



**United Nations Development Programme**  
**Country: Serbia**

**PROJECT DOCUMENT<sup>1</sup>**

**Project Title: Reducing Barriers to Accelerate the Development of Biomass Markets in Serbia**

**UNDAF Outcome(s): Outcome 2. Sustainable Development and Social Inclusion Enhanced**

2.5 - Improved mechanisms to protect the environment, ensure sustainable management of natural resources, and adapt to the impacts of global climate change on social, economic, and ecologic systems

**UNDP Strategic Plan Environment and Sustainable Development Primary Outcome:**

Environment and Sustainable Development

**UNDP Strategic Plan Secondary Outcome:** Democratic governance

**Expected CP Outcome(s):**2.5.: Improved mechanisms to protect the environment, ensure sustainable management of natural resources, and mitigate and/or adapt to the impacts of global climate change on social, economic, and ecologic systems

**Expected CPAP Output (s):** 2.5.4.3: Improved energy sector performance through enhanced market mechanisms, renewables and demand-side initiatives

**Executing Entity/Implementing Partner:** Ministry of Mining and Energy

**Implementing Entity/Responsible Partners:** Ministry of Mining and Energy, Ministry of Agriculture and Environmental Protection/UNDP

**Brief Description**

The overall objective of the project is to reduce barriers and accelerate the biomass market in Serbia. To achieve the objective, a comprehensive strategy is proposed, by developing and successfully launching a biomass support unit in the Ministry of Mining and Energy and by implementing a sustainable financial mechanism in collaboration with EBRD to support biomass projects which will continue beyond the lifetime of this project.

Programme Period:	2011-2015
Atlas Award ID:	00074238
Project ID:	00086739
PIMS #	4382
Start date:	9 June 2014
End date:	9 June 2018
Management Arrangements	NIM
PAC Meeting Date	18 February 2014

<i>Total resources required</i>	<i>US\$ 14,000,000</i>
Total allocated resources:	<u>US\$ 30,475,000</u>
Total cash-contributions:	<u>US\$ 3,155,000</u>
Regular (UNDP) (cash)	<u>US\$ 310,000</u>
Other (GEF) (cash)	<u>US\$ 2,845,000</u>
Parallel Funding:	
o Government (in-kind)	<u>US\$ 1,800,000</u>
o Other (cash)	<u>US\$ 23,800,000</u>
o Other: (in-kind)	<u>US\$ 1,720,000</u>

<sup>1</sup>For UNDP supported GEF funded projects as this includes GEF-specific requirements

**Agreed by the Ministry of Mining and Energy of the Republic of Serbia:**



21.05.2014.

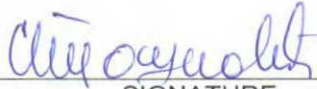
Aleksandar Antić  
Minister

SIGNATURE

Date/Month/Year



**Agreed by the Ministry of Agriculture and Environmental Protection of the Republic of Serbia:**



29.05.2014.

Snežana Bogosavljević Bošković  
Minister

SIGNATURE

Date/Month/Year



**Agreed by UNDP:**



20/5/14

Irena Vojáčková Sollorano  
Resident Representative UNDP

SIGNATURE

Date/Month/Year

## Contents

1) Situation analysis .....	5
Energy .....	5
Commitment of Serbia to reduce greenhouse gas emissions .....	5
Renewable Energy .....	6
Biomass supply .....	7
Biomass demand .....	7
Biomass for Heating .....	7
Biomass for Electricity .....	8
Barrier analysis .....	12
Project Baseline .....	14
2) Project Strategy .....	17
Project Objectives, Outcomes, Outputs and Activities .....	17
Project Risks .....	24
Expected global, national and local benefits .....	27
Country ownership: country eligibility .....	27
Financial modality and cost-effectiveness .....	27
Sustainability (including financial sustainability) .....	27
Replicability .....	27
3) Project Results Framework: .....	29
4) Total budget and workplan .....	32
5) Management Arrangements .....	40
6) Monitoring Framework and Evaluation .....	45
7) Legal Context .....	49
8) Annexes .....	50
Annex 8.1 Agreements .....	50
Annex 8.2 Terms of Reference: .....	51
Annex 8.3 Summary of findings from the PPG study .....	58
Annex 8.4 Greenhouse gas emission reduction analysis .....	60
A. Direct Emission Reductions .....	60
B. Direct Post-project Emission Reductions .....	61
C. Indirect Emission Reductions (bottom-up) .....	61
D. Indirect Emission Reductions (top-down) .....	61
Summary .....	62
Annex 8.5 Selecting appropriate ISM (Investment Support Mechanism) .....	63
Annex 8.6 Environmental and Social Screening .....	67
Annex 8.7 Letter of agreement .....	67

## List of acronyms

<b>CHP</b>	<b>Combined Heat and Power</b>
<b>CO</b>	<b>UNDP Country Office</b>
<b>CO2</b>	<b>Carbon dioxide</b>
<b>EU</b>	<b>European Union</b>
<b>GDP</b>	<b>Gross Domestic Product</b>
<b>GEF</b>	<b>Global Environment Facility</b>
<b>GHG</b>	<b>Greenhouse Gas</b>
<b>KfW</b>	<b>Kreditanstalt für Wiederaufbau (German Development Bank)</b>
<b>M&amp;E</b>	<b>Monitoring and Evaluation</b>
<b>MoME</b>	<b>Ministry of Mining and Energy</b>
<b>NGO</b>	<b>Non-Governmental Organization</b>
<b>QPR</b>	<b>Quarterly Progress Report</b>
<b>PIR</b>	<b>Project Implementation Review</b>
<b>PMU</b>	<b>Project Management Unit</b>
<b>PPG</b>	<b>Project Preparation Grant</b>
<b>RCU</b>	<b>UNDP Regional Coordination Unit</b>
<b>RTA</b>	<b>UNDP Regional Technical Adviser</b>
<b>SCTM</b>	<b>Standing Conference of Towns and Municipalities</b>
<b>toe</b>	<b>ton of oil equivalent</b>
<b>TPR</b>	<b>Tripartite Review</b>
<b>TTR</b>	<b>Terminal Tripartite Review</b>
<b>UNDAF</b>	<b>United Nations Development Assistance Framework</b>
<b>UNDP</b>	<b>United Nations Development Programme</b>
<b>UNFCCC</b>	<b>United Nations Framework Convention on Climate Change</b>
<b>UNHCR</b>	<b>Office of United Nations High Commissioner for Refugees</b>
<b>WBSEDF</b>	<b>Western Balkans Sustainable Energy Direct Financing Facility</b>

---

## 1) SITUATION ANALYSIS

### Energy

The Republic of Serbia has diverse energy supplies<sup>2</sup>. Energy generation largely relies on lignite reserves which are estimated at 3.1b tonnes (excludes reserves in Kosovo and Metohija). Serbia produces a small amount of natural gas domestically (387m m<sup>3</sup> in 2010) which covers about 16% of total gas demand while the rest is imported, mainly from Russia through Hungary (1,967m m<sup>3</sup> in 2010). Serbia also produces oil from domestic sources, covering about 31.5% of total oil supply (2.7m tonnes in 2010).

Total installed power generation capacity was 7,124 MW in 2010. This comprised 3,936 MW lignite-fired thermal power plants, 353 MW Combined Heat and Power (CHP) plants and 2,835 MW hydropower plants.

The electricity sector of Serbia was unbundled in 2005, when the independent transmission, system and market operator Elektromreže Srbije (EMS) was established by separating it from the vertically integrated public utility Elektroprivreda Srbije (EPS). Both EMS and EPS are fully state-owned companies. The electricity market of Serbia is formally open for all non-household customers, who can freely choose their electricity suppliers<sup>3</sup>. In practical terms this remains a theoretical possibility since low regulated tariffs for electricity supplied by EPS restricts new market entrants. According to an Energy Law adopted in August 2011, households and small customers will be entitled to choose suppliers from January 2015.

76% of households in Serbia use coal, wood and electrical energy for individual household heating. District heating systems serve 24% of households; district heat systems with total installed capacity of 6.6 GWth are located in approximately 55 cities and municipalities. Most district heat plants have heat-only boilers fuelled by natural gas with the ability to switch to heavy fuel oil, lignite and brown coal<sup>4</sup>.

District heating is considered to be a social service and most district heat companies are owned by municipalities and do not charge prices that cover costs (average heat price is around € 4.5 cents/kWh; average heat price for households is 0.72 EUR/sq.m, and for commercial sector – 1.83 EUR/sq.m.). Moreover, rates are typically area-based though it is expected that companies, especially those involved in internationally funded projects, will increasingly introduce consumption-based billing.

Installed heat capacity in industry is estimated to be 6.3 GWth comprising approximately 1,800 steam and hot water boilers. Currently, the main fuel source for the district heating is the natural gas (50.4%), followed by mazut (26.5%) and coal (23%), while biomass use is negligible – 0.1%. Thermal plants in industrial companies in Serbia are aged – it is estimated that 74% of plants are older than twenty years.

### Commitment of Serbia to reduce greenhouse gas emissions

Serbia has ratified the Kyoto Protocol as a non-Annex 1 Country and as such is eligible only for the CDM of Kyoto Protocol, but not for emission trading. Serbia did not accept any liabilities for GHG emissions reduction under the Copenhagen Accord, but only indicated that potential for emission reductions could be between 18-29% below 1990 levels<sup>5</sup>. Hitherto Serbia has not adopted targets for carbon emissions reduction.

According to the submitted Initial National Communication to the UNFCCC in November 2010, total CO<sub>2</sub> emissions in 1990 were 62,970 kton (of which 94.1% were the emissions from the energy sector). In 1998, the total emissions of carbon dioxide were 50,605 kton CO<sub>2</sub>, of which 47,430 kton CO<sub>2</sub> or 93.73 % had been emitted from the energy sector.

The following table presents GHG emission scenarios in Serbia up to 2020:

1. BAU scenario with 2020 projections
2. Low scenario (lower application of emission reduction measures) – with achieved 2.0% emissions reduction
3. High scenario (higher application of emission reduction measures) – with achieved 4.4% of emissions reduction.

---

<sup>2</sup>Energy balances of the Republic of Serbia, 2010 – previous data; Statistical Office of the Republic of Serbia.

<sup>3</sup>2011 Annual Report on the implementation of the Acquis under the Treaty establishing the Energy Community; Energy Community Secretariat, September 2011.

<sup>4</sup>Regulation on Establishing the Programme for Realizing the Energy Sector Development Strategy of the Republic of Serbia by 2015 for the period of 2007 – 2012 (OJ RS, No.17/07, 73/07, 99/09 and 27/10 of May 6, 2010).

<sup>5</sup>[http://unfccc.int/files/meetings/cop\\_15/copenhagen\\_accord/application/pdf/serbiacphaccord.pdf](http://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/serbiacphaccord.pdf)

**Table 1: GHG emission scenarios in Serbia up to 2020.<sup>6</sup>**

BAU GHG emissions projections (kton CO <sub>2</sub> )						Alternative scenario 2020	
Sectors	1990	1998	2007	2015	2020	High	Low
Energy	48,177	41,434	44,684	52,863	61,042	59,634	58,263
Industry	4,271	3,620	4,682	6,046	7,410	7,249	7,032
Buildings	8,889	5,243	8,245	8,979	9,713	9,579	9,354
Transport	5,710	3,872	5,296	8,026	10,756	10,528	9,923 <sup>7</sup>
Agriculture	11,827	9,500	9,306	9,720	10,135	10,114	10,063
Waste	1,930	2,678	3,122	3,651	4,180	4,116	4,034
Forestry	-6,665	-8,661	-11,188	-11,956	-12,725	-12,900	-13,075
<b>Total with Forestry</b>	<b>74,138</b>	<b>57,685</b>	<b>64,146</b>	<b>77,328</b>	<b>90,510</b>	<b>88,320</b>	<b>85,594</b>
<b>Total without Forestry</b>	<b>80,803</b>	<b>66,346</b>	<b>75,334</b>	<b>89,284</b>	<b>103,235</b>	<b>101,220</b>	<b>98,669</b>

### Renewable Energy

Serbia, as reported in a good number of recent reports<sup>8,9,10,11</sup> has substantial renewable energy potential, with significant hydro, biomass, wind, solar and geothermal resources. Exploitation of these resources is currently mainly via large hydropower plants and non-commercial use of biomass by households.

