



## Development and Commercialization of Bioenergy Technologies in the Municipal Sector in Ukraine



### Project Progress Report 2015

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Kyiv 2016

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**Annotation**

Project Title	Development and Commercialization of Bioenergy Technologies in the Municipal Sector in Ukraine
Country	Ukraine
UNDP PIMS ID: GEF Project ID:	2921 4377
Reporting Period	January – December 2015 (12 months)
Donor	The Global Environment Facility (GEF)
Funding Source	GEF Trust Fund
Responsible Party	United Nations Development Programme
Implementing Partner(s)	United Nations Development Programme
Project ID (Atlas): Outputs ID (Atlas):	00074537 00086891
Project Start Date	24 June 2014
Project End Date	31 March 2018
GEF grant	4,700,000.00 USD
Co-financing	30,057,500.00 USD
2015 Annual Work Plan Budget	1,390,930.00 USD
2015 Annual Delivery	1,226,502.37 USD
Total project expenditures as of 31.12.2015 since the project start	1,262,812.08 USD
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## ***Purpose of the Report***

This report represents a narrative Annual Status Report of the project “Development and Commercialization of Bioenergy Technologies in the Municipal Sector in Ukraine”. This report is not mandatory within the UNDP-GEF project implementation framework, given the Annual Project Review/Project Implementation Reports (APR/PIR) combining both UNDP and GEF reporting formats is a key report under monitoring and evaluation requirements for this project prepared annually to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July).

Being supplementary progress report, it is aimed at providing more detailed description and analysis of the project implementation progress, results achieved, challenges encountered, lessons learned and outlook for the future. This report is structured using the donor reporting template applicable to projects that receive non-core resource contributions through third party cost sharing agreements.

## **Acronyms**

ATLAS	Corporate business platform of UNDP
AWP	Annual Work Plan
CO	Country Office
EE	Energy efficiency
FSM	Financial Support Mechanism
GEF	Global Environment Facility
IEA	International Energy Agency
NGO	Non-Governmental Organization
Mtoe	Million Tonnes of Oil Equivalent
tbd	to be determined
PIU	Project Implementation Unit
RED	Renewable Energy Directive 2009/28/EC
RES	Renewable Energy Sources
UN	United Nations
UNDP	United Nations Development Programme
USD	United States Dollars

## I. Executive summary

Ukraine has a significant renewable energy potential, deployment of which, apart from environmental benefits and important diversification of energy supply sources, would help towards immediate policy goals of reducing dependency on imported natural gas.

Biomass, mostly agricultural, will clearly be the main source of renewables in Ukraine in the nearest future, however, the fast transition to a more (than now) sustainable energy system is currently an unsurpassed challenge.

The present UNDP-GEF project aims to support a long term vision of the Government towards agricultural biomass utilization for municipal heat and hot water supply and create “a platform” for at least 7% replacement of fossil fuels by biomass resources in Ukraine’s municipal heat and hot water supply sector by 2030 (as envisaged by the Energy Strategy of Ukraine for the period until 2030).

The project start date was 24 June 2014, however, its actual implementation started in November 2014 after the inception phase was completed and the Inception workshop held.

Overall, by the end of 2015 the project is on-track with its Component 1, Component 4 and partially Component 3, related to improving market-oriented policy and legal/regulatory framework, conducting various outreach activities and implementing municipal biomass demonstration projects.

There are certain delays with the project’s Component 2 (biomass market development through support of the Biomass Support Unit) and partially Component 3 (Financial Support Mechanism – FSM) due to major institutional changes within the state executive bodies (ministries) and liquidation of the initially selected partner for the FSM development and implementation.

However, during 2015 the project has made a good progress in reviewing the legislation and suggesting necessary changes, setting partnerships, introducing biomass technologies in selected municipalities, and has laid basis for successful implementation of its four components. All pending issues are planned to be resolved by early 2016 to allow the project contribute to accelerating the deployment of biomass energy in the municipal sector in Ukraine.

## II. Background

### 2.1. Country context

#### Situation in energy sector

Covering more than a half of its energy demand through external supplies and having one of the world's most energy intensive economies, Ukraine makes persistent efforts towards energy conservation, improving energy efficiency in industry, supply- and demand-sides and wider use of renewable energy.

Energy saving tasks for all sectors of the economy and use of renewables have received particular priority in connection with recent political developments in 2014-2015 (armed conflict in eastern Ukraine and political tension with the Russian Federation) and continued since 2006 price growth (from approx. \$ 50/thousand m<sup>3</sup> in 2005 to \$ 485/thousand m<sup>3</sup> in April 2014, a ten-fold increase) for imported (mainly from Russia) natural gas, which accounts for three fourths of total Ukraine's gas consumption.

