United Nations Development Programme

Country: Ukraine

PROJECT DOCUMENT

Project Title: Development and Commercialization of Bioenergy Technologies in the Municipal Sector in Ukraine

UNDAF Outcome(s): #2 – Reduced energy, resource and carbon intensity of economy through the application of energy efficient technologies, renewable and alternative sources of energy.

UNDP Strategic Plan Environment and Sustainable Development Primary Outcome: Mainstreaming environment and energy.

UNDP Strategic Plan Secondary Outcome: Mobilising environmental finance.

Expected CP Outcome(s): Policy frameworks and mechanisms adopted to ensure reversal of environmental degradation, climate change mitigation and adaptation, and prevention and response to natural and man-made disasters.

Expected CPAP Output(s): Output 6: National and local capacities for climate change resilient policies and practices enhanced.

Executing Entity/Implementing Partner: United Nations Development Programme

Implementing Entity/Responsible Partners: United Nations Development Programme.

Brief Description: The objective of this project is to accelerate sustainable agricultural biomass utilisation for municipal heat and hot water services in Ukraine by leveraging over $ 22 million in private sector investment over its four-year implementation period. This, in turn, is expected to generate direct global benefits of 63,577 tons of CO_2 over the same period and 19,143 tons CO_2/yr thereafter in avoided greenhouse gas (GHG) emissions. When one looks at the 20 year lifetime of the boilers earmarked for development during the project period, these boilers will have generated 1,618,834 MWhTH, with a combined amount of CO2 reduced of 361,000 tons, equivalent to $13 of GEF funds per tCO2. The project will achieve this target by introducing a conducive regulatory framework and by establishing a financial support mechanism that together will facilitate private sector participation in utilising agricultural biomass to supply municipal heat and hot water services and assist the Government in closing private sector funded investments in municipal biomass. It is envisaged that this project will enable Ukraine to substantially move closer to its target of having some 7% of the country's annual primary energy requirements for heating and hot water services supplied by biomass by 2030, as outlined in the "Energy Strategy of Ukraine to 2030".

Programme Period:	2011-2015
Atlas Award ID:	74537
Project ID:	86891
PIMS #	2921
Start date:	June 2014
End Date:	March 2018
Management Arrangements:	DIM
PAC Meeting Date:	_____

Total resources required	US$ 34,757,500
Total allocated resources:	US$ 34,757,500
• UNDP	US$ 900,000
• Other:	
○ GEF	US$ 4,700,000
○ Government	US$ 3,270,000
○ Private sector	US$ 20,750,000
○ Municipalities	US$ 5,137,500

Agreed by (Executing Entity/Implementing Partner): _____

Date/Month/Year

Agreed by (UNDP): _____

Date/Month/Year 24/6/2014

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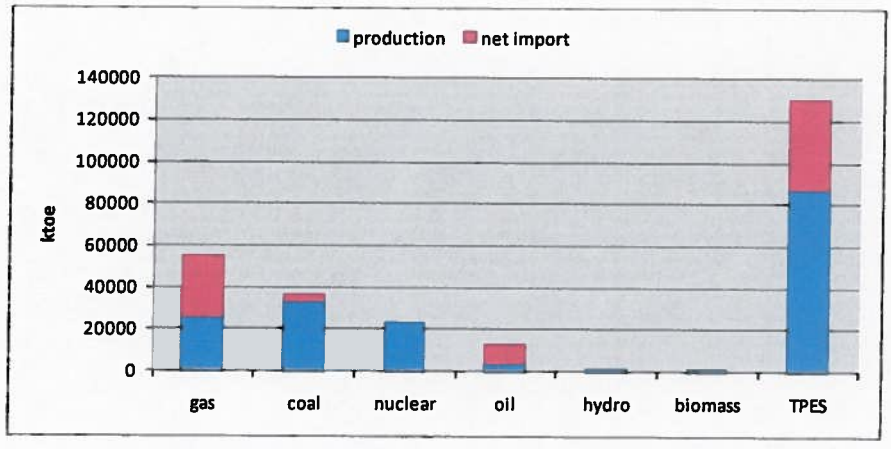
LIST OF ACRONYMS

APR	Annual Project Review
BTOR	Back-to-Office Report
CHP	Combined Heat and Power plant
CO	UNDP Country Office
CO_2	Carbon dioxide
DAER	State Agency on Energy Efficiency and Energy Savings of Ukraine
EE	Energy Efficiency
EU	European Union
GEF	Global Environment Facility
GHG	Greenhouse Gas
kW_{TH}	Kilowatt Thermal
kWh_{TH}	Kilowatt-hour Thermal
M&E	Monitoring and Evaluation
MAPF	Ministry of Agrarian Policy and Food of Ukraine
MRDCHCS	Ministry of Regional Development, Construction, Housing and Communal Services
Mtoe	Million tons of oil equivalent
MW_{TH}	Megawatt Thermal
MWH_{TH}	Megawatt-hour Thermal
NGO	Non-Governmental Organization
QPR	Quarterly Progress Report
PIF	Project Identification Form
PIR	Project Implementation Review
PMU	Project Management Unit
PPG	Project Preparation Grant
RCU	UNDP Regional Coordination Unit
RTA	UNDP Regional Technical Adviser
toe	Tons of oil equivalent
TPR	Tripartite Review
TTR	Terminal Tripartite Review
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change

1. SITUATION ANALYSIS

The need for energy independence has recently become a cornerstone of Ukrainian domestic and foreign policy; consequently, its energy policy is being developed in such a manner so as to help support it in moving in this direction. In 2011, for example, the country's primary energy supply of 130 million tons of oil equivalent (Mtoe) (Fig. 1) was largely based on natural gas (43%), coal (28%), nuclear (18%) and oil (10%). Even though domestic production covered a substantial share of its energy needs, Ukraine still had to import some 33% of energy resources (amounting to approx. 43 Mtoe), primarily natural gas and oil. This had and continues to have the net effect of putting an ever increasing burden on the national economy due to increasing energy prices and poses a threat to national energy security. Renewable sources of energy, including large hydro and biomass, represent even today a tiny 1.6% fraction of the total energy supplied in the country. However, strong support for renewable energy has become an integral part of the Ukrainian energy strategy aimed at enabling the country to diversify and secure its energy supply.

Fig. 1: Ukraine's primary energy supply, 2011



Source: National Statistics Service of Ukraine, 2012

Bioenergy is one of the most promising renewable energy sources in Ukraine. However, its productive use, notwithstanding the country's reputation as the "breadbasket" of Eastern Europe, remains very limited and of all the current on-going and new initiatives in the area of biomass in Ukraine, none of them specifically targets biomass in the municipal sector and none of them is aimed at developing municipal programmes on biomass. As of mid-2011, there was no national programme led by a single Government Agency aimed at developing municipal biomass energy projects. Some 44 projects have been approved to date for the green tariff in Ukraine dealing with electricity generation; yet, there are no regional administrations in Ukraine with large scale municipal programmes to promote the utilisation of biomass energy for heat and hot water. The absence of a robust national demand for energy from biomass results in most biomass pellets being exported to Western Europe and the lack of local authorities or regional administrations promoting biomass energy projects means that the energy production from biomass is much lower than it could be. At present, energy production from bioenergy sources is about 38 PJ/yr (or 10.6 TWh, heat only) that corresponds to 0.65% (0.76 mill toe, or 1.1 mill tce – "coal equivalent") of the total primary energy supply - mainly firewood for domestic purposes as well as for fuel in forestry and wood processing enterprises. This contrasts the 54.6 GW electricity generation capacity in the country which consists of 67% thermal, 24 % nuclear and almost 9 % hydro.

Some studies have suggested that biomass energy could provide at least six times more and potentially ten times more energy to Ukraine's energy mix, which would bring the share of biomass in the supply up to as much as 6% of the overall energy supply. The Institute of Engineering Thermodynamics of the

National Academy of Sciences of Ukraine in Kyiv has, for example, suggested that biomass in Ukraine could satisfy as much as 9% of the country's primary energy use. In 2010, there were in the country some 71 manufacturers of pellets and an equal number of manufacturers of briquettes from biomass (Source: Scientific Engineering Centre "Biomass", 2010). The share of wood pellets constitutes only 30 – 35% of total production; the rest is produced from sunflower husk and other agricultural residues. Some of the main pellet/briquette producers are Karpat Pellets Ltd. (Zakarpatsky Region), Forest Ukraine Ltd. (Kyiv Region), Barlinek Invest Ltd. (Vinnitsia Region) and Ecobioprom Ltd. (Chernigiv Region).
Both briquettes and pellets can be produced from the same raw materials (husks, stems, groundnut shells, bagasse, grass, wood, etc.) and have similar heating values. The difference lies in their size and density – briquettes are larger and more brittle than pellets, as the latter are produced under higher pressures and, therefore, are more compact and less prone to damage during transportation. Both biomass briquettes and pellets can serve as a substitute to the baseline conventional fuels like gas and coal presently used for residential/communal heating and co-firing at power plants.

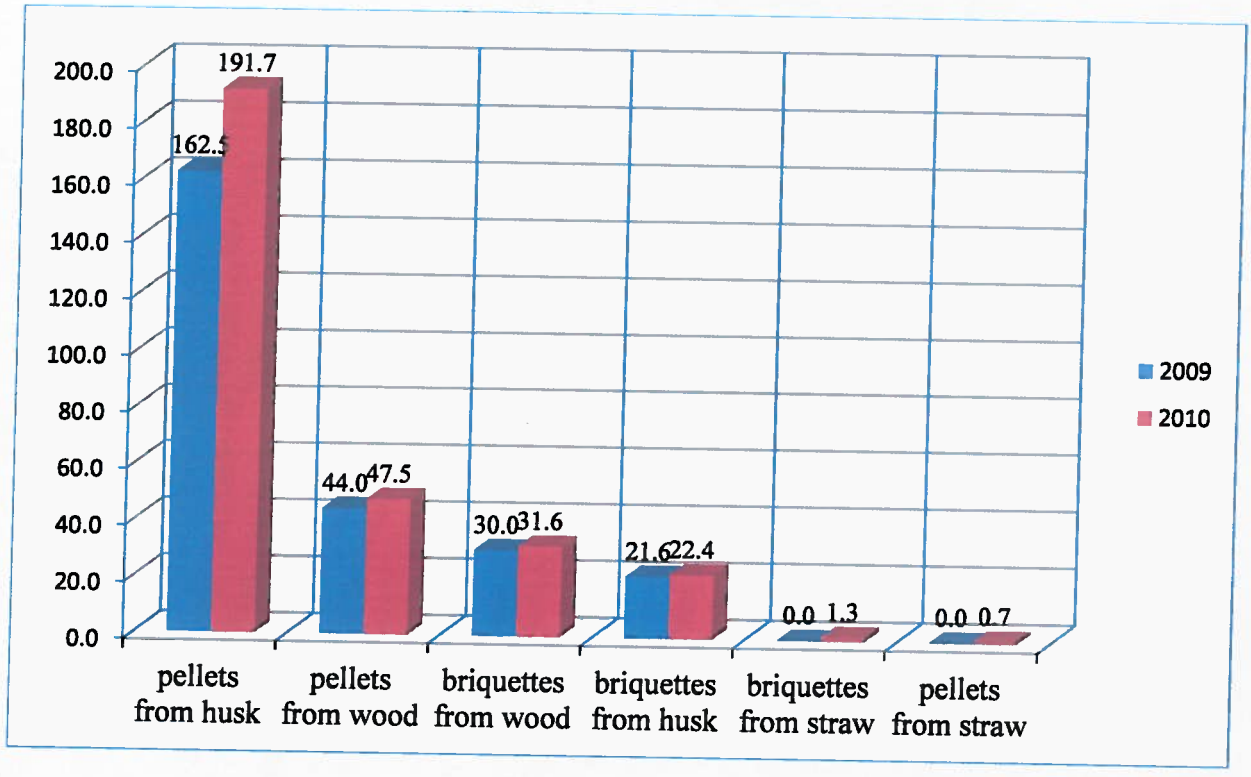
Table 1: Annual Economic Energy Potential of Biomass in Ukraine

Type of biomass	Economic Potential, mill. tce
Straw of cereal crops	4.13
Energy crops (willow, poplar, miscanthus, etc.)	13.3
Stems and ears of maize for grain	8.59
Stems, husk of sunflower	6.54
Biogas from manure	0.35
Sewage gas	0.09
Landfill gas	0.26
Wood waste	1.87
Liquid fuels from biomass	2.71
Peat	0.4
TOTAL	38.24

Source: Geletukha, G.G. et al, 2011.

The annual economic energy potential of biomass in Ukraine is presented in Table 1. The major constituent of the potential is agricultural residues of different types – up to 32.56 mill tce/year, representing 85% of the total biomass availability for energy purposes. The figure reflects a slightly conservative estimate: while assessing the economic biomass energy potential, it was assumed that only 50% of the total amount of straw could be used for energy purposes. In practice this percentage may be much higher, up to as much as 60% (e.g. Denmark). Hence, the availability of biomass for energy purposes in Ukraine is not an issue; however, the challenge is to create the necessary environment so that this huge potential can be tapped to reduce the country's reliance on fossil fuels and, consequently, reduce GHG emissions. Still, during implementation, the project will work with other partners to ensure that any problem arising in the biomass supply chain from harvesting and up to delivery to the points of use is promptly addressed.

Fig. 2: Production of solid biofuels in 2009 and 2010 (in thousand tons)



Source: M. S. Gabrel. Production of Solid Biofuel in Ukraine: Current State and Perspectives for Development, *Naukoviy Visnyk NLTU Ukrainy,* 2011, Issue 21.9. pp. 126-131

Pellet and briquette production in Ukraine in 2009 and 2010 were 263,200 and 290,000 tons, respectively (Fig. 2). The bulk of the production was from sunflower husk. Of the total production, the domestic market consumed 28,400 tons, representing, as per the "Energy Balance of Ukraine for 2011", 1.24% of the total primary energy supply. According to the Association of Alternative Fuels and Energy Market Participants (APEU), some 90% of the total production is exported to European countries. However, with regard to straw, its contribution towards the share of pellets and briquettes production in 2010 was a mere 2,000 tons (mainly for domestic consumption, as overseas clients have a preference for pellets/briquettes from sunflower husk), whereas a staggering 20 million tons remained unutilised, representing some 16 million tons of biofuel, equivalent to 4 million tce (Source: Fuel Alternative). It is this resource that the project will target. In addition, some 1.5 million tons of sunflower husks remain unutilised. In the local Ukrainian market, the main pellet consumers are wood-processing plants, food and agro-processing factories and, boilers at individual municipal buildings (schools, hospitals, sanatoriums, etc. – an indicative list of some boilers is provided in Annex 4), while briquettes are mainly used for heating private homes.

Currently, some 150 pellet/briquette plants (a list of some major producers is provided in Annex 5) annually produce approx. 240,000 tons of pellets/briquettes (Source: Kuznetsova, A. et. al., German-Ukrainian Dialogue, Sept. 2012) for both the local market (10%) and export (90%), the low consumption in the local market being attributed to low domestic prices. In 2009 and 2010, this production was lower and is attributed to "unfavourable external conditions" – read, reduced external demand a somewhat lower production compared to 2009 and 2010 and this is attributed to "unfavourable external conditions" (Source: IEA Bioenergy, December 2011). Some 20 million tons of straw remain unutilised, in addition to substantial amounts of other agricultural biomass. While a reduction in pellet export has been noted

over the recent years (e.g. 20% in 2011), it is observed that the Ukrainian market has picked up the slack. The price per ton in Ukraine varies between $ 80 and $ 200, depending on the raw material used and transportation costs. A higher low-end price would make it attractive to pellet/briquette manufacturers to target the local market as well. For this to happen, a favourable regulatory framework is required.

