network in order to connect power installations of power producer generating electric energy from the alternative energy sources.

Related costs will be distributed between power transmission organization and power producer as described above. More detailed procedure for financing connection to the networks will be developed and approved by NCSRPI.

The above procedure for financing connection to the networks will not apply to power producers that received technical specifications for connection before January 1, 2013 and where construction of such objects began before July 1, 2013.

The procedure for distribution of costs applies to all power producers. There are no special rules for power producers from periphery areas and regions with low density of population.

This procedure does not determine in any way how the costs are distributed between power producers that connect later and benefit from the improvement of old power transmission lines or construction of new lines.

(j) describe how the costs on connection and technical adaptation are attributed to producers and/or transmission network operators or distribution system operators? How transmission network operators or distribution system operators can compensate their investment costs? Are there any plans to change these costs distribution arrangements in the future? What changes are envisaged and what results are expected? (There are several options for distribution of costs related to connection to the network. Member-states can select one option or combination of options. According to the model of "deep" accrual of connection related costs, the developer of installation for power generation from renewable energy sources bears a number of costs related to network infrastructure (costs related to connection to the network, enhancement of the network, and expansion of the network). Another approach is "non-deep" accrual of connection related costs under which the developer bears only the costs on connection to the network and does not bear the costs on enhancement and expansion of the network (they are included in the network's tariff and are paid by the consumers). There is one more option where all connection costs are socialized and included in the network's tariffs.

To further develop provisions of the Law of Ukraine № 5021-VI "On Amendment of Certain Laws of Ukraine Regarding Payment for Connection to the Networks of the Subjects of Natural Monopolies", NCSRPI by its resolution № 115 dated February 12, 2013 (registered with the Ministry of Justice of Ukraine as of February 28, 2013 № 339/22871) approved the "Methodology for Calculation of the Fee Payable for Connection of Electric Installations to Power Networks". This methodology specifies the procedure for calculating the fee payable for connection of electric installations of customers to power networks, increasing existing connected capacity of electric installations, or changing requirements to reliability of power supply of electric installations. The methodology is based on formula approach.

The cost of development of technical specifications and preparation of draft agreement on connection to the power network is determined based on the calculations developed by power transmission organization and approved by NCSRPI. In this case the cost of development of design documents for non-standard connection is calculated separately and is not included in the final payment for non-standard connection. This cost is paid independently by the customer at the stage of development of respective documents.

Development of design and cost estimate documents for connection of power industry objects that generate electric energy through the use of alternative sources of energy is secured by power transmission organization and financed at the expense of funds envisaged in the tariffs on electric power transmission and/or at the expense of revocable/refundable financial assistance provided by the customer to power transmission organization. In case of provision by the customer of refundable financial assistance for the development of design and estimated documents, the parties conclude a separate agreement on provision of refundable financial assistance in accordance with the model form specified in annex 3 to this Procedure.

Measures on construction, reconstruction (modernization) of power networks and equipment of power transmission organizations due to the connection of power generating installations that produce electric power through the use of alternative sources of energy are included in the

investment program pursuant to the Procedure for formation of licensees' investment programs on transmission and supply of electric power.

Agreement on provision of refundable financial assistance for performance of works on connecting electric installations of the customer is concluded by the parties after the design and cost assessment documents have been developed and full estimated cost of connecting power industry objects that generate electric power through the use of alternative sources of energy has been determined. Amount provided by the customer as refundable financial assistance shall constitute 50% of full connection cost, taking into account the amounts of already concluded agreements on provision of financial assistance for the development of design and cost assessment documents.

The term for repayment of refundable financial assistance is 10 years. Repayment of refundable financial assistance must be stipulated in the agreement as of the calendar year following the year of putting the object into operation and after the receipt of required permit and licenses for electric power production.

(k) Are there any rules for distribution of costs between producers that were connected initially and later? If no, how the benefits for producers that got connected later are calculated and estimated?

There are no such rules.

(l) How the operators of power transmission and distribution systems can guarantee the provision of required information on costs, exact term for consideration of applications, and expected term of connection to the network for new producers willing to connect to the network?

National Commission for State Regulation in Power Industry by its resolution № 32 dated January 17, 2013 (registered with the Ministry of Justice of Ukraine as of February 8, 2013 № 236/22768) has approved "The Rules for Connecting Electric Installations to Power Supply Networks".

The service on connection to power supply network is provided on the basis of agreement on connection concluded in accordance with model template. To receive the draft agreement on connection the customer applies to power transmission organization at the place of location of its electric installations and submits the application on connection of electric installation of certain capacity and respective passport document. The term for provision of connection service for electric installations of the 1st degree of capacity is 15 business days as of the day of payment of connection cost by the customer in accordance with connection agreement. For electric installations of the 2nd and 3rd degree of capacity this term is 30 and 45 business days accordingly. Other term for the performance of the above works is agreed with the customer in the agreement on connection with reference to the requirements of regulations specifying the term for designing and construction. The duration of service related to standard connection is extended for the period required for registration of the right to use the land plots allocated for electric installations of external power supply in accordance with current legislation.

To connect electric installations designed for generation of electric power with capacity up to 10 MW, the customer files connection related application with power transmission organization in the territory of licensed activity of which the customer's electric installations are located.

To connect electric installations designed for generation of electric power with capacity ranging from 10 to 70 MW, the customer may file connection related application with power transmission organization in the territory of licensed activity of which the customer's electric installations are located, or with a licensee securing the transmission of electric power through power grid transmission network and interstate/transnational power networks. Final decision on connection of electric installations of the customer is adopted based on the feasibility study taking into account the impact on quality of electric power in the area of possible connection.

Section IV of the Rules stipulates specific aspects related to connection of electric installations designed for power generation through the use of alternative sources of energy.Connection of electric installations designed for power generation through the use of alternative sources of energy shall be carried out pursuant to the procedure stipulated in general section and taking into account the following specifics:

- Power transmission organization shall prepare and provide free of charge to the customer the signed draft agreement on connection to power supply network of electric installation generating electric power through the use of alternative sources of energy;
- Technical specifications shall be provided to the customer free of charge no later than within 15 business days as of the day of submission of application on connection of electric installation and 30 business days – in case of the need to agree respective aspects with the owner of power grid transmission networks or interstate/transnational power networks.

Technical specifications do not contain requirements related to external power supply.

Development of design documentation of external power supply electric installations is secured by power transmission organization at the expense of funds included in the tariffs for power transmission and/or at the expense of refundable financial assistance provided by the customer to power transmission organization. Power transmission organization secures the performance of construction-assembly and star-up and adjustment works, and putting into operation of newly built or reconstructed electric installations to the point of connection of the customer.

National Commission for State Regulation of Power Industry by its resolution № 1314 dated October 11, 2012 approved "Model agreements to be concluded with economic entities that generate electric power through the use of alternative sources of energy".The owner shall connect electric installations of the customer to its power supply networks after fulfillment by the customer of technical specifications for connecting electric installation generating electric power through the use of alternative sources of energy to power supply networks (which are annexed to the connection agreement), and after conclusion of agreement on sale of generated electric power stipulated by current legislation of Ukraine. The customer shall confirm that electric installation, owned by him by title of ownership or right of use, is designed for generation of electric power through the use of alternative sources of energy and put into operation in accordance with the procedure established by current legislation of Ukraine.

The price of agreement is determined based on the value of construction of new, reconstruction or technical re-equipment of existing local networks, and the value of development of technical specifications received by the customer.

The procedure for receipt of connection related information for wind power plants and solar power plants in specified in:

- DSTU Wind power engineering. Wind power stations. Connection to power supply system (pending approval).
- DSTU Solar power engineering. Sites for photovoltaic power plants. Connection to power supply system (pending approval).
- Rules for connection of wind power plants to power supply networks.

The above regulations establish how the operators of different levels determine the volume of technical information required by new producers for connection depending on declared capacity of a power plant using renewable energy sources and stages of project development.

Connection to power supply network is carried out pursuant to connection agreement within five business days after the fulfillment of the following conditions:

1) Execution of certificate of clearance for connection to the network.
2) Receipt by the producer of the certificate of compliance of power stations under construction with design documents, construction standards and rules.
3) The producer has operational and maintenance personnel and designated a person responsible for electric facilities or concluded the agreement on servicing of electric installations with organizations or natural persons who are adequately trained, attested, and eligible to perform such works.
4) If required, the agreement on operational servicing and maintenance of transit electric installations has been concluded between the producer (owner of transit electric installation) and power transmission organization.

The procedure is the same for other types of electric installations generating power through the use of renewable energy sources.

4.2.7. Operation of power supply networks (Article 16(2) and Article 16(7) and (8) of the Directive 2009/28/EC)

(a) How the operators of power transmission and distribution systems guarantee the transmission and distribution of power generated from renewable energy sources? Has the priority or guaranteed access to the network been secured?

Pursuant to the Law "On Power Industry" the wholesale electric energy market of Ukraine must purchase from economic entities that enjoy the "green tariff" all electric energy generated at power industry objects through the use of alternative sources under the "green tariff" and irrespective of installed power capacity or output volume.

Power suppliers that engage in activity on transmission of electric power through the use of their own networks must secure a fair and equal access to these networks for all economic entities that received the license granting the right to engage in respective activity and concluded the agreement on transmission of electric power. Power suppliers that engage in activity on transmission of electric power through the use of their own networks may not deny access to these networks to economic entities that generate electric power through the use of alternative sources of energy. Power suppliers that engage in activity on transmission of electric power through the use of their own networks must envisage in their investment programs the costs on connection of power industry objects that generate electric power from alternative sources of energy.

(b) How operators of power transmission system guarantee that during dispatching/scheduling of power stations they will give priority to electric power generated from renewable energy sources?

The wholesale electric energy market of Ukraine must purchase from economic entities that enjoy the "green tariff" all electric energy generated at power industry objects through the use of alternative energy sources (except blast furnace gas and coke gas, and in case of hydroenergy - only energy generated by micro, mini and small hydro power stations) under the "green tariff" and irrespective of installed power capacity or output volume. Power supply companies purchase electric power generated from alternative energy sources at the energy market on a par with energy generated from other sources and at the tariffs of energy market.

To fulfill the above requirements system operate must create conditions for day-to-day balancing of generation capacity between power plants that use alternative sources of energy and combined heat and power stations in accordance with declared daily schedules of generation capacity from alternative sources of energy. This provision is stipulated in the Rules for mutual relations between state-owned enterprise "National energy company "UkrEnergo" and subjects (objects) of power industry under conditions of parallel operation within the Unified Energy System of Ukraine. These Rules are currently under consideration and must replace the current rules ***COY***

Н МПЕ 007-2008, which do not take into consideration the power plants generating electric power from alternative sources of energy.

(c) How operational measures related to the network and the market are taken to minimize the decrease of power supply generated from renewable energy sources? What types of measures are planned and when their implementation is expected? (Energy market and network structure, which makes it possible to integrate various resources, can encompass such measures as trade closer to real time mode (transfer from a day in advance forecast to the forecast and adjustment of schedules for generating companies during a day); unification of territorial markets; securing the establishment of strong trans-border power pool systems and development of trans-border trade; improvement of cooperation between the operators of neighboring systems; use of improved means of communication and management; management of consumer's energy consumption and active consumer participation in the markets (through two-way communication systems – smart metering system); increasing the volume of distributed production and storage on the spot (e.g. e-vehicles) with possibility of active management of distribution networks (smart networks).

Existing structure of energy market within the electric power system of Ukraine (the model of "unified buyer") envisages that all electric power generated by power generating companies and transmitted to the power network of power transmission organizations is purchased from the power plants by the state enterprise "EnergoRynok" (Energy Market) under unregulated tariffs (from combined heat and power plants) and under tariffs regulated by NCSRPI (from nuclear power plants, hydraulic power plants, and renewable energy sources). Consumers purchase electric power from state enterprise "EnergoRynok" and receive it from the network of power transmission organizations under the average market tariffs as of the current time (at present it is the current day). A separate zone in Western Ukraine (Burshtynsky Ostriv) operates under conditions of trans-border market of the East European Countries. There are no other markets in Ukraine (either territorial, or markets of direct bilateral supply). However, the project on energy market liberalization is currently under discussion and consideration. It envisages the introduction of bilateral agreements and balancing electric energy market.

Current energy market infrastructure makes it possible to actively integrate the supply of electric power generated from renewable energy sources (RES) due to the fact that average market tariffs for the buyers are much lower (3-5 times) from the "green tariff" under which RES power plants sell energy to the energy market.

According to the results of scientific and research study "Research of operation regimes of the Unified Energy System of Ukraine and its development in the context of implementation of renewable energy sources" conducted by LLC "Donetsk Main Computing Center" jointly with the Institute of Renewable Energy of the National Academy of Sciences of Ukraine upon the order of National Energy Company "UkrEnergo", existing structure of generating equipment and power consumption levels until 2015 make it possible to integrate into the Unified Energy System of Ukraine nearly 4800 MW generated by power plants that use renewable energy sources. The above capacity of power plants can be achieved by enhancing the capacity of combined heat and power plants and, therefore, does not require substantial changes within the structure of power generating equipment of Ukrainian electric power system.

As for further development and improvement of legal framework, the draft law of Ukraine "On Fundamentals of Functioning of Electric Power Market in Ukraine" (registration № 2946) is currently considered by the Ukrainian Parliament.

As specified in the explanatory note, the main goal for adoption of the draft law is liberalization of wholesale electric power market of Ukraine and creation of effective competitive environment in the electric power market with due consideration of key requirements of the EU legislation, including the requirements stipulated by the Directive 2003/54/EC concerning common rules for the internal market in electricity and Regulation (EC) №1228/2003 on conditions for access to the network for cross-border exchanges in electricity. The adoption of the draft law will make it possible to created legal framework for operations in the market aimed at promoting investment in the system of generation, transmission, and supply of electric energy, securing non-

discriminative access to the market for all market players and consumers, as well as securing stable and break-free power supply through introduction of the system of competition among the constituent elements of the market. The proposed model of competitive market in electricity envisages its significant liberalization through implementation of self-regulation mechanisms and simultaneous reduction of regulatory functions of the state. The function of the state will transform towards vesting the central executive power agency responsible for managing power industry and state authority responsible for regulation of power industry with powers on approval of key regulations, which, actually, will determine the essence and content of relations in the electricity market (specifically, market rules, "day in advance", codes of power supply networks, revenue metering code).

It is also worth noting that the mechanism for fulfillment of state guaranteed stipulated in the draft law with regard to full settlements for the entire volume of electric energy generated by power industry objects that use alternative sources of energy and sold at "green tariff"; compensation of losses incurred by guaranteed suppliers from the sale of electric energy to consumers at regulated prices; compensation of losses resulting from the purchase of electric energy produced by cogeneration plants and other combined heat and power producing facilities at regulated prices and its subsequent sale at market prices; as well as compensation of losses of a party responsible for the balance of balancing group composed exclusively of the producers generating electric power through the use of alternative sources of energy, which result from purchase-sale of electric energy at a balancing/changeable market (actually at the expense of power producers from among nuclear power plants, hydraulic power plants, pumped storage power plants (except small hydraulic power plants) through the Fund for settlement of value/cost misbalances is associated with significant risks of both financial and man-caused nature.

Financial risks are associated, first of all, with the threat of loss of competitiveness in the Ukrainian market in electricity by the above mentioned subjects due to significant appreciation of electric power generated by them and unstable pricing for electricity predetermined by respective requirements of the draft law on securing the balanced nature of the Fund for settlement of value/cost misbalances in every new fiscal year. According to part 4 of Article 25 of the draft law, "revenues of the Fund for settlement of value/cost misbalances in respective fiscal year must equal to the expenditures of the Fund over the same period. State authority for regulation of operations in power industry must secure the adequacy of established payments for services provided by the Fund in accordance with provisions of this law in order to cover the Fund's expenditures over the respective period". To financial risks may also be attributed the consequences resulting from the increase of electricity tariffs for all categories of consumers, and decrease of budget revenues (including payments from the net income) which must be paid to the State Budget of Ukraine by state-owned enterprises pursuant to the Resolution of the Cabinet of Ministers of Ukraine № 138 dated February 23, 2011) due to aggravation of financial status of respective electric power producers.

Implementation of forecasting system is required to enable RES power plants' integration into liberalized energy market and their operation based on "day in advance" orders.

In the area of operational and technological management LLC "Donetsk Main Computing Center" jointly with the Institute of Renewable Energy of the National Academy of Sciences of Ukraine in its scientific and research study "Research of operation regimes of the Unified Energy System of Ukraine and its development in the context of implementation of renewable energy sources" recommends that a new annex "Model regulation on operational and technological relations between state-owned enterprise "National Energy Company "UkrEnergo" and RES power plants" should be added to the "Rules of mutual relations between state-owned enterprise "National Energy Company "UkrEnergo" and subjects (objects) of power industry under conditions of parallel operation within the Unified Energy System of Ukraine". This annex should regulate operational and technological relations between system operator and RES power

plants, particularly taking into account such specifics of wind power plants and solar power plants as the need for current forecasting of operating capacity, establishment of minimal guaranteed capacity, participation in controlling and adjusting the frequency and active capacity etc.

"Rules of Ukrainian wholesale market in electricity" approved by the resolution of NCSRPI №921 dated September12, 2003 do not cover the issues related to solar power plants, while wind power plants are considered to have no impact on the requirements to flexibility/cyclic load capacity of modular heat power plants. The following should be specified in more detail: the procedure for submission of orders for operating capacity of wind power plants and solar power plants; establishing the level of accountability of wind power plants and solar power plants for deviations from declared capacity; the need for increasing the volume of secondary reserve; issue on revising sections of the Rules related to payments for flexibility/cyclic load capacity; decreasing the output of modular heat power plants during operations on renewable energy sources, which requires the revision of algorithm for determining the price for operating capacity.