In the policy domain, a national strategy for increased use of renewable energy resources has been developed in 2009. Renewable energy production has been declared a priority and efforts are continuously being made to facilitate the establishment and improvement of a clear institutional and regulatory framework and to raise awareness both within the energy sector and with the general public. However, both the strategy and the framework are still in early stages of development and declared targets and measures are not yet supported by well-defined actions to be taken by government agencies, authorities or public / private companies.

Recently, the government of Serbia adopted a new set of by-laws that further improves the Energy law. The Decree<sup>12</sup> on Criteria for Privileged Power Producers adopted in January 2013 enables obtaining of a privileged power producer status to all operators using the RES as well as to those that perform activities in highly efficient CHP facilities. The Decree on Incentives for Privileged Power Producers set new feed-in tariffs in effect from 1 February 2013.

**Table 2: Feed-in tariffs for electricity production using biomass.**

Item	Power Plant type	P - Installed Power (MW)	Feed-in tariff (c€/kWh)
1	Biomass power plant		
1.1		$P \leq 1$	13.26
1.2		$1 < P \leq 10$	$13.82 - 0.56 * P$
1.3		$10 < P$	8.22
2.	Biogas power plant		
2.1		$P \leq 0.2$	15.66
2.2		$0.2 < P \leq 1$	$16.498 - 4.188 * P$
2.3		$P > 1$	12.31
2.4	Biogas power plants - from animal waste		12.31

<sup>6</sup>Efficient ways for GHG emissions reductions within the Post-Kyoto Framework in Serbia. Final report. Study for MEMSP. Garrigues. August 2011.

<sup>7</sup> The authors of the report consider the rise in transport sector emissions from 2015 rather high.

<sup>8</sup>Methodology and calculation of feed-in tariffs for electricity generation, ECA/Energy Saving Group (2012).

<sup>9</sup> Glavonjic, B. D.: Consumption of Wood Fuels in Households in Serbia – Present ... THERMAL SCIENCE, Year 2011, Vol. 15, No. 3, pp. 571-585

<sup>10</sup>Energy Community: Biomass Consumption for Energy Purposes in the Energy Community

<sup>11</sup>Biomass Consumption for Energy purposes in the Energy Community – draft final report; October 2011; CRES.

<sup>12</sup> RES bylaws adopted in January 2013 – OG 08/2013

Among the various types of renewable energy the role of biomass is highly recognised as one of the most important as the source has substantial and diverse potential for future energy exploitation alongside with providing significant outlets to the Serbian economy for rural development, restructure of the agriculture and forestry sectors, job creation and sustainable, efficient use of both land and water resources.

### Biomass supply

The technical potential of biomass has been estimated in several studies although economic potential is not yet well understood. Most of the recent ones (REFs) agree in principle that Serbia has good potential for the deployment of biomass. As part of the PPG study an analysis for the biomass potentials has also been conducted for the forestry, agriculture and livestock sectors.

According to this , the total potential of biomass from forestry for energy production in Serbia equals to 31.8 PJ, which is 5,3% of the total primary energy supply of Serbia, and is found mainly in the central and southern part of Serbia.

**Table 3: Biomass Supply potentials<sup>13</sup> (PJ)**

	Potential (PJ)
<b>Total biomass (I + II)</b>	<b>101.8</b>
<b>I. Forest biomass</b>	<b>31.8</b>
Fuelwood	23.6
Forest residues	2.8
Other wood industry residues	0.5
Sawmill residues	4.4
Bark	0.5
<b>II. Agricultural biomass</b>	<b>70.5</b>
Field crop residues	58
Arboricultural residues	5.5
Livestock residues (for biogas)	7

As seen in Table 3, fuel wood is the main source of forest based biomass in the country; nevertheless residual biomass contributes also significantly to the total potential.

Agricultural biomass residues are found mainly in the northern part of Serbia, in the region of Vojvodina, where fertile agricultural soil makes up 84% of the region's territory. It is estimated that approximately 4 million tonnes of field crop and arboricultural residues could be annually exploited for energy purposes. This is equivalent to 64 PJ of energy.

Regarding to livestock, the north-western part of the country presents the highest concentration of livestock residues, with some production in several districts of central Serbia. According to official statistics there were 936,570 cattle (heads), 3,286,900 pigs and 19,103,411 poultry in Serbia in 2011.<sup>14</sup> Their potential biogas production is estimated at 6.5 PJ.

### Biomass demand

#### Biomass for Heating

Biomass use for heat in both households and the industrial sector is significant. In the household sector in particular, recent studies have shown use to be much greater than official statistics suggest.

According to a comprehensive, recent study<sup>15</sup>, more than half (55%) of all households in Serbia used biomass for space heating, cooking and water heating in 2009/2010. Firewood is the fuel of choice, being used by nearly all households that use biomass for heating. In rural areas, the majority of households use wood (89%) and the proportion is also very significant in urban areas (34%). Most households that use wood (81%) have stoves and a few have open fireplaces. A significant share (18%) use wood in central heating systems.

<sup>13</sup>Estimations based on 2010 statistical data

<sup>14</sup>Statistical Office of the Republic of Serbia 2011. Statistical yearbook of Serbia 2011.

<sup>15</sup>Biomass Consumption for Energy purposes in the Energy Community – draft final report; October 2011; CRES.

The average cost of firewood in Serbia, reported in the study, was Euro 35 per stacked cubic meter.

According to the findings of a second recent study<sup>16</sup>, total consumption of woody biomass in Serbian households was 6.4m m<sup>3</sup> of solid wood equivalent in heating season 2010/2011. Other users, including schools, health care centres, lime production facilities, charcoal producers, consumed 1m m<sup>3</sup>.

The two fore-mentioned studies estimated total amount of wood used by households in the heating seasons 2009/2010 and 2010/2011 to be 0.92 to 1.37 Mtoe respectively. This amount is three to four times higher than the value reported in the official energy balance of the Republic of Serbia for 2010 (0.281 Mtoe).

More than 90-95% of wood industry residues are used, with the remainder being waste. Major uses are industrial heat (62%); pellet and briquette production (28%); and particleboard production (10%)<sup>17</sup>.

Despite the fact that wood industry residues are almost entirely exploited for various purposes, forest residues remain largely unexploited. It is estimated that less than 10% of forest residues are currently utilized and therefore these could become a significant source of biomass for wood fuels production in the future.

Agricultural residues and animal wastes are also largely unused for energy production but there is growing interest by some agro-industrial sectors in the use of their residues as a cost-effective means to provide space or process heat. In recent years, several companies have installed boilers using residues (straw from soybean and wheat, maize cobs, sunflower husks) and there is growing interest for biogas installations.

### **Biomass for Electricity**

By contrast, electricity production from biomass is currently limited to a small number (four) of recently installed biogas plants in the waste water treatment and agriculture sectors. Installed capacity of individual units is typically around 1MWe and total installed capacity to date is around 4MWe.

- In 2008, the company Alltech Fermin (a yeast production company) started constructing a waste water treatment plant in the municipality of Senta. The process includes biogas production and subsequent production of electricity and heat; partially for self-supply. The power plant has a capacity of 2,500 cubic meter of waste water per day and generates 1.6 MWe and 1.8 MWth. This plant is producing electricity, biogas and fertiliser at the same time and its regular operation started in late 2011. Expected annual production of the plant is around 12.8 GWh of electricity and 14.4 GWh of heat.
- In February 2011, a contract was signed between Lazar Dairy, located in Blace, southern Serbia, and GHD Inc. Company, an American biogas digester construction firm. The digester became fully operational in May 2012. The installed capacity of this power plant is 1 MWe and 1.2 MWth.
- In early 2011, EnviTec Biogas AG (its affiliate EnviTec Biogas South East Europe) signed a contract for the construction of a biogas installation on a dairy cattle farm in Curug (province of Vojvodina) with the aim of processing liquid manure and corn silage to produce heat and electricity. The installation have an electrical capacity of 635 kW and it is become operational by January 2013. The project was assigned by farm operator Velvet Farm, subordinated to the animal feed producing company Global Seeds.
- Finally, the construction of a biogas plant owned by the agricultural company Sava Kovacevic started in 2012. The facility with total investment value of € 5.5 million is financed by Mirotin-Energo from Vrbas and has an installed capacity of 1 MWe and 1 MWth, with expected annual generation of 8 GWh of electricity and 8 GWh of heat. The plant became fully operational in October 2012.

The biomass to electricity market is underdeveloped for two main reasons, i) lack of private equity and ii) inability to secure long-term supply of biomass which prevents the creation of successful bankable projects. State-owned companies – Srbijasume and Vojvodinasume, that manage around 50% of forests in Serbia, according to the Public Procurement Law - are not allowed to enter into long-term biomass delivery commitments. They could sign one year delivery contract, through auctioning system only. On the other hand, private forest owners that manage the remaining half of forests in Serbia are reluctant to sign long-term contracts since they experience annual increase in biomass demand and prices. Similar fragmented conditions exist in the agriculture and wastes sectors.

Based on the findings of the PPG, it is clear that both the heat and electricity sectors present significant opportunities for the future bio energy market development in Serbia.

---

<sup>16</sup> TCP/FAO Project 'Wood Energy for Sustainable Rural Development'

<sup>17</sup> FAO Statistics, 2010.



However, in the biomass for heat market, KfW has recently initiated a big project covering biomass use in district heating plants with public ownership only. In the framework of this project, the Serbian government and KfW on behalf of the German government plan to support several district heating companies in their efforts to switch to biomass as fuel and/or to build new biomass-based CHP plants. The envisaged budget for this project is 110 million EUR (100 million € soft loan with 15 years maturity + 10 million € grant). The final number of the district heating companies supported by the project will be determined after the elaboration of pre-feasibility studies.

Thus, to avoid duplication of efforts and increase the added value of the proposed GEF project the work will focus on removing barriers for biomass to electricity technologies in the agricultural (biogas) and wood sectors to facilitate the future deployment of efficient technologies and increase the share of sustainable bio energy in the Serbian electricity sector.

In summary, based on the preliminary results from the PPG study, the theoretical annual potential supply for biogas is estimated at 23 PJ. In real terms, much of this resource cannot be aggregated among farming units to provide sufficient feedstock that a typical AD unit may require. It is therefore assumed that ~30% of theoretical potential could be technically exploitable (~ 7 PJ). The installed capacity could be 102 MWe.

On the other hand, forest residues in Serbia (e.g. tops, branches and stumps) that are left over at the logging sites and are estimated (from the PPG study) at 2.8 PJ. It is assumed that ~50% of this potential could be exploited for small to medium scale CHP (~ 1,4 PJ). The installed capacity could be 19 MWe.