Forests cover only some 16% of the Ukrainian territory, mainly in the western and north-western regions, but a significant portion of the forest areas is off-limits to economic activity in order to preserve biodiversity and manage soil erosion. Hence, its supply for energy purposes is limited to self-usage at the wood-processing factories (several of which have closed in recent years to reduce pressure on the forests), high demand from the furniture industry and for producing pellets, again, for export. In any case, even if all the woody biomass were available for energy purposes, its share in the biomass energy mix (as can be computed from data in Table 1 above) would have been a mere 5%; the share of biogas, sewage gas and landfill gas combined would have been a tiny 1.8%.

The Biomass Action Plan (BAP, September 2009), formulated within the context of a Dutch-Ukrainian Government to Government Project on Biomass, comes to similar conclusions regarding the "potential of biomass available for energy production". It further states that "The main components of the potential are agricultural residues and energy crops". As per Table 1 above, the availability ratio of agricultural biomass (straw, willow, poplar, stems, ears of husk of corn and sunflower) to woody biomass is 17 to 1, making the former widely available throughout the country. This is no surprise as agricultural biomass has a much shorter growing time of 70 days, whereas woody biomass requires some 5 years before attaining maturity.

Table 2: Installed and Projected Capacities of Heat-Only Boilers in Ukraine

Fuel and Purpose of Use	2011, MW_{TH}	2020 (without project) MW_{TH}	2020 (with project) MW_{TH}
Gas (Municipal)	52,900	54,000	53,950
Coal (Municipal)	1,500	1,300	1,270
Biomass (Municipal)	2.5	10	60
Agricultural Biomass (Straw -Farms)	12	15	35
Agricultural Biomass (wood, crop residues – individual homes, schools, clinics, etc.)	8	10	30
Woody Biomass (Forestry Industries)	150	160	160

Sources: Various : (http://vgolos.com.ua/economic/290.html; http://ru-bio.ukrbio.com/ru/news/13200/; http://www.ienergy.kiev.ua, etc.)

The country's vast agricultural lands (71% of the country territory) and favourable climate make it also ideal for production of energy crops, such as willow, poplar and miscanthus and these can be utilised for energy purposes. There are good opportunities for combining the production of biomass for energy purposes with other environmental actions, such as the reduction of nitrate losses from Ind to ground or surface waters or restoration of degraded lands in the areas suffering from land degradation and water-

logging (estimated at 1760 km^2 or 11% in Lugansk oblast). None of these types of biomass are currently exploited on a commercial basis.

The present demand for bioenergy in Ukraine comes mainly from individual residences and private farms utilising their own sources of biomass for producing heat/hot water required for their commercial processes (Table 2). 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 utilisation 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 utilisation 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.

The Economics of using Biomass for heat and hot water.

At the present time, imported natural gas constitutes the main fuel for the bulk of heat and hot water supply in the country (Source: Ukraine's Second National Communication to UNFCCC, 2006), when they are not supplied from large coal, oil or gas-fired power stations operating as CHP units. In the past, there used to be many coal-operated heat-only boilers both in the individual housing and municipal sectors. However, with the availability of cheap piped natural gas until 2005 (Fig. 3 below), a large number of coal-operated boilers were gradually replaced with gas-fired ones, with the result that their numbers have been decreasing since and continue to do so even with recent increasing gas prices, mainly because of convenience of use and cleanliness of the fuel.

In 2012, Ukraine's total natural gas consumption was almost 55 billion m3, of which some 30 % (approx.17 billion m3) was used "by the housing sector for heating" (Source: Valery Saratov, Head of National Regulatory Commission on Utility Services, March 2013). Of the 17 billion m3, some 50% was used in "heat-only" municipal boilers. The project will lead the way to gradually replacing these gas-fired boilers with those that would operate on agricultural biomass (and wood, where available) and, in these cases, there would be little mechanical design work outside of the boiler room and construction of storage for biomass pellets/briquettes. This implies that the existing steam and hot water distribution systems would be utilised. And burning of biomass for energy, using feedstock from sustainable agricultural practices, does not produce a net increase in greenhouse gases.

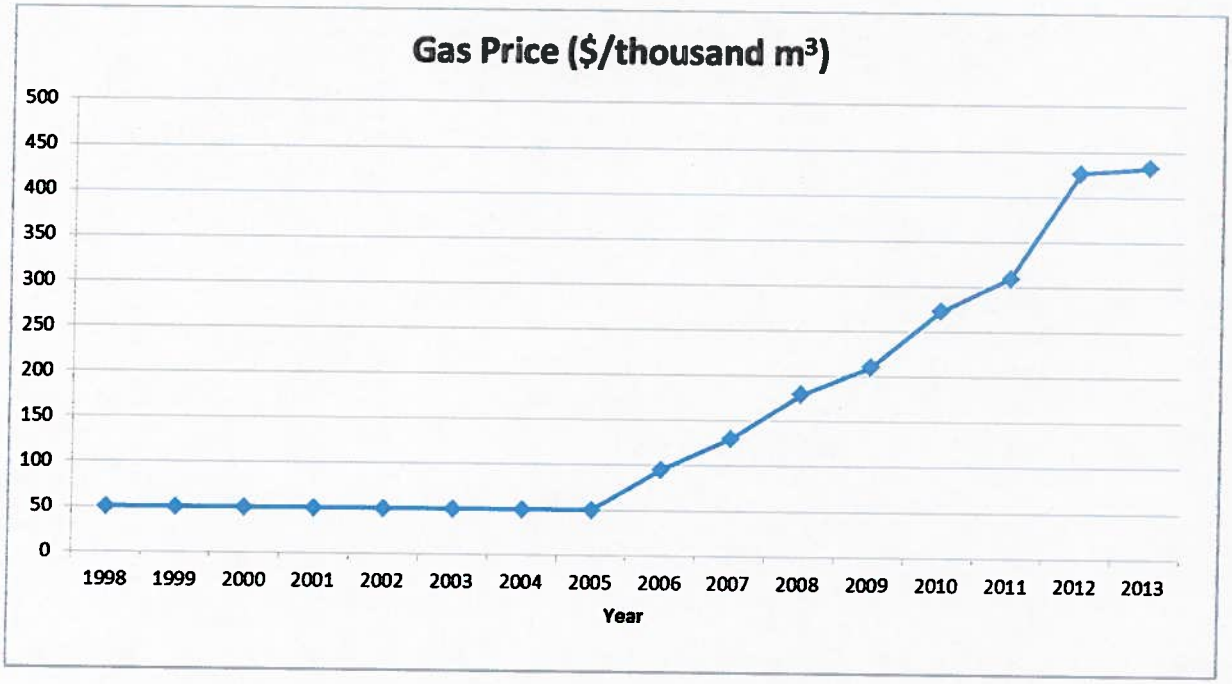
The price of this gas has continued on an increasing spiral over the last few years, reaching $ 432/thousand m^3 in February 2012, the highest ever in the country's history – for comparison purposes, the price per thousand m^3 was $ 130 in 2007 (Fig. 3). And indications are that there would be no abatement in this price increase, albeit less steep. Indeed, gas prices may continue to rise if relations with Russia deteriorate which is a strong possibility if Ukraine signs an association agreement with the European Union.

On 17 December 2013, an announcement was made, following a high-level meeting between Russian and Ukrainian authorities, that "Russia has given Ukraine a discount of almost a third on Russian gas and said it would buy billions of dollars' worth of Ukrainian government bonds. Both of the latest measures are intended to ease Ukraine's financial woes at a time when the country is struggling to avoid default". Details of implementing this announcement still needs to be worked out, but it is becoming clear that these measures are designed to assist Ukraine in boosting its economy by making its chemical and metallurgical industries (they are high consumers of imported gas) competitive and will hardly have any effect on the price of gas for municipal district heating.

The price of imported gas is negotiated annually with the supplier, following which the tariffs to be charged to consumers are established. According to the "Law on Heat Supply" referred to earlier, tariffs should cover the full cost of gas and provide for a margin of profitability (to include the cost of necessary

investments to modernize the system) set by the Cabinet of Ministers, on the basis of recommendations made by the "National Electricity Regulatory Commission of Ukraine" – it deals with tariffs for both gas and electricity. If the heat tariff in a particular municipality does not cover the actual cost of heat supply plus a marginal profit, e.g. like in the case of the housing-communal sector where heat is subsidised by the local government administration, the latter has the obligation to cover the shortfall from its own budget resources. Thus, local governments have great interest in utilising a locally available heat source (biomass) that would enable them to reduce or completely eliminate the expenditures they incur in order to subsidise heat and hot water services to the housing-communal sector.

Fig. 3: Price of gas in Ukraine over the last 15 years



Sources: 1. - Simon Pirani, Ukraine's Gas Sector. - Oxford Institute for Energy Studies, 2007(for years 1998-2007).
2. - http://www.credit-rating.ua/ua/analytics/analytical-articles/12852/ (for years 2008-2010).
3. - http://www.unn.com.ua/uk/news/1199604-gazprom-v-2012-rotsi-nedootrimav-blizko-2-mlrd-dol-vid-prodazhu-gazu-ukrayini (for years 2011-2013).

The tariffs dynamics has been recently changing due to the ever-increasing high cost of imported natural gas. On the basis of the cost of imported natural gas prevailing in 2012, it is computed that the per-unit cost of thermal energy was UAH 133.9/GJ paid by industries and UAH 37.4/GJ for the housing-communal sector. As described above, the lower energy cost for the housing-communal sector is due to the heavy subsidies provided by the Government. However, if locally-available baled straw, for example, had been used instead of imported natural gas, the per unit cost of thermal energy delivered to the housing-communal sector, including mechanised harvesting, baling/briquetting and transportation, would have been UAH 23.1/GJ (Source: Biomass Potential in Ukraine by Журбенко), i.e. at 17% of the present cost to industries and at 62% of the present cost even in the highly subsidised housing-communal sector. This clearly shows that utilisation of agricultural biomass for municipal heat and hot water services is a financially viable proposition that does not necessitate any need for a subsidy from the Government. And, as collateral, it is also a viable proposition for industries. Hence, it makes eminent economic and financial sense to switch from imported natural gas to agricultural biomass (or woody biomass, where available) as feedstock for municipal heat and hot water services. For this to happen, the Government needs to create a

conducive environment for the private sector to enter this market by removing the barriers that are discussed in para. A.5 below.

Boilers have a useful life of 20-25 years. In contrast to its low fuel cost, the capital cost of a boiler burning agricultural biomass in the kW_{TH} size is higher than that of a gas-fired boiler, e.g. approx. $ 100/kW_{TH} for a gas boiler (in the Ukrainian context) compared to 2-3 times that price for a similar sized biomass boiler, both inclusive of installation cost and, in the case of biomass boilers, including the cost of a storage shed for bales/briquettes/pellets. One reason for this, in addition to the storage shed, is because biomass boilers are physically larger than gas boilers, due to the requirements for a higher temperature combustion environment. However, as biomass boilers get bigger, in the few hundred kW_{TH} size and approaching the MW_{TH} size, the price disparity with gas boilers becomes comparatively smaller. Still, the maintenance cost of a biomass boiler is higher than that of a gas boiler due to the need for frequent ash cleaning and disposal. However, the fuel cost savings from burning biomass is normally substantial enough to pay for the cost of borrowing capital over 5 -6 years, a period much shorter than the life of the system.

Ukraine has witnessed the conversion of several boilers from natural gas to agricultural biomass over the last few years and information on some of these is provided in Table 3 below.

Table 3: Sample of completed boiler conversion projects from natural gas to agricultural biomass.

Project Location/Year of Commissioning	Educational Institution at Stavy Village, Kiev Oblast (2009)	AVERS-Energoproject Plant in Uman City, Cherkasy Oblast (2011)	"Teplo-Vin" Ltd., Vinnitsa City (2011)
Developer	SEC "Biomass"	AVERS	INKA
Boiler Manufacturer	OJSC AK "SATER", Ustynivka branch of "Sakhenergoservis", Ukraine	AVERS-Energoproject	INKA
Capacity (kW_{Th})	350	500	1,500
Thermal Efficiency (%)	83	80	90
Fuel Type	Baled Straw	Straw Pellets	Straw pellets, sunflower husk, grain wastes and wood.
Amount per load	200-250 kg (1 big bale)	22,000	1,170
Combustion Period per load (hrs)	3	139	4
Biomass Consumption	380 tons per heating season (15 October – 15 April)	570 tons per heating season (15 October – 15 April)	1,277 tons per heating season (15 October – 15 April)
Substitution of Natural Gas (m^3)	171,000 per heating season (15 October – 15 April)	224,600 per heating season (15 October – 15 April)	635,000 per heating season (15 October – 15 April)
Total Cost ($)	75,000	157,000	330,000
Payback Period (years)	5-6	5-6	6

2. STRATEGY

- ***Project rationale and policy conformity***

The project's goal is to reduce GHG emissions by creating favourable legal, regulatory and market environment and building institutional, administrative and technical capacities to promote the utilisation of the country's extensive agricultural biomass potential for municipal heat and hot water services. The objective is to assist the Government of Ukraine in addressing the various barriers with a view to having some 7% of the country's annual primary energy supply for heating and hot water services supplied by agricultural biomass by 2030, as outlined in the "Energy Strategy of Ukraine to 2030". In the business as usual scenario, the share of agricultural biomass for heat and hot water services within the same time-frame might remain negligible, similar to what it is at the present time. The project will accomplish this by supporting the Government of Ukraine in:

- Creating attractive and competitive business terms and conditions for investors, such as initial support in the preparation of feasibility studies and in terms of an investment grant, which will give developers long-term stability and provide for sufficient investment return;
- Streamlining and simplifying the administrative procedures for developers of projects utilising agricultural biomass for heat and hot water services and assisting the Ministry of Agrarian Policy and Food to promote the market for municipal biomass through the establishment of a Biomass Support Unit;
- Developing capacity within the DerzhZemBank to appraise municipal biomass projects for incorporation into its lending operations, including establishment of a dedicated line of credit at concessionary rates; and
- Facilitating 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 process.

- ***Institutional Structure***

The Ministry of Agrarian Policy and Food (MAPF) is the central body responsible for formulating and implementing the Government's policy in the field of agriculture and food production. It also entrusted with the responsibility of putting in place policy, plans and programmes that govern the promotion and usage of the by-products of agriculture and this includes agricultural biomass for such purposes as animal feedstock, fertiliser, utilisation in the furniture industry, production of pellets and for purposes of heat/hot water generation. The Ministry of Regional Development, Construction, Housing and Communal Services (MRDCHCS), on the other hand, is responsible for Housing and Communal Services that regulate, among others, heat and hot water supply to residential buildings. MAPF, as the Government Agency directly responsible for agricultural biomass (the subject of the present project) will be entrusted with implementation of the present project. In doing so, it will work very closely with MRDCHCS in the provision of heat and hot water services to the municipal sector.