To minimize the decrease of power supply generated from renewable energy sources (RES), new regulations are being developed which govern threshold levels for limiting RES capacity in case of emergency situations in the networks. Specifically, during the development of connection schemes for wind power plants and solar power plants the norm should be applied under which the mode of repair in the network should not limit output capacity of RES power plants. As of the beginning of 2013, two standards related to such limitations have been developed and submitted for consideration:

- DSTU Wing power engineering. Wind power plants. Connection to power supply system.
- DSTU Solar power engineering. Sites for photovoltaic power plants. Connection to power supply network.

The above standards specify the requirements to the key functions related to the operation of wind power plants and solar power plants within the unified energy system. This will make it possible to enhance the reliability of power supply system operation and more effectively use the capabilities of power supply system with regard to integration of RES power plants.

In 2013, during the revision of the "Rules of mutual relations between state owned enterprise "National Energy Company "UkrEnergo" and subjects (objects) of power industry under conditions of parallel operation within the Unified Energy System of Ukraine", the above rules were supplemented with Provisions on operation of wind power plants (WPP) and solar power plants (SPP), which take into account the specifics of operation of these power plants within power supply system. The provisions specify the requirement on submission of possible schedule of power generation by WPP and SPP for a day in advance. This requirement will make it possible to more effectively use the flexibility potential/cyclic load capacity and decrease the requirements to the volume of reserve capacity at regulating power plants (in Ukraine – combined heat and power plants). Requirements with regard to construction and reconstruction of power supply networks, transformer yards, substations and power networks for connection of objects generating electric power from renewable energy sources, and reconstruction of combined heat and power plants are included in the and "State Target Economic Program for Energy Efficiency and Development of Energy Inputs Production from Renewable Energy Sources and Alternative Types of Fuel over the Period of 2010-2015".

(d) Has power industry regulator been informed about such measures? Does power industry regulator have the required potential to monitor and secure the implementation of these measures?

Yes. All developed or revised regulations are agreed with all possible users and approved by respective regulatory authorities, specifically: on the issues related to technology of power

supply system operations - the Ministry of Energy and Coal Industry of Ukraine; and on the issues related to market relations – National Commission for State Regulation of Power Industry (NCSRPI). This procedure makes it possible to effectively and fairly assess the feasibility of implementation of respective measures and, if required, introduce required amendments.

(e) Are power plants generating electric power from renewable energy sources integrated into the market in electricity? Please, describe it. What are their obligations in terms of participation in electricity market?

Pursuant to current legislation, any licensed producer generating electric power from alternative sources of energy can become a member of wholesale market in electricity irrespective of production/generation volume or any other characteristics. NCSRPI has approved a model agreement on purchase-sale of electric power concluded between a producer and state-owned enterprise "EnergoRynok", which comes into force only after approval of "green" tariff. Following the conclusion of agreement, it must be agreed with NCSRPI. Moreover, the receipt of license is not mandatory for RES power plants with capacity up to 10 MW if they do not intend to sell generated electric power at the wholesale market in electricity (i.e. they voluntarily do not become members of wholesale market in electricity).

(f) What are the rules for establishing tariffs on transmission and distribution of electric power generated from renewable energy sources?

Currently for power transmission organization there is no division of electric power depending on the sources of its generation. NCSRPI establishes the unified/single tariff for power transmission organization based on the structure and spread of a network, network voltage, loading level, etc.

4.2.8. Biogas integration into the natural gas network (Article 16(7) and Article 16(9) and (10) of Directive 2009/28/EC

(a) How is it ensured that the charging of transmission and distribution tariffs does not discriminate against gas from renewable energy sources?

Access to the gas network is regulated by the Law of Ukraine **"On the Principles of the Natural Gas Market Operation"**[8]**.** According to this Law, natural gas market operators are entitled to **equal rights** of access to the unified gas transportation system of Ukraine. In the event of compliance with the requirements to physicochemical parameters, technical norms and safety standards the legislation provides that **flammable gasesof any origin** may be safely injected and transported, without technical obstacles, via the gas transportation system. The Law does not mention biogas directly.

Currently due to the absence of significant biogas production in Ukraine, there are no examples of connections (or even attempts of connection) of biogas producers to natural gas distributing systems, that is why the issue of setting up tariffs for transportation and biogas distribution is not relevant or urgent at the moment.

(b) Has any assessment been carried out on the need to extend the gas network infrastructure to facilitate the integration of gas from renewable sources? What is the result? If not, will there be such an assessment?

The Cabinet of Ministers issued an Order "The Matters of Arranging Production and Use of Biogas"[9] entrusting several profile ministries and organizations with the task to ensure establishment of the state standards for biofuel (including biogas) quality parameters and their determination methods. However, these days only one state standard is effective in practices in

[8]Law of Ukraine "On the Principles of the Natural Gas Market Operation"(No. 2467-VIdated 08.07.2010) http://zakon4.rada.gov.ua/laws/show/2467-17

[9]CMU's Order "The Matters of Arranging Production and Use of Biogas" (No. 217-rdated 12.02.2009) http://zakon4.rada.gov.ua/laws/show/217-2009-%D1%80

the biogas production sector - DSTU 4516:2006 dated 01 January 2007 "Energy-Saving. Renewable Energy Sources.Biogas Units.General Technical Requirements"[10]. The standard does not contain any requirements directly to biogas quality. There is mentioning that the main parameters and characteristics of the biogas unit may be completed with other parameters concerning biogas, fertilizers and by-products. Besides this standard, there is another standard for household biogas units – DSTU 7014:2009 "Personal Biogas Units. General Technical Requirements". Biogas requirements and evaluation methods are regulated by sectoral standard SOU 40.21-37-560:2007 "Biogases for Industrial and Household Use. Requirements and Evaluation Methods".

A favourable factor is that two biogas DSTU standards were developed during 2012 under guidance of SAEEE, they are pending approval:

"Gaseous Fuel.Biogas.Technical Requirements and Control Methods."

"Gaseous Fuel.Biogas.Taking Samples for Testing."

According to the Protocol concerning the Accession of Ukraine to the Treaty establishing the Energy Community, Ukraine was to implement Directive 2003/55/EC[11] "Concerning common rules for the internal market in natural gas" by 01 January 2012. In particular, the Directive goes "Member States should ensure that, taking into account the necessary quality requirements, biogas and gas from biomass or other types of gas are granted non-discriminatory access to the gas system, provided such access is permanently compatible with the relevant technical rules and safety standards. These rules and standards should ensure, that these gases can technically and safely be injected into, and transported through the natural gas system and should also address the chemical characteristics of these gases."

In general, we can say that the matter of biogas supply to the natural gas network has not been regulated yet at the legislative level in Ukraine. These issues are researched by the experts who report their findings in publications and presentations. It seems that in prospect we may expect consideration of the issue concerning biogas supply to the natural gas system at the national level.

(c) Are technical rules on network connection and connection tariffs for biogas published? Where are these rules published?

The procedure of access and connection to the gas network is defined in the Regulation of the National Energy Regulatory Commission[12]. However, the Procedure goes only about the natural gas, while biogas and other flammable gases are not mentioned directly. Ukraine has not seen any attempts to connect biogas units to gas networks. These issues have not been addressed at the national level so far.

4.2.9. District heating and cooling infrastructure development (Article 16(11) of Directive 2009/28/EC)

The heat supply networks are rather well-developed in Ukraine. As of 2010, the total thermal energy generated and consumed was equal to 232 million Gcal.

The main consumers of thermal energy are public utilities and individuals (nearly 70% in 2010) and industry (20%), while other economic sectors cumulatively consume a little bit more than 10% of total heat.

[10]DSTU 4516:2006 dated 01.01.2007 http://ksv.do.am/publ/dstu/dstu_4516_2006/3-1-0-418
[11]Directive 2003/55/EChttp://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:176:0057:0057:EN:PDF
[12]On approval of the procedure of access and connection to the unified gas transportation systemof Ukraine (NERC RegulationNo. 420 dated 19.04.2012) http://zakon2.rada.gov.ua/laws/show/z0721-12

544 cogeneration plants and district boiler houses of various types and capacities - which cumulative heat productive capacity is 30 thous. Gcal/hour - are in operation within the district heating systems. Moreover, the heat supply systems include 31,312 heating plants of the total heat productive capacity equal to 127 thous. Gcal/hour and 645 heat recovery units fuelled by secondary thermal energy sources.

The number and installed heating capacity of thermal energy sources within the district heating systems in 2010

Thermal energy sources of the district heating systems	Number, items	Installed heating capacity, thous. Gcal/hour
1. Condensation thermal power plants	15	5.4
2. Heating cogeneration plants	30	8.5
3. Industrial thermal power plants	495	16.1
4. Nuclear power plants	4	2.6
6. Industrial and heating boiler rooms	33,312	127
7. Heat recovery plants	645	2.5
Total thermal energy sources		162.1

The country's district heating system has the well-developed heat distribution networks, which were 37.3 thous. km long, two-pipe, as of 2010 inter alia 33.8 thous. km in the heating plant system including 30.9 thous. km in urban areas and 2.9 thous. km in rural areas. The most networks and thermal energy sources are not equipped with devices for sensor monitoring of heat losses, therefore no loss-related information is available. The estimated losses make up minimum 30%, while the actual losses may be higher. Large heat losses in the heating networks are due to their poor physical state, currently the worn out supply and distribution networks account for 70% of the total network length.

Households have been demonstrating a growing number of bidirectional air conditioning equipment installed in recent years. They may be used for heating as heat pumps, but the role of these systems in heat supply is scarcely noticeable so far. Household geothermal heat pumps become more and more popular as well. They are installed in new cottages where living space is over 150 m^2, however, due to their high price they remain unaffordable for average citizens. The situation in the individual heat supply sector is characterized by the low degree of heat comfort due to the lack of fuel and energy at reasonable prices.

The use of such alternative and renewable energy sources as low potential environmental energy (air, soil, water reservoir) with heat pump applications, bioenergy (direct firing of wood waste, agricultural waste and solid household waste and pyrolysis, use of biogas, fuel pellets, etc.), solar energy and alternative energy sources, primarily, waste potential of industrial productions and waste water discharges are most promising in the heating sector. Their implementation should be adjusted to community interests, this means this is the task for local authorities to address.

For extended introduction of solar energy in the heat supply system, the existing equipment and technologies should be improved, new materials should be developed for stand-alone systems of power supply, hot water supply and heating for residential buildings and industrial facilities.

To cover the heat load of the district heating systems, available cogeneration plant capacities will be used in the period till 2020. The possibility to transfer some cogeneration plants to coal-firing should be considered. The transfer should be accompanied with adequate environmental protection actions to protect population against emissions of particulate matter, sulphur and nitrogen oxides and actions to decontaminate and dispose of bottom ash waste. After 2020, only

most efficient gas-fired cogeneration plants are most likely to remain in operation, which replacement will not be feasible. The available heating plants of the district heating systems will remain in operation for the entire forecast period, while comprehensive reconstruction will be needed.

At the same time, the main factor that limits development of the heat supply sector and implementation of alternative and renewable energy is the subsidies provided for heating to the utilities sector and household sector.

4.2.10. Biofuels and other bioliquids — sustainability criteria and verification of compliance (Articles 17 to 21 of Directive 2009/28/EC)

Directive 2009/28/EC requires that the biofuels entering EC market comply with the sustainability criteria. All sustainability requirements concern the consequences of biofuel production and use: greenhouse gas emissions, changes in land status, biodiversity conservation, soil, water and air protection, social sustainability, etc. A lot of the sustainability criteria are applicable not only to sustainable biofuel production, but also, primarily, to sustainable production (growing) of feedstock that is biomass. Therefore, biofuel manufacturers as well as their feedstock suppliers are to demonstrate compliance with the sustainability criteria via independent audits (certification).

Today, Ukraine lacks legislative and regulatory framework to regulate sustainable development of biofuel production. At present, there are no certification bodies, audit bodies in Ukraine, which competence is formally proved to the end of certification of sustainable biofuel production. And there are no national requirements to sustainable development of feedstock growing for biofuel (biomass) production and a certification procedure itself is lacking[13].

However, Ukrainian enterprises are important suppliers of biomass as feedstock for biofuel production in the European Union. In order to implement the entire Ukrainian export potential, biomass should comply with sustainability criteria established in the EU set in Directive 2009/28/EC requirements, and the companies should provide proofs of compliance to the criteria. However, most EU countries have not yet approved relevant procedures for sustainability confirmation and the certification scheme has been in operation in full only in Germany and the Netherlands. Today, 17 Ukrainian companies are certified for compliance with the sustainability criteria. Other exporters had the opportunity to sell their products to the countries, which did not request the certificates[14]. There are still no arrangements between Ukraine and EU (a bilateral agreement) on relevant certification bodies. Only the bodies duly accredited in EU may perform certification.[15]

Therefore, introduction of sustainable biofuel production certification in Ukraine, first of all, requires that a legislative act is adopted to regulate this issue at the legislative level as well as some subordinate regulatory documents. Until their adoption, certification will remain selective and only exporters of feedstock to EU for biofuel production will seek certificates.

(a) How will the sustainability criteria for biofuels and bioliquids be implemented at national level? (Is there legislation planned for implementation? What will be the institutional setup?)

[13] *KravchukV., TsemaT.,TarhonyaB., OzytnyazhskyiM.*Regulatory framework to support biomassand biofeuls production in Ukraine. // Machinery and technology for Agro-Industrial Sector. – 2010, No.7, pp. 34-38 http://archive.nbuv.gov.ua/portal/Chem_Biol/Titapk/2010_7/7_10_s34.pdf

[14] *YuliyaOharenko, OlehNiviyevky.*EU policy on the biofuel market: consequences for Ukraine.// German-UkrainianAgrarian Dialogue. Review of the Agrarian Policy.IssueNo.3/2012 http://ua-energy.org/upload/files/APD_AFPR_2012_03_ukr.pdf

[15] *SerhiyKandul.*Rape exports from Ukraine: a response to the EU market challenges. // Supply. Ukrainian journalfor agribusiness.http://www.propozitsiya.com/?page=146&itemid=3480

The Treaty establishing the Energy Community, which Ukraine acceded to in February 2011, creates a clear legislative framework and Ukraine ratifies relevant EU legislative provisions within this framework. The Ministerial Council of the Energy Community issued the decision on 18 October 2012 approving the proposal of the European Commission to the Ministerial Council of the Energy Community concerning implementation of Directive 2009/28/EC on promoting the use of energy from renewable sources.

So, according to the Order of the Cabinet of Ministers "On approval of the Action Plan for implementation in 2013 of the National Program of adapting Ukrainian legislation to the European Union's legislation"[16] on drafting of regulatory acts, Ministry of Economic Development, SAEEE and other national executive authorities will November 2013 should draft the order of the Cabinet of Ministers "On approval of the Action Plan for implementation of the Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources", including the implementation plan itself. This Plan will foresee the development and adoption by the Cabinet of Ministers of Ukraine the legislative act on criteria approval of biofuel sustainability. After introduction of these criteria and monitoring the EU report on their commitment on the territory of Ukraine will be prepared.

At the moment in Ukraine there are no legislative acts that regulate sustainable development of biofuel production so far. There are no certification authorities, inspection institutions in Ukraine that could have official improvement of their competitiveness on certification of sustainable production of biofuel. Also there are no national requirements on sustainable development of raw material growing for biofuels (biomass) production and the procedure (order) of certification is also absent.

It is expected that while developing of the Action Plan on realization of the NREAP there will be an authority that will be responsible for introduction of certification system and monitoring of biofuels sustainability.

(b) How will it be ensured that biofuels and bioliquids that are counted towards the national renewable target, towards national renewable energy obligations and/or are eligible for financial support comply with the sustainability criteria set down in Article 17(2) to (5) of Directive 2009/28/EC? (Will there be a national institution/body responsible for monitoring/verifying compliance with the criteria?)

While developing the Action Plan on implementation of the Directive 2009/28/EC of the European Parliament and of the Council an authority that will be responsible for monitoring/equivalency determination to criteria of biofuels sustainability will be established in Ukraine.

(c) If a national authority/body will monitor the fulfilment of the criteria, does such a national authority/body already exist? If so, please specify. If not, when is it envisaged to be established?

There is no authority responsible for the monitoring of fulfilment of the sustainability criteria for biofuels so far. In general, the sphere of renewable energy sources is under the SAEE responsibility. Plans call for determination of state authority that will be responsible for monitoring of fulfilment of the sustainability criteria for biofuels that are mentioned in Directive 2009/28/EC and in Action Plan for implementation of the Directive in Ukraine. The Plan drafting should be completed by December 2013.

(d) Please provide information on the existence of national law on land zoning and national land register for verifying compliance with Article 17(3) to (5) of Directive 2009/28/EC. How economic operators can access to this information? (Please provide information on the existence of rules and distinction between different land statuses, like biodiversity area, protected area etc; and on the competent national authority who will monitor this land register and changes in land status.)

[16]CMU's OrderNo. 157-rdated 25 March 2013 http://zakon4.rada.gov.ua/laws/show/157-2013-%D1%80

The Law of Ukraine "On Land Protection"[17] defines natural-agricultural, environmental-economic, erosion preventive and other types of land zoning in Ukraine. The Cabinet of Ministers of Ukraine is in charge of establishing the zoning procedure[18]. These zoning types include:

- **Division of lands by designated purpose** on the basis of environmental conditions, agrobiologic requirements of agricultural crops, development of economic activities and priority of environmental safety requirements;
- Setting requirements to efficient land management by zones;
- Identification of territories, which require special protection against manmade impact;
- Setting required environmental restrictions for certain zones applicable to the use of lands or soils based on geomorphologic, environmental-climatic, soil, erosion preventive and other specific features depending on an environmental zone.