Both the biogas and woody biomass technologies at the foreseen scales are fully commercial and their security of supply can be safeguarded with local supply agreements, which will further facilitate the development of biomass supply companies who will enter into long-term biomass supply contracts.

Table 1 below provides an overview of technologies, efficiencies, investment, operation and maintenance costs of key technologies for heat and electricity generation.

Table 1: Technologies, efficiencies and costs ([www.biomassfutures.eu](http://www.biomassfutures.eu); GEMIS database)

Technology	Short description	Efficiency	Investment costs €2010/kW	Fixed O& M costs €2010/kW
Directco-firingcoal	The advantages of co-firing are: the overall electrical efficiency is high (usually around 40%) due to the economies-of-scale of the existing plant and investments costs are low to negligible when high quality fuels as pellets are used. Also, directly avoided emissions are high due to direct replacement of coal. Combined with the fact that many coal-fired power plants in operation are fully depreciated, this makes co-firing usually a very attractive GHG mitigation option.	El: 45%	168,5	39.3
CHP electricity - solid	Over time, the scale of CHP systems shows an increasing trend, with apparent advantages from higher electrical efficiencies and lower costs. This is also combined with a developing biomass market, allowing for more competitive and longer distance supplies of biomass resources (especially forest residues). Various technical concepts have been developed and this led to complex boiler concepts, e.g. involving two-stage combustion, but also new pre-treatment techniques such as straw washing. Austria, a leading country in deploying biomass fired CHP focuses on smaller scale systems on village level, generally combined with local fuel supply systems. Such countries have colder climates making CHP economically attractive.	El: 27% Heat: 55%	2000	

	Furthermore, involvement of local communities has proven important. Municipalities and forest owners are often the owners of the CHP-plants. Energy costs of those systems are usually somewhat higher. Local societal support is generally strong though, especially due to the employment and expenditures that benefit the local community.			30
Wastedigestion CHP	Anaerobic digestion of biomass has been demonstrated and applied commercially with success in a multitude of situations and for a variety of feed stocks such as organic domestic waste, organic industrial wastes, manure, sludge, etc. It is particularly suited for wet biomass materials, and biomass to gas conversion can reach some 38% strongly depending on the feedstock. Digestion has been deployed for a long time in the food and beverage industry to process waste water with high loads of organic matter. Currently, advanced, large scale, systems for wet industrial waste streams are applied in many countries and co-digestion of for example manure and wet organic process residues is particularly successful at present.	El: 38% Heat: 45%	775	40
Biogasdigestion CHP		El: 38% Heat: 45%	775	50
heat, woodchipsboiler	A classic application of biomass combustion is heat production for domestic applications. Technology development has led to the application of strongly improved heating systems, which can be automated, have catalytic gas cleaning and make use of standardized fuel (such as pellets). Advanced domestic heaters can obtain efficiencies of 70–85% with strongly reduced emissions. The application of such systems is widespread in Scandinavia, Austria, Germany, etc.	Heat: 85%	687	21
heat, pelletsboiler		Heat: 85%	860	26

At this point it should be stressed that despite the favourable fore-mentioned potentials a market for biomass energy (both agricultural and wood biomass) in Serbia can only really develop if both (i) demand is created and (ii) if biomass projects offer investors a good rate of return and can be seen to be succeeding.

The selected projects will prove to the market actors (including investors) that biomass to electricity plants are viable business opportunities and also show how the technical and financial challenges can be overcome in order to replicate identical or similar plants in the future in Serbia. Finally, they will also help “break” the classic “chicken and egg conundrum” where biomass fuel supplies do not develop until there is demand and vice versa.

Both the biogas and woody biomass technologies at the foreseen scales are fully commercial and their security of supply can be safeguarded with local supply agreements, which will further facilitate the development of biomass supply companies who will enter into long-term biomass supply contracts.

New legislation which provides a high guaranteed feed in tariff for biomass projects is a good start but it is not enough on its own. Adoption of specific by –laws relevant to bio energy are crucial for project implementation, compliance with international standards (both for feed stocks and conversion equipment) as well as the provision of a sustainable financing mechanism which will be able to facilitate future support for a larger number of projects and create a biomass industry which can function without any need for technical assistance.

The project will complement the Government activities to promote the use of biomass as an energy source in Serbia for electricity generation, by combining:

- a technical assistance package which includes building the institutional capacity required to address the legal and institutional barriers as well as creating awareness among all relevant stakeholders from the industry, government and financing sectors;

A Biomass Support Unit (BSU) will be established in the Ministry of Mining and Energy (MoME) – on the approval of the GEF project- with the objective to facilitate the investments on agricultural and wood biomass energy projects, which due to various legal, institutional and financial barriers cannot attract enough financial resources from other sources.

The BSU will also include permanent members from i) the other relevant ministries (Agriculture and Environmental Protection) and ii) external project partners from different institutions relevant for the project (EBRD, Serbian Chamber of Commerce, Standing Conference of Towns and Municipalities, Institute for Standardization and Regional Development Agency/Srem).

A number of seminars and workshops will be organized by the BSU, the Chamber of Commerce and the Standing Conference of Towns and Municipalities in the duration of the project. Their target groups will be governmental representatives and public sector administrators, industry and stakeholders from the financing sector.

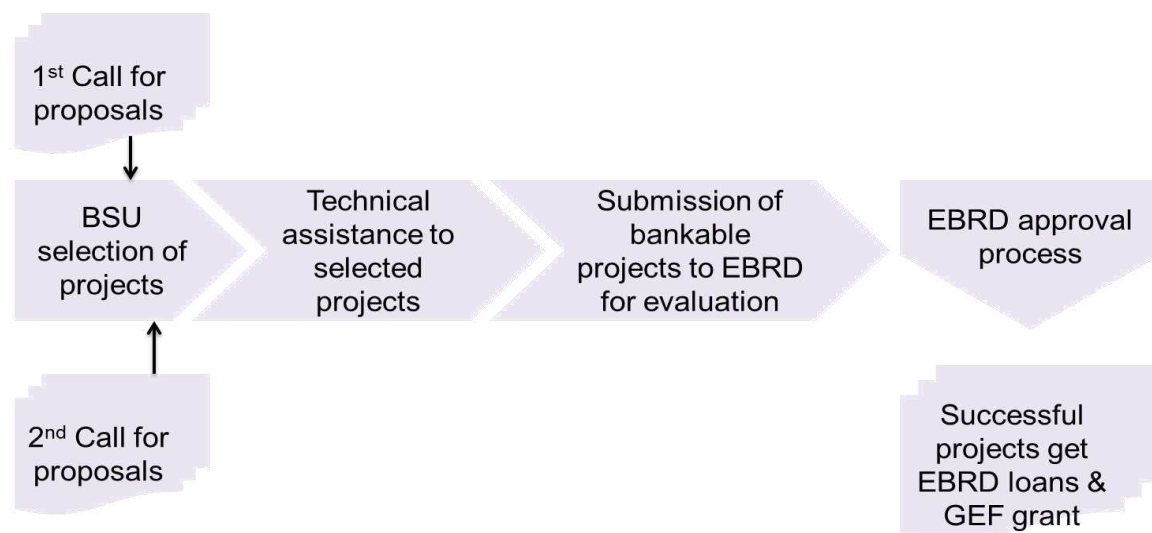
- an Investment Support Mechanism (combining the GEF grants with EBRD loans) to develop bankable projects through innovative financial packaging and to leverage other sources of financing, and to reduce the risk of projects not being commercially viable or able to attract debt finance;

An investment grant mechanism was selected as the most appropriate financial support mechanism for the Serbian biomass industry only after careful and thorough analysis, including several discussions with investors and financing institutions (EBRD, IFM, etc.) active in the region which concluded that this type of mechanism has the greatest potential to overcome barriers and help develop the biomass market in Serbia. More information on this analysis can be found in Annex 8.5 of this report.

The BSU will also facilitate the implementation of the Investment Support Mechanism (1.6 million dollars from GEF) while EBRD will complement existing financial resources, with the ability to absorb significantly higher risks and lower rates of return than financial resources available in the commercial market.

Firstly the BSU will identify suitable projects for financing based on a Call for proposals. Following, the BSU will use its technical capacity and also employ technical consultants to improve the bankability of the selected projects with assistance for feasibility studies and business plans on a 1:1 basis (\$1 from the project developer, \$1 from GEF).

The following figure illustrates how the scheme will work:



**Figure 1. Procedure for the Investment Support Mechanism with the collaboration of EBRD.**

The GEF grants will be then provided as a phased-out incentive payment which will be offered only to the projects successfully evaluated from EBRD as follows:

During the first call, four projects will be selected based on their technical readiness, bankability and best leveraging ratio. They will be further referred to EBRD for possible financing. EBRD will conduct a separate evaluation of the potential projects and if it finds them eligible will structure and provide debt financing for their implementation. No state guarantees will be required for this process and private investments, which will follow the procedures from the WBSEDF. The projects will be subject to the regular approval process (applied by the EBRD to small projects) and will be expected to

meet the rigorous standards of the EBRD about sound banking, environmental and health and safety regulations, among others. The EBRD will notify UNDP in writing when a project meets all criteria and it is approved for financing.

Then, the first two scoring higher on both BSU and EBRD evaluations will get up to 20% of the capital costs as GEF grant and up to a maximum of 400,000 dollars per project.

The other two will get up to 15% of the capital costs as GEF grant and up to a maximum of 250,000 dollars per project.

During the second year of the project a second call will be launched which will follow the same process as above and will finance another two projects which will get up to 10% of the capital costs as GEF grant and up to a maximum of 150,000 dollars per project.

In all projects the GEF grant will be provided in two sets:

- a) 30% of the grant will be provided once the project receives positive written response from EBRD in order to get the debt financing (i.e – the debt financing has been approved)
- b) the remaining 70% will be given upon project completion.

The provided grants are fully in line with Republic of Serbia National Legislation and will be implemented by the Ministry of Mining and Energy, whereby UNDP will provide full oversight and assurance within UNDP mandate.

During the mid-term project evaluation a thorough evaluation of the need for additional grant provisions will also be conducted.

In the longer term, it is expected that the GEF projects would establish a good level of understanding for the EBRD loans and this will enable the future development of bankable projects and provide a good structure to leverage other sources of financing, and to reduce the risk of projects not being commercially viable or able to attract debt finance;

More information on this analysis can be found in Annex 8.5 of Project Document.

During the project lifetime BSU and UNDP will also work closely with the Serbian government on the operationalization of public grant scheme for biomass (e.g. within the Environmental and Energy Efficiency funds, etc.). This work will also be part of the capacity building that will take place in Outcome 2 and individual consultations timed according to the Serbian government needs for consultation throughout the project duration.;

### Barrier analysis

Currently, there are a number of barriers that hinder the development of a local biomass energy market in Serbia. These can be further categorized as supply-side and demand-side barriers. On the supply side, the key barriers are scarcity and unreliability of data on biomass feedstock potentials, as well as low skills and capacities for efficient operation of biomass extraction, upgrading and logistics systems. On the demand side, the key barriers are the competition with other sources of energy (like electricity and natural gas), as well as high upfront costs of biomass to electricity plants. A critical barrier that is applicable to both supply and demand side is the lack of equity to go into projects and the high risk perceived for such investments which make it more difficult to secure debt finance for project developers. The proposed project offers a comprehensive response strategy that is designed to remove the identified barriers in a targeted manner with the main focus on removing the financing barrier by establishing an Investment Support Mechanism in collaboration with EBRD which will make one or more of their financing facilities available for eligible borrowers that the project will come up with. The following table provides a summary of the barriers identified alongside the corresponding removal measures proposed by the project, which are further detailed in the Project Strategy section below.