- ***Financial Support Mechanism***

The Cabinet of Ministers of Ukraine issued Resolution № 609 "On the Establishment of DerzhZemBank" (Derzhavni Zemelnyi Bank – State Land Bank) on 2 July 2012, followed by Resolution № 934 "On Approval of the Charter of the Public Company DerzhZemBank" on 25 July 2012, with a view to promoting economic development in agriculture. DerzhZemBank, which is under the purview of the Ministry of Agrarian Policy and Food, has already received its banking license from the National Bank of Ukraine and has an initial capital of $ 120 million made available by the Government. Its objective is "to create favourable conditions for economic development and agriculture, to support domestic agricultural producers, mainly small and medium farmers, to develop and strengthen the industrial and commercial potential of agriculture and agricultural production, as well as to conduct regular banking operations and other activities in accordance with the law".

The mandate provided to DerzhZemBank's allows it to perform the functions of a traditional "development" bank (unlike that of a regular commercial bank) regarding support to all activities revolving around agriculture and it by-products, as stated above. Like all development banks, whether national or international, it will provide loans with grace periods, at lower than market interest rates, subsidies when required, etc. This mandate naturally extends to supporting activities such as the production of ethanol from corn/molasses and the utilisation of agricultural biomass (and woody biomass, where available) for heat and hot water services, with a view to reducing gas imports and substituting gas with a national resource (locally produced biomass) without compromising on the quality and level of service. To assist DerzhZemBank's activities in municipal biomass, the project proposes to work with it to establish and strengthen a Financial Support Mechanism that would cater to the needs of private sector investors interested and willing to invest in substituting existing gas-fired municipal boilers with biomass fuel. At the present time, this capacity does not exist within DerzhZemBank.

DerzhZemBank has confirmed that it would be ready to make debt financing (loans) available to private sector developers in the field of municipal biomass up to 70% of the total project cost at an interest rate of between 8 and 12 %, compared to the 30% plus interest charged in the regular banking sector. To support municipal biomass, GEF will allocate an investment grant (referred to as an Investment Grant Mechanism in the PIF) of $ 3 million that can be utilised to co-finance feasibility studies to be undertaken by the private sector and to provide capital subsidy for initial projects.

The purpose of this investment grant is two-fold: first, it is designed to jump-start the market for utilising agricultural biomass (and woody biomass, where available) for municipal heat and hot water services through a buy-down of the total interest amount that would have been chargeable to the developer. As the project builds up experience and transaction costs go down, the % of subsidy allocated to project developers will decrease until a point is reached when sufficient experience would have been accumulated that would provide confidence to enable developers to embark on new projects based only on their initial capital and a loan. When this point is reached, the subsidy would then be eliminated altogether. The second purpose is to initially minimise any potential risk on the part of DerzhZemBank in making loans for such purposes, by shifting some risk of loss of capital to the Investment Grant Mechanism. As it accumulates experience with such loans and repayments, DerzhZemBank will have developed sufficient confidence in continuing making additional loans, even in the absence of any subsidy, thus rendering its municipal biomass banking operations financially viable.

The functions of the Financial Support Mechanism will be:

- To support the preparation of feasibility studies and business plans (FS/BP) for municipal biomass projects. This will be achieved through the provision of a grant to eligible project developers, in an amount of up to 50% of the costs involved, with a maximum grant not exceeding $ 50,000. While these funds will be ear-marked for the developer, they will be paid directly to the consultants/consultancy group preparing the FS/BP and disbursements in tranches would be made as per a set of established benchmarks.

Prior to allocating this grant, DerzhZemBank may request the developer (municipality or private sector) to provide evidence that it can bring in some 10 to 15% of equity capital in case its FS/BP qualifies it for consideration for debt financing.

- To provide an investment subsidy to a project developer whose FS/BP has successfully cleared appraisal. This capital subsidy will constitute no more than 25% of the total project cost and will support a minimum of 10 projects for a total sum of USD 3,000,000.00 (which will be disbursed in accordance with UNDP rules and regulations) and may involve more than one boiler conversion at a given project site. Determination of the amount of subsidy to a particular project will be made on the basis of an

economic and financial analysis, prepared by the developer, which would include the volume of the equity capital, loan and subsidy as inputs to determine the optimum internal rate of return (IRR) that makes the project attractive to the developer. When several developers are competing for a project, the winner will be the one requiring the lowest subsidy.

Again, as in the case of the FS/BP grant, disbursements of the investment subsidy would be made in tranches as per a set of established benchmarks. The project will adopt a phased approach to provide performance-based investment subsidies to commercial biomass projects in Ukraine. The scheme will be designed and implemented in stages aiming at gradual phase-out of subsidy provision and maximizing its leveraging potential, as follows:

	Max share of GEF grant (%)	Max value of GEF grant ($)	Total expected investment ($)	Ratio of GEF grant to investment
Stage 1	20	1,200,000	4,800,000	1:4
Stage 2	15	900,000	5,400,000	1:6
Stage 3	10	600,000	4,800,000	1:8
Stage 4	5	300,000	3,000,000	1:10

It has been clarified above that the purpose of the investment subsidy is to jump-start the market and to buy down the interest rate to the developer. In discussions with project developers, this issue will be highlighted and the website will also make it clear that the subsidy is specifically earmarked for reducing transaction costs during the initial years of the project. This, it is hoped, will sensitise project developers to the fact that no more subsidies will be available upon completion of the project nor will they be necessary to enable them to achieve a reasonable rate of return on investment, while the other incentives put in place by the Government will continue. However, during implementation of the project, discussions will be held with DerzhZemBank to consider the options for putting in place its own subsidy mechanism, in the unlikely circumstance that it should still be necessary beyond the project time-frame to support project developers.

There is, of course, a fundamental question of sustainability of resources available to DerzhZemBank for this operational and financial support to municipal biomass to continue beyond the projects' lifetime of 4 years. Neither the project nor the Government wants such an important modality for reducing the country's import of natural gas through substitution with locally available agricultural biomass (and woody biomass, where available) not be sustainable. As indicated earlier, the Government's intent to establish the DerzhZemBank is to support, among others, agricultural production and utilisation of agricultural by-products so as to optimise on the level of the country's efficiency to make use of its locally available resources and reduce the country's reliance of foreign energy sources, thus draining its foreign currency reserves year in and year out. There are numerous examples worldwide where governments, in order to achieve such objectives of promoting local production of "common goods" have resorted to setting up development banks to support certain sector(s) of the national economy. In doing so, the governments realise that such support has to be "for the long haul" and not short-lived, and Ukraine is no exception.

The Government is committed to supporting DerzhZemBank in accomplishing its mandate for many years to come. To do so in an effective manner, the Government plans to regularly monitor and update the Bank's regulations to remove any unforeseen bottleneck that may creep up along the way.

- ***Country ownership: country eligibility and country drivenness***

Utilisation of biomass as a source of renewable energy in municipal boilers to supply heat and hot water services is one of the important mitigations options that the Government of Ukraine has endorsed and

wishes to pursue for reducing greenhouse gas emissions in the country. In this connection, Ukraine's Third, Fourth and Fifth National Communications to UNFCCC prepared in 2009 (all three issued in one document) indicate that the energy sector is the one producing the main emission of greenhouse gases in the country. As per these National Communications, GHG emissions were 378.9 million tCO_2 in 2005 and, in the absence of mitigation measures, were forecasted to climb as high as 740.7 million tCO_2 by 2030. Hence, increased use of biomass energy is one of the options in a basket of measures that the Government wants to pursue to reverse the trend in GHG emissions.

Table 4: GHG Emissions in Ukraine (million tons of CO_2)

Year	1994	1996	1998	2000	2002	2004	2006	2008	2010	2011
Energy Sector	432.1	350.2	325.7	305.9	309.2	320.2	332.6	317.8	290.9	305.2
Total for Country	495.2	395.5	369.1	344.9	363.2	376.7	392.3	410.8	345.3	394.3

Sources: Ukraine's National Communications to UNFCCC and National Cadastre of GHG emission and adsorption - State Agency of Ecological Investments – Kyiv, 2013

Table 4 above indicates a downward trend in GHG emission, due to a slow-down in the economy after the country's independence in 1990, a gradual pick-up from 2002, another slow-down in 2010 and, finally, a slight pick-up in the following year. Emission figures for 2012 have not been released yet. However, from Table 4, it is clear that the energy sector, that includes heating and hot water services, accounts for 85% of the country's GHG emission in any given year. This demonstrates the willingness of the Government to focus on biomass-based municipal district heating as one of its options to reduce GHG emission in the country.

The project is also in line with national priorities as outlined in the following national laws and will contribute to meeting the objectives of the Government on global warming, air pollution and energy development:

- The Government has promulgated several laws dealing with alternative types of fuel and heat supply. For example, the "Law on Alternative Types of Fuel" (№ 1391-XIV, January 2000) defines, among others, the role that biofuels can play in the energy balance of the country while the "Law on Heat Supply" (№ 2633-IV, June 2005) (both these laws have gone through successive amendments and refinements over the recent years, the latest being in 2012, but the fundamentals have not changed) provides key directions on the distributed principles of heat supply as well as on the utilisation of "non-traditional and alternative energy sources, including biomass for heating". In this connection, it is estimated that the technically achievable annual potential of renewable energy in Ukraine is approx. 79 million tons of coal equivalent (tce), while the economically achievable potential of these sources is 57.7 million tce. Currently, the share of renewable energy in the energy balance of the country is only 1.6%, as indicated above and any increase in its share is proceeding at a slow pace.
- The State Programme for Housing Reform and Development for 2009-2014 years, adopted by Law of Ukraine № 1869-V (June 2004), has among its main objectives technical upgrading of housing and communal services, including the establishment of an effective and transparent mechanism to encourage the use of alternative energy sources and fuels. Moreover, among the measures to be undertaken for promoting alternative energy sources use, this programme are: (i) Creating the conditions for the organisation and development of enterprises producing alternative energy sources and fuels for the provision of housing services, (ii) Implementation of pilot projects aimed at transfer of housing and communal services for alternative energy sources and fuels, etc.

- In line with the preceding Law, the State Target Economic Programme on energy efficiency and development of energy production from renewable energy sources and alternative fuels for 2010-2015, formulated by DAER (the State Agency on Energy Efficiency and Energy Saving of Ukraine" that reports directly to the Cabinet of Ministers) and approved by Resolution of the Cabinet of Ministers of Ukraine (№ 243, March 2010) has the following main objectives: (i) development of typical projects aimed at modernization and replacement of boilers in the communal sector in order to transfer them to alternative fuels; (ii) implementation of projects for the construction of units that operate on solid biomass and biogas for heat and electricity production; (iii) implementation of pilot projects to install units for electricity generation using biomass energy; and (iv) development of feasibility study and standard construction project for building typical modern mini-CHP that can operate on biomass and other alternative fuels

- ***Design principles and strategic considerations***

The project will promote a market-driven approach to encourage the participation of the private sector to supply municipal heat and hot water services from agricultural biomass (and woody biomass, where available). In line with GEF requirements, "the emphasis will be upon developing policies and regulatory frameworks that provide limited incremental support to strategically important investments", such as investment in replacing imported natural gas with locally-produced agricultural biomass for municipal heat and hot water services, allowing the country to move towards energy independence and increased energy security in an environmentally and climate-friendly way. Further, the "host country willingness to adopt favourable policies and to follow through on the initiatives" was demonstrated by the Government through the adoption of the guiding document entitled "Energy Strategy of Ukraine to 2030" with a view to having some 7% of the country's annual primary energy supply being met by biomass, mainly for municipal heat and hot water services. Thus, the project will assist the Government to realize the objectives of the Strategy, design and adopt regulations and provide investment support aimed at promoting agricultural biomass for municipal heat and hot water services.

The focus of the project is on municipal heat and hot water supply using agricultural biomass. Woody biomass, as a feedstock for municipal boilers, will be considered in certain areas of the country where it is readily available for that purpose and where, in the view of the private sector investors, it is competitively priced compared to agricultural biomass. However, from information provided by MAPF, the bulk of woody biomass (wood chips, trimmings) is limited to self-usage at the wood-processing factories and used in the furniture industry or pelletized for export; hence, its availability for firing in boilers is very limited. Moreover, during implementation of the PPG, potential private sector investors indicated their preference for using agricultural biomass, which is widely available throughout the country, rather than woody biomass (they both have almost similar heating values) which is very region-specific, mainly being available in the western and north-western parts of the country. The reason for this preference is simple economics: agricultural biomass commands a lower purchase price of the feedstock, while woody biomass has a higher cost because of its value as pellets for export and transportation costs of the former will be greatly reduced due to smaller distances in most cases.

In addition, use of CHP boilers for both electricity and heat/hot water production is excluded, as in this case, according to information provided by the Ministry of Energy and Coal Industry, there is already excess electricity generating capacity in the country and no new licenses for electricity generation will be issued in the coming years. However, the project may consider support to investors operating existing gas-operated municipal CHP boilers who propose to convert to utilising agricultural biomass instead. Such conversions will, no doubt, make economic and financial sense in view of the high prices associated with imported gas used in these boilers at the present time.

- ***Project objective, outcomes and outputs/activities***

MAPF, as the Government Agency directly responsible for biomass (the subject of the present project) will be entrusted with implementation of the present project. In doing so, it will work very closely with MRDCHCS in the provision of heat and hot water services to the municipal sector.

The project consists of four components as outlined below. It is recognised that on-the-job training will be provided by the recruited consultants, both local and international, during the normal course of their support to the relevant project activities. This will be in addition to Components 2 and 4 that, respectively, deal with capacity development on financial and technical issues required by key Government and Financial institutions. Moreover, the project will seek to achieve gender equality through the empowerment of women to fully participate in all project activities and specifically those related to capacity development under the various components. This will be achieved through working, for example, with NGOs (Annex 6) like "Krona", the Ukrainian Women's Fund, La-Strada, School of Equal Opportunities, All-Ukrainian Women Centre of Information and Social-Economic Adaptation, etc.

Component 1: 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. The expected outputs under this component are:

- National and Municipal level targets until 2020 for biomass energy are agreed and adopted. At the regional level, municipal level targets will be aimed to be developed, agreed, and adopted in at least 6 oblasts of which at least two will be Cherkasy and Ivano-Frankovsk.
- Comprehensive market-oriented energy policy and streamlined legal/regulatory framework to regulate municipal biomass for heat and hot water services formulated and operationalised. While implementation will take place at the local municipal level, policy and regulatory frameworks, in the Ukrainian context, are formulated at the central level, e.g. issues related to access to land for biomass production.
- Overarching strategy document on municipal biomass for heat and hot water services sharpening the focus of the respective roles and responsibilities of MAPF and MRDCHCS developed and operationalised. This will assist in clearly defining the added value that each institution can be bring to the whole process without getting in each other's way and with a view to eliminating any duplication.
- Criteria and procedures developed and implemented to govern the introduction of a transparent process in the selection of municipal biomass projects. These will be made available to all developers interested in submitting proposals for municipal biomass, whenever a call for proposals is issued.