The lands of Ukraine by their main designated purposes are grouped into the following categories (according to Art.19 of the Land Code of Ukraine[19] and Annex 3 to the Procedure of the State Land Cadastre Maintenance[20]):

- Agricultural lands.
- Lands for housing and residential building development.
- Nature reserve and other nature conservation areas.
- Lands intended for health improvement purpose.
- Lands intended for recreation purpose.
- Lands intended for historic and cultural purpose.
- Forest fund lands.
- Water fund lands.
- Lands intended for industry, transportation, communications, energy, defence and other purposes.

Land owners/users are entitled to define a specific type of land use within a certain category of lands (except agricultural lands and defence lands), however they should comply with the legislative requirements to the use of relevant category of lands and take account of town planning documentation and land management documentation.

Agricultural land plots may be used by their owners or users exclusively in compliance with the requirements to the use of relevant land type established in articles 31, 33-37[21] of LCU. The defence lands may be used exclusively in accordance with the Law of Ukraine "On the Use of Defence Lands" (No. 1345-IV dated 27 November 2003).

Agricultural lands are the lands assigned to production of agricultural commodities, agricultural research and education activities, placement of relevant production infrastructure including infrastructure of wholesale markets for agricultural commodities or intended for these purposes. The lands that fit for agriculture should be primarily given for agricultural use.

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[17] Law of Ukraine "On Land Protection" (No. 962-IV dated 19.06.2003) http://zakon1.rada.gov.ua/laws/show/962-15

[18] CMU's Regulation "On Approval of the Procedure of natural-agricultural, environmental-economic, erosion preventive and other types of land zoning" (No. 681 dated 26.05.2004) http://zakon1.rada.gov.ua/laws/show/681-2004-%D0%BF

[19] Land Code of Ukraine (Law No. 2768-14 dated 05.01.2013) http://zakon4.rada.gov.ua/laws/show/2768-14

[20] CMU's Regulation "On Approval of the Procedure of the State Land Cadastre Maintenance" http://zakon4.rada.gov.ua/laws/show/1051-2012-%D0%BF

[21] Art. 31. Farm lands. Art. 32. Privatization of land plots by farm members. Ст. 33. Земельніділянкиособистихселянськихгосподарств. Art.34. Lands forhay fields and pastures. Art. 35. Land plots for gardening. Art. 36. Land plot for vegetable gardening. Art. 37. The right of non-agricultural enterprises, institutions and organizations for land.

Nature reserve lands are land/water areas with wildlife complexes and objects on them, which are of special nature conservation, environmental, scientific, aesthetic, reactions and other value, which are assigned the status of territories and objects of the nature reserve fund by law. Nature reserve lands include all designated wildlife areas and objects (nature reserves, national nature parks, biosphere reserves, regional landscape parks, nature preserves, natural sanctuaries, protected mountain areas) and manmade objects (botanical gardens, dendrological parks, zoological parks, landscape gardening parks-monuments). Lands of other nature conservation purposes include land areas with wildlife objects of special scientific value. The procedure of use of the nature reserve fund lands and other nature conservation lands is defined by the law.

The StateAgriculturalInspectorate of Ukraine is responsible for **state control** over the use and protection of lands[22], the State Environmental Inspectorate of Ukraine is responsible forcompliance with the land protection requirements established by the legislation[23]. The State Agency of Land Resources of Ukraine is in charge of land monitoring[24] in cooperation with the Ministry of Ecology and Natural Resources of Ukraine[25], Ministry of Agrarian Policy and Food of Ukraine[26], National Academy of Sciences of Ukraine and State Space Agency of Ukraine.

In 2011, Ukraine adopted the Law "On the State Land Cadastre"[27], however the National Cadastre System was founded only in 2013. The State Land Cadastre is a unified state geo-informational system of information about the lands within the state borders of Ukraine, their designated purposes, limitations on their use as well as the data on quantitative and qualitative characteristics of lands, their appraisal, distribution of lands among owners and users. The State Agency of Land Resources and its local agencies are responsible for maintenance of the State Land Cadastre. The Cabinet of Ministers of Ukraine defined the procedure of maintenance of the State Land Cadastre[28].

The Regulation "On the State Land Resource Agency"[29], this Agency's responsibilities include monitoring and protection of lands; maintenance and administration of the State Land Cadastre and receiving information on land allotment (including monitoring of land status changes); governmental oversight of land management, etc. The State Agency of Land Resources exercises its powers directly and via local bodies duly established in the Autonomous Republic of Crimea, regions, cities of Kyiv and Sevastopol, districts, cities, towns and via local district, intercity, interdistrict local bodies.

Access to the State Land Cadastre is provided to banks, the national executive authority in charge of state control over the use and protection of lands and to the persons duly included in the State Register of Certified Surveying Engineers and the State Register of Certified Geodetic Engineers and license holders for land appraisal works and land tenders, following the procedure established by the Cabinet of Ministers of Ukraine (art.38 of the Law "On the State Land Cadastre").

A public cadastre map of Ukraine is available at the State Agency's of Land Resources website[30]. It is a component of the overall national cadastre system.

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[22] http://www.disgu.gov.ua/
[23] http://dei.gov.ua/
[24] http://www.dazru.gov.ua/terra/control/uk/index
[25] http://www.menr.gov.ua/
[26] http://minagro.gov.ua/ru
[27] Law of Ukraine "On the State Land Cadastre" (No. 3613-VIdated 07.07.2011) http://zakon4.rada.gov.ua/laws/show/3613-17
[28] CMU's Regulation "On Approval of the Procedure of the State Land Cadastre Maintenance"http://zakon4.rada.gov.ua/laws/show/1051-2012-%D0%BF
[29] Regulation "On the State Agency of Land Resources of Ukraine" (No.445 dated 08.04.2011) http://zakon2.rada.gov.ua/laws/show/445/2011
[30] http://map.dazru.gov.ua/kadastrova-karta

(e) As far as protected areas are concerned, please provide information under which national, European or international protection regime they are classified.

Land protection is the system of legislative, institutional, economic, technological and other actions aimed at efficient land management, prevention of unreasonable withdrawal of agricultural lands to use for non-agricultural purposes, protection against adverse manmade impact, soil fertility recovery and improvement, improvement of forest fund land productiveness, ensuring special regime of use for the lands of health improvement, recreation, historic and cultural purposes (the Law of Ukraine "On Land Protection").

All lands within the territory of Ukraine are subject to special governmental protection. One of the main principles of the national land protection policy is to ensure protection of lands as the main **national** wealth of Ukrainian people.

The Law of Ukraine "On the Nature Reserve Fund (NRF)"[31] establishes a national classification of nature reserve areas based on the classification of the International Union for Conservation of Nature and Natural Resources (IUCN).

NRF of Ukraine comprises:

- designated natural areas and objects: nature reserves, biosphere reserves, national nature parks, regional landscape parks, nature (landscape, forest, botanic, general zoological, ornithological, paleontological and karstic-speleological) preserves, natural (integrated, botanical, zoological, hydrological and geological) sanctuaries, protected mountain areas
- manmade objects: botanical gardens, dendrological parks, zoological parks, landscape gardening parks-monuments.

The main legislative acts regulating establishment, functioning and development of the territories and objects within the nature reserve fund of Ukraine are as follows:

- Law of Ukraine "On the Nature Reserve Fund of Ukraine" (16 June 1992);
- Law of Ukraine "On the National Program for Establishing the National Environmental Network of Ukraine for 2000-2015" (21 September 2000);
- Law of Ukraine "On the Environmental Network of Ukraine" (24 June 2004).

The EU legislation is lacking a legislative act corresponding to the Law of Ukraine "On the Nature Reserve Fund of Ukraine". The EU's wildlife conservation legislative framework is based on two Directives. These Directives are implemented via the fulfilment of NATURA 2000 Program which is binding for EU member countries and involves a special financial instrument to fund relevant nature protection measures. Therefore, Ukrainian legislation on nature reserve areas is more developed than the European legislation and requires analysis whether it is possible to grow biomass on reserve territories.

In the context of the ban on biomass growing within certain areas, the following NRF objects should be mentioned: nature reserves, biosphere reserves, national natural parks, regional landscape parks.

Number and area of individual NRF objects (as of 01 January 2012)

Nature reserve fund object type	Number	Area, ha
Nature reserves	20	201,538
Biosphere reserves	4	252,146

[31]Law of Ukraine "On the Nature Reserve Fund of Ukraine" (No. 2456-12 dated 14.07.2011) http://zakon1.rada.gov.ua/laws/show/2456-12

National natural parks	47	1,215,806
Regional landscape parks	58	754,648

Nature Reserves:

According to the legislation of Ukraine, nature reserves mean national nature conservation and research institutions established in order to conserve wildlife systems either typical or unique for a certain landscape zone in their wild condition including all their components. Land or water areas along with all wildlife resources are completely withdrawn from economic use. So, it is forbidden to grow biomass within nature reserve territories.

Biosphere Reserves:

Biosphere reserves are international nature conservation and research institutions established in order to conserve the wild state of most typical natural biosphere systems. Biosphere reserves are included into the UNESCO World Network of Biosphere Reserves.

Biosphere reserves in Ukraine

Name	Location	Subordinate to	Year of establishment	Total area, ha
Askaniya-Nova	Kherson region	Ukrainian Academy of Agrarian Sciences	1993 (included in World Network of Biosphere Reserves 1985)	33,308
Black Sea	Kherson region	National Academy of Science of Ukraine	1993 (included in World Network of Biosphere Reserves 1985)	89,129
Carpathian	Zakarpattya region	Ministry of Ecology and Natural Resources of Ukraine	1993 (included in World Network of Biosphere Reserves 1992)	5,3630
Danube	Odessa region	National Academy of Science of Ukraine	1998 (included in World Network of Biosphere Reserves 1999)	46,403

Biosphere reserves are subject to the differentiated regime of conservation, recovery and use of wildlife systems depending on functional zones:

reserve zone – includes territories intended for conservation and restoration of the wildlife systems, which are most valuable and least disturbed by manmade factors, genetic flora and fauna resources; its regime is defined in accordance with the requirements established for nature reserves;

buffer zone - includes territories allotted to prevent negative impact of economic activities on a reserve zone within adjacent territories; its regime is defined in accordance with the requirements established for protected areas of nature reserves;

anthropogenic landscape zone - includes territories of conventional land use, forest use, water use, settled areas, recreation areas and areas where other economic activities are performed; hunting is not allowed in this zone.

As far as biosphere reserves are concerned, commercial growing of biomass is only possible in anthropogenic landscape zones.

National natural parks:

National natural parks are subject to the differentiated regime of conservation, recovery and use of wildlife system depending on functional zones:

reserve zone is designated for conservation and recovery of most valuable natural complexes, which regime is defined in accordance with the requirements established for protected areas of nature reserves;

regulated recreation zone is designated for short-term rest and recreation of citizens, sightseeing tours around picturesque places and monuments; it is allowed to establish and equip tour itineraries and ecological paths; forest cutting for main use, industrial fishery, hunting, other activities of potential negative impact on the state of natural systems and objects within a reserve zone are forbidden;

stationary recreation zone is designated for placing hotels, motels and other facilities for provision of services to visitors; there is a ban on economic activities not related to the designated purpose of this functional zone and of potential adverse impact on the state of natural complexes and objects of a reserve zone or a regulated recreation zone;

utility zone is designated for economic operations aimed at fulfilment of the tasks assigned to the park, it is the zone where settlements are located, park utilities, and lands of other land owners and land users, where economic and other activities are conducted in compliance with the requirements and subject to limitations established for anthropogenic landscapes of biosphere reserves.

Growing of biomass within the territory of national natural parks is possible only in the utility zone.

Regional landscape parks:

Regional landscape parks are zoned on the basis of nature protection, health improvement, scientific, recreational, historic and cultural and other values of natural systems and objects, their specifics incorporating the requirements established for national natural parks. In this case, biomass growing is possible only within utility zones.

Land and water areas are included in NRF if their natural complexes and objects on them are of special nature conservation, scientific, aesthetic, recreational or other value, and are allocated to the end of conservation of nature landscape diversity, genetic resources of flora and fauna, maintenance of general ecological balance and ensuring background monitoring of environment.

To this end, NRF is protected by the legislation of Ukraine as **national** wealth which is subject to special regime of conservation, recovery and use. Ukraine considers this fund as a component of the world system of nature areas and objects under special protection.

Sanctuaries, nature monuments, botanical gardens, dendrological parks, zoological parks and landscape gardening parks-monuments depending on their ecological and research, historical and cultural value may be of national or local importance. The highest reserve status is assigned to nature reserves, biosphere reserves and national natural parks. Several objects of Ukraine's NRF[32] are UNESCO Biosphere Reserves**.**

[32]Biosphere reserves are Askaniya-Nova and Carpathian, UNESCO Biosphere Reserves are Shatskyi and Roztochya.

The regime applicable to NRF's territories and objects is an aggregate of scientifically grounded environmental requirements, standards and rules defining a legal status, designated purpose of these territories and objects, permitted activities, procedure of conservation, use and recreation of their natural complexes.

The regime of NRF's territories and objects is defined in accordance with the Law of Ukraine "On the Nature Reserve Fund" taking account of their class and designated purpose.

(f) What is the procedure for changing the status of land? Who monitors and reports at national level on land status changes? How often is the land zoning register updated (monthly, annually, bi-annually, etc.)?

In accordance with the list of territorial zones (groups of the State Land Cadastre objects), lands of Ukraine by their main designated purpose are divided into the above mentioned categories (see par. (d)).

Lands may be categorized by decisions of public authorities, Verkhovna Rada of the Autonomous Republic of Crimea, Council of Ministers of the Autonomous Republic of Crimea and local self-governments in accordance with their powers (LCU, art.20).

Land status changes are entered on the basis of land management plans on their allocation.

Changing the status of lands being in public or community property is in the competence of the Verkhovna Rada of Autonomous Republic of Crimea, Council of Ministers of the Autonomous Republic of Crimea, executive authorities or local self-governments in charge of approval of land management plans relating to land parcel allocation, transfer of land parcels to ownership or to use in accordance with the powers established by LCU, art.122

Land status changes of private land plots are initiated by land plot owners. The changes are implemented by:

- village or town authorities where land plots are situated within populated areas;
- district public administrations where land plots are situated outside populated areas;
- Council of Ministers of the Autonomous Republic of Crimea, regional public administrations where there is no district public administration or if land plots are situated outside settlements not included in the district territory.

A land allotment plan for a privately-owned land plot where an owner seeks to change land status is developed by land plot owner's request and does not require any permit from the Council of Ministers of the Autonomous Republic of Crimea, executive authority or local self-government.

In the case of lands of special value, changes to their statuses are allowed only to place facilities of national importance, roads, power and communication lines, pipelines, melioration or irrigation channels, geodetic stations, residential buildings, social and cultural facilities, mining facilities, oil and gas wells and production structures relating to operation thereof and where land plots are alienated for public needs or due to social necessity, transfer of certain lands to the nature reserve fund and lands of other nature conservation purpose, lands of historical and cultural purpose.

Changing the status of state or community-owned land plots of nature reserve or other nature conservation, historic, cultural, forest lands require approval of the Cabinet of Ministers of Ukraine.

One of the State Land Cadastre principles is a **principle of ongoing updating** of information about the objects in the State Land Cadastre as soon as the status is changed (art.3 of the Law of Ukraine "On the State Land Cadastre"). Governmental authorities (except Verkhovna Rada of Ukraine) and local self-governments within five business days upon making a decision to approve land management documentation and technical documentation on land appraisal, which is the ground to enter information in the State Land Cadastre according to art.21 of the Law of

Ukraine "On the State Land Cadastre", must submit attested copies of their resolutions in accordance with their competence to the national executive authority implementing the state policy in the domain of land relations (the State Agency of Land Resources), so that the Agency enter relevant information into the State Land Cadastre. Information is entered into the State Land Cadastre within fourteen days from the date of receipt of relevant documents.

(g) How is compliance with good agro-environmental practices and other cross-compliance requirements (required by Article 17(6) of Directive 2009/28/EC) ensured and verified at national level?

Compliance with good agro-environmental practices is ensured and verified by oversight of the use and protection of lands via ensuring compliance with the land legislation of Ukraine on the part of governmental authorities, local self-governments, enterprises, institutions, organizations and individuals. There is state, self-governmental and non-governmental oversight over the use and protection of lands (section 3 of the Law of Ukraine "On Land Protection")[33].

The Law of Ukraine "On the State Supervision over the Land Use and Protection"[34] defines the bodies responsible for **state supervision over land use and protection**, and for compliance with land protection legislation of Ukraine and monitoring of soil fertility, specifically:

1. State supervision over the use and protection of land of all categories and patterns of ownership is responsibility of the ***State Agricultural Inspectorate of Ukraine*** (national executive authority implementing the state policy in the domain of governmental oversight (supervision) in the agro-industrial sector).

2. State supervision over compliance with land protection legislation of Ukraine is responsibility of the national executive authority implementing the state policy in the domain of governmental oversight (supervision) of environment protection, efficient wildlife resource management, recovery and conservation (***State Environmental Inspectorate of Ukraine*****)**.

3. Ministry of Agrarian Policy and Food of Ukraine (a national executive authority responsible for agrarian policy) is in charge of monitoring of soil fertility and agrochemical classification of agricultural lands.

Self-governmental supervision over the land use and conservation is provided by village, town, city, district and regional councils. Non-governmental oversight of the land use and conservation is performed by public inspectors assigned by relevant local self-governments, the State Agricultural Inspectorate of Ukraine, the State Environmental Inspectorate of Ukraine.