Barrier description	Type	Project response
<b>Low awareness of cost efficient biomass technologies and related benefits</b>		
The current situation in Serbia can be characterized by low awareness among key stakeholders (policy makers, investors, consumers) of the benefits offered by biomass energy. On the supply side, the stakeholders (e.g. forestry businesses, wood processing plants) are not familiar with cost-effective waste biomass harvesting and/or upgrading technologies. On the demand side, institutional energy users (municipalities) are not fully familiar with upgraded		A major component of this project (Component 1) will focus on raising awareness and improving the capability of both municipalities and local entrepreneurs to identify, prioritize and develop biomass investment opportunities.  Institutional capacity will be created by the Biomass Support Unit (Output 1.1) in order to facilitate the deployment of awareness mechanisms.

<p>biomass (e.g. chips, briquettes, pellets, biogas injection to grid) technologies that offer higher efficiency, cost-savings and flexibility compared to conventional fossil fuel-based electricity systems.</p>		<p>A specialized web portal will be under operation in Outcome 1.8 to enable e-trading with biomass and facilitate local and regional trading, as well as export of the locally produced biomass.</p>
<p>Limited local technical capacity. Serbian enterprises and municipal institutions lack the necessary skills and capacities for efficient operation of biomass extraction, upgrading and logistics systems. For example, one of the major forestry operators, Srbijasume, has acknowledged lack of technical capacity to cost-effectively collect and process wood logging residues generated by their core wood harvesting operation.</p>		<p>Component 5 of the project will also help to remove awareness barriers by developing i) a public awareness raising campaign on Biomass Energy, and ii) a short-film on Biomass Energy based on investment in biomass pilot projects in Serbia.</p>
<p><b>Legislative &amp; Institutional Barriers</b></p>		
<p>According to the provisions of the new Energy Law adopted in August 2011, development of by-laws was foreseen until the end of 2011 – <u>but the adoption for most of them is still pending.</u></p> <p>The option to feed biogas into the natural gas grid is mentioned by the Law on Pipeline Transport of Gaseous and Liquid Hydrocarbons. However, by-laws to practically regulate this matter are not yet drafted so injection of biogas into the grid is not <u>practically possible at present.</u></p>		<p>Institutional capacity will be created by the Biomass Support Unit (Output 1.1) in order to facilitate legal framework development.</p> <p>Component 2 of the project will aim to improve and update the legal, regulatory and support framework in the biomass sector, e.g. by correcting targets, improving support schemes or licensing procedures, harmonizing standardisation and regulations, etc.</p>
<p>There is a need for standards (both feedstock and equipment) and harmonisation of the definitions on biomass sustainability issues.</p>		
<p>Serbia needs strong long-term economic incentives in place for the different markets (electricity, heat and transport fuels), and a secure, reliable regulatory framework conditions over a medium/longer term.</p>		<p>Component 4 of the project will focus on the development of a long- term viable investment mechanism and complement the activities in Component 2 regarding to the regulatory frameworks.</p>
<p><u>Lack of reliable and comprehensive biomass production and consumption data</u></p> <p>As the project preparation has clearly demonstrated, scarce, fragmented and unreliable data on the availability, typology and geographical distribution of various biomass resources (most importantly, forest residues, wood processing waste including sawdust, agricultural residues including arboricultural prunnings from tree crops) significantly constrains potential private sector interest in developing biomass energy projects and assessment of their technical and financial feasibility.</p> <p>On the biomass consumption, the statistical methodology of data collection should be developed in accordance with the international reporting standards for biomass production and consumption for energy use, on a coherent and systematic approach.</p> <p>For both production and consumption the process should consist of several parts: defining the methodology for collecting data, adopting a statistical model for presenting acquired data and establishing methodology for publishing the data.</p>		<p>Output 1.4 will focus on the preparation of the Serbian Biomass Atlas (including both production and consumption methodologies and data)which can serve as a one stop shop for all information concerning biomass energy in Serbia</p>
<p><b>Finance Barriers: High upfront investment costs and lack of affordable financing</b></p>		
<p>Development of biomass-based energy systems are constrained by a relatively high upfront investment costs of biomass electricity plants. At</p>		<p>Component 4 of the project will focus on the development of a long- term viable investment mechanism.</p>

the same time, commercial lending rates available on the Serbian market are prohibitively high.		
---	--	--

Consequently, the implementation of the project will contribute to substantially improve the following barriers that were also stated in the Serbian Biomass Action Plan (2010):

- 1) Harmonization of Serbian technical standards on biomass and waste with those of the EU
- 2) Feasibility study of wood residue collection from forestry in Serbia
- 3) Development of a communication strategy for renewable energy in Serbia
- 4) Training for submitting successful project proposals to obtain EU funds
- 5) Biomass demonstration projects according to EU best practices
- 6) Development of a manual (guidelines) for applications for bank support – best practices.

UNDP will contribute US\$ 560,000 to this project over five years broken down into US\$ 310,000 as a cash contribution (US\$ 50,000/year) and US\$ 250,000 as an in-kind contribution (staff resources, office costs, travel etc. (US\$ 50,000/year). The cash contribution is broken down into support for energy roadmaps in municipalities in Serbia (\$150,000), a Municipal Guide for biomass and biogas projects and opportunity study for investments at municipal level and follow-up activities (\$120,000) and planned feasibility studies in four municipalities related to biomass (\$40,000).

### Project Baseline

Under the business-as-usual (BAU) scenario with no GEF involvement, it is reasonable to assume that the biomass market for electricity in Serbia would be characterized by the following features:

- the deployment of biomass energy would continue at a very slow rate in Serbia due to the large number of barriers clearly articulated in the Biomass Action Plan and in this document.
- The majority of electricity generation in Serbia will continue to be based on natural gas and fossil fuels, putting extra pressure on national budget for import prices and keep high levels of environmental pollution.
- Considerable potential for biomass electricity will remain unexploited. The technically exploitable potential of biogas is approximately 7 PJ. The installed capacity could be 102 MWe. On the other hand, forest residues in Serbia that are left over at the logging sites and are estimated at 2.8 PJ. It is assumed that ~50% of this potential could be exploited for small to medium scale CHP (~ 1,4 PJ). The installed capacity could be 19 MWe.

Under the BAU scenario, the biomass market for heating would be developing slowly, characterized by the following features:

- Significant share of biomass consumption in households would still be firewood in inefficient stoves, with most of the biomass coming from illegal logging, and therefore creating price distortions at the biomass market.
- Development and implementation of certification schemes and technical standards for biomass would be rather slowly developed.
- Use of agricultural residues for energy purposes would continue at a very slow rate.
- Establishment of the market for biomass supply with the application of sustainability requirements would be prolonged.
- Potential success of the KfW project would create several suppliers of biomass, directly linked to supply biomass to the district heating companies supported by the project – but this still would be fragmented and with no links to the integrated biomass market in Serbia.

GEF assistance is therefore requested to help overcome the main barriers which include the lack of capacity to develop bankable biomass projects and lack of ability to finance those projects on commercially attractive terms as well as lack of coherent datasets and awareness for the biomass opportunities in Serbia.

In the baseline situation the biomass electricity sector will be almost stagnant to the 4MWe currently on the ground. A set of consultations with project developers/ owners has clearly indicated that they face difficulties in:

- Clarity of licensing and permitting procedures
- Lack of secondary legislation which prohibits grid connection
- The option to feed biogas into the natural gas grid is mentioned by the Law on Pipeline Transport of Gaseous and Liquid Hydrocarbons. However, by-laws to practically regulate this matter are not yet drafted so injection of biogas into the grid is not practically possible at present.
- Lack of equity which prohibits them meeting the high upfront investment costs of biomass electricity plants.
- Commercial lending rates available on the Serbian market are also prohibiting.

In the baseline situation, awareness barriers will remain as there are no concrete coordinated actions to tackle the following issues:

- Cross ministerial and institutional collaboration required to build the capacity for legislation development, transposition of the relevant European Directives, compliance with certification, standardization and sustainability rules.
- Low familiarity of biomass merits among stakeholders when compared to the number of engineers and experts who have expertise in the energy sector in relation to fossil fuel energy generation projects.
- Lack of knowledge about the possibility of biomass utilization would remain a limiting factor to the future development of the sector, taking into account that the diversity and complexity of biomass technologies available in the market could increase uncertainty and confusion among investors.
- Local knowledge and experience on operation and maintenance of biomass power plants would develop at a very slow rate.
- Biomass trade/supply would develop slowly because of lack of an appropriate trade platform, long-term supply contracts and information on biomass prices.

In the baseline situation, data and awareness barriers will remain. In particular the most important ones would be:

- Scarcity, fragmentation and unreliability of data on the availability, typology and geographical distribution of various biomass resources which significantly constrains potential private sector interest in developing biomass energy projects and assessment of their technical and financial feasibility.
- Fragmentation and unreliability of data on the biomass consumption which hinders the development of concrete and realistic targets and creates difficulties in the international reporting for biomass consumption for energy use.
- Municipalities wouldn't be aware of the possibilities for the use of biomass technologies, which would lead to a more cautious approach and delays in licensing procedures.

In the baseline situation, legal and regulatory barriers will remain in the following key areas:

- Lack of adoption of appropriate by-laws will prohibit bio-electricity integration in the Serbian energy market.
- Unsustainable support schemes and complicated licensing procedures will continue prohibiting investments.
- Lack of harmonizing the respective standards and regulations according to the European requirements will cause difficulties in future market development. There will be a significant number of different appliances for the use of biomass, available at the Serbian market, which are not tested/ certified according to appropriate technical standards and development of corresponding laboratories for testing/certification would be very slow.

In the baseline situation, financing mechanisms will find it difficult to support biomass projects due to the lack of equity available in many projects and there will be a serious lack of investment in biomass to energy facilities by private sector investors due to perceived high risks and barriers as described in the previous section. Bio energy projects would be limited to small-scale one-off initiatives pursued by risk-taker entrepreneurs. These small-scale initiatives are less likely to proceed than those carried out by well capitalized companies.

GEF assistance is requested to help overcome the barriers outlined above, which currently prevent efficient production and utilization of biomass energy for electricity generation in Serbia - thereby helping to move the domestic electricity market towards an alternative path. The GEF alternative scenario relies on a set of actions and expected outputs, as described in the following section, in order to create an enabling environment for wider production and utilization of biomass, as a substitute to the currently used fossil fuels, to meet the energy sector's needs in a sustainable and efficient way, thereby reducing dependence on fossil fuels and limit GHG emissions in Serbia.

With the GEF support as part of this project and ensuring replications, the following impacts are expected to be effected by 2025:

- Biomass electricity generation is expected to grow at a faster pace than that of the BAU scenario, reaching up to 60 MWe of power (51 MWe biogas and 9 MWe wood- CHP) which represents 50% of the biogas and forest residues potential for this sector;
- At least six biomass plants will be built during the project phase (three agricultural and three woody biomass CHP ones); During the PPG phase, six projects (four biogas and two wood CHP ones, totaling 6.9 MWe) expressed interest to join the GEF project, so all the calculations in the Project Document are based on them. The final project selection/ configuration will be subject to technical assistance and final approval through the EBRD process.
- Additional 12 biomass plants will be successfully supported by the BSU beyond those which will be partially assisted with GEF funds;
- Each US\$1 of GEF money spent will have leveraged at least US\$5 in private and public investment into biomass production and utilization in Serbia based on the requirement that not more than 20% of each projects total capital cost comes from GEF;
- A number of the aforementioned barriers which currently prevent the development of the biomass market and use of bio-energy will be address and removed in course of the project. This will enable additional private and/or

public investments into forest biomass and bio gas electricity plants across Serbia enable efficient uptake of the high untapped biomass potentials to produce at least 60 MWe of power (51 MWe biogas and 9 MWe wood- CHP)..