Component 2: To develop capacity within MAPF ("micro level" activities) to support development and implementation of a municipal biomass programme through the establishment of a Biomass Support Unit and to formulate appropriate incentives to attract project developers. The expected outputs are:

- A Biomass Support Unit (BSU) established within MAPF to develop and support the municipal biomass programme during the project lifetime and beyond.
- Suitable methodology for the economic/financial evaluation of municipal biomass systems developed. The methodology will need to accommodate complex financial engineering involving equity, debt and subsidy, and enable the performance of sensitivity analyses for determining IRRs under different investment scenarios. BSU requires the tools to evaluate the economic and financial viability of municipal biomass systems proposed by investors, which will assist it in formulating any appropriate incentives that may be necessary to attract them.
- Technology transfer opportunities and delivery models formulated and operationalised. The main driver of technology delivery models will be the creation of an enabling environment (e.g. incentives to attract foreign partners, viz. importation of equipment/parts duty-free, speedy approval of licenses and clearance through customs, possibility of tax holiday on profit or reduced taxes, etc. – with the participation of the Ministry of Revenue and Taxes) for the private sector to partner with international promoters to invest in municipal biomass installations. Among the delivery models considered will be

implementation of locally manufactured biomass boilers, outright purchase of boilers from overseas and joint ventures with foreign manufacturers for local assembly/production, operation and maintenance. In order to benefit from latest technological developments, it is likely that joint ventures with foreign companies will be the preferred delivery model.

- One-stop shop established within the BSU to facilitate the issuance of construction licenses and permits to developers of municipal biomass projects through the provision of information and guidelines.
- BSU's capacity to monitor and document project experience developed and strengthened.

In line with the above, BSU's ToRs would be:

- To formulate a streamlined and comprehensive market-oriented policy and legal/regulatory framework to promote municipal biomass for heating and hot water supply.
- To develop criteria and procedures for the introduction of a transparent process in the selection/award of municipal biomass projects for development.
- To develop a suitable methodology for the economic/financial evaluation of municipal biomass projects.
- To formulate incentives for attracting potential investors.
- To facilitate the issuance of construction licenses and permits to developers of municipal biomass projects through the provision of information and guidelines.
- To formulate a replication plan for municipal biomass.
- To monitor and document project experience/best practices/lessons learned.
- To develop and implement an outreach programme of promotional activities targeting domestic (and international) investors.
- To published materials (including video) on project experience/best practices and lessons learned on project website.
- To organise the Annual Summit of the Regions Biomass conference.

Component 3: To promote investment in municipal biomass through the establishment/strengthening of a Financial Support Mechanism (FSM) within the DerzhZemBank. FSM will support the preparation of full feasibility and technical design studies, followed by construction and commissioning of the installations, for 18 municipal biomass projects, most of which will be identified during the project implementation phase. To achieve this, the FSM/DerzhZemBank will draw upon capacity developed within MAPF under Component 2 above, especially that of the BSU. This should not pose any problem as both the DerzhZemBank and BSU will be under the same parent Ministry (MAPF). The expected outputs are:

- A Financial Support Mechanism established within DerzhZemBank to finance investments in municipal biomass during the project lifetime and beyond.
- Capacity developed within the DerzhZemBank to appraise municipal biomass projects for incorporation into its lending operations.
- Reports on feasibility and design studies, and business plans (complete package necessary to reach financial closure) completed.
- Signed agreements on financial closure with identified developers/investors for one project each in Cherkasy and Ivano-Frankivsk Oblasts and 4 additional projects in other Oblasts.
- Report on completion of construction of municipal biomass projects, one each in Cherkasy and Ivano-Frankivsk Oblasts and 4 additional projects in other Oblasts.
- Report on the completion of a total of 18 municipal biomass heat and hot water systems by the end of the project.

During the course of the scheduled project mid-term review, an assessment of the FSM will be undertaken to determine whether the assumption that no subsidy will be needed at the end of the project is

still valid, and to ascertain the level of support, if any, that the Government may require for an eventual continuation of the subsidy scheme.

Component 4: To formulate an outreach programme and document/disseminate project experience/best practices/lessons learned for replication within the country (and in the region). The expected outputs are:

- Plan to implement outreach/promotional activities targeting domestic (and international) investors operationalised.
- Comprehensive and reliable data/information detailing project experience/best practices and lessons learned available for future initiatives.
- Published materials (including video) on project experience/best practices and lessons learned, and project website designed and regularly updated.
- Published Municipal Biomass Guide detailing a step-by-step approach for implementing municipal biomass programmes.

Table 5 below provides a list of potential projects selected on the basis of the biomass projects competition. These projects constitute a preliminary list that may be subject to change on the basis of additional information submitted by the short-listed investors during project implementation.

Table 5: List of potential biomass project for municipal heat and hot water services

	Project Developer/Site	Installed Capacity, kW_{Th}	Type of Biomass	Estimated Commissioning Date	Output, kWh_{Th}/yr	CO_2 Reduction, tons/year (emission factor for natural gas: 0.223 tCO_2/MWh)
1	Communal Enterprise "Sumy Specialized Psychiatric Asylum", Kudryavoe (Sumy Oblast)	1,160	Straw/wood	October 2015	1,567,000	349.4
2	Alternatyvna Teploenergia Ltd., Kramatorsk (Donetsk Oblast)	1,400	Wood waste	October 2016	5,040,000	1,123.9
3	"Strov Energy Opportunity" Ltd., Berdychiv (Zhytomyr Oblast)	4,000	Straw pellets	October 2015	16,000,000	3,568
4	"Salix Energy" Ltd., Lypyny (Volyn Oblast)	1,000	Energy willow	October 2015	1,977,000	440.9
5	"Salix Energy" Ltd., Kivertsi (Volyn Oblast)	1,000	Energy willow	October 2015	2,480,000	553
6	Aver-Tech Ltd., Uman (Cherkasy Oblast)	4,350	Straw pellets	October 2014	19,731,000	4,400
7	Aver-Tech Ltd., Kochubiivka (Cherkasy Oblast)	1,190	Straw pellets	October 2014	4,807,500	1,072.1
8	"Agrarian Union" Ltd., Turka (Ivano-Frankivsk Oblast)	1,000	Energy willow	October 2014	2,650,000	591
9	"Agrarian Union" Ltd., Pyadyky (Ivano-Frankivsk Oblast)	1,000	Energy willow	October 2015	2,473,000	551.5

	Project Developer/Site	Installed Capacity, kW_{Th}	Type of Biomass	Estimated Commissioning Date	Output, kWh_{Th}/yr	CO_2 Reduction, tons/year (emission factor for natural gas: 0.223 tCO_2/MWh)
10	Kievenergo, Kyiv, Boiler Dniprovodsky 1 (Kyiv Oblast)	8,600	Wood waste	October 2015	15,220,000	3,394.1
11	Kievenergo, Kyiv, Boiler Montazhnyk 28 (Kyiv Oblast)	1,200	Wood waste	October 2015	2,580,000	575.3
12	"Salix Energy" Ltd., Pidgaytsi (Volyn Oblast)	800	Energy willow	October 2015	930,000	207.4
13	"Salix Energy" Ltd., Mayaky (Volyn Oblast)	800	Energy willow	October 2015	1,651,000	368.2
14	Aver-Tech Ltd., Kharkiv (Kharkiv Oblast)	500	Straw pellets	October 2016	2,268,000	505.8
15	Aver-Tech Ltd., Odessa (Odessa Oblast)	500	Straw pellets	October 2016	2,268,000	505.8
16	Aver-Tech Ltd., Zhytomyr (Zhytomyr Oblast)	500	Straw pellets	October 2016	2,268,000	505.8
17	Communal Services Department of Pryluky City Council, Pryluky, Secondary School No. 10 (Chernihiv Oblast)	240	Wood waste	October 2016	1,010,880	225.4
18	Communal Services Department of Pryluky City Council, Pryluky, Sports School (Chernihiv Oblast)	240	Wood waste	October 2016	920,260	205.2

- ***Key indicators, assumptions and risks***

Indicators

Key indicators of the project's success will include:

- CO_2 emissions are reduced by 63,577 tons by the end of project activities.
- Post-project CO_2 emissions without replication are reduced by 361,000 tons, under the assumption of a 20-year equipment projected life.
- Indirect post-project CO_2 emissions with replication are reduced by 1.4 million tons, again assuming a 20-year equipment projected life and 80% GEF causality factor.
- Capacity developed within MAPF to promote private sector investment in municipal biomass systems for heat and hot water services.
- Lessons learned are documented and distributed to potential investors/stakeholders through publications, videos, Annual Summit of the Regions Biomass Conferences and project website.

Detailed indicators are provided in the Project Results Framework below.

Assumptions

The assumptions are outlined in the Project Results Framework below.

Risks

The project presents some risks which are discussed in the Table 6 below:

Table 6: Risks, Rating and Mitigation Approach

Risks	Rating	Mitigation Approach
Political: Lack of political will to adopt a necessary policy and legal/regulatory framework.	Medium	This risk will be mitigated by creating a coalition of interested parties including the association of Municipalities for Biomass Energy in Ukraine, government, private project developers, and NGOs like the Bioenergy Association of Ukraine and others. The coalition will work together to encourage and support investment in bioenergy projects in the municipal sector.
Institutional: Apprehension that the likelihood of a biomass programme for municipal heat and hot water services may not take off.	Medium	A Biomass Support Unit will be established within the Ministry of Agrarian Policy and Food to develop and support a National Programme on Biomass, including raising awareness, which would target both national and international investors. In addition, there is already investor interest in developing business opportunities in the municipal biomass sector.
Bio-energy technology failure.	Low	Bioenergy technologies are generally well known and are widely used in the rest of the world, including neighbouring EU countries. The project will be designed and implemented to identify, transfer and adopt best available bioenergy technologies and practices in Ukraine. There are also several companies in Ukraine which have started boiler manufacturing under license with foreign companies, including a share of foreign components.
Biomass supply chain disruptions.	Medium	Economic efficiency of energy use of biomass is dependent on the logistics of the full chain of biomass harvesting/collection, processing and supply. The project will work with the different partners in the biomass supply chain to minimise disruptions from cultivation all the way to delivery at the boiler site. It is recognised that agricultural

		biomass collection will take place in summer/early autumn, while its usage for heating will be in late autumn, winter and early spring - complementary, in a sense.
Low domestic demand for bioenergy in municipalities.	Low	Although more than 90% of produced pellets (from wood chips and sunflower husks) in Ukraine are exported to the European Union, the increase in gas prices would facilitate domestic demand for agricultural biomass which is not widely utilized at the present time. Moreover, this project will promote and encourage demand in the municipal sector for biomass-based heat and hot water services.
Environmental/ Climate Change	Low	There are multiple environmental risks (e.g. a drop in biomass resource due to a change in climatic conditions) which are potentially associated with development and deployment of bioenergy technologies. On the resource supply, the risk will be mitigated by focusing on ready available straw and willow (thus minimizing existing negative environmental impact from their uncontrolled combustion/storage). With regard to a decrease in biomass resource due to climatic conditions, this is unlikely to happen within the project timeframe, as evidenced in the national communications. In addition, environmental risk management will be carefully integrated and studied in the course of technology development for biomass combustion in order to avoid any potential negative impact.
Financial: Lack of commitment from private and public sector to invest in municipal biomass.	Low	Already during the project design stage several potential investors participated in the municipal biomass projects competition, signifying their interest and commitment to invest provided a conducive and appropriate investment environment is created. In the unlikely event that investment does not materialize from proposed investors, alternative investors will be sought.
Financial: DerzhZemBank experiences longer than expected loan processing times, resulting in hardships to potential investors.	Medium	DerzhZemBank became operational on 1 January 2013, under the purview of the Ministry of Agrarian Policy and Food, and is still in a "running-in" period with regard to its banking operations. This Bank will "host' the Financial Support Mechanism to provide loans to potential investors, while also managing the investment grant from GEF. Thus, the project is in a unique position towards "moulding" the Bank in the right direction from almost its very start. It is not expected that disbursements for municipal biomass will start right after initiation of project activities; however, monitoring of the Bank's operations will take place to ensure that lending for such activities stays on track.
Insufficient Information and Awareness	Low	Biomass is often perceived as waste with zero cost and insufficient information on bioenergy technologies is typical for Ukraine. However, since 2002 international Ukrainian conferences on biomass have become regular events in the country and BSU will support and participate in these conferences. Ukraine has also sufficient scientific, technological and engineering base for production of certain RES technologies. Moreover, the Municipal Biomass Guide and capacity building activities of the project will help to raise the awareness on biomass related issues.

- ***Financial modality***

The project is aimed at policy development, capacity building, technical assistance and the provision of financial incentives to catalyse private sector investment in municipal biomass. A major part of GEF resources will be allocated to investment purposes connected with the latter investment component. GEF funds will be pooled with government resources under the Financial Support Mechanism of the DerzhZemBank to, initially, support the preparation of feasibility studies/development of business plans and provision of an investment grant, if necessary, in addition to making available debt financing to project developers. The transfer of GEF funds to DerzhZemBank (and subsequently to the project developers) will be conditional upon and analogical to PPAs that are signed with the project sponsors so as to insure that GHG reductions get actually realised The project objective will be attained through technical assistance and facilitating third parties' investment in municipal biomass projects for heat and hot water services. No loan or revolving-fund mechanisms with GEF funds are considered appropriate, and, therefore, grant-type funding is considered as the most suitable to enable successful delivery of the project outcomes.

➢ ***Cost-effectiveness***

The project is expected to be approved in time to commence activities in late 2013/early 2014. Under this scenario, the first three municipal biomass boilers (Table 5) totalling 6,540 kW_{TH} are scheduled to come on line in time for the start of the heating season in October 2014. Over the heating season that will last for 6 months from 15 October 2014 through 15 April 2015, the private sector will accumulate hard technical and financial data on the operation of these three "pilots" to enable it to make more informed decisions for the next set of boilers that will become operational a year later, i.e. in October 2015 when another 9 boilers having an additional capacity of 19,560 kW_{TH} will come on line. This will be followed by another 6 boilers totalling 3,380 kW_{TH} in October 2016. All these boilers will provide heat and hot water during the heating season. During the "off" season, the hot water needs of the consumers will be met by much smaller biomass boilers which will provide an additional small reduction in natural gas usage.

Under the above scenario, all municipal biomass boilers with a total installed capacity of 26,100 kW_{TH} (or 26.1 MW_{TH}) would be fully operational by October 2016. Accordingly and on the basis of expected outputs, heat generation from biomass will be zero during Year, 127,188.5 MWh_{TH} during Year 2, 72,066.5 MWh_{TH} during Year 3, and 85,841.64 MWh_{TH} during Year 4 (final year) of the project. Thus, by project completion, some 285,096.64 MWh_{TH} would have been generated and an annual generation of 85,841.64 MWh_{TH} will be sustained over an expected minimum 20-year projected life of the equipment. All this municipal biomass heat and hot water generation, if not implemented, would have otherwise been accomplished through boilers burning imported natural gas (as indicated earlier, gas has gradually been replacing coal in heat only boilers) having an emission factor of 0.223 tCO_2/MWh_{TH}. Consequently, during the 4-year project period, almost 63,577 tons of CO_2 (285,096.64 MWh_{TH} x 0.223 tCO_2/MWh_{TH}) would have been avoided (based on the staggered heat output schedule mentioned above), equivalent to $74 of GEF funds per tCO_2. However, these boilers will continue avoiding 19,143 tons of CO_2 annually during their remaining 17-19 years of equipment life. When one looks at the 20-year lifetime of the boilers earmarked for development during the project period, the boilers would have generated 1,618,834 MWh_{TH}, with a combined amount of CO_2 reduced of 361,000 tons, equivalent to $13 of GEF funds per tCO_2. Moreover, GEF funding should be viewed as creating the conditions to jumpstart the municipal biomass market for heat and hot water services in the country that would help to galvanise both the government and the private sector. This implies that there would be significant potential in further "indirect" GHG reduction once the market has reached cruising speed.