The system of events in the land conservation domain includes:

- state integrated observation system (including topographic, geodetic, map, soil, agrochemical, radiological and other examinations and exploration of the land and soil state, their monitoring. National, regional and local databanks on land and soil condition are formed on the basis of the state integrated system of observations);
- development of national and regional programs of the land use and conservation, land management documentation relating to land conservation;
- establishing an environmental network;
- nature-agricultural, environment-economic, erosion preventive and other types of land zoning;
- economic incentives to promote land conservation and efficient use and soil fertility improvement;
- standardizing and rate setting.

[33]Law of Ukraine "On Land Protection" (No.962-15 dated 09.12.2012) http://zakon1.rada.gov.ua/laws/show/962-15/page

[34]Law of Ukraine "On the State Supervision over the Land Use and Protection" (No. 963-15 dated 09.12.2012) http://zakon2.rada.gov.ua/laws/show/963-15

State supervision over land use and conservation, compliance with the legislation of Ukraine relating to land protection and soil monitoring is implemented as follows (art. 9, Law of Ukraine "On State Supervision over the Land Use and Protection"):

- audits;
- consideration of complaints from legal entities and individuals;
- participation in commissioning of melioration systems and recultivated lands, windbreakers, erosion preventive hydrotechnical structures and other facilities to be build to the end of soil fertility improvement and land conservation;
- consideration of land management documentation relating to the land use and conservation;
- soil monitoring and agrochemical classification of agricultural lands.

Soil monitoring of agricultural lands is responsibility of the Ministry of Agrarian Policy and Food of Ukraine in cooperation with other implementing agencies: Ministry **of Ecology and Natural Resources of Ukraine**, State Land Agency, State Water Agency and UAAS land conservation research institutions[35].

National, regional and local types of soil monitoring are performed depending on territorial coverage and tasks:

- national monitoring – covers agricultural lands in Ukraine;
- regional – covers agricultural lands within physical-geographical and administrative units, large irrigation and melioration areas;
- local – is performed within individual estates or land use plots.

Soil monitoring on agricultural lands envisages performance of the following assignments:

- observations, collection, analysis and processing of information about quality of soils (soil erosion, soil structure condition, acidification, salinity, alkalinity, bogginess, dynamics of humus content and plant food elements), soil contamination with heavy metals, radionuclides, residual pesticides and other toxic substances;
- integrated analysis of agricultural-environmental situation within agricultural lands, assessment and forecast of potential changes in soil fertility under the impact of natural and manmade factors, environmental-ameliorative state of irrigated and meliorated lands;
- identification of zones fit for agricultural production of children's and dietary food products;
- creation and maintenance of databanks of agricultural land soil condition and information analysis system aimed at development of soil fertility protection actions;
- participation in nature-agricultural, environmental-economic, erosion preventive and other types of land zoning;
- preparing and issuing annual (periodical) reports on the soil status of agricultural lands.

Agrochemical classification of arable lands takes place every 5 years with that of hay meadows, pastures and perennial plantations being performed every 5-10 years, and it also may be performed by request of a land owner, land user, and if an agricultural land owner has changed. Data on agrochemical classification of land parcels are issued in the form of an agrochemical passport. Ministry of Agrarian Policy and Food of Ukraine is responsible for establishing a form and procedure of maintenance of agrochemical passports.

The central executive authority in charge of implementation of the state policy on state supervision (control) in the domain of environment protection, efficient use, reproduction and

[35]Order of the Ministry of Agrarian Policy and Food of Ukraine"On Approval of the Regulation on Soil Monitoring of Agricultural Lands" (No.51 dated 26.02.2004)
http://zakon4.rada.gov.ua/laws/show/z0383-04

conservation is the State Environmental Inspectorate of Ukraine. Its powers are as follows:

a) to perform state supervision over compliance with the land protection legislation of Ukraine as concerns:

- compliance with the land protection legislation of Ukraine by executive authorities and local self-governments, individuals and legal entities;
- conservation of degraded and low-productive lands;
- conservation of wetlands;
- fulfilment of environmental requirements by owners and users of land plots including by land tenants;
- implementation of measures to prevent contamination of lands with chemical and radioactive substances, wastes, wastewaters;
- compliance with the regime applicable to nature reserves and other nature conservation lands and areas subject to special protection as established by the legislation of Ukraine;
- compliance with environmental safety requirements during transportation, storage, use, treatment and disposal of chemical weed and pest killers, mineral fertilizers, toxic, radioactive substances and waste;
- compliance with environmental standards on land use and conservation;

b) laboratory testing of land contamination, including radioactive contamination, in the zones under direct impact of enterprise contaminant emissions and discharges, and in the event of accidents and emergencies;

c) organizing environmental accident management, engaging to this end enterprises, institutions, organizations regardless of their subordination or pattern of ownership as well as general public.

Conservation of health improvement, recreation, historic and cultural, nature reserve and other nature conservation lands is implemented via including the said lands into the environmental network, imposing restrictions on withdrawal (taking) for other needs and limitation of manmade impact on the same lands (art.50, Law of Ukraine "On Land Protection").

Conservation of NRF territories and objects is ensured by the following methods:

- establishing a reserve regime;
- organizing routine monitoring of the status of nature reserves and objects;
- integrated research aimed at development of scientific basis for their conservation and efficient use;
- compliance with requirements to protection of nature reserve fund's territories and objects during economic, management and other activities, development of project and project planning documentation, regulation of land distribution, regulation of forest distribution, environmental assessment;
- introducing economic incentives to encourage protection;
- governmental and non-governmental oversight of compliance with the protection and use regime;
- establishing stricter liability for violation of the protection and use regime as well as for destruction and damages to nature reserve systems and objects;
- extended international cooperation in this domain;
- other measures aimed at conservation of nature reserve fund's territories and objects.

Subject to compliance with the requirements established by Law of Ukraine "On the Nature Reserve Fund", the nature reserve fund's territories and objects may be used:

- for nature conservation purposes;
- for research purposes;

- for health improvement and other recreation purposes;
- for education and upbringing purposes;
- for environment monitoring purposes.

(h) Do you intend to help develop voluntary 'certification' scheme(s) for biofuel and bioliquid sustainability as described in the second subparagraph of Article 18(4) of Directive 2009/28/EC? If so, how?

Ukraine recognizes the need to comply with the sustainability criteria for biomass production towards energy purposes. However at this stage of the biomass market development as fuel/feedstock for fuel production we believe it sufficient to ensure the use of the available European voluntary certification schemes, which are relevant for Ukraine and have been approved or pending approval by the European Commission.

According to the expert recommendations (Biomass sustainable production and certification for the EU biofuel market.Guidance for manufacturers and traders.GIZ, 2012). The certification systems recommended for Ukraine may be as follows:

- **ISCC (International Sustainability and Carbon Certification)**. ISCC EU version is approved by the European Commission and government of the Netherlands. ISCC DE version is recognized by the German government, although it is also in operation in other countries. ISCC certification system may apply to any agricultural crops all over the world. Besides EU RED criteria, ISCC includes social and environmental requirements. Certificates are issued by certification bodies accredited by authorized governmental bodies. A certificate is valid for 12 months.

- **NTA8080 Sustainable biomass certification**. This certification scheme is recognized by the government of the Netherlands to prove compliance with EU RED. NTA 8080 certification scheme has been submitted for consideration to the European Commission.

- **Roundtable on Sustainable Biofuels (RSB).** RSB certification scheme has been recognized by the European Commission and the German government as consistent with EU RED requirements. This standard can be used to certify any agricultural crop all over the world.

- **Harmonised Calculations of Biofuels Greenhouse Gas Emissions in Europe (BIOGRACE)11**. BioGrace is a tool to calculate greenhouse gas emissions aimed at harmonizing various methodologies and initial data used for EU RED implementation. BioGrace is managed by several research institutions and regulatory bodies of EU member countries. It is funded by the European Commission.

4.3. Support schemes to promote the use of energy from renewable resources in electricity applied by Ukraine.

The main legislative act of support aimed at promoting use of energy from renewable sources in electric energy industry is the Law of Ukraine On Electric Energy, which provides for setting out of the Green Tariff (GT), which is applied to purchase electric energy produced generated by electric energy facilities with alternative energy sources (except for blast-furnace gas and coke gas, but including use of hydro energy, which is produced only by micro-, mini- and small hydropower plants).

The GT value for economic entities generating electric energy from RES is established at the level of retail tariff for consumers of second class voltage as of January 2009 multiplied by GT coefficient

Up to 01.04.2013 the GT value for economic entities generating electric energy from RES is established at the level of retail tariff for consumers of second class voltage as of January 2009 multiplied by GT coefficient:

- 1.2 - for electric energy generated from wind energy by energy facilities with installed capacity not exceeding 600 kW;
- 1.4 - for electric energy produced from wind energy by energy facilities with installed capacity exceeding 600 kW but less then 2,000 kW;
- 2.1 - for electric energy generated from wind energy by energy facilities with installed capacity exceeding 2,000 kW;
- 2.3 - for electric energy generated from biomass;
- 4.8 - for electric power produced by surface energy generating facilities from solar energy;
- 4.6 - for electric energy generated from solar radiation by surface energy facilities, integrated into (installed) on roofs of houses, buildings and structures, with installed capacity exceeding 100 kW;
- 4.4 - for electric energy generated from solar radiation by surface energy facilities, integrated into (installed on) roofs of houses, buildings and structures, with installed capacity not exceeding 100 kW, as well as for facilities integrated into (installed on) fronts houses, buildings and structures, irrespective of their threshold capacity;
- 0.8 - for electric power produced by small hydropower plant.

Since 01.01.2013 the Green Tariff coefficient, as well as the requirement as to local component are regulated by the Law of Ukraine No 5485-VI "On amendments to the Law of Ukraine On Electric Energy" for promotion of electric energy production from alternative energy sources" dated 20.11.2012.

The Law provides that after 2014, 2019 and 2024 the Green Tariff coefficient shall be reduced respectively by 10, 20 and 30% from its baseline (see the below table).

Types of electric energy facilities where green tariff is applied	Green Tariff coefficient for commissioned facilities				
	from 31.03.2013 included	from 01.04.2013 to 31.12.2014	from 01.01.2015 to 31.12.2019	from 01.01.2020 to 31.12.2024	from 01.01.2025 from 31.12.2029
for electric energy generated from wind energy by energy facilities with installed capacity not exceeding 600 kW	1,20	-	-	-	-
for electric energy produced from wind energy by energy facilities with installed capacity exceeding 600 kW but less then 2,000 kW	1,40	-	-	-	-
for electric energy generated from wind energy by energy facilities with installed capacity exceeding 2,000 kW	2,10	-	-	-	-
for electric energy generated from wind energy by wind power stations that consist of wind installations with unit installed capacity not exceeding 600 kW	-	1,20	1,08	0,96	0,84

for electric energy generated from wind energy by wind power stations that consist of wind installations with unit installed capacity exceeding 600 kW but less then 2,000 kW	-	1,40	1,26	1,12	0,98
for electric energy generated from wind energy by wind power stations that consist of wind installations with unit installed capacity exceeding 2,000 kW	-	2,10	1,89	1,68	1,47
for electric energy generated from biomass	2,30	2,30	2,07	1,84	1,61
for electric energy generated from biogas	-	2,30	2,07	1,84	1,61
for electric energy generated from solar radiation by surface energy facilities	4,80	3,50	3,15	2,80	2,45
for electric energy generated from solar radiation by surface energy facilities, integrated into (installed) on roofs and/or fronts of houses, buildings and structures, with installed capacity exceeding 100 kW	4,60	3,60	3,24	2,88	2,52
for electric energy generated from solar radiation by surface energy facilities, integrated into (installed) on roofs and/or fronts of houses, buildings and structures, with installed capacity not exceeding 100 kW	4,40	3,70	3,33	2,96	2,59
for electric energy generated from solar radiation by surface energy facilities, integrated into (installed) on roofs and/or fronts of houses, buildings and structures, with installed capacity not exceeding 10 kW	-	3,70	3,33	2,96	2,59
for electric energy generated from micro- hydropower plants	1,20	2,00	1,80	1,60	1,40
for electric energy generated from mini-hydropower plants	1,20	1,60	1,44	1,28	1,12
for electric energy generated from small hydropower plants	1,20	1,20	1,08	0,96	0,84

For electric energy facilities generating electric energy from alternative energy sources (except blast-furnace gas and coke-oven gas) with their construction started after January 1, 2012, Green Tariff is applied considering the compliance with requirements of the amount of local component.

The share of local component for electric energy facilities generating electric energy from wind energy, solar radiation and biomass, with their construction started after 01.01.2012, and them being put into operation after July 1, 2013, is established at the level not less then 30%, and for electric energy facilities generating electric energy from wind energy, solar radiation and biomass, with their construction started after 01.01.2012, and them being put into operation after July 1, 2014, is established at the level not less then 50%.

The local component for the aims of this Law is a determined by this Law share of components of electric energy facility (elements of local component) of Ukrainian origin, used for constructing the electric energy facility.

The share of local component for electric energy facilities generating electric energy from biogas, with their construction started after 01.01.2012, and them being put into operation after 01.01.2014, is established at the level not less then 30%, and for electric energy facilities generating electric energy from biogas, with their construction started after 01.01.2012, and them being put into operation after 01.01.2015, is established at the level not less then 50%

For business entities and private households generating electric energy from alternative energy sources the Green Tariff is established for the period up to 01.01.2030.

Fixed minimum Green Tariff rate for business entities is set by conversion of Green Tariff as calculated pursuant to the rules under the Law as of 01.01.2009 into Euro according to the official currency exchange rate as established by the National Bank of Ukraine as of such date.

The Green Tariff may be less than the fixed minimum Green Tariff rate, which is recalculated (as of each date the retail tariffs are set for consumers) in national currency at the official currency exchange rate as established by the National Bank of Ukraine as of such date.

Green Tariff for electric energy, generated from RES at electric energy facilities with their construction started after 01.01.2012, and them being put into operation **before 01.07.2013**, is established on the condition that the specific weight of stock, materials, fixed assets, works and services of Ukrainian origin in the total value of construction of the specific electric energy facility generating electric energy from alternative energy sources, is not les then 15%.

The requirement of local component share is not applied to generating installations of private households as well as micro-, mini- and small hydropower plants.

Since 01.07.2013 **new requirements as to local component** shall come into force in accordance with the Law of Ukraine On amendments to the Law of Ukraine On Electric Energy" for promotion of electric energy production from alternative energy sources[36].

The share of local component for electric energy facilities generating electric energy from wind energy, solar radiation and biomass, with their construction started after 01.01.2012, and them being put into operation after 01.07. 2013, is established at the level not less then 30%, and for electric energy facilities generating electric energy from wind energy, solar radiation and biomass, with their construction started after 01.01.2012, and them being put into operation after 01.07.2014, is established at the level not less then 50%.

The local component for the aims of this Law is a determined by this Law share of components of electric energy facility (elements of local component) of Ukrainian origin, used for constructing the electric energy facility

Correspondence of the local component volume to requirements under this Law shall be defined based on calculations and supporting documents submitted by a business entity and made by the national commission responsible for government regulation in energy production sphere, taking into account the following fixed rates (the below data refer to electric energy from biomass/biofuels only):

- for electric energy facilities including commissioned stages of construction of power plants (start-up facilities), which produce electric energy from biomass:

Elements of local	Actions to be carried out on	Fixed rate, %

[36]The Law of Ukraine On amendments to the Law of Ukraine "On Electric Energy" for promotion of electric energy production from alternative energy sources (No. 5485-VI dated 20.11.2012)
http://zakon2.rada.gov.ua/laws/show/5485-17

component	the territory of Ukraine	
Turbine	production	25
Boiler	production	35
Construction works	implementation	40
Total		100

- for electric energy facilities including commissioned stages of construction of power plants (start-up facilities), which produce electric energy from biogas:

Elements of local component	Actions to be carried out on the territory of Ukraine	Fixed rate, %
Digester	production	35
Co-generator	production	35
Construction works	implementation	30
Total		100

In addition to the Green Tariff there are several ways to support electric energy production from renewable energy sources (RES). Thus, pursuant to the Tax Code of Ukraine[37] (TCU):

- on a temporary basis (for the period of 10 years, beginning from 01.01.2011) the tax shall not be charged on profit received from principal activities of enterprises in the sphere of electric energy (class 40.11 group 40 КВЕД ДК 009:2005), which produce electric energy exclusively from renewable energy sources (subsection 4 of Section XX of the Tax Code of Ukraine).
- on a temporary basis (up to 01.01.2020) the tax shall not be charged on profit of enterprises received by them from activities related to simultaneous production of electric and heat energy and/or production of heat energy with the use of biofuel (subsection 4 of Section XX Tax Code of Ukraine).
- Electric energy produced from the renewable energy sources shall be exempt from payment of duty in the form of special purpose surplus to the current tariff for electric and heat energy (section 311.1 of the Tax Code of Ukraine).
- Tax on land plots assigned to placement of facilities, which produce electric energy from RES, shall be charged at the rate of 25% of the fixed regular tax rate (section 276.6 of the Tax Code of Ukraine).

A range of tax benefits is provided to enterprises, which activity is related to biofuels. In particular, on a temporary basis (up to 01.01.2020) the tax shall not be charged on profit of enterprises received by them from activities related to simultaneous production of electric and heat energy and/or production of heat energy with the use of biofuel (subsection 4 of Section XX Tax Code of Ukraine).

Specific features related to charging of profit tax on enterprises active within RES and AFT spheres shall be defined by the Tax Code of Ukraine.

Clause 158.1 of Section 158 of the Tax Code of Ukraine provides for tax exemption of 80% of corporate profit received from sale within the customs territory of Ukraine of goods produced by the enterprise itself according to the list as established by the Cabinet of Ministers of Ukraine.