Ukraine as a member of the Energy Community (since 2011) is obliged to implement a number of European Union directives. Directive 2009/28/EC, the Renewable Energy Directive (RED), was to be implemented by Ukraine by January 1, 2014. The plan for the RED implementation was adopted by the Resolution of the Cabinet of Ministers of Ukraine "On the Action Plan for implementation of the European Parliament and Council Directive 2009/28/EC" (№ 791-p of 03.09.2014). One of the Resolution's points is connected with the sustainability requirements harmonization. This process, however, is not finished yet.

Currently Ukraine is trying to reduce its dependence on imports by diversifying suppliers (receiving gas from the neighbouring European countries – Hungary, Poland and Slovakia – through so-called "reverse flow"), switching to other energy sources (for example, the use of biomass) as well as increase its own production volumes. However, there is a number of legislative, financial and other barriers challenging and delaying the implementation of the energy security strategy and stimulating wider use of renewable energy, including from biomass sources.

In 2014 (the data by National Statistics Service of Ukraine released in December 2015) the country's Total Primary Energy Supply (TPES) of 105.7 million tons of oil equivalent (in 2012 TPES was 132.5 Mtoe, in 2013 – 115.9 Mtoe) was largely based on coal (33.7%), natural gas (31.6%), nuclear (22%) and oil (10.1%), with the remaining 2.6% supplied by renewable energy sources – biomass, hydro, solar, and wind power (in 2012 the share of renewables was 1.8%, in 2013 – about 2.7%). According to IEA as well as National Statistics data, bioenergy in Ukraine comprised the largest share of Total Primary Energy Supply (TPES) from renewable energy sources (RES) with about 1.9 Mtoe (59.3%) in 2013 and 73.5% in 2014. However, bioenergy still accounts for only about 1.6% of TPES in Ukraine.

Thus, while bioenergy is one of the most promising renewable energy sources in Ukraine, its productive use, notwithstanding the country's reputation as the "breadbasket" of Eastern Europe, remains very limited. By contrast, studies suggest that energy from biomass could provide at least six times more energy to Ukraine's energy mix which would bring the share of biomass in the supply up to as much as 7%-9% of the overall energy supply.

## Legal framework

As a long term vision, the priority for wider use of renewables (including biomass) is also emphasized in **The Energy Strategy of Ukraine for the period until 2030** (adopted in March 2006, updated in 2012-2013) – the leading strategic document in the energy sector. The Energy Strategy identifies goals and objectives of the state policy in the field of energy conservation and efficiency of energy resources utilization in the country; its implementation leads directly to a reduction in GHG emissions in Ukraine. The Energy Strategy also identifies quantitative targets to reduce energy intensity of GDP for the period up to 2030 and the directions of development, which are to ensure the achievement of these targets. In particular, this applies to:

- Accelerated deployment of renewable energy;
- The demand to bring, in a very short period of time (by 1 January 2018), powerful plants burning fossil fuels, in compliance with strict EU regulations on emissions of polluting substances (ash, NO<sub>x</sub> and SO<sub>2</sub>);
- Revision of the agreements with the Russian Federation concerning the conditions of import and transit through the territory of Ukraine for Russian gas, etc.
- Increase in domestic energy security;
- Cost reduction per unit of energy production and use, via the following measures: assuring efficient energy use, introducing energy-saving technologies, rationalising the structure of industry and reducing the share of energy-intensive technologies;
- Integration of Ukraine's energy system into the European energy system, with gradual growth of electricity exports; strengthen Ukraine's position as an oil and gas transit nation.

Other important legislative documents aimed at promoting biomass utilization include:

- **The Law of Ukraine “On alternative energy sources”** dtd 20.02.2003 № 555-IV updated in 2015) declares, that increased energy production from renewable energy sources should be one of the main principles of the state policy in Ukraine.
- **The National Renewable Energy Action Plan until 2020** (developed in accordance with the Renewable Energy Directive 2009/28/EC requirements), adopted by the Decree of the Cabinet of Ministers of Ukraine dated 01.10.2014 № 902-p., aims at boosting renewable energy consumption to 8.6 Mtoe by 2020. The main contribution of biomass is planned in the heating (cooling) sector with 5000 ktoe/yr in 2020 which will be 85% of contribution of all RES. In addition, by 2020 it is planned to install 950 MWe of biomass power equipment and to use 390 ktoe/yr of biofuels (bioethanol and biodiesel) for transport.
- **The Law of Ukraine “On Amending Certain Laws of Ukraine with respect to Securing Competitive Conditions for Generation of Electricity from Alternative Energy Sources”** dtd 04.06.2015 No. 514-VIII, has removed the local content requirements as a pre-condition for obtaining the Green Tariff, while keeping them as a stimulus: matching them would allow to surcharge the Green Tariff by 5% (localization of 30%) or 10% (localization of 50%). Moreover, the Law No.514 has changed the definition of the term “biomass” and aligns it with EU Directive 2009/28/EC with that both products and waste are considered as biomass for the purpose of qualifying for the feed-in tariff.