Finally, there are indications that other private sector developers, from enquiries made to the UNDP CO over the last few weeks, may at some later date, under the assumption of a conducive environment for investment, join the other developers with the installation of many additional MW_{TH} of biomass boiler capacity, several times greater than what will be achieved during the four-year project implementation.

Thus, the indirect post-project emission reduction estimates related to only the additional plants – on the basis of a conservative policy scenario and a GEF causality factor of 80% (top-down approach) -- can be estimated at 1,465,110 tons of CO_2 avoided, which translates into an abatement ratio of $ 2.7 of GEF funds per tCO_2 reduced. In the case of the bottom-up approach, with a replication factor of 4, the indirect post-project emission avoided would be 1,444,000 tons of CO2. Table 7 below summarises the direct and indirect total CO_2 emissions reduction during implementation of the project and beyond.

Table 7: Project GHG emission reduction impacts

Time-frame	Up to project completion (4-year project duration).	Direct post-project without replication (20-year equipment projected life).	Indirect post-project with replication (20-year equipment projected life based on 100 MW_{TH} of additional capacity).
Total CO_2 emissions reduced (tons)	63,577	361,000	1,465,110*

*100 MW_{TH} operating during the 6 months of the heating season (4,380 hrs/heating season) will theoretically generate 438,000 MWh_{TH} per year or 8,760,000 MWh_{TH} over 20 years. Applying a realistic load factor of 75%, a total of 6,570,000 MWh_{TH} will be generated through biomass, equivalent to a GHG reduction of 1,465,110 tons of CO_2.

- ***Sustainability***

From a technical point of view, the viability of municipal biomass for heat and hot water services has been proven in the international market, both in the context of developed and, to some extent, developing countries. By addressing the non-technical barriers that impede the development of municipal biomass in Ukraine, the project will assist in creating a sustainable niche through strengthening the policy, institutional, legal, regulatory and operational capabilities of the key national institutions, supporting the development of biomass-based municipal services for heat and hot water through a market-driven approach, developing national capabilities and disseminating information. These efforts should ensure the long-term sustainability of municipal biomass in the country.

With regard to the financial sustainability of the Biomass Support Unit (BSU), it will provide its services on a cost-recovery basis. This will generate a constant source of income to sustain BSU operations after project completion.

From a financial point of view, the project will help introduce transparency by developing a competitive institutional model for the selection/award of municipal biomass projects for development. Furthermore, the project will support the integration of local industries into the municipal biomass sector. This will be achieved through the provision of focused support to farmers involved in the agricultural biomass supply chain, local engineering firms/specialised engineering workshops for construction, installation, operation, maintenance and repair of equipment. With the increase over time in of municipal biomass installations, it is envisaged that such efforts will intensify with opportunities being created for additional players to provide such services.

- ***Replicability***

The Project's potential for replicability throughout the various Oblasts in Ukraine is very good since the project will adopt a bottom-up approach within the overall policy/investment framework that is envisaged to be developed to promote municipal biomass. Technical assistance for barrier removal and institutional strengthening to be provided under the FSP will facilitate such replicability since it will create the required institutional, policy, and technical conditions to enable the generation of renewed investor interest for the development of additional municipal biomass projects. Moreover, the lessons learned will be of great value to the neighbouring countries sharing similar resource base, should they decide to tap into their respective biomass resources for municipal heat and hot water services.

- ***Coordination with other GEF-related initiatives***

There are presently 3 on-going climate change projects funded by GEF in Ukraine. Two of them deal with renewable energy and, therefore, have some issues in common with the proposed municipal biomass project, while the third one deals with Energy Efficient Lighting (UNDP is the GEF Agency for this project) which has no direct relevance to this project, except that the common thread is GHG emission reduction. The 2 projects where UNDP is not the GEF Agency are:

- The EBRD project entitled "Creating Markets for Renewable Power in Ukraine" with a GEF grant of $ 8.45 million for technical activities addressing policy, finance, business, and information barriers to renewable energy market development in Ukraine. Project activities were initiated in March 2010 and are expected to be completed in December 2014.
- The above GEF grant is linked to EBRD's dedicated Ukraine Renewable Energy Direct Lending Facility (URELDF) in the amount of € 50 million to provide debt financing for renewable energy. The Facility is designed to be complementary to EBRD's Ukraine Energy Efficiency Credit Line (UKEEP – a credit facility for targeting Ukrainian private companies looking to invest in energy efficiency or renewable energy projects) and will be a source of loans to project developers of up to 50% of financing from EBRD and up to 20% from the Clean Technology Fund (CTF). Another EBRD project in the field of energy is the Ukraine Sustainable Energy Lending Facility (USELF), with a total volume of € 50 million from EBRD and € 20 million from CTF to support renewable energy projects for electricity generation.
- The UNIDO project "Improving Energy Efficiency and Promoting Renewable Energy in the Agro-Food and other Small and Medium Enterprises (SMEs) in Ukraine" has a GEF budget of $ 5.23 million and commenced activities in May 2011, with a target completion date of April 2016. It is aimed at developing a market environment for introducing energy efficiency and enhanced use of renewable energy technologies in the agro-food and other energy intensive manufacturing small and medium enterprises (SMEs) in Ukraine, as a basis for promoting their competitiveness while ensuring an integrated approach for lower carbon intensity and improvement in their productivity and local environment.

To date, activities related to modernising boilers and heat distribution systems are under implementation in PJSC "Crimea milk", Private Enterprise "Crimea paper", PJSC "Concern Khlibprom" (LvivHlib) and Private Enterprise "Technosoyuz". In addition, a study tour to Germany was organized in September 2012 for Ukrainian counterparts to learn best experience and an International Workshop on benchmarking was held in Kyiv.

None of the above-mentioned initiatives funded by GEF in Ukraine deals with the utilisation of agricultural biomass to provide municipal heat and hot water services. Still, during the course of implementation of the PPG, discussions were held with both EBRD and UNIDO to confirm this and to explore ways on how the proposed activities under the present project could add value to those being undertaken by them while, simultaneously, benefitting from their experience. Hence, there will be absolutely no overlap between loans to be provided by DerzhZemBank and those provided by URELDF. Moreover, during implementation of the proposed full project, regular consultations with both EBRD and

UNIDO would continue for the mutual benefits of the project stakeholders and to eliminate the possibility of any duplication in project activities.

Other non-GEF-related Initiatives

- USAID Municipal Heating Reform Project in Ukraine: This project is targeted particularly at the municipal level, directed towards enhancing the capacity of 38 municipalities to plan, manage, and fund the development of their heating systems. The project promotes establishing mandatory metering of energy consumption in buildings; implements energy efficiency pilot projects in partner cities; undertakes capacity building initiatives of city energy managers and energy auditors; supports undertaking energy audits of 25 heating systems and 400 buildings; supports development of 25 Municipal Energy Plans in partner cities etc. The project is not involved in substituting gas with biomass as a source of fuel. The project results as of January 2013 are, among others: 295 million m3 of natural gas saved, $ 175 million leveraged for energy efficiency projects, 530,000 tons CO2 emissions reduction, 3,100 people (1,760 women) directly trained in energy efficiency, etc.
- SIDA – NEFCO Demo Ukraine District Heating Investments Project: This project started in 2010 and is implemented in cooperation with the Ministry for Regional Development, Construction, Housing and Communal Services and is supported by E5P (Contributors to E5P are: European Union, Sweden, Ukraine, United States, Denmark, Norway, Finland, Poland, Estonia, Iceland, Latvia and Lithuania). The project is aimed at supporting the development/modernisation of ten environmentally sustainable and energy efficient demonstration projects in Ukraine´s district heating sector, achieving energy savings of at least 30 %, worth € 2,000,000 annually and reducing CO2 emissions by at least 50,000 tons.

During 2012, Ukrainian project partners (publicly-owned District Heating Companies) were selected to develop ten demonstration projects in district heating. By the end of 2012, the demo projects in Vinnytsia and Zhytomyr had been approved for funding. Both these projects involve modernisation of the heating system, including new condensing gas boilers together with new heat pumps. The projects also include installation of Individual Heating Stations (IHS) and replacement of distribution lines with pre-insulated piping. Once completed, savings in gas consumption are estimated at 30% in Vinnytsia and 42% in Zhytomr, respectively.

3. PROJECT RESULTS FRAMEWORK

This project will contribute to achieving the following Country programme Outcome as defined in CPAP or CPD:
Outcome # 10: Government adopts policy frameworks and mechanisms adopted to ensure reversal of environmental degradation, climate change mitigation and adaptation, and prevention and response to natural and man-made disasters.

Country Programme Outcome Indicators:
Indicator 1: Number of newly adopted environmental policy frameworks.
Indicator 2: Number of active green investment schemes (GIS) and energy efficient (EE) projects.
Indicator 3: % of national budget allocated to environment and energy sectors.

Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page):
Output 6: National and local capacities for climate change resilient policies and practices enhanced.

Applicable GEF Strategic Objective and Programme: To promote investment in renewable energy technologies.

Applicable GEF Expected Outcomes: Total avoided GHG emissions from utilisation of biomass for municipal heat and hot water services.

Applicable GEF Outcome Indicators: Avoided GHG emissions from utilisation of biomass for municipal heat and hot water services (tons CO_2) and \$/t CO_2.

	Indicator	Baseline	Targets End of Project	Sources of Verification	Risks and Assumptions
Objective					
The objective of the project is to significantly increase the use of biomass energy as a fuel source for heating and hot water services in the municipal sector in Ukraine by at least 20% over the baseline scenario in order to reduce direct greenhouse gas emissions by 63,577 tons of CO2 over the 4-year life of the project and, subsequently, 19,143 tons of CO2 during each year of the remaining 16-year life of the boiler equipment. When one looks at the 20 year lifetime of the boilers	Municipalities/ Private Sector have operationalised direct investment in municipal biomass projects for heat and hot water supply.	GHG in the municipal heating sector scheduled to increase from 434.4 million tCO_2 (in 2005, as per Ukraine's Third, Fourth and Fifth National Communications to UNFCCC prepared in 2009 (all three issued in one document)) to as high as 740.7 million tCO_2 by	285 GWh_{TH} in terms of heat and hot water generated (as a result of the 18 municipal biomass systems brought on-line) by project completion. Direct reduction of 63,577 tons of CO_2 over the 4-year FSP project life cycle and 361,000 over the full lifetime of the plants. Estimated cumulative	Project's annual reports, GHG monitoring and verification reports. Project final evaluation report.	Continued commitment of project partners, including Government agencies and investors/developers.

earmarked for development during the project period, the boilers will have generated 1,618,834 MWhTH, with a combined amount of CO2 reduced of 361,000 tons, equivalent to $13 of GEF funds per tCO2.		2030.The present contribution of biomass towards heat/hot water supply is estimated at 75 $GWh_{TH.}$ Negligible investments taking place in municipal biomass for heat and hot water supply.	indirect GHG emission reduction of over 1.4 million tons of CO_2 by 2035 on the basis of a conservative policy scenario and a GEF causality factor of 80%.		
Outcomes					
Outcome 1A: Streamlined and comprehensive market-oriented policy and legal/regulatory framework to promote municipal biomass for heat and hot water services.	Policy and legal/regulatory framework finalized, adopted and available for consultation by potential investors.	None available at the present time.	To be completed within 15 months of recruitment of project manager and approved by Government 1.5 years after start of project.	Published documents. Government decrees/laws.	Commitment of the various Government institutions.
Output 1A.1: Report streamlining a market-oriented policy and legal/regulatory framework to regulate municipal biomass for heat and hot water services.	Report confirming that policy and framework arrangements are adopted and in place.	Potentially overlapping responsibilities of various Government institutions make the decision process quite cumbersome.	To be completed within 15 months of recruitment of project manager and approved by the Government 1.5 years after project start.	Published documents.	Commitment of the various Government institutions.
Output 1A.2: Strategy document aimed at sharpening the focus of the respective roles and responsibilities of Ministry of Agrarian Policy and Food (MAPF) and Ministry for Regional Development, Construction, Housing and Communal Services (MRDCHCS).	Document outlining individual roles and responsibilities formulated, adopted and procedures in place.	Not available at the present time.	To be completed within 15 months of recruitment of project manager and approved by the Government 1.5 years after project start.	Published documents.	Commitment of the respective Government institutions.

Output 1A.3: Criteria and procedures for the introduction of a transparent process in the selection/award of municipal biomass projects for development.	Guidelines for the selection of projects available and put into practice.	Not available at the present time.	To be completed within 15 months of recruitment of project manager and approved by the Government 1.5 years after project start. Competitive selection/award of projects completed by the end of 3 years after project start.	Published documents. Signed documents.	Commitment of the various Government institutions and project developers.
Outcome 1B: Municipal Targets for Biomass Energy for heating are agreed and established.	Confirmation that municipal targets have been established.	None available at the present time.	To be completed within 12 months of project start.	Published document.	Commitment of Municipalities.
Output 1B.1: National Targets for Biomass Energy in heating until 2020 are agreed and adopted.	Confirmation that national targets for agricultural an wood biomass until 2020 have been established.	None available at the present time.	To be completed within 18 months of project start.	Published document.	Commitment of Government institutions and municipalities.
Output 1B.2: Municipal Targets for Biomass Energy in heating (for at least 5 Oblasts including Ivano-Frankivsk and Cherkasy) are agreed and adopted.	Confirmation that municipal targets for agricultural and wood biomass have been agreed and adopted.	None available at the present time.	Municipal targets for at least 5 Oblasts including Ivano-Frankivsk and Cherkasy) completed within 12 months of project start.	Published document.	Commitment of 5 Oblasts including Ivano-Frankivsk and Cherkasy.
Outcome 2: Capacity available within MAPF to support development and implementation of a municipal biomass programme through the establishment of a Biomass Support Unit.	Number of staff who participated in and successfully completed capacity development programme, including training on the	None available at the present time.	Ten staff trained within 15 months of recruitment of project manager.	Training modules/number of staff trained. Project report.	Concerned institutions willing to release staff for training.

	revised and updated Municipal Biomass Guide.				
Output 2.1: A sustainable Biomass Support Unit (BSU) established within MAPF to support the municipal biomass programme during the project lifetime and beyond.	Biomass Support Unit, including website, in place and operational.	None available at the present time.	To be fully operational within 15 months of recruitment of project manager.	Biomass Support Unit in place. Project report. Evidence that BSU has been integrated within MAPF structures.	Support of MAPF ensured prior to commencement of project activities.
Output 2.2: Suitable methodology for the economic/financial evaluation of municipal biomass systems. Appropriate incentives to attract project developers.	Methodology applied by BSU for municipal biomass projects. Incentives operationalised.	Not available at the present time.	To be completed within 15 months of recruitment of project manager and applied by Government thereafter.	Project report.	Cooperation of concerned entities and staff.
Output 2.3: Technology transfer opportunities and delivery models, including development of boiler construction and installation standards, formulated and operationalised.	Reports confirming that technology models and boiler standards have been developed and are being implemented.	None at the present time.	Completed within 24 months of project start.	Project reports.	Commitment of equipment suppliers and project developers.
Output 2.4: One-stop shop within BSU to provide information and guidelines on construction licenses and permits to developers.	One-stop shop is operational. Information brochure and website are available.	Under the business-as-usual scenario, the average time to secure all required construction licenses and permits can take up to 12 months.	All construction licenses and permits are issued within 6 months following completion of feasibility studies and selection of promoters.	Signed documents.	Continued investor interest.
Output 2.5: Capacity of BSU developed to monitor and document project experience.	Capacity development material prepared, including lessons learned.	No capacity development programme.	10 BSU staff trained by the end of project.	Project reports.	Designation of staff by Government.