[37] Tax Code of Ukraine. Law № 2755-VI dated 02.12.2010 http://zakon1.rada.gov.ua/laws/show/2755-17

The above list is approved by the Resolution of the Cabinet of Ministers of Ukraine No. 1005 dated 28.09.2011.

Clause 158.2 of Section 158 of the Tax Code of Ukraine provides for tax exemption of 50% of profit received from implementation of energy efficiency measures and realization of energy efficient projects at enterprises as included in to the State register of enterprises, agencies and organizations, which are engaged in development, implementation and application of energy efficient measures and energy efficient projects. The procedure for inclusion to the State register is approved by the Decree of SAEE No. 49 dated 01.04.2008.

Clause 197.16 of Section 197 of the Tax Code of Ukraine provides for tax exemption of operations related to import to the customs territory of Ukraine of energy saving materials, equipment, installations and components. The list of such goods is approved by the Resolution of the Cabinet of Ministers of Ukraine No. 444 dated 14.05.2008 on issues related to import of energy saving materials, equipment, installations and components to the customs territory of Ukraine.

Paragraph 2 of subsection 2 of Section XX "Transitional Provisions" of the Tax Code of Ukraine provides for temporary, till 01.01.2019, Value Added Tax exemption for transactions related to supply of machinery, equipment, installations as defined in Article 7 of the Law of Ukraine On Alternative Types of Fuel, within the territory of Ukraine transactions related to import under UCC FEA (Ukrainian Commodities Classifier for Foreign Economic Activities) codes, as defined by Article 7 of the Law of Ukraine On Alternative Types of Fuel, of machinery, equipment and installations, which are used for reconstruction of existing and construction of new biofuel production facilities and for production and reconstruction of technical means and vehicles for the purpose of biofuel consumption, if such commodities are not produced and have no equivalents in Ukraine, as well as technical means and vehicles, including self-propelled agricultural vehicles and energy installations, which consume biofuel, if such commodities are not produced in Ukraine. The procedure for import to the customs territory of Ukraine for those machinery, equipment, installations, technical means and vehicles, which are used for development of production and ensuring consumption of biological fuel types is approved by the Resolution of the Cabinet of Ministers of Ukraine No. 581 dated 18.05.2011.

Paragraph 15 of subsection 4 of Section XX "Transitional Provisions" of the Tax Code of Ukraine provides for tax exemption of biofuel producers' income received from sale of biofuel, income of enterprises received by them from activities related to simultaneous production of electric and heat energy and/or production of heat energy with the use of biological fuel types, income of manufacturers of machinery, equipment and installations as defined by Article 7 of the Law of Ukraine On Alternative Types of Fuel for production and reconstruction of technical means and vehicles, including self-propelled agricultural vehicles and energy installations, which consume biological types of fuel, obtained from sale of such machinery, equipment and installations, being produced within the territory of Ukraine.

4.4. Support schemes to promote the use of energy from renewable resources in heating and cooling applied by Ukraine

Ukraine has implemented tax benefits for those enterprises, which operations are related to **biofuels**. Only one of them is directly related to heat energy production sector, and others may be referred to any sector depending on exact use of certain biofuel type.

Before 01.01.2020 the following profits are temporarily exempt from taxation (subsection 4 of Section XX of the Tax Code of Ukraine):

- profit of biofuel producers received from biofuel sales;

- profit of enterprises received by them from simultaneous production of electric and **heat** energy and/or production of **heat** energy with the use of biofuel;
- profit of manufacturers of machinery, equipment and installations as defined by the Article 7 of the Law of Ukraine **On Alternative Types of Fuel**[38] for manufacturing and reconstruction of technical means and vehicles, including self-propelled agricultural vehicles and energy installations, which consume biofuel, which profit is received from sale of the above machinery, equipment and installations being produced within the territory of Ukraine.

Before 01.01.2019 the following operations are temporarily exempt from VAT taxation (subsection 2 of Section XX of the Tax Code of Ukraine) and customs duty payment (Section XXI of the Customs Code of Ukraine[39]):

- supply of machinery, equipment and installations, as defined by the Article 7 of the Law of Ukraine On Alternative Types of Fuel, to the territory of Ukraine;
- import under UCC FEA (Ukrainian Commodities Classifier for Foreign Economic Activities) codes, as defined by Article 7 of the Law of Ukraine On Alternative Types of Fuel, of machinery, equipment and installations, which is used for reconstruction of existing and construction of new biofuel production facilities, if such commodities are not produced in Ukraine. In particular, such machinery, equipment and installations include steam boilers, central-heating boilers and auxiliary equipment thereto, gas generators, internal combustion engines, burners etc.

The procedure for import of the above machinery, equipment, installations, technical means and vehicles is defined by the Cabinet of Ministers of Ukraine[40].

It should be noted that the Tax Code of Ukraine provides also for some more tax benefits for enterprises, which activities are related to the use of equipment operating based on RES, as well as to implementation energy efficient projects. These support mechanisms may be referred to all sectors of bioenergy industry (electric energy, heat energy, transport) depending on direction, which is followed by each individual enterprise.

Tax emption is also applied to import of the following equipment and materials to the customs territory of Ukraine (section 197.16 of the Tax Code of Ukraine):

- equipment operating on RES, energy saving equipment and materials, equipment and materials for production of alternative fuel types or for production of energy from RES;
- materials, equipment, components, which are used for production of equipment operating on RES, materials, raw materials, equipment and components that shall be used in production of alternative fuel types or in production of energy from RES;
- energy saving equipment, materials and goods, application of which ensures economy and rational use of fuel and energy resources.

Tax benefit may be granted, if such goods are used by the taxpayer for its own production and if similar goods with the same qualitative characteristics are not produced in Ukraine. The list of

[38] Law of Ukraine On Alternative Types of Fuel (No. 1391-XIV dated 14.01.2000)
http://zakon4.rada.gov.ua/laws/show/1391-14
[39] Customs Code of Ukraine. Law No. 4495-VI dated 13.03.2012
http://zakon4.rada.gov.ua/laws/show/4495-17
[40] Resolution of CMU No. 581 dated 18.05.2011 on Approval of the Procedure for import of machinery, equipment, installations, technical means and vehicles, which are used for promotion of production and ensuring consumption of biological fuel types, to the customs territory of Ukraine
http://zakon2.rada.gov.ua/laws/show/581-2011-%D0%BF

such goods together with UCC FEA (Ukrainian Commodities Classifier for Foreign Economic Activities) codes shall be established by the Cabinet of Ministers of Ukraine[41].

Tax exempt are 80% of corporate profit received from sale within the territory of Ukraine of goods produced by the enterprise itself according to the list as established by the Cabinet of Ministers of Ukraine[42] (section 158.1 of the Tax Code of Ukraine):

- equipment operating based on RES;
- materials, raw materials, equipment and components that will be used in energy production from RES;
- energy saving equipment, materials and products, application of which ensures economy and rational use of fuel and energy resources;
- equipment for production of alternative fuel types.

Among others, the list of such goods includes solid biomass boilers with 80% and higher efficiency coefficient, biomass gas generators with 85% and higher efficiency coefficient, heat generators operating on alternative fuel types (which include biofuel) with capacity from 3 kW and higher with 80% and higher efficiency coefficient, cogeneration installations operating on wastes biogas, as well as other equipment. The tax benefit is applied for 5 years upon receipt of the first profit due to increase of the production energy efficiency.

Tax is not charged on 50% of profit received from implementation of energy efficiency measures and realization of energy efficient projects at enterprises as included in to the State list of enterprises, agencies and organizations, which are engaged in development, implementation and application of energy efficient measures and energy efficient projects. The register is kept by the State Agency on Energy Efficiency and Energy Saving of Ukraine[43]. The tax benefit is applied for 5 years upon receipt of the first profit due to increase of the production energy efficiency.

4.5. Support schemes to promote the use of energy from renewable resources in transport applied by Ukraine

Ukraine has established targets with regard to biofuel production and use in transport. For the year 2013 these targets are recommended, for the next succeeding years they are mandatory. These targets are set forth in the Law of Ukraine on Alternative Fuel Types. Subject to the Law the bioethanol content in motor petrols produced and/or sold within the territory of Ukraine must be as follows:

in 2013	- **recommended** content at least 5% (volume)
in 2014-2015	- **mandatory** content at least 5% (volume)
in 2016	- **mandatory** content at least 7% (volume)

The instrument for support of development in this sector is a benefit related to taxation of bioethanol as excisable goods. Pursuant to Tax Code of Ukraine (Article 229.1.1) the tax is charged at the rate of UAH 0 per 1 liter of 100%-spirit made of:

[41] Resolution of the Cabinet of Ministers of Ukraine No. 444 dated 14.05.2008 on issues related to import of energy saving materials, equipment, installations and components to the customs territory of Ukraine http://zakon2.rada.gov.ua/laws/show/444-2008-%D0%BF

[42] Resolution of the Cabinet of Ministers of Ukraine No. 1005 dated 28.09.2011 on Approval of the List of Goods of Own Produce, where 80 per cent of corporate income from their sale within the customs territory of Ukraine are tax exempt http://zakon0.rada.gov.ua/laws/show/1005-2011-%D0%BF

[43] Decree of SAEE (at present– State Agency on Energy Efficiency and Energy Saving of Ukraine) on approval of the Procedure for inclusion to the State register of enterprises, agencies and organizations, which are engaged in development, implementation and application of energy efficient measures and energy efficient projects (No. 49 dated 01.04.2008) http://zakon4.rada.gov.ua/laws/show/z0318-08

- bioethanol, which is used by enterprises for production of mixture motor petrols with bioethanol, ethyl tertiary butyl ether (ETBE), other bioethanol-based additives content;
- bioethanol, which is used for biofuel production.

Moreover, tax is not charged from 80% of the enterprise profit derived from the sale in Ukraine of its own produce (Section 158.1 of Tax Code of Ukraine) subject to the list as approved by the Cabinet of Ministers of Ukraine (Regulation No. 1005 dated 28.09.2011). In particular, this list includes biodiesel internal combustion engines, internal combustion engines on biofuel with 85% content of ethanol for motor vehicles.

4.6. Specific measures for the promotion of the use of energy from biomass

4.6.1. Biomass supply: both domestic and trade

Table 7. Biomass supply in 2006

Sector of origin		Amount of domestic resource([1])	Imported		Exported		Net amount	Primary energy production (ktoe)[3)]
			EU	Non- EU	EU	non-EU		
(A) Biomass from forestry	Of which:							
	(1) direct supply of wood biomass from forests and other wooded land for energy generation	2 670,3 ths m3					2 670,3 ths m3	647,0
	Optional — if information is available you can further detail the amount of feedstock belonging to this category: *(a) fellings* *(b) residues from fellings (tops, branches, bark, stumps)* *(c) landscape management residues (woody biomass from parks, gardens, tree rows, bushes)* *(d) other (please define)*							
	(2) indirect supply of wood biomass for energy generation	150 ths t [1)]			135 ths t		15 ths t	6,1
	Optional — if information is available you can further detail: *(a) residues from sawmilling, woodworking, furniture industry (bark, sawdust)* *(b) by products of the pulp and paper industry (black liquor, tall oil)* *(c) processed wood-fuel* *(d) post consumer recycled wood (recycled wood for energy generation, household waste wood)* *(e) other (please define)*	150 ths t			135 ths t		15 ths t	6,1
(B) Biomass from agriculture and fisheries	*Of which:*	--- [2)]						
	(1) agricultural crops and fishery products directly provided							

	for energy generation							
	Optional — if information is available you can further detail: *(a) arable crops (cereals, oilseeds, sugar beet, silage maize)* *(b) plantations* *(c) short rotation trees* *(d) other energy crops (grasses)* *(e) algae* *(f) other (please define)*							
	(2) Agricultural by-products/processed residues and fishery by-products for energy generation							
	Optional — if information is available you can further detail: *(a) straw* *(b) manure* *(c) animal fat* *(d) meat and bone meal* *(e) cake by-products (incl. oil seed and olive oil cake for energy) (f) fruit biomass (including shell, kernel)* *(g) fishery by product* *(h) clippings form vines, olives, fruit trees (i) other (please define)*							
(C) Biomass from waste	*Of which:*							
	(1) Biodegradable fraction of municipal solid waste including biowaste (biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants) and landfill gas	75 ths t					75 ths t	15,0
	(2) Biodegradable fraction of industrial waste							
	(3) Sewage sludge							

1) This value includes production of granules and briquettes from wood processing/furniture production residues in 2006. 90 % of these products were exported to EU countries.
2) In 2006 in operation were only one boiler on baled straw, one large biogas installation on livestock wastes and boilers on husk at oil extraction plants and other enterprises of fat and oil industry. Official records on final consumption of these types of biomass for energy generation were not kept: energy balance of Ukraine for 2006 only includes the amount of wood consumption for heating.

3) Conversion coefficient/methodology for calculations: net volume of the resource (in physical units) is multiplied by combustion value of relevant type of biomass ($Q_н^р$) and is divided by combustion value of oil equivalent (41,9 MJ/kg o.e.).
$Q_н^р$ wood for heating – 14.5 MJ/kg.Wood density– 700 kg/m^3.
$Q_н^р$ wood granules and briquets – 17 MJ/kg.
$Q_н^р$ of a share of biodegradable residential solid waste (RSW) – 8.4 MJ/kg. Share of biodegradable RSW in the total amount of RSW – 50% (expert estimate).

Table 7a. Estimated biomass domestic supply in 2015 and 2020

Sector of origin		2015		2020	
		Expected amount of domestic resource	Primary energy production (ktoe)	Expected amount of domestic resource	Primary energy production (ktoe)
(A) Biomass from forestry	(1) direct supply of wood biomass from forests and other wooded land for energy generation	3 375	1 151	5 969	1 771
	(2) indirect supply of wood biomass for energy generation	50	17,5	750	259
(B) Biomass from agriculture and fisheries	(1) agricultural crops and fishery products directly provided for energy generation	474	119	2 873	621
	(2) Agricultural by-products/processed residues and fishery by-products for energy generation	2 942	808	6 005	1 643
(C) Biomass from waste	(1) Biodegradable fraction of municipal solid waste including biowaste (biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants) and landfill gas	191	15,4	1 219	169
	(2) Biodegradable fraction of industrial waste (including paper, cardboard, pallets)				
	(3) Sewage sludge				

***** Ukraine possesses sufficient amount of own biomass resources for production of estimated energy rate in 2020. There is no need in biomass import.

Table 8. Current agricultural land used for production of crops dedicated to energy in 2006 (ha)

Agricultural land use for production of dedicated energy crops	Area
1. Land used for short rotation trees (willows, poplars)	–[1)]
2. Land used for other energy crops such as grasses (reed canary grass, switch grass, Miscanthus), sorghum	–[1)]

1) There is no statistical records on areas of agro-cultural lands used for cultivating energy crops. According to expert estimation energy crops were almost not cultivated in 2006. The exceptions are small experimental plantations of research organizations.

4.7. Planned use of statistical transfers between Member States and planned participation in joint projects with other Member States and third countries

Pursuant to Art. 4 Par. 3 of the Directive 2009/28/EC of the European Parliament and of theCouncil on the promotion of the use of energy from renewable sources and amending andsubsequently repealing Directives 2001/77/EC and 2003/30/EC which relates to the nationalrenewable energy action plans the Ukraine would like to notify the Commission of itsestimated excess production of energy from renewable sources compared to the indicativetrajectory which could be transferred to other Member states, of estimated potential for jointprojects until 2020 and of estimated demand for energy from renewable sources to be satisfiedby means other than domestic production until 2020.

Ukraine assumes, in compliance with the Directive, that the gross finalconsumption of energy will comprise a 11% share of energy from renewable sources in 2020and that the increase in shares of energy from renewable sources will follow the indicativetrajectory as stated in Annex 1, part B of the Directive.

Currently, we do not anticipate anytransfers of surplus energy produced from renewables to other Member State nor statisticaltransfers of renewable energy from the other Member States in favour of Ukraine.

Expected transfer of ERS to/from other Member States

	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer ofERS to other MemberStates	0	0	0	0	0	0	0	0
Expected transfer of ERS from other Member States in favour of Ukraine	0	0	0	0	0	0	0	0

5. Estimates

To date, the most common in the world fuels for heat and power generation are gas, oi land coal. They are responsible for around 80% of energy. These mineral resources relate to non-renewable (exhaustive) energy resources of the Earth, which sooner or later will run out. According to estimates the world's natural gas reserves should be sufficient for abou tanother 50-60 years, oil - 70-80 years and coal -250-300 years.

The renewable (i.e. those that can renewing a relatively short period of time) sources of energy - sun, wind, water, biomass – are generating the increasing interest of society.Besides the fact that the reserves of gas, oil and coalare limited, their hugedisadvantage ispollution. The weight of the harmful gaseous and particulate combustion products entering the environment as a result of burning by several times exceeds the weight ofthe used fuel. For example, the combustion of natural gas - by 5 times, coal – by 4 times.

Given the shortage of resources and the ever-increasing price of oil and gas as well as the awareness of environmental responsibility there is an increased demand for the use of renewable energy sources as economically viable, environmentally safe and reliable method of supply of both heat and electricity for a long time.

The production of energy from renewable sources in the developed countries is developing rapidly. The beginning of the millennium is characterized by the intensive growth of its volume. In most developed countries, including the USA, Germany, Sweden, Denmark and Japan in the first half of the XXI century it is planned to increase the share of renewables in the general energy mix for up to20-50%.

The need for development of the renewable energy in Ukraine is determined by many factors. The main ones are as follows:

- high energy potential of the main types of RES
- energy deficit (dependency on the import of traditional energy resources, increase in their value on the world market, the problems of external supply)
- exhaustion of domestic energy resources (estimated reserves of oil and natural gas shall be sufficient for another 40-50 years)
- environmental impacts of energy production at thermal powerplants, radioactive contamination of area from the Chernobyl disaster
- the obligations of the country (the share of renewable energy sources in the national energy production of Ukraine, which seeks to join the European Union, shall be not less than 11% in 2020).