## Challenges for biomass usage in Ukraine

Although Ukraine is one of the six largest grain exporters of the world and a large producer and exporter of oilseeds, and sugar beets, and the total potential from forestry, energy crops and agricultural waste estimated at approximately 1000 petajoules (or over 870 petajoules according to other sources), the Ukrainian biomass-to-energy market is rather fragmented. There is a lack of established links in the market between players, which prevents it from smooth functioning.



### Biomass from forestry:

- Current forest industry is relatively small-scale.
- The Annual Allowable Cut ranged from 5.2 to 5.7 million m<sup>3</sup> of commercial wood last decade. This is expected to increase by 10-15% for the next decade.
- Annually only 0.9% of the total growing stock is harvested.
- Forest biomass is mainly available in the north and west of the country.
- The bulk of woody biomass (wood chips, trimmings) is mainly limited to self-usage at the wood-processing factories and used in the furniture industry or pelletized for export; hence, its availability for domestic market is very limited.

### Biomass from Agriculture:

- Agricultural biomass is wider available throughout the country (in the central, south eastern and southern regions), than woody biomass, and can be purchased at lower price (while woody biomass has a higher cost because of its value as pellets for export and transportation costs).
- Production of oilseed crops has increased considerably during last years;
- The estimated availability of land for energy crops is 4.7 million hectares of free land.
- Major part of the estimated biomass potential from agricultural waste is found in the central regions of Ukraine.

The present demand for bioenergy in Ukraine comes mainly from individual residences and private farms utilizing their own sources of biomass for producing heat/hot water required for their commercial processes. Apart from that, there is very little local commercial demand for agricultural biomass (due to unfavourable regulatory framework), except for sunflower residues (as opposed to woody biomass), including its utilization in the municipal sector for heat/hot water production. Hence, stimulation of the national agro-holdings to produce bioenergy based on their agricultural waste would make it possible to increase the supply of energy to villages and households within a given municipal area. Thus, the utilization of agricultural biomass for providing heat and hot water to the municipal sector would open up new business opportunities for agricultural enterprises with excess biomass resources that end up being left behind in the fields or in landfills.

### Key challenges for wide introduction of biomass technologies:

- Uncertain economy, lack of financing, bureaucracy and lack of regulatory base are major impediments to the growth of renewables energies in Ukraine.
- Technology is generally imported; this results in an increase of start-up costs.
- Capital is required for long term investment projects;
- A sustainable business model based on few biomass sources is required.
- Sustainable energy crops cultivation on different soils aimed at optimizing productivity whilst avoiding negative impact on environment and biodiversity is required.

## **2.2. Project genesis**

Since the biomass potential of Ukraine is considered as significant and the most robust segment of the market is municipal heat supply, the project idea for the promotion of biomass energy in the municipal sector has been developed and Project Identification Form (PIF) submitted to GEF in September 2010. After few re-submissions in 2011 the Project Preparation Grant amounted at 90,000.00 USD was granted in March 2012. The formulated full-sized project aimed at "Development and Commercialization of Bioenergy Technologies in the Municipal Sector of Ukraine" with the GEF-funded budget of 4,700,000 USD and committed co-financing for over 30,000,000 USD was approved by GEF in early 2014 and the project officially started on 24 June 2014.

The objective of UNDP/GEF “Development and Commercialization of Bioenergy Technologies in the Municipal Sector of Ukraine” Project is to accelerate sustainable agricultural biomass utilization for municipal heat and hot water services, which is expected to generate direct global benefits of 63,577 tons of CO<sub>2</sub> over 4 years period and 19,143 tons CO<sub>2</sub>/yr. thereafter in avoided greenhouse gas (GHG) emissions.

Following the engagement of the Project Manager in September 2014, the Project Inception Workshop was held on 19 November 2014 in Kyiv. The workshop was attended by the identified key partners and project stakeholders, including: representatives of the Ministry of Agrarian Policy and Food of Ukraine, Ministry of Regional Development, Construction, Housing and Utilities of Ukraine, Ministry of Ecology and Natural Resources of Ukraine; State Agency for Energy Efficiency and Energy Saving of Ukraine, Ukrainian Parliamentary Committee on Environmental Policy, Nature Use and Liquidation of Consequences of the Chernobyl accident, the Public Union "Bioenergy Association of Ukraine", as well as municipal governments, private institutions, academic and research institutions, community organizations, non-governmental organizations.

Thus, since November 2014 the actual implementation of the project has begun.