During the lifetime of the project it is estimated that this project will lead to direct emission reductions of 1,247,481 tCO<sub>2</sub>e associated with the demonstration projects. The combined impacts of the project-supported interventions and ensuring replications within 10 years of the GEF project influence period are estimated to enable cumulative GHG emission reductions of 769.623 MtCO<sub>2</sub>e (over 20 years of investment lifetime), assuming GEF causality factor of 60% (refer to Annex 8.4 for estimation of GHG emissions reductions).

For P10 in the calculations it is assumed that the total technological and economic potential for GHG emission reductions in this area over 10 years is 51 MWe for biogas and 9 MWe for wood CHP, which is half of the total potential over 20 years that was estimated by this project. Further assumptions and the calculations are presented in Table 8-2, Annex 8.4.

The calculations follow the “GEF Manual for Calculating GHG Benefits of GEF Projects: Energy Efficiency and Renewable Energy Projects”. Key assumptions for the estimation of direct emissions reductions achieved by 4 agricultural and 2 wood small to medium projects over its duration of 4 years (total 6.9 MWe biomass electricity/ CHP projects) are the Serbian baseline CO<sub>2</sub> emission factors for grid electricity (0.945 tCO<sub>2</sub>e/MWh) and heat (0.32 tCO<sub>2</sub>e/MWh), 20 year asset lifetime and the estimated annual energy production of the planned projects. Indirect emission reductions were calculated both bottom-up and top-down methodology.

In the bottom-up methodology a replication factor of 3 was assumed.

In top-down methodology, the assumptions were 20 MWe for biogas and 5 MWe for wood CHP for the 20-year technological/economic potential, and a GEF causality factor of 60%.

Summary of GHG reductions:

Direct: 1.247 MtCO<sub>2</sub>e

Indirect BU: 3.742 MtCO<sub>2</sub>e

Indirect TD: 397.711 MtCO<sub>2</sub>e



---

## 2) PROJECT STRATEGY

### Project Objectives, Outcomes, Outputs and Activities

The project strategy is presented by a logical framework approach. The essence of this approach is that outputs are clustered by outcomes, which together will achieve the project objective. These are discussed below with further details in Section 3 “Project Results Framework”.

The aim of this project is to accelerate the development of biomass for electricity generation projects in Serbia by developing and successfully launching a biomass support unit and implementing a sustainable financial mechanism to support biomass projects which will continue beyond the lifetime of this project since:

- EBRD would continue its support through dedicated Western Balkans Sustainable Energy Direct Financing Facility, with cash-back incentives of 15-20% of the project cost.
- The established Biomass Support Unit (BSU) would monitor and assess the need for continuation of financial support, and if appropriate, will elaborate a proposal for the creation of long-term financial mechanism.
- The project will complement the Government activities to promote the use of biomass as an energy source in Serbia, by combining a technical assistance package addressing the barriers described above with a financial support scheme to leverage other sources of financing, and to reduce the risk and to support the learning costs of the first “demonstration” projects.

As such, the project seeks to gain more information and experience on the following areas:

- (i) security of biomass feedstock supply and demand
- (ii) policy and legislative development related to licensing procedures for biomass projects
- (iii) dissemination of information on biomass projects
- (iv) technology and knowledge about biomass projects
- (v) financial and economics of biomass projects
- (vi) implementation and monitoring of biomass projects.

The focus of the project is on the use of agricultural (including biogas) and wood biomass, which in many communities had already been identified as an attractive alternative to fossil fuels.

The target of the project is to develop, construct and operate at least 3 agricultural and 3 wood small to medium biomass electricity/ CHP projects over its duration of 4 years, and based on the experiences from these projects to encourage and leverage development of at least 12 similar projects in other communities. During the PPG phase, six projects (four biogas and two wood CHP ones, totalling 6.9 MWe) expressed interest to join the GEF project, so all the calculations in the Project Document are based on them. The final project selection/ configuration will be subject to technical assistance and final approval through the EBRD process.

Support to the development of these projects will continue through:

- established Biomass Support Unit (which will continue being operational beyond the lifetime of the project),
- development of stronger and more effective secondary legislation related to biomass energy (Outcome 2 – Outputs 2.2. and 2.3). The GEF funds will only be used for technical assistance while the establishment and operationalization of the BSU involves co-financing from the Ministries and the national institutions involved in the project.
- a set of foreseen project activities - training, information dissemination, development of National Biomass Program, preparation of Serbian Biomass Atlas, E-trade platform, and creation of biomass/energy crops development companies who will enter into long-term biomass supply contracts with the projects financed through proposed Investment Mechanism.

Besides that, realized flagship biomass projects will give confidence to investors that such projects are commercially viable with proven technology - and therefore encourage development of new biomass projects.

The 6 (or more) projects to be financed will be selected by the Project Team following discussions with EBRD on the basis of a flexible set of technical, environmental and financial criteria encouraging the economic optimisation and long-term cost reduction objective of biomass energy technologies. The involvement of EBRD will also help on this, by advising on the criteria what would be eligible projects – and how to take actions in creating bankable biomass projects. Only once EBRD has provided a written confirmation that it is willing to debt finance the project, will a project be selected to receive the investment grant.

Besides promoting the biomass projects, the project will also promote the increased and more efficient use of biomass in energy applications through dedicated capacity building and training actions for a variety of stakeholders from the industry, governmental and financial sectors.

The project strategy is built around five outcomes, as follows.

**Outcome 1: Improved capability of local municipalities and entrepreneurs to identify, prioritize and develop biomass investment opportunities in Serbia**

A significant barrier in Serbia is a lack of awareness on the opportunities available for biomass energy. Local entrepreneurs and municipalities who might implement projects need to have a greater understanding of the specific opportunities and the risks involved. This project component will be designed to address this type of barrier.

This outcome will focus on successfully launching activities that will improve the capability of both governmental/institutional bodies, municipalities and local entrepreneurs to identify, prioritize and develop biomass investment opportunities.

**Output 1.1: Biomass Support Unit Established and Operational with Team in Place to Support Biomass Projects in Serbia**

- *Activity 1.1.1: Develop and agree ToR for Biomass Support Unit (BSU)*
- *Activity 1.1.2: Prepare ToR for all staff positions*
- *Activity 1.1.3: Hire all Biomass Support Unit Staff including Head of Unit/Project manager*
- *Activity 1.1.4: Hire international Chief Technical Advisor (part-time) to support the work of BSU*

**Output 1.2 Designed and Implemented Training Modules on Biomass Energy for local municipalities and entrepreneurs based upon the UNDP Municipal Biomass Guide and Guide for Investors in Biomass Plants**

- *Activity 1.2.1: Develop training module based upon UNDP Municipal Biomass Guide and Guide for Investors in Biomass Plants*
- *Activity 1.2.2 Training Courses successfully delivered based on the UNDP Municipal Biomass Guide and Guide for Investors in Biomass Plants by the Biomass Support Unit*
- *Activity 1.2.3: Gap analysis on the issues that arose during initial trainings on UNDP Municipal Biomass Guide and Guide for Investors in Biomass Plants (based on feedback from initial trainings)*
- *Activity 1.2.4: Updating of the Municipal Biomass Guide and Guide for Investors in Biomass Plants by end of the Project*

**Output 1.3 At least 16 completed regional seminars on biomass energy that employed the designed training module and the UNDP Municipal Biomass Guide and Guide for Investors in Biomass Plants will be presented (both demand side and supply side)**

- *Activity 1.3.1: Implement the 10 Training Modules on Biomass Energy for local municipalities and entrepreneurs in at least 16 regional seminars*

**Output 1.4: Completed studies on biomass and preparation of “Serbian Biomass Atlas”**

- *Activity 1.4.1: Review existing studies and perform gap analysis on the issues that still require investigation*
- *Activity 1.4.2: Define and adopt methodology for biomass potentials estimation*
- *Activity 1.4.3 Define and adopt methodology for biomass consumption estimation*
- *Activity 1.4.4: Continuation of studies on “The Potential of Biomass Projects in Serbia” with a focus on biomass and energy crops from agricultural and improving (as required) the study on wood waste potential for biomass*
- *Activity 1.4.5 : Preparation of Serbian Biomass Atlas (including both production and consumption data), a one stop shop for all information concerning biomass energy*

**Output 1.5: Incorporated new course on Biomass Energy at the University of Belgrade & Novi Sad**

- *Activity 1.5.1: Design new course (annual weekly course module incl. international expert lectures)*
- *Activity 1.5.2 Provide funding for two top international biomass experts to serve as lecturers to deliver the courses at University of Belgrade and University of Novi Sad*
- *Activity 1.5.3: Implement new course in the two Universities*

**Output 1.6: Completed national public awareness raising campaign on Biomass Energy run by the Biomass Support Unit**

- *Activity 1.6.1: Design and implement a national public awareness campaign*
- *Activity 1.6.2: Incorporation of Biomass awareness Raising Activities into the activities of the Standing Conference on Towns and Municipalities with a particular focus on supply-side activities*

**Output 1.7: Regularly organized and conducted Annual International Workshop on Biomass Energy in Serbia prepared by the Biomass Support Unit**

- Activity 1.7.1: Organization of International Biomass Conference in Serbia in partnership with other key stakeholders
- Activity 1.7.2 Organization and conduct of study Tours to Biomass Projects in other countries in the region for selected municipalities

**Output 1.8 E-trade platform**

- Activity 1.8.1: Specialized web portal to enable e-trading with biomass and facilitate local and regional trading, as well as export of the locally produced biomass.

**Output 1.9: Project Website**

- Activity 1.9.1: Development and Updating of Project Website including relevant information such as Municipal Biomass Guide and Serbian Biomass Atlas (and E-trade platform)

**Outcome 2: Stronger and more effective secondary legislation related to biomass energy is developed, approved and implemented**

**Output 2.1: Adopted and implemented technical standards and regulations for biomass energy projects in line with international best practices**

- Activity 2.1.1: Review of international best practices on technical standards related to biomass and identification of most relevant ones for adoption in Serbia
- Activity 2.1.2: Supporting development, adoption and implementation of technical standards and regulations for biomass projects, including required amendments to existing standards and regulations for energy/power facilities.

**Output 2.2: Policies and regulations to promote biomass supply and its sustainability adopted and implemented**

- Activity 2.2.1: Supporting development, adoption and implementation of biomass sustainability criteria considering a range of issues such as sustainable harvesting rates, biodiversity protection and land use rights for local population. Only projects and facilities meeting the established criteria would qualify for investment support scheme and any other form of public support
- Activity 2.2.2: Supporting development, adoption and implementation of policies and regulations promoting and enhancing bioenergy production by farmers (such as bioenergy crops production, collection and handling of agricultural residues), including, inter-alia, via amendments to the existing agricultural policies and rural development programmes.

**Output 2.3: Appropriate licensing procedures developed and in place to support the long-term development of the biomass market in Serbia**

- Activity 2.3.1: Develop the Business Plan of a one stop shop for bio energy investments
- Activity 2.3.2: Development improved licensing procedures for long term biomass supply, bio energy and bio fuel plants to support market development

### **Outcome 3: Successfully operating Biomass Support Unit which leads to increased capability of municipalities and entrepreneurs in Serbia to develop, finance, construct, and operate bankable biomass energy projects**

Currently, there is a lack of detailed and high quality information available on potential biomass project opportunities which are sufficient to attract investment capital. Project developers typically need to invest high-risk early seed capital into new project ideas, and in the case of biomass projects, there is a lack of willingness to do so.