Outcome 3: Investment promotion in municipal use of biomass through establishment/strengthening of Financial Support Mechanism.	Funding available from DerzhZemBank, including funds under FSM, to support preparation of feasibility studies, business plans and investment.	Not presently available.	Construction of at least 18 municipal biomass projects completed by the end of the project.	Signed Heat and Hot Water Purchase Agreements and other relevant documents.	Government has a sustainable financing mechanism in place.
Output 3.1: Financial Support Mechanism (FSM) established within DerzhZemBank of MAPF and continues to operate beyond project lifetime.	Financial Support Mechanism (FSM) established and operationalized and is supporting projects to be implemented.	None available at the present time.	FSM is operational 2 years after project start. As a mid-term target, the project will look into an eventual need for further subsidy and subsequent support to the Government for continuing with the subsidy scheme.	Applications for loans from project developers processed. Disbursements made to project developers.	Cooperation of MAPF and DerzhZemBank. Sustained interest of developers.
Output 3.2: Capacity developed within FSM to appraise projects in municipal use of biomass for lending.	Number of financial institution's staff successfully trained.	None available at the present time.	Five to six financial institution staff trained within 15 months of recruitment of project manager.	Number of staff trained. Project report.	Cooperation of DerzhZemBank.
Output 3.3: Feasibility studies and business plans for municipal biomass heat and hot water systems.	Reports available.	Non-existent at the present time.	Completed within 18 months of project start.	Project documentation.	All necessary data available to project developers.
Output 3.4: Reports on financial closure with project developers and completion reports for one project each in Cherkasy and Ivano-Frankivsk Oblasts and 4 additional projects in other Oblasts.	Signed financial closure documents.	Not presently available.	Completed within 30 months of project start.	Project reports.	Supportive financial regulations in place. Sustained interest of developers.
Output 3.5: Report on completion of a total of 18 municipal biomass heat and hot water systems by project	Completion reports.	Almost none being built at the present time.	18 municipal biomass heating and hot water systems completed by	Site visits and project reports.	Supportive policy, institutional, legal and regulatory framework,

end.			project end which will have generated 1,618,834 MWhTHin thermal energy with a combined amount of CO2 reduced of 361,000 tons over the 20 year lifetime of the boilers.		and sustained interest of investors.
Outcome 4: Outreach programme and dissemination of project experience/best practices/lessons learned for replication throughout the country.	Outreach programme formulated. Project experience compiled, analysed and disseminated.	Lack of sufficient information to pursue programme.	Increased awareness among stakeholders in place to promote and develop the market for municipal biomass.	Project final report and website.	Growth of programme will be sustained.
Output 4.1: National plan to implement outreach/promotional activities to support biomass projects targeting domestic (and international) investors.	National Plan for supporting national biomass projects available and operationalised.	No such plan available.	Completed within 18 months of project initiation.	Project documentation.	Expected expansion of programme.
Output 4.2: Comprehensive and reliable data compiled and available for future initiatives.	Project experience, lessons learned and best practices compiled.	None available.	Completed within 3 months of project end.	Project documentation.	Successful completion of project.
Output 4.3: Published Municipal Biomass Guide detailing a step-by-step approach for implementing municipal biomass programmes.	Increased capacity of municipalities to implement municipal biomass programmes.	None available.	Completed within 12 months of project initiation.	Project publication.	On-time finalisation of Municipal Biomass Guide.
Output 4.4: Published materials (including video) on project experience/best practices and lessons learned.	Project experience and best practices compiled, published and available on website. Short video available.	Lack of information on best practices and lessons learned. None available.	Completed within 3 months of project end. Completed within 3 months of project end.	Project documentation and web site. Video posted on website.	Successful completion of project. Successful completion of project.

	Annual Summit of the Regions Biomass Conference.	None is being held.	Annual Summit of the Regions Biomass Conference organised in a different region each year.	Conference Proceedings.	Project activities are proceeding as per plans.

TOTAL BUDGET AND WORK PLAN

Award ID:	00074537	**Project ID(s):**	00086891
Award Title:	Development and Commercialization of Bioenergy Technologies in the Municipal Sector in Ukraine		
Business Unit:	UKR 10		
Project Title:	Development and Commercialization of Bioenergy Technologies in the Municipal Sector in Ukraine		
PIMS no.	2921		
Implementing Partner (Executing Agency)	Ministry of Agrarian Policy and Food of Ukraine		

GEF Outcome/ Atlas Activity	Responsible Party/ Implementing Agency	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Total (USD)	Budget Notes
Outcome 1: Streamlined and comprehensive market-oriented policy and legal/regulatory framework to promote municipal biomass for heat and hot water services.	**MAPF**	**62000**	**GEF**	71200	International Consultants	75,000	50,000	25,000	25,000	175,000	Partial costs of N-R CTA and consultant for policy/regulat. framework.
				71300	Local Consultants	30,000	30,000	15,000	15,000	90,000	Policy and strategy documents and criteria for selection/award of projects.
				71600	Travel	10,000	10,000	10,000	10,000	40,000	Inception and training w/shops.
				74200	Publications	10,000	10,000	10,000	10,000	40,000	Strategy document, criteria/procedures.
				74500	Miscellaneous	10,000	5,000	5,000	5,000	25,000	
					Total Outcome 1	**135,000**	**105,000**	**65,000**	**65,000**	**370,000**	
Outcome 2: Capacity available within MAPF to support development and implementation of a municipal biomass programme through	**MAPF**	**62000**	**GEF**	71200	International Consultants	50,000	50,000	25,000	25,000	150,000	Partial costs of N-R CTA and consultant to support BSU.
				71300	Local Consultants	30,000	20,000	20,000	10,000	80,000	Technology transfer models and one-stop shop.
				72100	Contractual services	60,000	25,000	15,000	0	100,000	Methodology and computer programme for ecofin evaluation.

the establishment of a Biomass Support Unit.				71600	Travel	15,000	10,000	10,000	10,000	45,000	Site visits to Oblast Admin.
				72200	Equipment/Software	25,000	0	0	0	25,000	Equipment for undertaking ecofin evaluation.
				72800	Software	0	10,000	10,000	10,000	30,000	Software for undertaking ecofin evaluation
				74200	Publications	10,000	10,000	5,000	5,000	30,000	Website, video and brochures.
					Total Outcome 2	**190,000**	**125,000**	**85,000**	**60,000**	**460,000**	
Outcome 3: Investment promotion in municipal biomass through establishment and strengthening of a Financial Support Mechanism (FSM).	**MAPF**	**62000**	**GEF**	71200	International Consultants	100,000	50,000	0	0	150,000	Partial costs of N-R CTA and consultant to support FSM.
				71300	Local Consultants	10,000	10,000	10,000	10,000	40,000	Capacity development for FSM.
				72100	Contractual Services (Investment Support)	600,000	850,000	850,000	700,000	3,000,000	Support for feasibility studies, business plans and investment.
				72200	Equipment/Software	30,000	0	0	0	30,000	Equipment for business plan evaluation.
				72800	Software	0	20,000	0	0	20,000	Software for business plan evaluation
				74500	Miscellaneous	2,500	2,500	2,500	2,500	10,000	
					Total Outcome 3	**742,500**	**932,500**	**862,500**	**712,500**	**3,250,000**	
Outcome 4: Outreach programme and dissemination of project experience/best practices/lessons learned for replication throughout the country.	**MAPF**	**62000**	**GEF**	71200	International Consultants	23,750	53,750	23,750	38,750	140,000	Partial costs of N-R CTA and costs for mid-term review and final evaluation.
				71300	Local Consultants	30,000	30,000	40,000	40,000	140,000	Outreach programme and lessons learned.
				71600	Travel	15,000	15,000	15,000	15,000	60,000	Annual Summit of the Regions Biomass Conf.
				74200	Publications	10,000	10,000	10,000	10,000	40,000	Brochures and publications.
				74500	Miscellaneous	5,000	5,000	5,000	5,000	20,000	
					Total Outcome 4	**83,750**	**113,750**	**93,750**	**108,750**	**400,000**	

Project Management	**MAPF**	**62000**	**GEF**	71400	Project Personnel	42,262	42,262	42,262	42,262	169,048	Project Manager and Assistant.
			GEF	74599	Direct Project Cost	12,738	12,738	12,738	12,738	50,952	
					Total Management	**55,000**	**55,000**	**55,000**	**55,000**	**220,000**	
PROJECT TOTAL						**1,206,250**	**1,331,250**	**1,161,250**	**1,001,250**	**4,700,000**	

Summary of Funds[1]:

	Amount ($) Year 1	Amount ($) Year 2	Amount($) Year 3	Amount ($) Year 4	Total ($)
GEF	1,206,250	1,331,250	1,161,250	1,001,250	4,700,000
UNDP	218,000	244,000	244,000	194,000	900,000
National Government[2]	1,000,000	750,000	950,000	570,000	3,270,000
Local Government	1,500,000	1,500,000	1,500,000	637,500	5,137,500
Private Sector	4,000,000	7,000,000	7,000,000	2,750,000	20,750,000
TOTAL	**7,924,250**	**10,825,250**	**10,855,250**	**5,152,750**	**34,757,500**

[1] Summary table should include all financing of all kinds: GEF financing, co-financing, cash, in-kind, etc

2 The in-kind co-financing of the national and local government will be catalytic and strategic for the project. In particular, the project will not be executed unless the relevant decisions by the national authorities (such as the market-oriented policy and legal/regulatory framework to regulate municipal biomass for heat and hot water services; decision on the re-focused and streamlined areas of responsiblities between the three relevant ministries, decisions and operationalization of the Biomass Support Unit) are adopted. The component on project pilots will depend on the decisions of the local councils and administration about the transitions of certain municipal boiler houses (and relevant provisions on their infrastructure and land on which they are situated) from the use of the fossil fuels to the use of the agricultural biomass. These and other decisions will require the use of the time of staff of national and local authorities, in some cases, the expertise from outside experts and will involve the use of equipment, supplies, technologies, and premises of the authorities. This and similar types of support will count as in-kind co-financing and will be crucial for the project implementation.

4. MANAGEMENT ARRANGEMENTS

This Project will be implemented using UNDP Direct Implementation Modality (DIM). Taking into account that the recent events in Ukraine, there is a strong rationale to implement it under this modality.

Through its global network of highly qualified international experts and knowledge hub, UNDP Ukraine can not only provide exposure to best practices and innovations, tried and tested in other countries of the world, as well as partnerships, it can also bring in practical hands-on experience of concrete development challenges for the benefit of the country.

UNDP Ukraine will be responsible for the overall management of the project, and in particular for achieving the expected outputs. UNDP will also be accountable for the use of project resources. The Project's management arrangements are designed using the PRINCE2 project management methodology. PRINCE2 has been adopted globally by UNDP as the standard methodology to be used in managing all UNDP projects.

Implementing Partner: The UNDP will be implementing the project directly, given the multiple governmental parties benefiting from it.

Project Board: The Project Board is responsible for making, on a consensus basis, management recommendations for a project when guidance is required by the Project Manager. Particularly, the Project Board will have the responsibility to review/endorse project documents and revisions thereto, annual work plans, quarterly and annual project reports.

This Board has three roles:

Executive representing the project ownership to chair the group. For this project, the Resident Representative will assume the role of Project Board Executive.

Senior Supplier role to provide guidance regarding the technical feasibility of the project. This role will be assumed by UNDP's Deputy Resident Representative

Senior Beneficiary role to ensure the realization of project benefits from the perspective of project beneficiaries. This role will be fulfilled by relevant line ministries, as well as regional and local government.

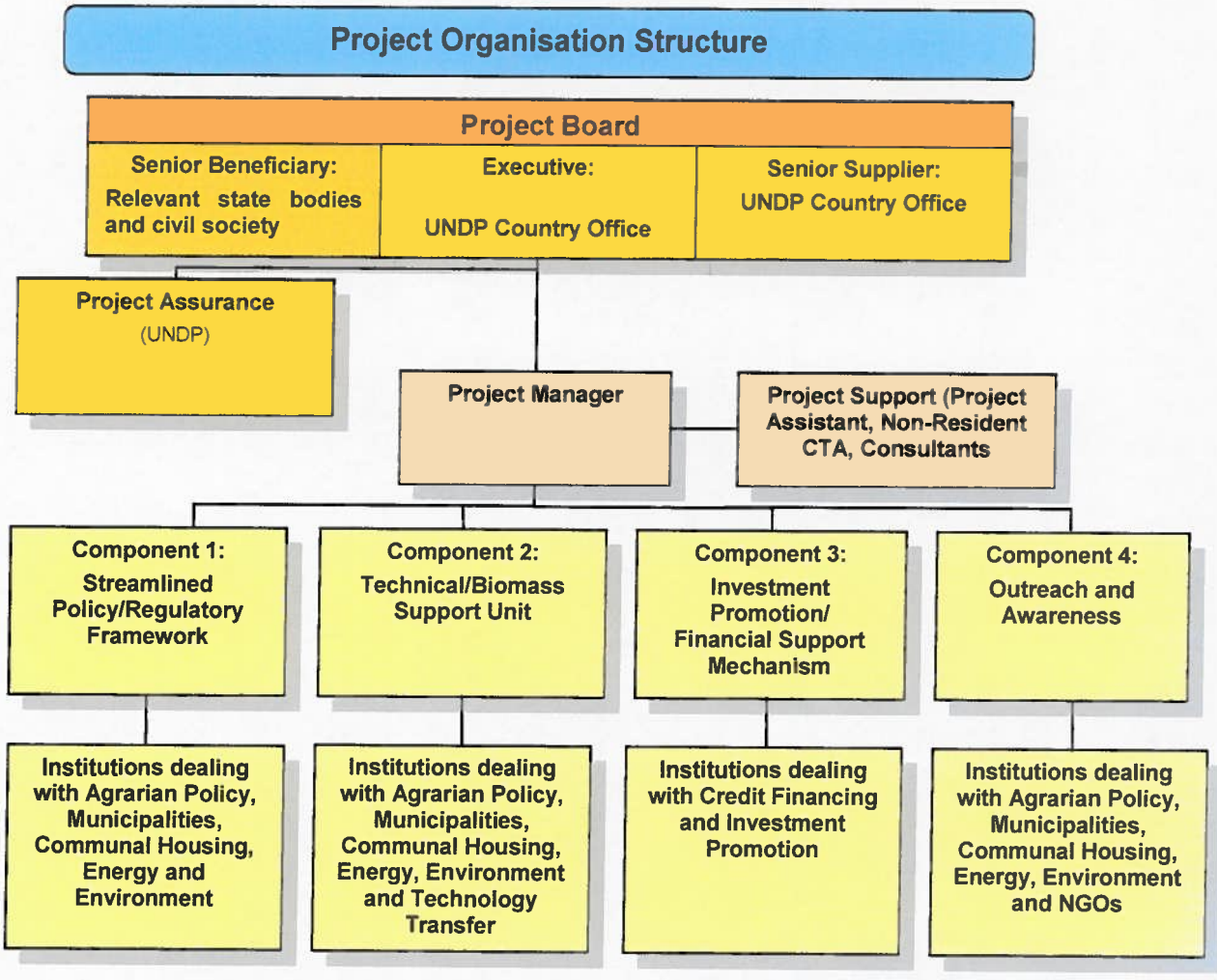
To discuss the strategic issues of the project activities and its impact, and to ensure that best available international and national expertise is given due consideration in formulating the project strategy, the Project Board may decide to invite to its meetings other stakeholders.