### **2.3. Project strategy**

The strategy of the Project is (i) to create an attractive and competitive business environment for wider biomass utilization and investments attraction; (ii) help optimize and simplify administrative procedures for developers of projects utilizing agricultural biomass; (iii) build capacities of the local banks to finance biomass projects, including establishment of dedicated credit lines at incentive (reduced) rates; and (iv) facilitate implementation of initial municipal biomass projects by assisting to put in place a fair and transparent project selection process, supporting subsequent negotiation and signature of licensing agreements and providing technical support and oversight throughout the construction and commissioning processes.

The project aims to achieve this by introducing a conducive regulatory framework and by establishing a financial support mechanism that together will facilitate private sector participation in utilizing agricultural biomass and production of energy crops to supply municipal heat and hot water services, by assisting the Government in attracting private sector funded investments in municipal biomass and by implementing a demonstration municipal biomass pilot projects in selected municipalities.

The project consists of four components (activities) as outlined below:

#### **COMPONENT (ACTIVITY) 1: Market-oriented policy and legal/regulatory framework.**

This activity aims to formulate and introduce a streamlined and comprehensive market-oriented policy and legal/regulatory framework (“macro level” activities) to promote municipal biomass for heat and hot water services in the country, which includes national/municipal targets for biomass energy for heating

#### **Planned actions/activities for 2015:**

1. Analyse Ukrainian legislation and regulation in force covering bioenergy technologies in the municipal sector and define key barriers, gaps and opportunities.
2. Promote changes and amendment to the current legislation to facilitate biomass use in the municipal heat and hot water supply.
3. Study energy crops cultivation in Ukraine identifying strengths and weaknesses for further development and growth.

**COMPONENT (ACTIVITY) 2:** Developing capacity within the Government to support development and implementation of municipal biomass programme through establishing a Biomass Support Unit.

This activity aims to support development and implementation of a municipal biomass programme and to formulate appropriate incentives to attract project developers.

**Planned actions/activities for 2015:**

1. Develop methodology for the economic/financial evaluation of municipal biomass systems for potential budgetary support.
2. Develop criteria and procedures for the introduction of a transparent process in the selection/award of municipal biomass projects for implementation.
3. Help establish and develop regulations for the Governmental Biomass Support Unit.
4. Organize study tour for Biomass Support unit staff to EU countries to study best practices of implementing bioenergy technologies in the municipal sector.

**COMPONENT (ACTIVITY) 3:** Financial Support Mechanism and Pilot Projects.

This activity is aimed to promote investments in municipal biomass through the establishment/strengthening of a Financial Support Mechanism (FSM) within financial institutions.

**Planned actions/activities for 2015:**

1. Analyse Ukrainian legislation and regulation covering specific aspects important for establishing a biomass financial support mechanism.
2. Engage necessary expertise to support establishing of a biomass financial support mechanism.
3. Conduct assessment of the biomass boilers market and biomass pellets market in Ukraine (identification of the growing points).
4. Develop model business plans for utilization of biomass in the municipal sector
5. Start implementation of the pilot projects (conduct feasibility studies for biomass boilers installation, procure, supply and install biomass-fired boilers).

**COMPONENT (ACTIVITY) 4:** Outreach programme and dissemination of project experience/best practices.

This activity is to formulate an outreach programme and document/disseminate project experience/best practices/lessons learned for replication within the country (and in the region).

**Planned actions/activities for 2015:**

1. Develop National plan for implementing outreach/promotional activities to support biomass projects targeting domestic (and international) investors.
2. Develop Municipal Biomass Guide with detailed step-by-step approach for implementing municipal biomass programmes.
3. Document the best practices of bioenergy technologies use in the municipal sector of Ukraine available at the beginning of 2015.

### III. Progress Review

#### ***3.1. Formulating a streamlined and comprehensive market-oriented policy and legal/regulatory framework to promote municipal biomass for heat and hot water services***

**Promoting changes and amendments to the Ukrainian legislation and regulation in force covering bioenergy technologies in the municipal sector to facilitate biomass use in the municipal heat and hot water supply.**

The envisaged growth in biomass consumption cannot be reached without streamlined regulation and strong support to broad involvement of agricultural residues and energy crops to energy balance, as the potential of other biomass such as wood biomass types, biogas from landfills and manure is not enough to reach the targets. At the same time, there is a certain imbalance in state policy support of agricultural biomass use and targeted biomass energy share.