At the same time, the comparative assessment of energy consumption, energy intensity and environmental impact of production in Ukraine and worldwide shows that one of them most effective ways to diversify the sources of energy supply is a change in the structure of energy mix, particularly at the expense of renewable energy sources in terms of their effective use and taking into account then need to strengthen environmental protection.

Thus, increasing the use of RES in the state energy mix shall strengthen Ukraine's energy independence and increase the diversity of energy sources.

5.1. The overall contribution of each of the renewable energy technologies in achieving the mandatory indicative targets for 2020 and the trajectory for achieving indicative targets indicating the share of renewable energy sources in the sectors of heating and cooling, electricity and transport.

In the production of electricity from renewable sources in 2009 a major producer was the hydropower sector with the volume of annual production at 11,430 GW·h with installed capacity of 4,549 MW. Thus, the production of electricity by small-scale hydropower plants (micro, mini and small HPP) in 2009 was 30 GW·h at their total capacity of 49 MW.

Overall, the production of electricity by HPP in 2009 amounted to 99.65% of the volume of electricity generated from RES. Another producer of electricity from RES was wind energy through which the 41 GW·h (0.35%) was produced with installed capacity of 76 MW. It should be noted that in Ukraine only land-based WPP are used.

The production of electricity from other renewable energy sources(solar, biomass, biogas, geothermal resources etc.) in 2009 was actually lacking(was conducted only in the framework of there search).

In 2012, micro- and mini- HPP produced 60 GW·h of electricity with their total capacity of 26 MW, while small HPP produced 110 GW·h of electricity with their total capacity of 50 MW. In total the small hydro power plants produced 170 GW·h of electricity, representing 1.3% of the total volume of electricity produced from RES. Large HPP in 2012 produced 10,064 GWh·h of electricity with their total capacity of 4,600MW.

In general, the total installed capacity of HPP in 2012 was 4,676 MW. They produced 10,234 GW·h of electricity representing 89.7% of the total volume of electricity produced from RES.

WPP in 2012 produced 258 GWh·h of electricity with their total installed capacity of 194 MW accounting for 4% of the total volume of electricity produced from RES.

SPP in 2012 produced 334 GW·h of electricity with their total installed capacity of 372 MW. All electricity produced by SPP was generated by photo power plants. SPP were not applied in concentrators in Ukraine in 2012. Overall, the electricity produced by SPP in 2012 amounted to 6% of the total volume of electricity produced from RES.

The production of electricity from biomass in 2012 amounted to 22 GW·h with installed capacity of bio-power plants of 10 MW.

The total contribution of electricity produced from RES in the total electricity production in 2012 was 5.5%, taking into account the electricity produced by large HPP and 0.4% excluding the electricity produced by large HPP.

In view of the commitments undertaken by Ukraine having joined the Energy Community as well as the policy documents approved by the Government in the field of energy[44]and the dynamics of development of the renewable energy in the country it is possible to estimate the potential contribution of different types of RES in the achievement of the required indicative goals for 2020.

Hydropower: the current capacity of the small-scale hydro power plants is about 90 MW. Given the small share in the total energy mix (0.2%), small hydropower now can not significantly affect the energy supply structure of the country. However, the natural potential of its development is not fully implemented currently. Ukraine has significant potential of using the resources of small rivers (mainly in the western regions) accounting for almost 28% of the total hydropotential of all rivers of Ukraine. According to various estimates the economically feasible potential of small HPP in Ukraine is almost 4 GW.

When using the hydropotential of small rivers in Ukraine it is possible to achieve significant saving of fuel and energy resources, and the development of small hydropower will foster the decentralization of the general energy system, which would eliminate several problems in energy supply to the remote and inaccessible rural areas.

The micro-, mini- and small HPP can be a power fulbase for energy supply to all regions of Western Ukraine, and for some districts in Zakarpattya and Chernivtsi regions-a source of full energy self-supply.

To solve the issues of small hydropower development, Ukraine has sufficient scientific and technical potential and considerable experience in the design and development of hydraulic turbine equipment. Ukrainian enterprises have the necessary production capacity to equip small HPP with domestic equipment.

By upgrading the existing facilities, restoring the previously operational small hydro power plants and construction and commissioning of the new hydropower generating facilities in Ukraine, the production of electricity can be as follows:

micro- and mini- HPP -	up to 110 GW·h in 2015 (with their total capacity of 33 MW) and up to 170 GW·h in 2020 (with their total capacity of 55 MW);
small HPP -	up to 220 GW·h in 2015 (with their total capacity of 65 MW) and up to 330 GW·h in 2020 (with their total capacity of 95 MW);
large HPP -	up to 11,700 GW·h in 2015 (with their total capacity of 4,800 MW) and up to 12,650 GW·h in 2020 (with their total capacity of 5,200 MW);

Solar energy: by improving the technology and commissioning of the new facilities the energy production will be increased to 1,050 GW·h in 2015 (with their total capacity of 1,140 MW) and up to 2,750 MW in 2020 (with their total capacity of 2,800 MW).

[44] State Target Economic Program of Energy Efficiency and the Development of Energy Production from Renewable Energy Sources and Alternative Fuels for 2010-2015, The Energy Strategyof Ukraine till 2030 and other.

The average annual total volume of solar energy coming yearly on the territory of Ukraine is in the range of 1,070 kWh/sq.km in the North of Ukraine and up to 1,400 kWh/sq.km and above in the AR of Crimea.

The term of efficient operation of solar power equipment in the southern regions of Ukraine is 7 months (from April to October), in the northern regions- 5 months (from May to September). The photo energy equipment can operate quite effectively throughout the year. According to various studies, the possible economic potential of developing solar power generation in Ukraine is about 4 GW.

The converting of solar energy into electrical power in Ukraine should be directed primarily on the use of photovoltaic devices. The availability of large stocks of raw materials, industrial, scientific and technical basis for the manufacture of photovoltaic devices can fully provide not only the needs of local consumers but also provide for export of more than two thirds of the output.

Taking into account the experience of implementation of SPP in the European countries with similar levels of solar radiation, as well as in view of the global trend of a steady decline in the cost of construction of SPP as a result of technological developments, in Ukraine, by improving the technology and commissioning of the new acilities the generation of electricity by SPP shall be up to 1,050 GW·h in 2015 (with their total capacity of 960 MW) and up to 2,600 MW in 2020 (with their total capacity of 2,300 MW).

Wind energy: Ukraine also has significant potential for wind energy development. The most promising for its development are the southern and south-eastern regions of the country, where the average wind speed exceeds 5m/s. However, this potential is now barely used. Today in Ukraine there are WPP with total installed capacity of about 420 MW representing only 0.2% of the total generating capacity. One of the reasons for this low level of installed capacity is that until 2009, when the "green" tariff was established, there were no incentives for potential investors.

At the same time, the potential for development of wind energy generation in Ukraine, according to various estimates, is up to15 GW.However, for the construction of so many WPP substantial investments are required-according to various estimates– of more than 200 billion UAH.

Based on the experience of most European countries related to the introduction of WPP, through the use of more powerful wind generators and commissioning of new facilities,in Ukraine the WPP electricity production can be increased for up to 2,100 GW·h in 2015 (with their total capacity of 800 MW) and up to 6,700 GW·h in 2020 (with their total capacity of 2,550 MW).

Bioenergy: in this sector Ukraine has one of the highest growth potential. This is due to the peculiarities of the climate, the potential of the agricultural sector and the availabilityof the necessary labor force. The greatest energy potential in Ukraine belongs to the following types of biomass: crops, wood waste, liquid fuels from biomass, biological component of solid household waste and biogas. According to various estimates the potential installed capacity of the bioenergysegmentis 15 GW.

However, the implementation of the existing potential of bioenergy is impeded by th eunderdeveloped infrastructure and resource base necessary to ensure the uninterrupted supply of raw materials, low level of development of sectors -equipment suppliers, as well as the small volume of generation of each facility. Due to these reasons, the dynamics of the production of electricity from biomass goes behind the generation of electricity from other RES. However, the use of biomass can be an important componentin the production of heat energy. An important role in this belongs to the dissemination of the "green"tariff for these types of generation.

Given the experience of implementation of bioenergy plants in the European countries with similar bioenergy potential as well as in view of the reduction in the cost of construction of

bioenergy power plants due to the improvement of technologies, in Ukraine through the construction and commissioning of the new bio generation capacities the production of electricity from biomass can be increased to 430 GW·h in 2015 (with a total capacity of bio power plants of 110 MW) and up to2,350 GW·h in 2020 (with their total capacity of 530 MW).

RES in Transport:

Pursuant to the Law of Ukraine "On Amending Certain Laws of Ukraine concerning Production and Use of Motor Fuels Containing Biocomponents" No 4970-VI of 19 June 2012, the **mandatory** content of bioethanol in motor petrols produced and/or sold within the territory of Ukraine in 2014-2015 shall be minimum 5% (by volume), starting with 2016 it shall be minimum 7%.

According to the Ministry's of Energy and Coal Industry of Ukraine data, the national consumption of light oil products was equal to about 10 million tons (4.2 mln tons of petrol and 6 million tons of diesel fuels). Therefore, even the rough estimates demonstrate that in order to meet the requirements of this Law, Ukraine must produce minimum 225 ths tons of bioethanol in 2014 and minimum 314 ths tons of bioethanol starting with 2016.

As of today, activities in the sphere of bioethanol and motor fuel components production are carried out by five enterprises of Public enterprise "Ukrspyrt" of distillation industry, which is under the management of the Ministry of agrarian policy and food of Ukraine, these enterprises have following capacity:

Naumivskyy distilling plant – 9,500 tons per year;
Ivashkivskyy distilling plant – 1,400 tons per year;
Khorostkivske business location – 11,300 tons per year;
Haysynskyy distilling plant – 10,600 tons per year;
Luzhanske business location – 17,110 tons per year.

Almost all distilling plants use molasses as feedstock for bioethanol production.

It is expected that 3 other plants with the following capacity should be put into operation by the end of the current year:

Trylisskyy distilling plant – 14,000 tons per year;
Barskyy distilling plant – 11,000 tons per year;
Kamenskyy distilling plant – 13,000 tons per year

Production and sale dynamics for main types of products of distillation industry for 2007-2012 and 5 months of 2013

Period, year	2007	2008	2009	2010	2011	2012	5 months of 2013
Bioethanol							
Production, thousand tons		0	0	0.63	9.17	21.11	17.6
Sales, thousand tons		0	0	0.47	8.60	21.67	17.7
Motor fuel component							
Production, thousand tons		0	0	2.06	13.91	29.52	22.1
Sales, thousand		0	0	1.88	13.65	29.35	21.0

tons							

It is also expected that one installation for bioethanol production with state of art and more productive technology - molecular sieve, with output 100 tons per day, or 30,000 tons per year, will be put into operation in 2013.

Estimated productive capacity of currently operating plants and those that will start operation will approximately constitute 120.51 thousand tons per year in 2013.

Geothermal energy: Ukraine has a certain potential of geothermal energy development. This is so due to the thermal and geological features of terrain and peculiarities of the geothermal resources. However, now in Ukraine the research, exploration and practical workis focused only on geothermal resources, which are represented by thermal waters. According to various estimates, the economically viable energy resource of thermal waters in Ukraine is 17mtoe/year.

The practical development of thermal waters in Ukraine is carried out in the AR of Crimea, where the 11 geothermal circulation systems that meet the standards of the modern technology of extracting the geothermal heat of the Earth were built. All geothermal installations operate within there search and industrial stage.

The large reserves of thermal waters were found on the territory of Chernihiv, Poltava, Kharkiv, Luhansk and Sumyregions. Hundreds of wells that showed thermal water and are in conservation and can be recovered for their further use as the system for extraction o geothermal heat.

Ukraine has enough geothermal fields with high temperature potential(120-180 Cº), allowing the use of geothermal heat for electricity production.

When calculating the number of possible volumes of consumption of low temperature geothermal resources in the geoclimatic conditions of different regions of Ukraine it is necessary to take into account that their intensive exploitation can lower the temperature of the soilmassand lead to rapidexhaustion. It is necessary to maintain such level of use of geothermal energy, which would allow to exploit a source of energy r sources without harming the environment. For each region of Ukraine there is somemaximumintensity of extraction of geothermalenergy, whichcan be maintainedfor a long time.

Based on the experience of the European countries related to the introduction of geothermal powerplants, in Ukraine due to commissioning of new facilities, the production of electricity through geothermal power plants can be achieved in the amount of 60 GW·h in 2015 (with their total capacity of 11 MW) and in the amount of 310 GW·h in 2020 (with their total capacity of 50 MW).

The results of calculations of the total volume of consumption (of installed capacity and gross electricity production), expected from each source of renewable energy in Ukrain eaiming to achieve the mandatory indicative targets for 2020 and the indicative interim trajectory of achieving the share of energy from RES in electricity generation and in heating/cooling, are presented in Tables 10a, 10b and 11.

Table 10a. The estimationof the totalconsumption volume (installed capacity, gross electricity generation) expected from each renewable energy source in Ukraine aiming to achieve the mandatory indicative targets for 2020 and the indicative interim trajectory of achieving the share of energy from RES in electricity generation within 2009-2015.

	2009		**2013**		**2014**		**2015**	
	MW	GW·h	MW	GW·h	MW	GW·h	MW	GW·h
HPP:	4 549	11 430	4 676	11 870	4 788	12 345	4 898	12 515
< 1MW	19	12	26	60	28	65	33	75
1MW –10 MW	30	18	50	110	60	130	65	140
> 10MW	4 500	11 400	4 600	11 700	4 700	12 150	4 800	12 300
Geothermal energy	0	0	2	10	6	30	11	60

Solar:								
photo power plants	0	0	510	540	750	770	960	1 050
power plants on the concentrators	-	-	-	-				
Energy of tides, waves	0	0	0	0	0	0	0	0
Wind power plants:								
ground	76	41	300	790	525	1 380	800	2 100
sea	-	-	-	-	-	-	-	-
Biomass:	0	0	10	22	40	152	120	440
solid	0	0	6	18	28	110	80	320
biogas	0	0	4	4	12	42	30	110
bioliquids ([1])								
Total	**4 625**	**11 471**	**5498**	**13 232**	**6109**	**14 677**	**6779**	**16 155**
of which CHP	0	0	10	22	40	152	120	440

([1]) Only those that meet the criteria of sustainability are taken into account (excerpt from the last subparagraph of Article 5(1) of Directive 2009/28/EC

Table 10b. The estimation of the total consumption volume (installed capacity, gross electricity generation) expected from each renewable energy source in Ukraine aiming to achieve the mandatory indicative targets for 2020 and the indicative interim trajectory of achieving the share of energy from RES in electricity generation within 2016-2020.

	2016		**2017**		**2018**		**2019**		**2020**	
	MW	GW·h	MW	GW·h	MW	GW·h	MW	GW·h	MW	GW·h
HPP:	4 987	12 660	5 077	12 810	5 167	12 965	5 258	13 140	5 350	13 290
< 1MW	37	85	42	95	47	110	52	120	55	130
1MW –10 MW	70	155	75	165	80	175	86	190	95	210
> 10MW	4 880	12 420	4 960	12 550	5 040	12 680	5 120	12 830	5 200	12 950
Geothermal energy	18	100	23	140	30	180	39	240	50	300
Solar:										
photo power plants	1 430	1 350	1 750	1 670	2 100	2 010	2 430	2 300	2 800	2 600
power plants on the concentrators	-	-	-	-	-	-	-	-	-	-
Energy of tides, waves	0	0	0	0	0	0	0	0	0	0
Wind power plants:										
ground	1 350	2 900	1 710	3 750	2 100	4 670	2 500	5 650	3 000	6 700
sea	-	-	-	-	-	-	-	-	-	-
Biomass:	190	735	270	1 045	355	1 570	440	1 950	530	2 350
solid	150	595	215	855	285	1 260	340	1 510	400	1 790
biogas	40	140	55	190	70	310	100	440	130	560
bioliquids ([1])	-	-	-	-	-	-	-	-	-	-
Total:	7 975	17 745	8 830	19 415	9 752	21 395	10 667	23 280	11 730	25 240
of which CHP	190	735	270	1 045	355	1 570	440	1 950	530	2 350

(1) Only those that meet the criteria of sustainability are taken into account (excerpt from the last subparagraph of Article 5(1) of Directive 2009/28/EC

Table 11. Estimation of the total contribution (final volume of energy consumption ([5])), expected by each source of renewable energy in Ukraine aiming to achieve the mandatory indicative targets for 2020 and the indicative interim trajectory of achieving the share of energy from RES in the heating and cooling within 2013-2020 (ktoe)

	2009	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**

Geothermal (excluding the low-temperature geothermal heat for use in heat pumps)	0	25	35	47	60	75	95	120	150
Solar	0	130	170	210	250	300	370	470	600
Biomass:	2 410	2 480	2 550	2 680	2 900	3 100	3 350	3 650	4 000
includingsolid	2 410	2 475	2 540	2 665	2 875	3 060	3 290	3 570	3 900
biogas	0	5	10	15	25	40	60	80	100
bioliquids ([1])	0	0	0	0	0	0	0	0	0
Renewable energy from heat pumps:	40	60	200	340	480	620	760	900	1 100
includingair thermal	27	40	133	227	320	413	507	600	733
geothermal	9	13	44	76	107	138	169	200	244
hydrothermal	4	7	22	38	53	69	84	100	122
Total	**2 450**	**2 695**	**2 955**	**3 277**	**3 690**	**4 095**	**4 575**	**5 140**	**5 850**
of which DH ([2])	370	450	470	555	730	900	1 150	1 500	2 000
biomass in households([3])	1 200	1 230	1 260	1 290	1 320	1 360	1 400	1 450	1 500

([1]) Only those that meet the criteria of sustainability are taken into account (excerpt from the last subparagraph of Article 5(1) of Directive 2009/28/EC.
([2]) Central heating and/or cooling of the total volume of consumption of energy from renewable sources in heating and cooling (RES-DH).
([3]) Of the total volume of consumption of energy from renewable sources in heating and cooling.
([5]) Direct use and district heat as defined in Article 5(4) of Directive 2009/28/EC.