Project Assurance: The Project Assurance role supports the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed. This role will be performed by relevant UNDP Ukraine Programme Managers.

The PM will be responsible for overall project coordination and implementation, consolidation of work plans and project papers, preparation of quarterly progress reports, reporting to the project supervisory bodies, and supervising the work of the project experts and other project staff. The PM will also closely coordinate project activities with relevant Government and other institutions and hold regular consultations with project stakeholders. In addition, a Project Assistant (PA) will be recruited to support the PM on administrative and financial issues.

The Project Manager will be supported by a non-resident Chief Technical Adviser (CTA), short-term international and national experts/consultants who will support implementation of specific technical assistance components of the project. Contacts with experts and institutions in other countries that have already gained more experience in implementing bioenergy projects, related policies and financial support measures are also to be established.

Finally, the UNDP CO will provide specific support services for proper project implementation, as required, through its Administrative, Programme and Finance Units and through support from Bratislava Regional Centre. Specific support services will include support for annual PIR review (project implementation review), mid-term review and final evaluation. An organogram representing the implementation arrangement is presented below.



Project implementation will be governed by the provisions of the present Project Document and Programme and Operations Policy and Procedure (POPP). UNDP Ukraine will maintain oversight and management of the overall project budget, utilizing a direct payment modality.

5. MONITORING AND EVALUATION

UNDP Ukraine will be responsible for monitoring and evaluation (M&E), including organizing project evaluations, approving annual implementation work plans and budget revisions, monitoring progress, identifying problems and suggesting remediating actions, facilitating timely delivery of project outputs and supporting the coordination and networking with other related initiatives and institutions in the country and in the region.

During implementation, proper care will be exercised to have adequate communication and co-ordination mechanisms in place to ensure that areas of common interest can be addressed in a cost-efficient way.

The project will be monitored through the following M&E activities. The M&E budget is provided in the table below.

Project start:
A Project Inception Workshop will be held within the first 2 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and programme advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.

The Inception Workshop should address a number of key issues including:

a) Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RCU staff vis-à-vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.
b) Based on the project results framework and the relevant GEF Tracking Tool, if appropriate, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
c) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
d) Discuss financial reporting procedures and obligations, and arrangements for annual audit.
e) Plan and schedule Project Board meetings. Roles and responsibilities of all project organisation structures should be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.

An Inception Workshop report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

Quarterly:

- Progress made shall be monitored in the UNDP Enhanced Results Based Managment Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Note that for UNDP GEF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes, or capitalization of ESCOs are automatically classified as critical on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical).
- Based on the information recorded in Atlas, a Project Progress Reports (PPR) can be generated in the Executive Snapshot.
- Other ATLAS logs can be used to monitor issues, lessons learned etc. The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard

Annually:

- Annual Project Review/Project Implementation Reports (APR/PIR): This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements.

  The APR/PIR includes, but is not limited to, reporting on the following:

- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
- Project outputs delivered per project outcome (annual).
- Lesson learned/good practice.
- AWP and other expenditure reports
- Risk and adaptive management
- ATLAS QPR
- Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

Periodic Monitoring through site visits:

UNDP CO and the UNDP RCU will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Board may also join these visits. A Field Visit Report/BTOR will be prepared by the UNDP CO and UNDP RCU and will be circulated no less than one month after the visit to the project team and Project Board members.

Mid-term of project cycle:

The project will undergo an independent Mid-Term Review at the mid-point of project implementation around September/October 2015. The Mid-Term Review will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term review will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term review will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Center (ERC).

The relevant GEF Focal Area Tracking Tools will also be completed during the mid-term review cycle.

End of Project:

An independent Final Evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term review, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.

The Final Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Center (ERC).

The relevant GEF Focal Area Tracking Tools will also be completed during the final evaluation.

During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

Learning and knowledge sharing:

Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums.

The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyse, and share lessons learned that might be beneficial in the design and implementation of similar future projects.

Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

Communications and visibility requirements:

Full compliance is required with UNDP's Branding Guidelines. These can be accessed at http://intra.undp.org/coa/branding.shtml, and specific guidelines on UNDP logo use can be accessed at: http://intra.undp.org/branding/useOfLogo.html. Amongst other things, these guidelines describe when and how the UNDP logo needs to be used, as well as how the logos of donors to UNDP projects needs to be used. For the avoidance of any doubt, when logo use is required, the UNDP logo needs to be used alongside the GEF logo. The GEF logo can be accessed at: http://www.thegef.org/gef/GEF_logo. The UNDP logo can be accessed at http://intra.undp.org/coa/branding.shtml.

Full compliance is also required with the GEF's Communication and Visibility Guidelines (the "GEF Guidelines"). The GEF Guidelines can be accessed at: http://www.thegef.org/gef/sites/thegef.org/files/documents/C.40.08_Branding_the_GEF%20final_0.pdf. Amongst other things, the GEF Guidelines describe when and how the GEF logo needs to be used in project publications, vehicles, supplies and other project equipment. The GEF Guidelines also describe other GEF promotional requirements regarding press releases, press conferences, press visits, visits by Government officials, productions and other promotional items.

Where other agencies and project partners have provided support through co-financing, their branding policies and requirements should be similarly applied.

M&E Work Plan and Budget

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame
Inception Workshop and Report	▪ Project Manager ▪ UNDP CO, UNDP GEF	Indicative cost: 12,000	Within first two months of project start up
Measurement of Means of Verification of project results.	▪ UNDP GEF RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members.	To be finalized in Inception Phase and Workshop.	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on *output and implementation*	▪ Oversight by Project Manager ▪ Project team	To be determined as part of the Annual Work Plan's preparation.	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	▪ Project manager and team ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG	None	Annually

Type of M&E activity	Responsible Parties	Budget US$ Excluding project team staff time	Time frame
Periodic status/ progress reports	▪ Project manager and team	None	Quarterly
Mid-term Review	▪ Project manager and team ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost: 25,000	At the mid-point of project implementation.
Final Evaluation	▪ Project manager and team, ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost : 25,000	At least three months before the end of project implementation
Project Terminal Report	▪ Project manager and team ▪ UNDP CO ▪ local consultant	0	At least three months before the end of the project
Audit	▪ UNDP CO ▪ Project manager and team	Indicative cost per year: 3,000	Yearly
Visits to field sites	▪ UNDP CO ▪ UNDP RCU (as appropriate) ▪ Government representatives	For GEF supported projects, paid from IA fees and operational budget	Yearly
TOTAL indicative COST Excluding project team staff time and UNDP staff and travel expenses		US$ 74,000 (+/- 5% of total budget)	

6. LEGAL CONTEXT

This document together with the CPAP signed by the Government and UNDP which is incorporated by reference constitute together a Project Document as referred to in the SBAA and all CPAP provisions apply to this document.

Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.

The implementing partner shall:

a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;

b) assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained

by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

Audit Clause: The project will be subject to an annual audit that will be conducted in accordance with UNDP Financial Rules and Regulations, and applicable audit policies for UNDP projects.

7. ANNEXES

Annex 1 – Offline risk log
Annex 2 – Terms of Reference
Annex 3 – Letters of Co-financing and Support from the Government
Annex 4 – Indicative list of some installed biomass boilers
Annex 5 – List of some major pellet/briquette producers
Annex 6 – List of NGOs working on biomass energy (including women NGOs)
Annex 7 – Environment and social screening summary

ANNEX 1: OFFLINE RISK LOG

#	Description	Date identified	Type	Impact & Probability	Countermeasures / Mgt response	Owner	Submitted, updated by	Last Update	Status
1.	Political: Lack of political will to adopt a necessary policy and legal/regulatory framework.	During PIF formulation.	Policy	P = 2 I = 3	This risk will be mitigated by creating a coalition of interested parties including the association of Municipalities for Biomass Energy in Ukraine, government, private project developers, and NGOs like the Bioenergy Association of Ukraine and others. The coalition will work together to encourage and support investment in bioenergy projects in the municipal sector.	CO to monitor.			
2.	Institutional: Apprehension that the likelihood of a biomass programme for municipal heat and hot water services may not take off.	During PIF formulation.	Policy	P = 2 I = 3	A Biomass Support Unit will be established within the Ministry of Agrarian Policy and Food to develop and support a National Programme on Biomass, including raising awareness, which would target both national and international investors. In addition, there is already investor interest in developing business opportunities in the municipal biomass sector.	CO to monitor.			
3.	Bio-energy technology failure.	During PIF formulation.	Technical	P = 1 I = 1	Bioenergy technologies are generally well known and are widely used in the rest of the world, including neighbouring EU countries. The project will be designed and implemented to identify, transfer and adopt best available bioenergy technologies	CO to monitor.			

#	Description	Date identified	Type	Impact & Probability	Countermeasures / Mgt response	Owner	Submitted, updated by	Last Update	Status
					and practices in Ukraine. There are also several companies in Ukraine which have started boiler manufacturing under license with foreign companies, including a share of foreign components.				
4.	Biomass supply chain disruptions.	During PIF formulation.	Operational	P = 2 I = 2	Economic efficiency of energy use of biomass is dependent on the logistics of the full chain of biomass harvesting/collection, processing and supply. The project will work with the different partners in the biomass supply chain to minimise disruptions from cultivation all the way to delivery at the boiler site.	CO to monitor.			
5.	Low domestic demand for bioenergy in municipalities.	During PIF formulation.	Operational	P = 1 I = 2	Although more than 90% of produced pellets (from wood chips and sunflower husks) in Ukraine are exported to the European Union, the increase in gas prices would facilitate domestic demand for agricultural biomass which is not widely utilized at the present time. Moreover, this project will promote and encourage demand in the municipal sector for biomass-based heat and hot water services.	CO to monitor.			
6.	Environmental.	During PIF formulation.	Environmental	P = 2 I = 2	There are multiple environmental risks which are potentially associated with development and deployment of bioenergy technologies. On the resource supply, the risk will be mitigated	CO to monitor.			

#	Description	Date identified	Type	Impact & Probability	Countermeasures / Mgt response	Owner	Submitted, updated by	Last Update	Status
					by focusing on ready available straw and wood waste (thus minimizing existing negative environmental impact from their uncontrolled combustion/storage). In addition, environmental risk management will be carefully integrated and studied in the course of technology development for biomass combustion in order to avoid any potential negative impact.				
7.	Financial: Lack of commitment from private and public sector to invest in municipal biomass.	During FSP formulation.	Financial	P = 1 I = 2	Already during the project design stage several potential investors participated in the municipal biomass projects competition, signifying their interest and commitment to invest provided a conducive and appropriate investment environment is created.	CO to monitor.			
8.	Financial: DerzhZemBank experiences longer than expected loan processing times, resulting in hardships to potential investors.	During FSP formulation.	Financial	P = 2 I = 3	DerzhZemBank became operational on 1 January 2013, under the purview of the Ministry of Agrarian Policy and Food, and is still in a "running-in" period with regard to its banking operations. This Bank will "host' a Financial Support Mechanism to provide loans to potential investors, while also managing the investment grant from GEF. Thus, the project is in a unique position towards "moulding" the Bank in the right direction from almost its very start.	CO to monitor.			

#	Description	Date identified	Type	Impact & Probability	Countermeasures / Mgt response	Owner	Submitted, updated by	Last Update	Status
					It is not expected that disbursements for municipal biomass will start right after initiation of project activities; however, monitoring of the Bank's operations will take place to ensure that lending for such activities stays on track.				
9.	Insufficient Information and Awareness.	During PIF formulation.	Operational	P = 1 I = 2	Biomass is often perceived as waste with zero cost and insufficient information on bioenergy technologies is typical for Ukraine. However, since 2002 international Ukrainian conferences on biomass have become regular events in the country and BSU will support and participate in these conferences. Ukraine has also sufficient scientific, technological and engineering base for production of certain RES technologies.	CO to monitor.			

P = Probability on a scale from 1 (low) to 5 (high). **I** = Impact on a scale from 1 (low) to 5 (high).

ANNEX 2: TERMS OF REFERENCE

1. Project Manager

Post title:	Project Manager (Full-time)
Office:	Project Management Unit (PMU)
Organisation:	Ministry of Agrarian Policy and Food (MAPF)
Duration of Employment:	One year with possibility of extension
Duty station:	Kyiv, Ukraine

II. Duties

- Lead, manage and coordinate the day-to-day activities of the PMU to be established within MAPF including administration, accounting, technical expertise, and actual project implementation and reporting;
- Lead the development of project design including preparation of consultants' and sub-contractors' terms of reference, identification and selection of national and international sub-contractors/consultants, cost estimation, time scheduling, contracting, and reporting on project activities and budget;
- Monitor and follow-up on the status of delivery by consultants, sub-contractors, etc.
- Coordinate activities of consultants including contract management, direction and supervision of field operations, logistical support, review of technical outputs/reports, measurement/assessment of project achievements and cost control;
- Assist in the design, supervision and outreach activities of the project;
- Provide technical support to municipal biomass policy discussions and development;
- Act as a liaison/facilitator among the various stakeholders, including the private sector, international and national partners;
- Assume responsibility for the quality and timing of project outputs;
- Establish and maintain relationships and act as the key focal point with UNDP CO to ensure that all programming, financial and administrative matters related to the project are transparently, expediently and effectively managed, in line with established UNDP Rules and Regulations.
- Undertake other management duties that contribute to the effective implementation of the project.

III. Qualifications and Experience

Education:	• Master's degree or equivalent in engineering, economics, international development, social sciences, public administration or other relevant field.
Experience:	• Minimum of 5 years of experience in management, preferably in the energy field. • Proven ability to draft, edit and produce written proposals and results-focussed reports. • Proven experience working with Government, civil society, international organizations or donors in combination with the knowledge of economic and financial analysis, institutional, regulatory and policy frameworks. • Good knowledge of and experience GEF Climate Change issues, operational modalities and familiarity with UNDP-GEF procedures; • Familiarity with UNDP rules, regulations and administrative procedures; • Prior knowledge and experience of the political, social and environmental factors and issues related to energy development and climate change mitigation in island

	countries; • Experience in the use of computers and office software packages (MS Word, Excel, etc.)
Language Requirements:	• Excellent Ukrainian, Russian and English, both written and oral.

2. Project Assistant

I. Position Information	
Post title:	Project Assistant (Full-time)
Office:	Project Management Unit (PMU)
Organisation:	Ministry of Agrarian Policy and Food (MAPF)
Duration of Employment:	One year with possibility of extension
Duty station:	Kyiv, Ukraine

II. Functions

Under the overall supervision of the Project Manager, the Project Assistant will:

- Support the activities of international/national experts, potential investors and sub-contractors;
- Provide administrative support re. typing, filing, arranging visas for international experts/sub-contractors, maintaining project's financial records, etc.;
- Administer project accounting as per UNDP procedures;
- Assist the Project Manager in organising workshops, meetings of the Project Board and other events.
- Assist in procurement of goods and services;
- Draft letters of invitation and agendas for meetings of Project Board/workshops;
- Prepare background information, briefing materials, reports, etc., as required;
- Draft minutes of meetings, monitor/follow-up on actions required.