A Biomass Support Unit (hereafter referred to as the BSU) will be established within the MoME with the objective to facilitate the investments on agricultural and wood biomass energy projects, which due to various financial barriers cannot attract enough financial resources from other sources. The BSU will use the Investment Support mechanism to complement existing financial resources, with the ability to absorb significantly higher risks and lower rates of return than financial resources available in the commercial market. GEF funding will be used to help launch the BSU and for BSU activities but the ongoing running and operating costs of the BSU will be paid for by the MoME as part of its co-financing commitment to the project.

The BSU will also include permanent members from i) the other relevant ministries (Agriculture and Environmental Protection) and ii) external project partners from different institutions relevant for the project (EBRD, Serbian Chamber of Commerce, Standing Conference of Towns and Municipalities, Institute for Standardization and Regional Development Agency Srem).

The UNDP Serbia will provide support to the MoME and BSU as needed during the project implementation. Specifically, support will be provided in the following areas: assistance in the project launching, potential participation in the Project Board meetings, monitoring the implementation of the work plan and timetable, field visits and preparing and circulating reports after the visit, project documentation revision, reviewing, editing and responding to the project reports, technical backstopping, support to the policy negotiations, financial management and accountability, advising and consulting during the audit process, preparation of budget revisions, financial completion activities, direct payments, advance payments, other support services as networking and exchange of best practices, preparation of the Annual Project Reports, Project Implementation Reports, and arranging the independent evaluations.

This Outcome will help to overcome these barriers by providing support for the National Programme for Supporting Biomass and by establishing criteria for the support of selected projects. The expected outcome from the outputs that will be delivered from the completion of the envisioned activities under this component is increased capability of municipalities and local entrepreneurs to develop bankable biomass energy projects.

#### **Output 3.1: Developed and adopted National Programme for Supporting Biomass Projects**

- *Activity 3.1.1: Develop National Biomass Programme (five year plan)*
- *Activity 3.1.2: Provide expert assistance to the selected project developers including assessment of CDM potential and carbon finance and support for preparation of CDM documentation*
- *Action 3.1.3: Develop a Biomass Resource Efficiency Strategy and Roadmap to exploit the biomass feed stocks for energy, fuels and other industrial applications.*

#### **Output 3.2: At least 20 completed training seminars by the Biomass Support Unit (with EBRD) for Serbian banks and Serbian project developers regarding biomass to energy projects and how the Biomass Support Unit can provide assistance through the Investment Support Mechanism**

- *Activity 3.2.1: Work with existing banks, financing programs, and facilities in Serbia to improve their understanding of renewable/biomass energy projects*
- *Activity 3.2.2: Use the technical assistance funding as a tool to secure financing for the best demonstration projects and project ideas by ensuring that technical assistance funds are targeted at those projects with highest chances of success*

### **Outcome 4: A minimum of six biomass projects are successfully financed, constructed and operating by the end of the project**

Encouraging additional investment in biomass projects requires flagship projects with high replication potential which give confidence to investors that such projects are commercially viable and are proven to work. This is the expected outcome from the anticipated outputs of the envisioned activities that will be carried out under Component 4. The two main types of biomass projects which have potential for large scale deployment in Serbia include agricultural waste (incl. livestock) biomass projects and wood-waste biomass projects. Therefore component 4 of the project will involve providing investment grants to a minimum of six biomass projects (3 wood biomass and 3 agricultural biomass) and providing them each with GEF investment grants of up to US \$400,000 each on the basis that the GEF cost is no more than 20% of the total project investment cost meaning that each selected project should be at least US\$ 1.6 million dollars or more in total costs. The selection of at least four projects will be based in the collaboration of UNDP with EBRD (Figure 1). During the PPG phase, six projects (3 biogas and 3 wood CHP ones, totaling 6.9 MWe) expressed interest to join the GEF project. The final project selection/ configuration will be subject to technical assistance and final approval through the EBRD process. To ensure institutional sustainability, the Biomass Support Unit, will be responsible for the management of the

Investment Support Mechanism. The selected projects (six or more) will help to create a market demand for biomass in Serbia. However, in order for the projects to be successful it is critical to ensure a long term reliable supply of biomass to the projects themselves.

A FiT is already in place in Serbia but as elaborated during the PPG phase, a key challenge of FiTs is that the tariffs are only received once the asset starts delivering electricity, i.e. all investment has to be made by the developer upfront. This is also the case with tradable renewable energy credits, which have to be combined with effective mandates and a functioning multi-actor market, which is not feasible at this point of time in the Serbian context.

Both favorable grid access and RE mandates are policies that support RE deployment without directly providing financial support, which is why they do not fit the requirements of RE developers in Serbia at this stage – they definitely need direct cash support in the start-up phase of the projects.

The leasing mechanism does remove all up-front costs for the project developers as lessees, but it does place the burden of the full investment solely on the government as owner and less or of the asset.

Grants are much preferred by the investors as they would not have to pay them back but their main drawback is that the grant money are limited and once they finish there is no further sustainable investment development.

Following several consultations during the PPG phase with the government and the other financial institutions in the country (IFC, KfW, EBRD) the option that was favored as the most sustainable, already successfully implemented in the region and transparent was the one of combining the GEF grant funds with a direct lending facility.

The performance based grant option is considered to have the following strengths:

- Grant funds help address the equity gap that exists in Serbia i.e. the fact that there is a lack of investors and those that are active have very high costs of equity.
- The structure of the grant, with the major portion of grant retained until a project is completed, provides better likelihood that grants are paid for successful projects. The retained 70% grant will act as a major incentive for developers to construct and commission projects. The developer will require loans from EBRD and / or other sources. This lender (or lenders) will also conduct due diligence on the project and will maintain strong pressure on the developer achieving successful outcome.
- Performance based grants can be controlled by agencies such as UNDP and therefore such a scheme will be robust against potential changes in the political landscape in Serbia.
- Grants provide support to both electricity and heat (unlike FiT which supports only electricity) and so will be well-suited to the biomass sector.
- In the event that several grant-supported projects are successfully built and operated, this will de-risk future projects, so other investors will be attracted to the sector. In other words, there is an exit strategy for the scheme.

Given this panorama and these insights, the collaboration of UNDP/ GEF and EBRD will ensure an efficient investment mechanism with transparent tendering process and minimal additional administrative burden, while giving project developers financial support in the start-up phase of the project.

#### ***Output 4.1 Investment Support Mechanism***

The project will facilitate establishment and implementation of the Investment Support Scheme for biomass projects in partnership with EBRD, whereby GEF resources will be used to provide performance-based subsidies to the first batch of commercial biomass projects in Serbia. The scheme will be designed and implemented in stages aiming at gradual phase-out of subsidy provision and maximizing its leveraging potential, as follows:

- Stage 1. Subsidy covers up to 20% of capital costs leveraging at least 3 mln US\$ against GEF investment of 0.6 mln US\$ (1:5)
- Stage 2. Subsidy covers up to 15% of capital costs leveraging at least 4 mln US\$ against GEF investment of 0.6 mln US\$ (1:7)
- Stage 3. Subsidy covers up to 10% of capital costs leveraging at least 4 mln US\$ against GEF investment of 0.4 mln US\$ (1:10)

	Max share of GEF grant	Max value of GEF grant, \$	Total Project Cost	Leveraging ratio
Phase I	20%	600,000	3,000,000	5
Phase II	15%	600,000	4,000,000	7
Phase III	10%	400,000	4,000,000	10
Total	15%	1,600,000	11,000,000	7

The Investment Support Mechanism will be designed to ensure its sustainability beyond project duration, as follows:

- 1) Strengthened performance-based nature of grant provision in order to maximize success of demonstration projects and thus contribute to elimination of principal barrier, which is the absence of successful commercially run biomass projects which deter investment and increase risks for developers.

Performance-based financing principles will be incorporated in the grant provision scheme as follows:

- 30% of grant amount will be provided after approval of EBRD loan financing and thus only for those projects which meet EBRD due diligence requirements for lending;
- 70% of grant amount will be allocated after project construction and commissioning, which is a clear incentive for and criteria of a success.

- 2) Phased approach to implementation of Investment Support Mechanism will be adopted to gradually reduce the amount and share of subsidies in the project financial structure (see also response to question 14 above). This will allow testing project assumptions about underlying risks (i.e. market perception and lack of investors' confidence), as well as the impact of the project on reducing them. Two independent evaluation of the project and the Investment Support Mechanism will be conducted, at mid-point and by the end of the project to re-assess market situation, investors' perception and the remaining needs, if any, for additional support scheme and subsidy provisions beyond the duration of the project and GEF budget.
- 3) Continuous dialogue and partnership with EBRD and other financiers will be pursued to inform them, using demo-projects as examples, about risk-reward profile of biomass investment with a view of gradually reducing financier's requirements for high equity share in such project types and thus reducing the need for direct grant support.
- 4) Based on the finding of project mid-term and final evaluation, the project will provide assistance to the Government of Serbia with establishing public funding window for biomass projects under its Environment and Energy Efficiency Fund. The nature of public support will be determined based on the results of Investment Support Mechanism evaluation and might include either only project preparation support to facilitate identification and development of biomass project pipeline or also continuation of direct grant subsidies, should the market conditions dictate further need and demand for such scheme.

- *Activity 4.1.1 Structure of Investment Support Mechanism*
- *Activity 4.1.2 Tendering and evaluation process*
- *Activity 4.1.3 Provision of investment support to six biomass projects*
- *Activity 4.1.4 Assistance to the Government of Serbia with establishing public funding window for biomass projects under its Environment and Energy Efficiency Fund;*

**Output 4.2 Agricultural Biomass projects are selected under the Investment Support Mechanism and are developed, constructed and operational by the end of the project**

- *Activity 4.2.1 Selection of projects through tendering procedure*
- *Activity 4.2.2 Monitoring project development*
- *Activity 4.2.3 Best Practice guidelines for the implementation of the similar type projects*

**Output 4.3 Wood Biomass projects are selected under the Investment Support Mechanism and are developed, constructed, and operational by the end of the project.**

- *Activity 4.3.1: Selection of projects through tendering procedure*
- *Activity 4.3.2: Monitoring project development*
- *Activity 4.3.3: Best Practice guidelines for the implementation of the similar type projects*

**Outcome 5: At least 12 additional Biomass Projects are being supported by the Biomass Support Unit / Investment Support Mechanism by the end of the Project**

It is important that the project has sustainable results throughout Serbia in order that a more widespread promotion of biomass energy can be undertaken and that there is ongoing support. For this to happen the Biomass Support unit needs to be providing ongoing assistance to additional biomass projects in Serbia beyond only those projects which are selected and partially supported by this project. The goal of the project will be that at least 12 additional projects are successfully being supported by the Biomass Support unit through technical assistance - \$5,000 per project for business plans/feasibility studies by the end of this project. The financial assistance for these additional projects will not come from the GEF. The collaboration with EBRD will improve the knowledge base among investors, reduce barriers and facilitate the future financing of biomass projects in Serbia.