The results of calculations of the total contribution expected from each source of renewable energy in Ukraine aiming to achieve the mandatory indicative targets for 2020 and the indicative interimtrajectory of achieving the share of energy from RES in the transport sector are presented in Table 12.

Table 12. Estimation of the total contribution expected from each source of renewable energy in Ukraine aiming to achieve the mandatory indicative targets for 2020 and the indicative interim trajectory of achieving the share of energy from RES in the transport sector within 2013-2020 ([5]) (ktoe)

	2009	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Bioethanol/bio-ETBE	0	30	110	150	200	225	250	280	320
including biofuel ([1]), *Article 21(2)*	0	30	110	150	200	225	250	280	320
import ([2])	0	0	0	0	0	0	0	0	0
Biodiesel fuel	0	0	0	0	20	40	50	60	70
including biofuel ([1]), *Article 21(2)*					20	40	50	60	70
import ([3])									
Hydrogen from renewable sources ([4])	0	0	0	0	0	0	0	0	0
Electricity from renewable sources:	52	60	64	71	78	86	95	105	115
including motor vehicles ([4])									
non-motor vehicles	52	60	64	71	78	86	95	105	115
Other (biogas, vegetable oils etc.) - specify	0	0	0	0	0	0	0	0	0
including biofuel ([1]) *Article 21([2])*									
Total	52	90	174	221	298	351	395	445	505

([1]) Biofuel that is included in Article 21(2) of Directive 2009/28/EC.
([2]) Of the total volume of bioethanol/bio-ETBE.
([3]) Of the total volume of biodiesel fuel.
([4]) There is research of technology; industrial design has not been implemented.
([5]) For biofuels it is necessary to take into account only what meets the sustainability criteria (excerpt from the last subparagraph of Article 5 (1)).

In the field of electricity generation the full implementation of the Government policy documents should provide for commissioning of 7,159 MW of renewable energy facilities in 2015 and 11,730 MW in 2020 (including the capacity of large HPP) or 2,359 MW in 2015 and 6,530 MW in 2020 (excluding the capacity of large HPP).

This will provide an opportunity to produce from RES in 2015 the 16,595 GW·h of electricity and 25,240 GW·h in 2020, which will be respectively 6.4% and 11% of the total volume of electricity production and shall ensure the implementation of Ukraine's obligations to the Energy Community.

5.2. The total share, which is expected to be obtained through the implementation of energy efficiency and conservation measures in the mandatory indicative targets for 2020 and the indicative trajectory for achieving the indicative targets for the share of energy from renewable sources in the sector of heating and cooling, electricity and transport.

In Ukraine the 600 thous.houses of state, municipal, private and common property are heated, including multistory (5 floors or more)- more than70 thous. Approximately one fourth of fuel burned in Ukraine is used for heating the residential houses and public buildings. It is the only consumer group that did not reduce the overall volume of energy consumption over the past seven years.

The enterprises of the housing and utilities sector of Ukraine annually consume more than 10 billion cubic meters of natural gas, much of which is used for heating.

In Ukraine the population consumes 38% of heat energy produced domestically. More than 93% of families in Ukraine live in buildings erected before1990. Only 6% of the total housing stock of Ukraine was built after 1990 and it has more or less decent indicators of energy efficiency. Almost 50% of the housing can be described as the one with low energy saving performance, the main part of it consists of the houses built in the 1950's. All these buildings are characterized by the extremely inefficient use of heat energy. In addition, nearly 5 thous. houses are in disrepair. More than 36 thous. houses are classified as old, every third house of the existing housing stock needs overhaulor current repair. The traditional architectural and building systems (large-panel, large-block, frame of precast concrete etc.) by their parameters do not meet the modern requirements for energy efficiency. All this leads to greater unit consumption of thermal energy for heating.

In Ukraine the unit consumption of thermal energy during the heating season per 1 sq. m. of housing, for houses built during the Soviet period is as follows: brick apartment – 400 kW·h/sq.m.; panel apartment – 600 kW·h/sq.m.; individual - up to 700 kW·h/sq.m.

For comparison, in the 1970's-80's during the heating season the specific energy consumption for heating of 1 sq.m.of housing for houses built earlier was: 280kW·h/sq.m. in England, 360 kW·h/sq.m. in Germany, 400 kW·h/sq.m. in Poland. In the 1990's in Western Europe this figure was 120 kW·h/sq.m., and according to modern requirements– it decreased to 40 to 60 kW·h/sq.m.

In general, the distribution of heat energy losses in the residential sector in Ukrainein recent years is as follows: in the heating system – 59.3%, in the hot water system–20.2%, in the system of heat insulation of buildings – 19.0%, in the system of ventilation – 1.5%.

With the increase in gas prices in Ukrainet here are conditions for the economically reasonable modernization of urban multistory buildings aimed to reduce the heat loss by 65-75% of the current levels to the technically achievable levels of thermal renovation of buildings and a corresponding decrease in demand for heat energy.

Today in Ukraine the new, more approximate to the European level specifications of resistance of the heat protective structures required for the design of new and rehabilitation of existing residential and public buildings were introduced. With the increase of the level of thermal insulation to the minimum level of indicators established by the DBNB.2.6-31:2006, the energy saving shall amount to 3.6 billion cubic meters of natural gas annually.

The technical condition of the heat energy sector of Ukraine is largely unsatisfactory. The cause of the degradation of the technical condition of the heating system in recent years has been the lack of funding for the recovery of the fixed assets of the sector, which isprovided mainly on the residual principle.

The main production assets used in the district heating sector in Ukraine for the generation and transport of thermal energy are low efficient and require immediate replacement or upgrading.

Another very important issue facing Ukraine is the inefficiency of heating networks. Almost 16% of the country's heating networks are in disrepairand need replacing. Analysis of the dynamics of actual heat losses of enterprises that produce heat energy shows that they tend to increase.

In addition, the indicators of unit energy consumption for production of 1 Gcal of heat energy by boilers in recent years are practically at the same level – 250 kg o.e./Gcal, which is significantly higher than the same rate in the developed countries.

The experience of the developed countries shows that an effective way to reduce the final energy consumption in the sector of heating and coolingis to promote the use of electricity derived from the renewable sources for heating of residential houses and public buildings, taking into account the resources available locally and the reduction by introducing these measures of the natural gas consumption.

Ukraine has a developedinfrastructure ofrail,water androad transport. By the length ofthe railway networkUkraineranks secondin Europe (21,7thous. kmof railways). In the Black Sea, Azovand Danube basins there are18 seatradeports. The lengthof inland waterwaysin the majorEuropeanrivers - Danubeand Dnieperis 2,2 thous. km. The transit coefficient of Ukraineis among the highestin the world.

The geo-strategic locationbetween the countries of Europe, Asia and the Middle Eastallows Ukraine to be a beneficial transitbridge for thetransportationof goods andpassengers.Thisis impeded by notsufficiently developedtransport complex.In the presenceof the developed infrastructure of rail andwater transport the quality of transport services, frequency of traffic, speed, storage of goods do notallowitsfulland effectiveuse.In addition, the indicators of energy efficiency,environmental impact etc., requiresignificantimprovements.

In recentyears there has beena significant increase inbothcargoandpassenger traffic.In recent years the cargoturnoverhas grownby an averageof 14%annually and passenger traffic by more than 4%.

The number ofroad transportregisteredin the statetraffic policeis around9 mln.units.Among them,thosethat useonlygasoline–78,7%, diesel– 16,0%, liquefiedpetroleum gas– 1,1%,compressedgas - 0,5%. The shareof vehiclesthatconsumecombinedgas andgasolineor dieseldoes not exceed 3,7%.

The rolling stock of the railway transport of Ukraineincludes2 545locomotives,1 860 electric locomotives, 52 locomotives, 326 dieselsections,1 589train sections,124910 freight cars,7 444 passenger cars.

The rolling stock of the urban electrictransport consists of 1 035 subway cars, 4 064 of trolleybuses and2 621 trams.

The average annualcargo andpassenger traffic by air transportin recent yearsamounted to16 544tonsand3,15million peoplerespectively.

The share ofthe transport sector inthe structure offinal energy consumptionin recent years on the averageamounted to14,1million tons n.e.

It is necessary to draw attention to theincreased consumptionin theland transport sector, mainly of petroleum gas, which can be explained bythe low costof operation of vehicles, as the price of such gas is by50-60% less than the cost of gasoline. The growthin gas consumption will be observedin the futurein connectionto propane – butane gas used for vehicles, andis a combinationof the two typesof gasproducedin the process of oil refining at factories.

The experienceof the developed countriesshows thatan effective way toreduce the finalenergy consumptionin transportis to encourage the expandeduse of renewableenergy andalternative fuels at themobileand stationaryfacilities oftransport enterprises, taking into account the resources availablelocallyand the reductionby introducingthese measuresof the naturalgas consumption.

Thus,there is significant potentialfor the reduction of thegrossfinalenergy consumptionfor heating,cooling,electricity andtransportthrough the implementationof energy efficiencyand energy conservation measures.

In order to estimate theinterimgoalat the national levelit is necessary totake into accountthe proposedadditional measures andincentives aimed to improve energy efficiency, such as:

- the use ofelectricityderivedfrom renewableenergy sourcesfor heating of residential houses and publicbuildings;
- the rehabilitation of the sub-sectors ofhousing and utilities sectorbased onthe latest scientificandtechnical developments, national and international experience, proximity to the EU requirementsand internationalagreements onindicators ofenergy andmaterial resources consumption, reduction of greenhousegases emission and pollution;
- the construction of the new, the reconstruction and modernization of existingheating devicesbased on the automation of technology processes, the use of the latestmanufacturing technologiesand structuralsolutions, and the utilization of energy ofoutgoinggases;
- the replacement ofmorally andphysicallyobsoletefactorypower plants in the compressor andenergy sector;
- ensuring the restructuringofthe transport infrastructurein accordancewith the needsof productionand social sphere.

In this regard, Ukraine has made preliminary efforts in order to achieve the interim goals. The preliminarytargetsare2 910ktoe of energy savedby the end of2015, accounting for 5% of the average volume ofthe finalenergy consumption.

The results ofcalculatingthe expectedgrossfinal volume of energy consumptionofUkrainefor heating,cooling,electricity andtransportby2020taking into account theeffectsof energy efficiencyand energy conservation measures in2013-2020are presented inTable 1of Section 2 of NREAP.

According to the Energy Balance of Ukraine for 2009 year in 2009 he contribution of RES in the energy sector amounted to 2,505 mtoe (p.94), including the 1,433 mtoe at the cost of biofuel,

plus the large HPP–1,026 mln toe, 0,004 mln toe WES and SES and 0,042 mln toe – energy produces by the heat pumps (is not shown in the energy balance separately and is reflected in "Other"). Totally 2,505 mln toe or 3,8% of gross consumption of all the energy. This value was taken as baseline for determination of the minimum trajectory.

The results of calculating the trajectory of growth in the share of energy from renewable sources in heating and cooling, electricity and transport tby 2020and the calculation of the total share of renewables in the final energy consumption in 2013 -2020are presented in Tables3,4a and4bin the Section 2 of NREAP.

5.3. Impact Assessment (optional)

Table 13. Estimated cost of measures aimed to support the policy of renewable energy development and the benefits of these measures

Measure	Expected volume of energy consumption from renewable (mtoe)*	Estimated costs (specify timetable), mln. euro	Estimated reduction of GHG emissions broken down by the typeofgas,(mln.t/CO^2per year)*	Estimated number of new jobs, number
Development of standards in the field of renewable energy, units	2014 – 5 2015 – 30 2016 – 35 2017 – 35 2018 – 35 2019 -35	2014 – 0.05 2015 – 0.34 2016 – 0.52 2017 – 0.52 2018 – 0.52 2019 – 0.52		
Adaptation of the legislation Ukraine in the field of renewable energy to the EU legislation, number of regulations	2014 – 4 2015 – 4 2016 – 4	2014 – 0.03 2015 – 0.03 2016 – 0.03		
Construction and reconstruction of electric networks, transformer yards and sub-stations for connection of facilities that produce electricity from renewable energy sources in the Autonomous Republic of Crimea and Odessa region	2014 – 1.6 2015 – 3.2 2016 – 6.36	2013 – 5 2014 – 26.2 2015 – 20	2014 – 3.0 2015 – 6.0 2016 – 12.0	
Construction of 110kV transmission network and transformer yards for connection of facilities that produce electricity from RES:				
Kherson region	2014 – 0.29 2015 – 0.57 2016 – 1.14	2014 – 7.8	2014 – 0.6 2015 – 1.2 2016 – 2.4	

Mykolaiv region	2014 – 0.29 2015 – 0.57 2016 – 1.14	2014 – 7.8	2014 – 0.6 2015 – 1.2 2016 – 2.4	
Conversion of boilers serving social facilities to the use of RES	2014 – 0.12 2015 – 0.73 2016 – 1.46 2017 – 2.92 2018 – 5.83 2019 – 11.65	2014– 2.09 2015 – 3.09 2016 – 5.58 2017 – 10.2 2018 – 15.32 2019 – 17.09	2014 – 0.24 2015 – 1.5 2016 – 3.0 2017 – 6.0 2018 – 12.0 2019 – 24.0	
Construction of WPP in the AR of Crimea, Donetsk, Zaporizhzhya, Mykolaiv, Odessa regions	2014 – 1.17 2015 – 2.33 2016 – 4.64 2017 – 10.43 2018 – 20.86	2014 – 1 356 2015 – 1 356 2016 – 1 356 2017 – 1 356 2018 – 1 356	2014 – 2.4 2015 – 4.8 2016 – 9.6 2017 – 21.9 2018 – 43.8	2 850
Implementation of projects for the construction of solar installations for: - electricity production - heat energy production	 2014 – 0.015 2015 – 0.29 2016 – 0.057 2014 – 0.015 2015 – 0.029 2016 – 0.057 2017 – 0.1	 2014 – 8.2 2015 – 19.4 2016 – 38.6 2017 – 77.1 2018 – 88.3 2014 – 13.5 2015 – 24.5 2016 – 42.4 2017 – 63.8 2018 – 73.5	 2014 – 0.03 2015 – 0.06 2016 – 0.12 2014 – 0.03 2015 – 0.06 2016 – 0.12 2017 – 0.21	1 610
Renovation and construction of small HPP	2014 – 0.015 2015 – 0.015 2016 – 0.029 2017 – 0.057	2014 – 1.6 2015 – 9.3 2016 – 13.0 2017 – 13.0 2018 – 13.0	2014 – 0.03 2015 – 0.03 2016 – 0.06 2017 – 0.12	
Construction of facilities that use solid biofuels for: - electricity production -heat energy production	 2014 – 0.015 2015 – 0.029 2016 – 0.057 2017 – 0.12 2018 – 0.23 2014 – 0.1 2015 – 0.2 2016 – 0.42 2017 – 0.84 2018 – 1.69	 2014 – 2.9 2015 – 5.9 2016 – 5.9 2017 – 5.9 2018 – 8.9 2014 – 7.7 2015 – 15.4 2016 – 15.4 2017 – 15.4 2018 – 23.1	 2014 – 0.03 2015 – 0.06 2016 – 0.12 2017 – 0.24 2018 – 0.48 2014 – 0.21 2015 – 0.42 2016 – 0.87 2017 – 1.77 2018 – 3.54	
Construction of facilities that				

operate on biogas for: - electricity production - heat energy production	 2018 – 0.015 2019 – 0.029 2014 – 0.015 2015 – 0.029 2016 – 0.057 2017 – 0.12 2018 – 0.23	 2014 – 0.3 2015 – 0.7 2016 – 0.7 2017-0.7 2018-1.0 2014 – 1.0 2015 – 2.0 2016 – 2.0 2017 – 2.0 2018 – 3.0	 2018 – 0.03 2019 – 0.06 2014 – 0.03 2015 – 0.06 2016 – 0.12 2017 – 0.24 2018 – 0.48	
Construction of facilities for the production of biodiesel	2014 – 0.015 2015 – 0.015 2016 – 0.029 2017 – 0.057 2018 – 0.13	2014 – 0.04 2015 – 0.08 2016 – 0.08 2017 – 1.0 2018 – 1.2	2014 – 0.03 2015 – 0.03 2016 – 0.06 2017 – 0.12 2018 – 0.27	
Construction of facilities for the production of bioethanol	2014 – 0.1 2015 – 0.2 2016 – 0.4 2017 – 0.82 2018 – 1.63	2014 – 19 2015 – 38 2016 – 38 2017 – 38 2018 – 57	2014 – 0.21 2015 – 0.42 2016 – 0.84 2017 – 1.71 2018 – 3.42	
Construction of geothermal facilities for: - electricity production - heat energy production	 2014 – 0.1 2015 – 0.22 2016 – 0.43 2014 – 0.015 2015 – 0.043 2016 – 0.086 2017 – 0.16	 2014 – 0.7 2015 – 0.9 2016 –16.0 2017 – 37 2018 – 116 2014 – 0.6 2015 – 10.0 2016 – 13.0 2017 – 17.0 2018 – 25	 2014 – 0.21 2015 – 0.45 2016 – 0.9 2014 – 0.03 2015 – 0.09 2016 – 0.18 2017 – 0.33	
Creation of a system of monitoring of energy production from renewable energy sources		2015 – 0.3 2016 – 0.3 2017 – 0.3 2018 – 0.2 2019 – 0.2		
Establishment of centers for testing and certification of equipment used in renewable energy sector, units	2015 – 1 2016 – 1 2017 – 1 2018 – 1 2019 – 1	2015 – 0.3 2016 – 0.3 2017 – 0.3 2018 – 0.3 2019 – 0.3		
Conduction of research of implementation of the new technologies and equipment in the production of energy from renewable energy sources		2015 – 0.3 2016 – 0.3 2017 – 0.3 2018 – 0.3 2019 – 0.3		

Estimation of opportunities of the development of gas supply infrastructure aimed at promoting biogas integration.		2015 – 0.3 2016 - 0.3		
Development of Rules for connection of biogas systems to natural gas distributing systems		2016 – 0.3 2017 – 0.3		
Setting up tariffs for transportation and distribution of gas produced from renewable energy sources		2016 – 0.3 2017 – 0.3		
Establishment of demonstration and training centers and the vocational education system in the sector of production of energy from renewable energy sources, units	2015 – 3 2016 – 7 2017 – 7 2018 – 5 2019 – 5	2015 – 1.0 2016 – 1.0 2017 – 1.0 2018 – 1.0 2019 – 1.0		

* calculated on an accrual basis

5.4. Development of the National Renewable Energy Action Plan and the monitoring of its implementation

The Resolution of the CMU #73-r of February 13, 2013enteredthedevelopment of NREAP into the Priority Action Planfor Ukraine's integration into the EuropeanUnion. The responsiblefor the development ofNREAP were appointed the Ministry of Economic Development, SAEE and other central bodiesof executive power. In the next Resolution of theCMU Onapproval of the Action Planfor the implementation in2013 of the National Programme ofadaptation of the legislation of Ukraine tothe legislation of the European Union #157-r of March 25, 2013in paragraph 35 it is envisaged to develop adraft Resolution of the Cabinetof Ministers ofUkraineOn approval ofthe National Renewable Energy ActionPlan for the periodup to2020 with a deadline -June 2013.