The process of legal/regulatory framework review and formulating a streamlined and comprehensive market-oriented policy has started by the project in 2015. A pool of Ukrainian laws/regulatory acts that require amendments in order to focus on the bioenergy technologies utilization has been identified, including:

- The Budget Code of Ukraine;
- The Law of Ukraine «On energy saving» (dtd 01.07.1994 № 74/94-BP, latest revision 09.05.2015);
- The Law of Ukraine «On heat supply» (dtd 02.06.2005 № 2633-IV, latest revision 01.01.2016);
- The Law of Ukraine «On alternative energy sources» (dtd 20.02.2003 № 555-IV, latest revision 16.07.2015);
- The Law of Ukraine «On introducing new investment opportunities, guaranteeing rights and legal interests of businesses entities for conducting large-scale energy modernization» (dtd 09.04.2015 № 327-VIII);
- The Law of Ukraine «On housing and communal services» (dtd 24.06.2004 № 1875-IV, latest revision 01.01.2016);
- The Law of Ukraine «On the priority of social development of villages (rural areas) and agricultural sector in the national economy» (dtd 17.10.1990 № 400-XII latest revision 01.01.2015);
- Decree of the Cabinet of Ministers of Ukraine «On approval of Energy Strategy of Ukraine for the period until 2030» (last update 24.07.2013);
- Decree of the Cabinet of Ministers of Ukraine «On the National Renewable Energy Action Plan until 2020» (dtd 01.10.2014 № 902-p).

A team of 12 experts to draft changes/amendments to the selected current legislation to support utilization of bioenergy technologies for heat and hot water supply in the municipal sector (8 laws under review) has been formed and engaged by the project in cooperation with the Ministry of Regional Development, Construction, Housing and Communal Services and State Agency on Energy Efficiency and Energy Saving of Ukraine.

The following key changes were suggested by the project experts' team to the above mentioned legislation:

- Proposed changes to the Budget Code of Ukraine:

- Secured allocations for repayment of the loan taken for purchase of any energy generating equipment (except gas-fired) or partial reimbursement of the loan taken for purchase of energy efficient equipment and/or materials for implementation of energy saving measures.
- Reinvesting of savings from energy efficiency measures performed in municipal (public, budget funded) institutions into further EE projects in public institutions.
- Extended list of local budgets' expenses for implementing renewable energy and alternative fuels projects.
- Provision of budget subsidies (subventions) to local budgets for implementing energy saving technologies in public institutions.
- Proposed changes to the Law of Ukraine «On heat supply»:
  - Giving authority to the Government to set and revise minimum share of renewable energy in gross final energy consumption.
  - Introduction of long-term contracts (up to 5 years) for heat supply to public (budget funded) institutions for the heat generated through renewable and alternative sources.
  - Fixing energy tariffs under energy performance contracts for the heat generated through renewable and alternative sources (subject to inflation adjustment).
- Proposed changes to the Law of Ukraine «On energy saving»:
  - Mandatory metering and regulation of energy consumption.
  - Mandatory recording of energy consumption (supply) data obtained through metering;
  - Promotion of bioenergy technologies for heat and hot water supply.
  - Introduction of long-term contracts for heat supply.
  - Tax incentives for renewable energy equipment manufacturers and users.
  - Prioritizing loans for purchase of energy saving equipment.
  - Setting the margin for renewable heat energy rates at no less than 25%.
- Proposed changes to the Law of Ukraine «On alternative energy sources»:
  - Possibility to sign an energy performance contract with the purpose of energy and/or cost savings and/or reducing energy/utility bills.
- Proposed changes to the Law of Ukraine «On housing and communal services»:
  - Referring to the principles of state regulation of prices / tariffs for housing and communal services – enabling the intended use and return of investments attracted to implement projects replacing fossil energy with alternative/renewable energy sources.
- Proposed changes to the Law of Ukraine «On the priority of social development of villages (rural areas) and agricultural sector in the national economy»:
  - Investment support to the development of alternative energy from solid biomass and effective economic support to introduction of bioenergy technologies in agro-industry.
  - Funding of measures promoting production of alternative solid fuels from biomass.
  - Establishing material and technical facilities for production of alternative solid fuels from biomass.
- Proposed changes to the «Energy Strategy of Ukraine for the period until 2030»:
  - Prioritize the development of municipal biomass heating systems.
  - Expand the resource potential for heat energy generation.
  - Identify the alternative energy sources (biomass) potential for heat energy generation.
  - Create favorable environment for boosting bioenergy technologies use in heat and hot water supply.
- Proposed changes to the «National Renewable Energy Action Plan until 2020»:
  - Stimulate the increase of renewable heat energy production.
  - Expand the resource potential for heat energy generation from biomass.

The proposed changes were discussed during the working meeting held on 29 September 2015 with the representatives of the Ministry of Regional Development, Construction, Housing and Communal Services, State Agency on Energy Efficiency and Energy Saving of Ukraine, Ministry of Agrarian Policy and Food of Ukraine, Ministry of Ecology and Natural Resources of Ukraine.

On 12 October 2015 drafts of the above amended regulatory legal acts have been officially submitted to the central executive bodies of Ukraine for review, comments and feedback.