***Output 5.1 Twelve 12 additional Biomass Projects in Serbia are successfully supported beyond those which are partially assisted with GEF funds***

- *Activity 5.1.1: Selection of projects through tendering procedure*
- *Activity 5.1.2: Monitoring project development*
- *Activity 5.1.3: Best Practice guidelines for the implementation of the similar type projects*

***Output 5.2 Produced documentary film on the implemented Biomass Energy pilot projects produced by the Biomass Support Unit***

- Activity 5.2.1 Development of short-film on Biomass Energy based on investment in biomass pilot projects in Serbia
- Activity 5.2.2 Short Case Studies produced from the Demonstration Projects

## Project Risks

The following risks have been identified by the project:

Risk Described	Risk Level	Mitigation Strategy
Climate Change	Medium	<p>The project will ensure application of the EU Guidance on integrating climate change and biodiversity in the Environmental Impact Assessment (see below) when conducting EIA for the investment proposals by making adequate emphasis on the following provisions:</p> <ul style="list-style-type: none"> <li>- Selection of relevant climate change scenarios for biomass sector and identification of relevant climate change adaptation concerns for the sector, such as the impact of changing climate on biomass availability;</li> <li>- Identification of critical interdependencies, such as water-energy-biomass linkages and the impact of climate change on the individual components within the system;</li> <li>- Review of projects risk management plans and ensuring incorporation of measures to address identified climate risks and adaptation needs.</li> </ul> <p>The project involves biomass and so in general there is the potential of climate change impacts, both socially and environmentally. However, both the selection and the monitoring processes will ensure that high standards are applied and compliance with EU and international regulations for emissions, effluents, etc., is secured. In detail, the impacts will primarily be evident in the upstream in two issues:</p> <p>a) forest harvesting/ handling for the forest biomass projects that will be supported. The evaluation, approval and monitoring procedures will be tailored accordingly and an Environmental Impact Assessment will be included in the investment proposals to ensure these potentially negative impacts are managed with current best practices.</p> <p>b) collection/ storage/ handling of the manure for biogas production. The evaluation, approval and monitoring procedures will be tailored accordingly and an Environmental Impact Assessment will be included in the investment proposals to ensure these potentially negative impacts are managed with current best practices.</p> <p>Also, the project will encourage real investments, physical interventions, with the implementation of at least four biomass to electricity plants, so again, that provides potential for negative impacts.</p> <p>For the downstream the following two issues are considered more relevant for the project:</p> <p>a) the combustion of biomass will be made with efficient equipment that will include all the necessary filters and environmental technologies to</p>



		<p>minimise emissions. The disposal of the generated ash will also be made according to international practices and the selected projects will be asked to ensure the appropriate supply chains for this process.</p> <p>b) in the case of biogas, the de-gassed manure will be used as fertiliser and the selected projects will be asked to ensure the appropriate supply chains for this process.</p> <p>Again, as in the upstream, the evaluation, approval and monitoring procedures will be tailored accordingly and an Environmental Impact Assessment will be included in the investment proposals to ensure these potentially negative impacts are managed with current best practices.</p> <p>On the other hand it should be stated that the project will create significant opportunities for the local communities and more specifically the following:</p> <ul style="list-style-type: none"> <li>• Serbian communities through the creation of new jobs and provision of renewable energy to their population;</li> <li>• Local farmers and forest owners through creating the market for wood fuel collected from forest thinning and cleaning, and from increased use of agricultural residues;</li> <li>• Local project developers interested to develop , build , and successfully operate biomass projects in Serbia</li> <li>• Local consultant companies and NGOs providing expertise and services to promote and implement biomass energy activities; and</li> </ul> <p>Local firms producing wood biomass boilers and related equipment (secondary beneficiary)</p>
Supply Risks	Medium	Difficulty of securing long-term supply. Project will work to reduce this risk by developing model supply agreements.
Poor cooperation between government stakeholders	Medium	The project will follow a highly participatory approach to its development meaning that all government stakeholders will be consulted and involved. The decision to appoint Ministry of Mining and Energy as the lead agency for this project and for the establishment of the Biomass Support unit and the direct involvement of the other related Ministries (Agriculture and Environmental Protection) is expected to facilitate the communication and efficient transfer of knowledge. Consideration is also given to the active involvement (through capacity building, training and technical contribution to standards and regulations) of key external project partners from different institutions relevant to the project (EBRD, Serbian Chamber of Commerce, Standing Conference of Towns and Municipalities, Institute for Standardization and Regional Development Agency Srem).
Inadequate project implementation	Medium	Careful selection of project team members and the BSU staff to be put in place is required. The project design aims to minimize institutional bureaucracy through the careful division of activities between

		government, municipalities, NGOs and the private sector.
Lack of ongoing, long term political and government support for improved biomass energy sector in Serbia	Low	The Government commitment to promoting renewable energy is confirmed by the 2011 Energy Law and the new FiTs adopted on January 2013. New legislation and new policies need to be backed up by real projects which demonstrate that the new policies are indeed working. Hence, we do not expect this to be a major risk. Continuous engagement with the Government over the lifetime of this project will help to reduce this risk.
Use of inappropriate biomass technologies for projects	Low	Only biomass technologies with a proven track record in other countries will be selected for the projects, and a thorough analysis of the entire value-chain economics

## **Expected global, national and local benefits**

On a global level, the project will facilitate reductions of CO<sub>2</sub> amounting to 770 million tonnes CO<sub>2</sub><sup>18</sup> from direct and indirect emission reductions as follows:

- Direct GHG emission reduction benefits from the pilot demonstration(s) implemented in the framework of the project and supported by project funding are estimated at 62,370 by the end of the project and 1,247,481 tCO<sub>2</sub>e will be achieved over the lifetime of the investments of 20 years. In the non-GEF case, these energy needs would be satisfied by similar generators currently providing grid electricity, with an emission factor of 0.945 tCO<sub>2</sub>e/MWh, or by a similar expansion of heat provision, with an emission factor of 0.32 tCO<sub>2</sub>e/MWh.
- Indirect GHG reduction benefits resulting from broader market transformation brought about by the project activities are estimated at 397.711 MtCO<sub>2</sub>e. For P10 in the calculations it is assumed that the total technological and economic potential for GHG emission reductions in this area over 10 years is 20 MWe for biogas and 5 MWe for wood CHP, which is half of the total potential over 20 years that was estimated by this project. Further assumptions and the calculations are presented in Table 8-2.

The main national and local beneficiaries are expected to be:

- Serbian communities through the creation of new jobs and provision of renewable energy to their population;
- Local farmers and forest owners through creating the market for wood fuel collected from forest thinning and cleaning, and from increased use of agricultural residues;
- Local project developers interested to develop, build, and successfully operate biomass projects in Serbia
- Local consultant companies and NGOs providing expertise and services to promote and implement biomass energy activities; and
- Local firms producing wood biomass boilers and related equipment (secondary beneficiary)

## **Country ownership: country eligibility**

According to the Instrument for the Establishment of the Restructured Global Environment Facility, Serbia qualifies for GEF financing on the following grounds:

- It has ratified the UN Framework Convention on Climate Change on 2007 (OJ International Agreements 88/2007); and
- It receives development assistance from UNDP's core resources.

## **Financial modality and cost-effectiveness**

The GEF support will primarily consist of grants for technical assistance and of investment grants for demonstration projects (up to 20% of the total project capital cost), which will support the Government of Serbia to further develop and implement required policies to facilitate biomass energy market development. The GEF funding of US\$ 2.845 million will be complemented by the co-financing of US\$ 27.63 million. This means that for each US\$ 1 of GEF funding spent, at least of US\$ 5 of private and public co-financing will have been leveraged. For further details see the attached co-financing letters. In addition, if the project reaches its objective of reducing 1.2 million tonnes of CO<sub>2</sub> emission reductions over the 20 year lifetime of the projects then the cost-effectiveness of GEF spending will be under \$3 USD per tonne of carbon dioxide reduced which represents a highly cost-effective use of GEF funds.

## **Sustainability (including financial sustainability)**

The proposed project aims to accelerate the development of biomass projects in Serbia. The issue of project sustainability is addressed directly and indirectly throughout the design and implementation of the project and in particular through the establishment of the Biomass Support Unit and the Investment Grant Mechanism.

Directly – financial sustainability is directly addressed through the establishment of an investment grant mechanism with EBRD, while institutional sustainability is supported through launching of Biomass Support Unit and through development of stronger and more effective secondary legislation related to biomass energy (Outcome 2 – Outputs 2.2. and 2.3)

Indirectly – through training, information dissemination, development of National Biomass Program, preparation of Serbian Biomass Atlas, E-trade platform, and creation of biomass/energy crops development companies who will enter into long-term biomass supply contracts with the projects financed through proposed Investment Mechanism.

## **Replicability**

The project design and implementation envisages biomass market development and replication will not be limited to the existing strategy in the final year of the project. Replicability has been taken into account throughout the project design phase:

---

see Annex 8.4

Directly – through support of Biomass Support Unit provided to at least 12 additional projects - through technical assistance and investment grants (Outcome 5 – Output 5.1) and through the continued existence of the Biomass Support Unit beyond the lifetime of the project

Indirectly – through realized flagship biomass projects which will give confidence to investors that such projects are commercially viable with proven technology, training, information dissemination and development of National Biomass Program.

In summary, based on the preliminary results from the PPG study, the theoretical annual potential supply for biogas is estimated at 21.55 PJ. In real terms, much of this resource cannot be aggregated among farming units to provide sufficient feedstock that a typical AD unit may require. It is therefore assumed that ~30% of theoretical potential could be technically exploitable (~ 6.5 PJ). The installed capacity could be 102 MWe. In the project document analysis we assumed that 20% of this potential, i.e 20 MWe can be implemented during the next ten years.

On the other hand, forest residues in Serbia (e.g. tops, branches and stumps) that are left over at the logging sites and are estimated (from the PPG study) at 2.8 PJ. It is assumed that ~50% of this potential could be exploited for small to medium scale CHP (~ 1,4 PJ). The installed capacity could be 19 MWe. In the project document analysis we assumed that 25% of this potential, i.e 5 MWe can be implemented during the next ten years.

Both the biogas and woody biomass technologies at the foreseen scales are fully commercial and their security of supply can be safeguarded with local supply agreements, which will further facilitate the development of biomass supply companies who will enter into long-term biomass supply contracts.