The SAEE informed the central authorities, regional and local authorities and interested enterprises on the development of theNREAP and asked them to submit their proposals to the developed NREAP.

Inpreparation of the NREAP a series of public consultations, roundtables, briefings and press conferences were held for thepublicdiscussionofproposalsandcertainprovisionsof the NREAP.

A numbe of regional and loca lauthorities took into account theresults of the publicdiscussionsof NREAP in their Plan sfor the development of regional/local renewable energy development strategies.

Plans for the development of regional/local renewable energy development strategies

Region	Local Strategy of Renewable EnergyDevelopment
Kherson	Kherson region Renewable Energy Development Programme by 2030
Rivne	Regional Energy Efficiency Programme for 2011-2015.
Kharkiv	Within the Strategy of Sustainable Development of the Kharkiv region by 2020.

Zakarpattya	Within the Economic Reforms Programme for 2010-2014 in the energy sector and the Program of energy conservation and energy efficiency in Zakarpattya region for 2012-2015.
Dnipropetrovsk	Within the Programme of improvement of energy efficiency and reduction of energy consumption in Dnipropetrovsk region for 2010-2015
The AR of Crimea	Crimea Development Strategy for 2011-2020; Implementation Plan for Phase I (2011-2013) Strategies for economic and social development of the Autonomous Republic of Crimea for 2011-2020.
Volyn	Within theStrategy of economic and social development of Volyn region for 2012-2015.
Luhansk	Regional Energy Efficiency Programme of Luhansk region for 2011 – 2015
Vinnytsya	Within the Regional Developmen tStrategy of Vinnytsya region by 2015
Zhytomyr	Regional Energy Efficiency Programme of Zhytomyr region for 2011 – 2015
Odessa	Regional Energy Efficiency Programme of the Odessa region for 2011 – 2015
Kyiv	Regional Energy Efficiency Programme of Kyiv region for 2011 – 2015
Ivano-Frankivsk	Regional Energy Efficiency Programme of Ivano-Frankivsk region for 2011 - 2015
Lviv	Regional Energy Efficiency Programme of Lviv region for 2011 – 2015
Khmelnytsky	Regional Energy Efficiency Programme of Khmelnitsky region for 2011 – 2015
Ternopil	Regional Energy Efficiency Programme of Ternopil regionfor 2011 – 2015
Kirovohrad	Regional Energy Efficiency Programme of Kirovohrad region for 2011 – 2015
Zaporizhzhya	Regional Energy Efficiency Programme of Zaporizhzhya region for 2010-2015
Cherkassy	Regional Energy Efficiency Programme of Cherkassy region for 2011 – 2015
Chernivtsi	Regional Energy Efficiency Programme of Chernivtsi region for 2011 – 2015
Chernihiv	Regional Energy Efficiency Programme of Chernihiv region for 2011 – 2015
Sumy	Programme for production and use of local renewable fuels in the Sumy region within 2009-2015
Poltava	Regional Energy Efficiency Programme of Poltava region for 2011 - 2015
Mykolaiv	Development of alternative and renewable energy sources (ARES) in Mykolaiv region by 2015
Donetsk	Energy Efficiency Programme of Donetsk region for 2010-2015

Key measures of the National Renewable Energy Action Plan

The Ministry of Energy and Coal Industry of Ukraineon its official website http://mpe.kmu.gov.ua published the Draft Update of the Energy Strategy of Ukraine till 2030 for public discussion.

Paragraph 3.2.2. “Prospects for the industry development” of Subsection 3.2. “The production, transmission and distribution of electricity” of Chapter 3. “Strategy of electric power industry development” of the Strategy identifies the following priorities, namely:

- modernization of existing generating facilities (TPP with installation of gas treatment equipment (GTE), power plants, NPP, HPP);
- modernization and development of transmission and distribution networks;

- implementation of HPP and PS HPP construction projects (with total capacity of 5 GW);
- extension of lifetime of the existing NPP for 20 years;
- construction of the new 2 GW nuclear units of Khmelnitsky NPP (3rd and 4th units);
- construction of 4 GW coal power stations to replace the decommissioned facilities;
- commencement in 2017 of the pre-design works, in 2022 - the start of construction of nuclear units to replace the existing units to bed ecommissioned after 2030;
- construction of nuclear units at the new sites (with minimum baseline capacity of 3 GW and 5 GW at the peak demand, which is expected in the optimistic scenario);
- additional construction of coal-fired plants (with capacity of 5 GW at baseline and 11 GW at maximum scenario).

This Section envisages the baselin ecommissioning of energy facilities that use renewable energy sources (in 2015 – 0.6 GW, in 2020 – 1.6 GW, in 2025 – 3.3 GW, in 2030 – 6 GW of installed capacity).

However, SAEE considers that further development of the electricity sector should be based on the measures of renewable energy development, primarily through the construction of wind power plants, solar power plants and small HPP, as well as the modernization and construction of electrical networks, shunting facilities with the introduction of modern frequency control systems of the United Energy System of Ukraine by modernizing the networks for transition to the so-called Smart Grids.

This approach of SAEE is reflected in the activities of the State Target Economic Program for Energy Efficiency and the development of energy production from renewable energy sources and alternative fuels for 2010 – 2015 (hereinafter - the Program), approved by the Resolution of the Cabinet of Ministers of Ukraine #243 dated 01.03.2010. The goal of the Program is, in particular, the optimization of the energy mix of Ukraine, where the share of energy derived from renewable energy sources and alternative fuels in 2015 will be not less than 10%. The implementation of the Program activities in 2015 shall result in the production of 20 billion kW·h of electricity from renewable energy sources, representing 10% of the production of energy in the national energy mix.

However, in paragraph 2.2. “The balance of electric energy” of Section 2. “Forecasting the balance of energy resources” in the profitable balance of electricity the Minenergycoal envisages the production of electricity from renewable energy sources in the amount of 1 billion kW·h in 2015, 4 billion kW·h in 2020, 7 billion kW·h in 2025 and 13 billion kW·h in 2030.

Also, paragraph 3.b. “Alternative renewable energy sources” of Section 3. “The Strategy of development of electric powe rindustry” states that “the target indicator of the total capacity of alternative and renewable energy by 2030 will beat least 10% of the installed capacity or 5-7 GW (10-12 GW including large HPP), and the volume of output -11-16 TW·h (23-28 TW·h, including large HPP)”.

These provisions of the Strategy contravene the Program, which envisages the commissioning by 2015 of renewable energy facilities with the capacity amounting to 8.24 GW, including for generation of electricity –7.12 GW and heat energy –1.12 GW, and the volume of production will be more than 20 billion kW·h of electricity and 10.6 million Gcal of thermal energy.

Also, the Sub-section “Generation of energy based on RES” of paragraph 7.2. “The potential for the development of alternative and renewable energy sources and alternative fuels of Chapter 7. “Priorities of energy saving, the potential of the development of alternative and renewable energy sources” of the Strategy states that the strategic development of renewable energy in Ukraine must meet the fundamental principles of the European Energy Community.

It should be noted that the Decision of the European Commission of 19.03.2012 On approval of the Proposal of the Commission to the Ministerial Council of the Energy Communityon the implementation of Directive2009/28/EC and amending Article 20 of the Treaty on the Establishment of the Energy Community (Brussels,19.03.2012C(2012)1745final) defines the obligations for Ukraineto increase the share of energy produced from renewable sources in the total final energy consumption in Ukraine to 11% in 2020.

Thus, the defined by the Minenergycoal share of RES in the total energy mix contravenes not only the Programme activities, but also the international obligations of Ukraine.

In view of the above, the SAEE considers it necessary to envisage in the revised Draft Energy Strategy of Ukraine till 2030 the increase in the share of renewable energy installed capacity to the following levels:

2015 – 6.8 GW

(WPP – 0.8 GW; SPP – 0.96 GW; big HPP – 4.8 GW small HPP – 0.1 GW, BES – 0.1 GW);

2020 – 10.8 GW

(WPP – 2.6 GW; SPP – 2.3 GW; big HPP – 5.2 GW, small HPP -0.15 GW, BES – 0.5 GW);

2025 – 19.7 GW

(WPP – 6.2 GW; SPP – 4.4 GW; big HPP – 5.2 GW, small HPP – 2.2 GW, BES – 1.3 GW);

2030 – 24.8 GW

(WPP – 7.6 GW; SPP – 5.4 GW; big HPP – 5.2 GW, small HPP – 2.0 GW, BES – 2.6 GW).

Moreover, SAEE also proposes to include the following measures in the National Renewable Energy Action Plan:

- in 2015 to ensure the maximum use as shunting facilities the HPP, PS HPP, TPP-gas and to use the shunting facilities in coal-based TPP through their modernization and partial replacement of obsolete units with 100 MW combined-cycle installations;
- in 2020 to ensure the continuation of introduction of the new shunting facilities in coal-based TPP, HPP, PS HPP and commissioning of Shcholkinsk and Bolgrad combined-cycle power plants;
- in 2025 instead of commissioning the nuclear power unit with the installed capacity of 1 GW to commission the 4 GW renewable energy facilities, and provide for their regulation through the introduction of the new energy storage technologies and commissioning of the new shunting facilities;
- in 2030, instead of commissioning the nuclear power unit with installed capacity of 1 GW to commission the renewable energy facilities with total capacity of 4 GW, and provide for their regulation through the introduction of the new energy storage technologies and commissioning of the new shunting facilities.

During the public discussion it was also proposed to include in the National Renewable Energy Action Plan the following measures:

- introduction of the new technologies of production of energy from renewable energy sources and alternative fuels (AF);
- optimization of Ukraine’s energy mix by increasing the share of energy produced from RES and AF;
- further legislative regulation of the development of energy production from RES and AF in Ukraine;

- acceleration of the approval of an updated Energy Strategy by 2030, taking in to account the obligations of Ukraine to the Energy Community on ensuring in the final consumption of the share of energy produced from RES amounting at least to 11% in 2020;
- acceleration of the development and adoption of the framework Law On Energy Efficiency instead of the current Law On Energy Saving, adopted in 1994;
- ensuring the development and approval of the State Target Economic Program on energy efficiency and the development of energy production from renewable energy sources and alternative fuels for the duration of the Energy Strategy, gradually for the periods:
    1. 2015- 2020.
    2. 2020- 2025.
    3. 2025- 2030.
- provision for the development of a system of technical regulations and standards, especially in the field of environmental, energy, international law and technical regulations necessary for the formation and development of RES and AF;
- updating of sustainability criteria bearing in mind specific character of national agrarian industry and development of industry-specific standard of sustainable biomass/biofuel production
- development and adoption of regulations on the gradual introduction of:
    - market prices for natural gas and other fossil energy sources to meet the needs of housing and utilities sector and the population;
    - mandatory energy disposal of waste, including restrictive measures on the use of technology and production in agriculture and utilities, forestry, food industries and other economic activities - sources of biological waste without their full disposal.
- in order to support the production of motor biofuels and their components it is necessary to adopt the regulations on:
    - improvement of the excise policy for automotive fuel oil that contains ingredients from renewable resources, primarily manufacturing and sales of mixed gasoline;
    - promotion of the export of biofuels and their components;
    - simplifying the rent policy, land use related to energy plantations.
- adaptation of the national legislation in the field of energy production from RES and AF to the EU legislation, namely the gradual harmonization of legislation on energy efficiency and renewable energy with the following requirements:
    - Directive of the European Parliament and of the Council of the EU 2009/28/EC of April 23, 2009 on the promotion of use of energy from renewable sources, amending and further cancellation of Directives 2001/77/EC and 2003/30/EC;
    - Directive of the European Parliament and of the Council of the EU 2010/31/EC of May 19, 2010 on energy supply to premises;
    - Directive 2006/32/EC of the European Parliament and the Council of April 5, 2006 on the efficiency of the end use of energy and energy services and on cancellation of Council Directive 93/76/EC.
- establishment of the appropriate scientific, technical, technological and industrial infrastructure in the RES and AF sector;
- development of the state system of monitoring the process of the development of production of energy from RES and AF;
- improvement ofthe reliability of statistical information on indicators of the production of energy from RES and AF in Ukraine;

- improvement of the mechanism of financing of activities aimed at developingthe production of energy from RES and AFthat require government support;
- creation of favorable conditions for attraction of investments in the production of energy from RES and AF in Ukraine;
- enhancement ofinternational cooperation in the production of energy from RES and AF and reduction of environmental pollution;
- promotion of the prospects of development of the production of energy from RES and AF in Ukraine, including the inclusion of relevant issues in curriculums at all levels.

The implementation of the National Renewable EnergyAction Plan in full shall allow to:

- increase the energyin dependence of Ukraine;
- increase the share of energy produced from RES and AF in GFEC to at least11% till 2020;
- optimize the structure of the energy mix of Ukraine, in particular, to provide by 2020 for the reduction of use of traditional energy sources in the amount of 35 mtoe;
- improve the mechanism of governance and regulation of RES and AF;
- ensure greater involvement of intellectual property in the process of the development of RES and AF;
- increase the competitiveness of the national economy;
- improve the environmental situation in the country by reducing the amount of harmful emission resulting from the combustion of fossil fuels into the atmosphere;
- enhance the development of energy production from RES and AF to meet the requirements of the European Union and provisions of the Energy Charter.

Explanation:

1. "Energy balance of Ukraine for 2009" provides following data (ktoe):

Total Final Consumption of Energy Sources – **67,555** (Line 29 "TFC" in Energy Balance-2009)
Losses – **3,452**(Line 28 inin Energy Balance-2009)
Non-energy use (NEU) – **4,269** (Line 57 in Energy Balance-2009) - Use of energy resources as raw materials, e.g.: natural gas for mineral fertilizes production, oil fuel as additive agent for roadway surface construction

Thus GFEC is equal TFC plus Losses minus NEU: 67,555+3,452-4,269=66,738

2. Transport consumption, as indicated in Article 3(4)(a) of Directive 2009/28/EC:

(a) for the calculation of the denominator, that is the total amount of energy consumed in transport for the purposes of the first subparagraph, only petrol, diesel, biofuels consumed in road and rail transport, and electricity shall be taken into account)

Supply and Consumption	Coal and peat	Crude Oil	Oil Products	Nat.gas	Nuclear	Hydro	Geotherm	Biofuels and waster	Electr	Heat	Total
Transport	25	-	8,255	3,329	-	-	-	-	786	-	12,396
Domestic aviation	-	-	2	-	-	-	-	-	-	-	2
Road	-	-	7,996	52	-	-	-	-	-	-	8,049
Rail	25	-	163	-	-	-	-	-	501	-	688
Pipeline transport	-	-	8	3,277	-	-	-	-	49	-	3,335
Domestic Navigation	-	-	38	-	-	-	-	-	-	-	38
Non-specified	1	-	48	-	-	-	-	-	236	-	285

Thus, the third line of Table 1: 7,996 + 163 + 501 + 48 + 236 = **8,944**

3. Electric energy consumption for transport needs for 2009 constituted 169.5**TW·h, or 14,577 ktoe (this is more then indicated in energy balance*, because more producers were taken into account), 786*ktoe were assigned for transport needs. Total 14,577- 786 = **13,791** (second line of Table 1)
4. Heat energy as total energy consumption minus electric energy and transport:

   66,738 – 13,791– 12,396 = **40,551** (first line of Table 1)
5. For the needs of 4th line in Table 1 "Gross final energy consumption" is equal to 40,551+13,791+8,944=**63,286** (difference in 1 in transport comes from rounding – figure 8,944 comes from adding required numbers when 8,943 – from subtracting add from a whole number)

References:
* Energy balance of Ukraine for 2009 www.ukrstat.gov.ua
**Fuel and energy resources of Ukraine. Statistics Data Book. State Statistics service of Ukraine, Kyiv, 2011