### **Assessing energy crops cultivation in Ukraine. identifying strengths and weaknesses for further development and growth**

A comprehensive study analyzing the potential of energy crops cultivation in Ukraine to provide a sustainable biomass feedstock for bioenergy industry was conducted by the project, including the Analytical report and recommendations compiled (discussed during the Project Board Meeting on 16 June 2015, Minutes of the Project Board Meeting available in Annex 1 hereto). This is required to support the implementation of dedicated energy crops cultivation and subsequent production of biomass, as there is currently no governing law on the matter.

Dedicated energy crops have the potential to supply a sustainable biomass feedstock to support the intended wider bioenergy utilization in Ukraine, subject to removing existing legislative, technical and economic barriers. For example, some cultures (as energy willow) are not registered in Ukraine as cultivated agricultural crops that constitute a barrier for their wide utilization.

In many countries, a major constraint for promoting energy crops has been the availability of land for establishing energy crops. However, in Ukraine the estimated availability of poor quality agricultural land suitable for energy crops is about 4.7 million hectares of free land. Growing 1 million hectares of energy crops with average annual yields of 11.5 million tons can potentially replace up to 5.5 billion cubic meters of natural gas per year. Thus, using 4 million hectares of marginal land to grow energy willow, poplar, miscanthus and other crops could allow replacing of over 20 billion cubic meters of natural gas annually.

Based on the Study recommendation, 6 pilot oblasts (Ivano-Frankivsk, Zakarpattia, Poltava, Dnipropetrovsk, Volyn' and Zhytomyr) in Ukraine were selected for establishment of mother plantations (nurseries) of energy willow.

Other recommendations included:

- improvement of regulatory framework by creating national and local energy efficiency programs and transition to alternative energy sources;
- establishing energy willow plantations (nurseries) in all oblasts of Ukraine that allows plants to acclimatize in Ukraine and will create basis for future municipal and private farms;
- take necessary actions to reduce production costs of biomass.

### **Roadmap for bioenergy development and regional programs for sustainable use of agricultural biomass**

As awareness is growing of the urgent need to turn political statements and analytical work into concrete actions, the project has developed a biomass energy roadmap and organized public discussion to present it along with other renewable energy roadmaps for Ukraine on 03 October 2015 in Kyiv.

The discussion was attended by representatives of the State Agency for Energy Efficiency and Energy Saving of Ukraine, the Institute of Renewable Energy of the National Academy of Sciences of Ukraine, the Association of Renewable Energy of Ukraine, the Association of thermal power companies of Ukraine, the Ukrainian public organization "Ukrainian Wind Energy Association", the Ukrainian public organization "Association "Ukrhydroenergo", the Association of alternative fuels and renewable energy of Ukraine, the Ukrainian Association of alternative transport fuels "Ukrbiopalyvo", the Institute of Technical Thermal Physics of the

National Academy of Sciences of Ukraine, the state enterprise “MASMA”, the Ukrainian Association of alternative solid fuels, the state enterprise “Ukrspirit”, the Association “Ukrainian Association for renewable energy”.



During the discussion, participants presented drafts of renewable energy roadmaps supporting implementation of the National Renewable Energy Action Plan until 2020. The roadmaps have been developed and presented by UNDP/GEF Project "Development and commercialization market of bioenergy technologies in the municipal sector in Ukraine" together with the Institute of Renewable Energy of the National Academy of Sciences of Ukraine and supported by the State Agency for Energy Efficiency and Energy Saving of Ukraine.

In particular, the biomass energy roadmap provides an important and authoritative perspective on the opportunities and challenges of the bioenergy development in Ukraine. It specifies solutions and actions needed today to accelerate a transition to a sustainable future and to help reach the National Renewable Energy Action Plan's targets. Political will, targeted programmes, extensive (and intensive) investments, and continuous innovation are required, both to modernize traditional energy uses and to enhance the innovation and deployment of new technologies and create a sustainable biomass supply chain.

By identifying the steps needed to accelerate the implementation of bioenergy technology, the bioenergy roadmap along with the other similar documents related to renewables will help the government, industry and businesses to make the right choices.

As the outcome of the discussion, the structure of the roadmaps was approved and the Renewable Energy Association were tasked to provide their feedback and suggestions for the regulation required to support the implementation of the National Renewable Energy Action Plan until 2020.

The project has also launched the development of regional programmes for sustainable use of agricultural biomass for heat and hot water supply in Poltava, Zakarpattia and Ivano-Frankivsk oblasts and has established strong partnerships with the National Ecological-Naturalistic Center, Zhytomyr National Agro-Ecological University and all-Ukrainian NGO “All-Ukrainian Ecological League”



### **3.2. Developing capacity within the Government to support development and implementation of municipal biomass programme through establishing a Biomass Support Unit**

#### **Establishing a Biomass Support Unit**

In line with the Project strategy outlined in the Project Document, the project was to develop capacity within the Ministry of Agrarian Policy and Food of Ukraine to support development and implementation of a municipal biomass programme through the establishment of a Biomass Support Unit.