III. Qualifications and Experience

Education:

- Higher education in economics, management, accounting, finance or other related field.
- Specialized training in finance is desirable

Experience:

- 3 years of relevant administrative, accounting and financial experience at national and/or international level.
- Experience in the usage of computers and office software packages (MS Word, Excel, etc.).
- Previous experience of working for nationally executed programme (s) funded by bilateral/multilateral organisations.
- Practical experience in procurement will be an asset.

Language Requirements:

- Excellent Ukrainian, Russian and English, both written and oral.

3. Chief Technical Adviser (Non-resident)

Post title:	Chief Technical Adviser (Non-Resident)
Office:	Project Management Unit (PMU)
Organisation:	Ministry of Agrarian Policy and Food (MAPF)
Duration of Employment:	24 weeks (over a 4-year period) (30 days per year including 2 missions of 5 days. Contracts for 12 months, renewable based upon performance)
Duty station:	Home Office and Kyiv, Ukraine

II. Duties

Under the overall supervision of the National Project Director, the non-resident Chief Technical Adviser will:

- Work closely with the PM in coordinating and facilitating inputs of government agencies, partner organizations, scientific and research institutions, subcontractors, and national and international experts in a timely and effective manner;
- Provide guidance and assistance to the PM and project staff to ensure that the project activities conform to the approved project document;
- Assist the PM during the initial 2 months of the project, in the preparation of an "inception report" which will elaborate on the project Logical Framework Matrix and planned project activities, the 1st year Annual Work Plan and Budget, ToRs for key project staff, and an M&E plan;
- Assist the PMU in development of relevant ToRs and recruitment/mobilization of qualified national and international experts and organizations as needed to provide specific consultancy and engineering services;
- In close cooperation with the PMU and UNDP's Focal Point on Energy and Environment, and in consultation with the project partner organizations and stakeholders, prepare Annual Project Work Plans to be agreed upon by the Project Board (PB);
- Provide "on-the-job" technical guidance and mentoring to the PMU in order to strengthen their capacity to effectively implement the technical aspects of the project;
- Support the PM in reporting to the PB on the progress of project implementation and achievement of project results in accordance with the project's logical framework matrix;
- Support the PMU in project-related meetings, as required;
- Review reports of national and international consultants, project budget revisions, and administrative arrangements as required by UNDP/GEF procedures;
- Assist the PM in the development of a concrete Monitoring and Evaluation Plan at the outset of the project (within inception report);
- Support the PM in preparing project progress reports, information releases, as well as monitoring and review reports in accordance with UNDP/GEF monitoring and evaluation rules and procedures;
- Support the PM in the preparation and implementation of mid-term and final Independent Evaluation Missions (TOR's, identification and recruitment of appropriate candidates, organization of missions, joint field missions and discussion with evaluators, etc.);
- Support UNDP CO staff on their annual monitoring visits to project sites.

III. Qualifications and Experience

Education:	• Postgraduate degree in energy/renewable energy development.

Experience:	• Minimum ten years of experience in implementing renewable energy projects in combination with knowledge of economic and financial analysis, institutional, regulatory and policy frameworks; • Good knowledge of and experience with GEF Climate Change issues, operational modalities and familiarity with UNDP-GEF procedures; • Familiarity with UNDP rules, regulations and administrative procedures; • Prior knowledge and experience of the political, social and environmental factors and issues related to energy development and climate change mitigation in Eastern Europe, preferably in Ukraine; • Computer proficiency, especially related to professional office software packages; • Excellent drafting and communication skills.
Language Requirements:	• Excellent English, both oral and written. Knowledge of Ukrainian/Russian will be an advantage.

Project Consultants

TECHNICAL ASSISTANCE	
LOCAL CONSULTANTS	
Component 1	
Position/Title	***Tasks to be performed***
Policy Consultant (s)	S/he will undertake the following activities: • Review existing policies regarding municipal biomass. • Support the formulation of policy to regulate municipal biomass for heat and hot water services. • Support the drafting of document that clearly outlines the roles and responsibilities of MAPF and MRDCHCS in municipal district heating. • Assist in developing guidelines for the selection of municipal biomass projects for development. Estimated person weeks: 60
Component 2	
Consultant (s) on technology transfer and one-stop shop	S/he will undertake the following activities: • Support the international consultant in identifying technology transfer opportunities, including cooperation possibilities with neighbouring countries, and formulate appropriate delivery models with local developers. • Develop targets for municipal district heating in 5 Oblasts. • Liaise with BSU and developers to create an enabling environment that favours technology transfer. • Determine the staffing requirements, draft staff profiles and participate in capacity development of one-stop shop staff.

	Estimated person weeks: 25
BSU Capacity Development Consultant	S/he will undertake the following activities: • Formulate a capacity development programme for selected staff to monitor and document project experience. • Prepare inter-active training materials for participants. • Participate in the implementation of the capacity development programme. Estimated person weeks: 15
Component 3	
Consultant to support capacity development within FSM.	S/he will undertake the following activities • Support international consulting firm in developing FSM procedures for business plan evaluation. • Support international consulting firm in developing FSM capacity to appraise municipal biomass projects for lending. Estimated person weeks: 20
Component 4	
Consultant(s) on Outreach and Results dissemination	S/he will undertake the following activities: • Prepare report on project experience/best practices and lessons learned. • Disseminate project overall results, experiences and lessons learned through website, videos and publications. • Organize Annual Summit of the Regions Biomass Conference to present the lessons learned to stakeholders. Estimated person weeks: 70
INTERNATIONAL CONSULTANTS	
Component 1	
Position/Title	***Tasks to be performed***
Policy Consultant	S/he will undertake the following activities: • Support local consultant (s) in review existing policies regarding municipal biomass. • Formulate policy to regulate municipal biomass for heat and hot water services. • Draft document that clearly outlines the roles and responsibilities of MAPF and MRDCHCS in municipal district heating. • Developing guidelines for the selection of municipal biomass projects for development. Estimated person weeks: 25
Component 2	
Technology transfer and BSU capacity development consultant (s)	S/he will undertake the following activities: • Identifying technology transfer opportunities, including cooperation possibilities with neighbouring countries, and formulate appropriate delivery models with in consultation with local developers. • Liaise with BSU and developers to create an enabling environment that favours technology transfer.

	• Determine the staffing requirements, draft staff profiles and participate in capacity development of one-stop shop staff. • Formulate a capacity development programme for selected staff to monitor and document project experience. • Prepare inter-active training materials for participants. • Participate in the implementation of the capacity development programme. Estimated person weeks: 25
Component 3	
Consultant to support capacity development within FSM.	S/he will undertake the following activities: • Formulate FSM procedures for business plan evaluation. • Draft and implement programme to develop FSM capacity to appraise municipal biomass projects for lending. • Support FSM in reaching financial closure with investors. Estimated person weeks: 30
Component 4	
Consultant on Outreach and Results dissemination	S/he will undertake the following activities: • Formulate plan to implement outreach/promotional activities targeting investors. • Prepare outreach/promotional material. Estimated person weeks: 20

ANNEX 3: LETTERS OF CO-FINANCING AND SUPPORT FROM THE GOVERNMENT

Provided in separate file.

ANNEX 4: INDICATIVE LIST OF SOME INSTALLED BIOMASS BOILERS

No.	Location and Year Installed	Power	Efficiency	Type of biomass
1	«Cherkassyteplocomunenergo», Cherkassy (2011)	2.5 MW_{Th}	86%	Straw waste, wood waste
2	"Rodon Plant" Ivano-Frankivsk (2009)	1.4 MW_{Th}	92%	Straw and wood waste
3	Stavy Village, Kyiv region (2009)	0.35 MW_{Th}	83%	Straw bales
4	Agrofirm DiM, Drozdy Village, Kyiv region (2000)	1.0 MW_{Th}	81%	Straw bales
5	Malyn Derzhlisgosp, Zhytomyr region (2000)	1.5 MW_{Th}		Wood chips, sawdust
6	Uman, Kyiv region (2012)	0.5 MW_{Th}	80%	Straw pellets
7	Village Schastlivoe, Kyiv region (2010)	4.5 MW_{Th}	90%	Wood chips
8	Village school, Vakhnivka village, Vinnytsia	0.3 MW_{Th}	82%	Straw

	region (2009)			
9	Village school, Olhopil village, Vinnytsia region (2009)	0.3 MW_{Th}	82%	Straw
10	Village school, Rososha village, Vinnytsia region (2010)	0.6 MW_{Th}	84%	Straw
11	Village school, Chkalovo village, Zaporizhzhia region (2010)	0.6 MW_{Th}	84%	Straw
12	Village school Poltavka village, Zaporizhzhia region (2010)	0.3 MW_{Th}	82%	Straw
13	Village school, Uizdtsi village, Rivne region (2011)	0.3 MW_{Th}	82%	Straw
14	Woodworking enterprise, Orzhiv, Rivne region (2000)	5.0 MW_{Th}	90%	Wood chips, sawdust, bark

ANNEX 5: LIST OF SOME MAJOR PELLET/BRIQUETTE PRODUCERS*

No.	Name	Location	Productivity (thousand tons - 2010)	Contact information
1	Vin-Pellets	Vinnitsia region	75	http://98589.ua.all.biz
2	KSG Agro	Dnepropetrovsk Region	90	www.ksgagro.com
3	Grinevsky Pellet Plant Ltd.	Sumy region	6	http://www.prometheus.in.ua
4	Ecobioprom Ltd.	Chernigiv region	4.4	http://ecobioprom.com/
5	Ecoprime Ltd.	Sumy region	20	http://www.ecoprime.com.ua
6	Forest Ukraine Ltd.	Kyiv region	1.2	http://mdo.marketing.vc/enterprise?id=30972751
7	Barlinek Invest Ltd.	Vinnitsia region	27.5	http://www2.ucci.org.ua/
8	Ecogran Ltd.	Malyn city, Zhytomyr region	50	http://ekopellet.com.ua/
9	Europellets	Village Pyrne (Vyshgorod), Kyiv region	6	http://europellets.zenako.ua/index_en.htm

* More information is available at http://pellets-wood.com/ (paid service)

ANNEX 6: LIST OF NGOS WORKING ON BIOMASS ENERGY (INCLUDING WOMEN NGOS)

No.	Name	Contact information
1	Bioenergy Association of Ukraine	http://www.uabio.org/

2	Scientific Engineering Centre "Biomass" Ltd. (SECB)	http://biomass.kiev.ua/en/
3	Kiev International Energy Club "Q-Club"	http://www.qclub.org.ua/en/
4	SALIX Energy Agro-Energy Company	http://www.salix-energy.com/en/
5	La-Strada	http://www.la-strada.org.ua/
6	Ukrainian Women's Fund (UWF)	http://www.uwf.kiev.ua/en_index.htm
7	Ukrainian Educational Reform Centre	http://cure.org.ua/
8	School of Equal Opportunities	http://www.gender-ua.org/en/
9	All-Ukrainian Women Centre of Information and Social-Economic Adaptation	Tel/Fax: (044) 244 18 82

The participation of NGOs will be solicited in the implementation of the following:

- Socio-economic analyses and studies.
- Gender mainstreaming.
- Community awareness and participation in project activities.
- Partnership between producers of biomass and developers of municipal biomass systems.
- Monitoring of any potential impact of the biomass supply chain on the health of communities being served.

ENVIRONMENTAL AND SOCIAL SCREENING SUMMARY

Name of Proposed Project: Development and Commercialization of Bioenergy Technologies in the Municipal Sector of Ukraine

A. Environmental and Social Screening Outcome

☒ Category 1. No further action is needed

☐ Category 2. Further review and management is needed. There are possible environmental and social benefits, impacts, and/or risks associated with the project (or specific project component), but these are predominantly indirect or very long-term and so extremely difficult or impossible to directly identify and assess.

☐ Category 3. Further review and management is needed, and it is possible to identify these with a reasonable degree of certainty. If Category 3, select one or more of the following sub-categories:

> ☐ Category 3a: Impacts and risks are limited in scale and can be identified with a reasonable degree of certainty and can often be handled through application of standard best practice, but require some minimal or targeted further review and assessment to identify and evaluate whether there is a need for a full environmental and social assessment (in which case the project would move to Category 3b). See Section 3 of the Review and Management Guidance.
>
> ☐ Category 3b: Impacts and risks may well be significant, and so full environmental and social assessment is required. In these cases, a scoping exercise will need to be conducted to identify the level and approach of assessment that is most appropriate. See Section 3 of Review and Management Guidance.

B. Environmental and Social Issues (for projects requiring further environmental and social review and management)

NOT REQUIRED

C. Next Steps (for projects requiring further environmental and social review and management):

NOT REQUIRED

D. Sign Off

Project Manager: olena.ovchynnikova

Signed Date: 2013-05-20

ENVIRONMENTAL AND SOCIAL SCREENING CHECKLIST

Name of Proposed Project: Development and Commercialization of Bioenergy Technologies in the Municipal Sector of Ukraine

QUESTION 1

Has a combined environmental and social assessment/review that covers the proposed project already been completed by implementing partners or donor(s)?

Answer to Question 1:. . . . . .Yes

TABLE 1.1: CHECKLIST FOR APPRAISING QUALITY ASSURANCE OF EXISTING ENVIRONMENTAL AND SOCIAL ASSESSMENT	
1. Does the assessment/review meet its terms of reference, both procedurally and substantively?	Yes
2. Does the assessment/review provide a satisfactory assessment of the proposed project?	Yes
3. Does the assessment/review contain the information required for decision-making?	Yes
4. Does the assessment/review describe specific environmental and social management measures (e.g. mitigation, monitoring, advocacy, and capacity development measures)?	Yes
5. Does the assessment/review identify capacity needs of the institutions responsible for implementing environmental and social management issues?	Yes
6. Was the assessment/review developed through a consultative process with strong stakeholder engagement, including the view of men and women?	Yes

7. Does the assessment/review assess the adequacy of the cost of and financing arrangements for environmental and social management issues?	Yes

SIGNATURE PAGE
Country: Ukraine

UNDAF Outcome (s)/Indicator (s): #2 – Reduced energy, resource and carbon intensity of economy through the application of energy efficient technologies, renewable and alternative sources of energy

CP Outcome(s): Policy frameworks and mechanisms adopted to ensure reversal of environmental degradation, climate change mitigation and adaptation, and prevention and response to natural and man-made disasters.

CPAP Output(s): Output 6: National and local capacities for climate change resilient policies and practices enhanced.

Executing Entity/Implementing Partner: United Nations Development Programme

Implementing Entity/Responsible Partner: United Nations Development Programme.

Programme Period:	2011-2015
Atlas Award ID:	00074537
Project ID:	00086891
PIMS #	2921
Start date:	June 2014
End Date:	December 2017
Management Arrangements: DIM	
PAC Meeting Date:	

Total resources required	US$ 34,757,500
Total allocated resources:	US$ 34,757,500
• UNDP	US$ 900,000
• Other:	
○ GEF	US$ 4,700,000
○ Government	US$ 3,270,000
○ Private sector	US$ 20,750,000
○ Municipalities	US$ 5,137,500

Agreed by (Executing Entity/Implementing Partner):

NAME
Date/Month/Year

SIGNATURE

Agreed by (UNDP):

24/6/2014

NAME
Date/Month/Year

SIGNATURE