Project's updated vision for the establishment of an Interagency Biomass Working Group (involving few key state executive bodies, i.e. the Ministry of Agrarian Policy and Food of Ukraine and the Ministry of Regional Development, Construction, Housing and Communal Services) instead of the Biomass Support Unit under the Ministry of Agrarian Policy and Food was presented and discussed during the First Project Board meeting held on 16 June 2015. As the biomass utilization issues are now within the authority of the Ministry of Regional Development, Construction, Housing and Communal Services, more consultations and expert support are required, according to the deputy Minister of Regional Development, Construction, Housing and Communal Services of Ukraine, to take the decision. Therefore establishment of the Biomass Working Group has been postponed until further discussions with the Ministry of Regional Development, Construction, Housing and Communal Services and other project partners.

#### **Study tour to EU countries to study best practices of implementing bioenergy technologies in the municipal sector**

Study tour to Sweden was organized on 21-27 June 2015 for high-level authorities (Central and local government officials, members of the Parliament) and bioenergy professionals to familiarize with the best practices of biomass utilization for heat and hot water supply in the municipal sector and the advanced experience of energy crops cultivation.

To find out what was the reason behind Sweden's huge success in utilization of



alternative energy technologies, the study tour participants discussed lawmaking issues in bioenergy technologies sector with representatives of the Ministry of Environment and Energy of Sweden, Ministry of Foreign Affairs of Sweden and Swedish Energy Agency.

Municipal delegates presented locally adopted measures and arrangements, while Swedish business community shared experience of running Clean-Tech companies. The delegates visited the municipal 100-megawatt bio-power

plant Örtoftaverket, fueled exclusively by wood waste and energy crops biomass; got



acquainted with the environment-friendly technology of litter-burning at the Tekniska Verken plant in Linköping; and visited energy willow plantations near Uppsala and Svalöv.

The vivid example of Sweden has shown practical side of the bioenergy promotion efforts which UNDP-GEF project is now actively pursuing in cooperation with the Government of Ukraine.

### ***3.3. Establishment of a Financial Support Mechanism and Implementation of Pilot Projects***

#### **Establishment of a Financial Support Mechanism**

To address the existing barriers the project envisages establishment and strengthening of a Financial Support Mechanism under component 3 that would enable financial incentivization of investment in agricultural biomass projects, as such projects are typically more expensive than those involving the traditional methods of energy generation, and they are in some cases also considered to be riskier investments due to technology or resource uncertainties.

Moreover, access to credits for project developers and farmers/producers is very limited in Ukraine. Ukrainian credit market is characterised by high interest rates and constrained access to credit. Raising long- and medium-term loans on the domestic market is yet limited because of high interest rates (fluctuating around 23-25% in the national currency) of Ukrainian commercial banks. Access to financial resources is also complicated because of limited possibilities to use mortgage both by municipal institutions (facilities) and agricultural enterprises.

Originally, the Project Document envisaged a financial support mechanism (FSM) being established within DerzhZem bank. However, Government reforms in 2014 in Ukraine mean that this is no longer possible (as on 12 September 2014 the Cabinet of Ministers of Ukraine took the decision to liquidate the DerzhZem bank) and that a new partner needs to be chosen by UNDP project to establish and implement the financial support mechanism.

Since the operating procedures of UNDP meant that UNDP could not directly manage a financial support mechanism, in 2015 the project was looking for a new partner to re-design the financial support mechanism. This work involved reviewing international best practice on financial support mechanisms for renewable energy, including in Ukraine, identifying and selecting a partner (financial institution) to develop and launch the financial support mechanism. As an outcome of the consultations and analysis, the negotiations have started with the International Finance Corporation (IFC) office in Ukraine to involve it as the FSM development and implementation partner.

#### **Implementation of municipal biomass pilot projects**

Promotion of biomass utilization for municipal use is another important task of the project. Based on a thorough analysis, the regions of Ukraine were reviewed, selected and approved by the Project Board for the development of regional programs on biomass utilization for heat and hot water supply, including:

a) six oblasts (Ivano-Frankivsk, Zakarpattia, Poltava, Dnipropetrovsk, Volyn' and Zhytomyr) were selected and approved by the Project board as pilot sites for the development of regional programs on biomass utilization for heat and hot water supply, with a focus on energy willow cultivation (establishment of willow plantations/nurseries);

b) three oblasts (Cherkasy, Zhytomyr and Kyiv) were selected as pilot sites for technical demonstration projects (straw pellets fired boilers installation).

During 2015 the Partnership Memoranda were signed with Uman' municipality, Zhytomyr municipality, Poltava oblast council, Ivano-Frankivsk oblast council and Zakarpattia oblast council to support the introduction of bioenergy technologies in the municipal heat and hot water supply aiming at improving energy efficiency, sustainability and energy management in municipal housing and communal sector.

Municipal and oblast partners are committed to support the development of bioenergy technologies and related small business in their cities, provide consultative and advisory assistance, involve the public to the implementation of pilot projects and provide additional financial and other resources, as might be required.

After having the Partnership Memoranda signed, the project has started implementation of 10 demonstration project in the selected municipalities. Seven projects involving installation of biomass (straw pellets) fired boilers were completed during 2015 in the selected municipalities – 3 projects in Uman' and 4 projects in Zhytomyr.

In Uman' the biomass fired boilers were installed in two schools (# 9 and #12) and one kindergarten (#21) providing heating for over 900 children and saving over 700,000 Hryvnya (roughly 30,000 USD) on heating bills annually. The money saved this year will be used for installing energy-efficient windows in the kindergarten. Both straw pellets and boilers are produced by an Uman-based company; assisting the struggling local economy and creating badly needed jobs for the town. Uman' municipality plans to allocate future year savings for further energy-efficient initiatives engaging more schools and kindergartens in the eco-virtuous circle.



In Zhytomyr the automatic biomass fired boilers were installed at school #1, kindergarten #10 and at the Zhytomyr national agro-ecological university. As the reduction of natural gas consumption and its replacement with renewables is among the top priorities of Zhytomyr municipality, this experience seems to be very promising in view of

developing a sustainable biomass supply chain in Zhytomyr oblast.

### ***3.4. Outreach programme and dissemination of project experience/best practices***

The awareness among decision makers, municipal officials, farmers/agricultural companies can make a huge difference for the progress in biomass energy deployment. Therefore the project envisages strong outreach programme to improve the awareness among the targeted groups as well as the general public.

In 2015 the project has started development of the National plan for implementing outreach/promotional activities to support biomass projects targeting domestic (and

international) investors and launched the development of the Municipal Biomass Guide with detailed step-by-step approach for implementing municipal biomass programmes. This work is to be completed by early 2016 to provide a strong basis for the project's outreach programme.

During 10-13 November 2015 the project organized Renewable Energy Days within VII International Investment Business Forum on Energy Efficiency and Renewable Energy and International exhibition "Energy efficiency. Renewable energy - 2015" held in Kyiv.

The project presented its concept and tasks, as well as first results achieved, as well as took an active part in the discussions on available financial instruments to boost energy efficiency, initiatives in the buildings sector, energy management in the municipal sector and renewable energy deployment in Ukraine. During the 2<sup>nd</sup> day of the Forum the project presented the proposed changes to the Ukrainian legislation aimed at promoting biomass utilization for municipal heat and hot water supply.

### ***3.5. Project implementation and adaptive management in 2015***

In view of the recent (2014-2015) socio-economic and political transformations in Ukraine, the national context has changed, affecting project design and presenting new challenges for project implementation.

In particular, it concerns development and implementation of a Financial Support Mechanism under the project Component 3 and establishment of a Biomass Support Unit under the project Component 2. The adaptive management practices were used by the project to proceed with the implementation of these important components.

Implementation of an initial concept of the Financial Support Mechanism as designed in the Project Document has been no longer possible due to recent Government reform. Therefore the project is now cooperating with the IFC to engage this reputable institution in the development and implementation of the Financial Support Mechanism.

The Ministry of Agrarian Policy and Food of Ukraine has now limited authority to lead and manage a Biomass Support Unit, so the project will support the establishment of an Interagency Biomass Working Group under the possible leadership of the Ministry of Regional Development, Construction, Housing and Utilities of Ukraine.

## **IV. Conclusions and way forward**

Despite the extremely challenging political and economic transformations in Ukraine and in view of the forthcoming significant reduction of the state budget expenses for energy subsidies and local programmes, the role biomass (especially locally produced) as an energy source for municipal heat and hot water supply becomes even more significant.

Recent regulatory framework changes require even more thorough and vast (vs. initially planned) expertise that project effectively engages by forming a task force of experts for reviewing and formulating amendments to legislation, development of the market-oriented regulation and instruments to promote bioenergy utilization.

In 2016 the project will proceed with pursuing the proposed changes to the legislative/regulatory framework, establishing of a Financial Support Mechanism, analysis of the Ukrainian biomass pellets and boilers markets, establishing of energy willow nurseries in the selected regions and conducting the biomass awareness campaign, including trainings and toolkits for the targeted groups.

## **V. Annexes**

***Annex 1. Minutes of the Project Board Meeting dtd 16.06.2015***

***Annex 2. Minutes of the Project Board Meeting dtd 05.02.2016***