### 3) PROJECT RESULTS FRAMEWORK:

<b>This project will contribute to achieving the following Country Programme Outcome as defined in CPAP or CPD:</b> Focusing on environmental and natural resource management					
<b>Country Programme Outcome Indicators:</b> Enabling environment and status of implementation of national and international environmental commitments					
<b>Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one):</b> <b>1. Mainstreaming environment and energy</b> OR 2. Catalyzing environmental finance OR 3. Promote climate change adaptation OR 4. Expanding access to environmental and energy services for the poor.					
<b>Applicable GEF Strategic Objective and Program:</b> GEF-4 Strategic Programme 4 on 'Promoting Sustainable Energy Production from Biomass'					
<b>Applicable GEF Expected Outcomes:</b> a. Appropriate policy, legal and regulatory frameworks adopted and enforced; b. Sustainable financing and delivery mechanisms established and operational; c. GHG emissions avoided					
<b>Applicable GEF Outcome Indicators:</b> a. Extent to which EE policies and regulations are adopted and enforced; b. Volume of investment mobilized; c. Tonnes of CO2 equivalent avoided					
	<b>Indicator</b>	<b>Baseline</b>	<b>Targets End of Project</b>	<b>Source of verification</b>	<b>Risks and Assumptions</b>
<b>Project Goal</b> Reduction of GHG emissions associated with electricity generation in Serbia	GHG emission reductions, achieved during project lifetime, from project-supported installation and operation of biomass	Zero	At 1,247,481 tonnes of CO2 equivalent will be achieved over the lifetime of the investments of 20 years from projects supported by the UNDP GEF project	Project monitoring system and all project reports	- Feasibility studies prove cost-effectiveness of biomass technologies in Serbian context - Required investments are forthcoming
<b>Project Objective</b> To reduce barriers to accelerate the development of biomass markets in Serbia	Installed capacity of incremental biomass projects, substituting fossil fuel-based heating, supported by the project	Zero	At least 3 MW of installed capacity support by this project fully operation by end of the project  Direct greenhouse gas emission reductions totaling 1.2 million tonnes of CO2 equivalent will be achieved over the lifetime of the investments of 20 years	Commissioning reports  Energy balance – energy generated from biomass	- Feasibility studies prove cost-effectiveness of biomass technologies in Serbian context - Required investments are forthcoming - Not attractive investment environment for investors (adoption of lower feed-in tariffs)
<b>Outcome 1:</b> Improved capability of local municipalities and entrepreneurs to identify, prioritize and develop biomass investment opportunities in Serbia	Established Biomass Support Unit	No Biomass Support Unit	Biomass Support Unit staffed and in full operation with funding to continue after project ends	Commissioning report, project monitoring system	Relevant stakeholders provide sufficient level of cooperation
	Training Modules and seminars on Biomass Energy for local municipalities and entrepreneurs based upon the UNDP Municipal Biomass Guide	No training or study courses on Biomass to Energy issues  Not existing guidance in development of biomass projects or previous experience	At least 12 completed regional seminars on biomass energy that employed the designed training module will be presented	Number of biomass projects in advanced phase (with construction permit)	- Not attractive investment environment for investors (adoption of lower feed-in tariffs)
	Preparation of the Serbian Biomass Atlas for	No defined methodology for	Defined and adopted methodologies and respective	Project monitoring system	- Feasibility studies prove cost-effectiveness of biomass

	production and consumption	biomass potential estimation and for the estimation of biomass consumption	databases		technologies in Serbian context - Required investments are forthcoming
	New course on Biomass Energy at the University of Belgrade & Novi Sad	Currently no training or study courses on Biomass to Energy issues	Established courses on biomass at Uni Belgrade and Novi Sad	Project monitoring system Surveys and Questionnaires	No interest from the Uni's side No continuation after end of project
	Public awareness raising campaign on Biomass Energy	Limited awareness about climate change issues	Regularly organized and conducted Annual International Workshop on Biomass Energy in Serbia produced by the Biomass Support Unit	Project monitoring system Surveys and Questionnaires	Opposition to climate change Indifference against climate change
	Support material to facilitate investments <ul style="list-style-type: none"> <li>Public awareness campaign</li> <li>Annual International workshop</li> <li>e-trade platform</li> </ul>	Confusion about the meaning of bankable biomass project  Lack of knowledge about biomass projects among local banks	Guidelines for the preparation of bankable projects that can be financed by EBRD and other international funds	Project monitoring system Surveys and Questionnaires	No capacity from the financial side (local banks)  Lack of equity prohibits further investment in the bio energy sector
<b>Outcome 2</b> Stronger and more effective secondary legislation related to biomass energy is developed and approved and adopted	Status of adoption of technical standards, policies and regulations for biomass projects and biomass supply (the exact list of regulatory documents to be developed and adopted – to be clarified at the Inception stage)	No standards or policies exist specifically for biomass projects	Proposed technical standards, policies and regulations are adopted and implementation documents by the end of the project	Report on the status of adoption and implementation on biomass policies and regulations in Serbia	Lack of harmonized standards and regulations according to the European requirements causes difficulties in future market development. There is a significant number of different appliances for the use of biomass, available at the Serbian market, which are not tested/ certified according to appropriate technical standards and development of corresponding laboratories for testing/certification is very slow.
	Established licensing procedures	Lack of integrated licensing procedures	Appropriate licensing procedures biomass to energy systems are in place and investors have clarified and simplified process to follow	Project monitoring system Surveys and Questionnaires	Changes in EU biomass legislation mainly due to sustainability issues could potentially create complications in the licensing procedures.
<b>Outcome 3</b> Successfully operating Biomass Support Unit which leads to increased capability of municipalities and entrepreneurs in Serbia to develop, finance, construct, and operate bankable biomass energy projects	Availability of National Programme for bio energy development in Serbia	No long-term National Programme for bio energy sector in Serbia	National Bio energy Strategy and Action Plan, which reflects broad stakeholder consensus, adopted by the Government of Serbia	Bio energy strategy; stakeholder consultation reports Surveys and Questionnaires	Government of Serbia willing to formalize vision for bio energy development in the country

	Number of training seminars for banks and project developers	No dedicated training	At least 20 completed training seminars by the Biomass Support Unit for Serbian banks and Serbian project developers regarding biomass to energy projects and how the Biomass Support Unit can provide assistance through the Investment Support Mechanism	Project monitoring system Surveys and Questionnaires	
	Status of Investment Grant Mechanism	No Investment Grant mechanism	Operational criteria agreed with relevant stakeholders and investment grants released	Project monitoring system	Co-financing partners keep their financial commitments  Continuation of Grant Mechanism after project ends?  Cancellation of selected project
<b>Outcome 4:</b> Six biomass projects are successfully financed, constructed and operating by the end of the project  Technical viability of specific biomass technologies is demonstrated as the basis for replication	Investment grant mechanism	No investment grant mechanism	Investment grant mechanism established and successfully piloted by the end of the project Public support scheme for biomass projects established and is operational under the State Energy and Environment Fund by the end of the project		
		No bio energy projects, insufficient capacities	6 biomass projects of at least 4MW installed capacity (in total) are successfully financed, constructed and operating by the end of the project	Project monitoring system	Sufficient level of interest among potential bio energy sector participants
<b>Outcome 5:</b> At least 12 additional Biomass Projects are being supported by the Biomass Support Unit / Investment Grant Mechanism by the end of the Project	Number of new bio energy projects initiated in Serbia	No bio energy projects, insufficient capacities	At least 12 new bio energy projects designed with financial closure reached by the end of the project	Project monitoring system	Sufficient level of interest among potential bio energy sector participants  Sufficient budget resources
	Case Study or Documentary film on biomass	No recent films covering full supply to delivery chains	One film covering all the projects established during the project	Project monitoring system	No risks

#### 4) TOTAL BUDGET AND WORKPLAN

<b>Award ID:</b>	00074238	Project ID(s):	00086739
<b>Award Title:</b>	PIMS 4382 Reducing Barriers to accelerate the Development of Biomass Markets in Serbia		
<b>Business Unit:</b>	SRB10		
<b>Project Title:</b>	Serbia – Reducing Barriers to accelerate the Development of Biomass Markets in Serbia		
<b>PIMS no.</b>	4382		
<b>Implementing Partner (Executing Agency)</b>	Ministry of Mining and Energy		

GEF Outcome/Atlas Activity	Implementing Agent /Responsible Party	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)	See Budget Note:	
<b>OUTCOME 1: Improved capability of local municipalities and entrepreneurs to identify, prioritize and develop biomass investment opportunities in Serbia</b>	<b>MoME/UNDP</b>	<b>62000</b>	<b>GEF</b>	71200	International Consultants	1,000	1,000	1,000	1,000	4,000	1	
				71300	Local Consultants	31,250	22,000	22,000	12,000	87,250	2	
				71400	Contractual services - individuals	54,000	54,000	54,000	54,000	216,000	3	
				71600	Travel	3,000	13,000	13,000	3,000	32,000	4	
				72100	Contractual services companies	-	1,250	1,250	2500	-	5,000	5
				74500	Miscellaneous	2,000	2,000	-	-	4,000	6	
				72400	Communication	1,250	1,250	1,250	1,250	5,000	7	
				72500	Office Supplies	1,000	1,000	1,000	1,000	4,000		
					<b>sub-total GEF</b>	<b>94,750</b>	<b>95,500</b>	<b>94,750</b>	<b>72,250</b>	<b>357,250</b>		
		<b>4000</b>	<b>UNDP</b>	71200	International Consultants	5,000	5,000	5,000	5,000	20,000	1	
				71400	Contractual services individuals	-	15,000	15,000	15,000	60,000	8	
				61000	Contractual services	-	5,000	5,000	5,000	20,000	8	



					individuals							
				71600	Travel	5,000	5,000	5,000	5,000	20,000	9	
					<b>sub-total UNDP</b>	<b>30,000</b>	<b>30,000</b>	<b>30,000</b>	<b>30,000</b>	<b>120,000</b>		
					<b>Total Outcome 1</b>	<b>124,750</b>	<b>125,500</b>	<b>124,750</b>	<b>102,250</b>	<b>477,250</b>		
<b>OUTCOME 2: Stronger and more effective secondary legislation related to biomass energy is developed and approved and adopted</b>	<b>MEDEP/UNDP</b>	<b>62000</b>	<b>GEF</b>	71200	International Consultants	6,000	6,000	6,000	6,000	24,000	10	
				71300	Local Consultants	14,000	14,000	14,000	14,000	56,000	11	
				71400	Contractual services individuals	-	1,000	3,000	4,000	2,000	10,000	11
				71600	Travel	2,000	3,000	2,500	2,500	10,000	12	
				72100	Contractual services companies	-	2,000	7,000	7,000	4,000	20,000	13
				74500	Miscellaneous	1,000	1,000	1,000	2,000	5,000	14	
				72500	Office Supplies	1,000	1,000	1,000	2,000	5,000		
					<b>sub-total GEF</b>	<b>27,000</b>	<b>35,000</b>	<b>35,500</b>	<b>32,500</b>	<b>130,000</b>		
		<b>4000</b>	<b>UNDP</b>	71300	Local Consultants	10,000	10,000	10,000	10,000	40,000	11	
				71400	Contractual services individuals	-	2,000	3,000	4,000	1,000	10,000	11
					<b>sub-total UNDP</b>	<b>12,000</b>	<b>13,000</b>	<b>14,000</b>	<b>11,000</b>	<b>50,000</b>		
					<b>Total Outcome 2</b>	<b>39,000</b>	<b>48,000</b>	<b>49,500</b>	<b>43,500</b>	<b>180,000</b>		
<b>OUTCOME 3: Successfully operating Biomass Support Unit which leads to increased capability of municipalities and entrepreneurs in Serbia to develop, finance, construct, and operate bankable biomass</b>	<b>MoME/UNDP</b>	<b>62000</b>	<b>GEF</b>	71200	International Consultants	20,000	80,000	60,000	20,000	180,000	15	
				71300	Local Consultants	20,000	50,000	50,000	30,000	150,000	16	
				71600	Travel	20,000	20,000	20,000	20,000	80,000	17	
				72100	Contractual services companies	-	5,000	15,000	15,000	5,000	40,000	18
				74500	Miscellaneous	5,000	5,000	5,000	5,000	20,000	19	
				72400	Communication	7,500	7,500	7,500	7,500	30,000	20	
				72500	Office Supplies	-	2,500	2,500	5,000	10,000	15	

energy		4000	UNDP		<b>sub-total GEF</b>	<b>77,500</b>	<b>180,000</b>	<b>160,000</b>	<b>92,500</b>	<b>510,000</b>		
				71300	Local Consultants	3,000	4,500	3,250	4,250	15,000	2	
				74500	Communication	1,000	1,500	1,250	1,250	5,000	7	
					<b>sub-total UNDP</b>	<b>4,000</b>	<b>6,000</b>	<b>4,500</b>	<b>5,500</b>	<b>20,000</b>		
projects					<b>Total Outcome 3</b>	<b>81,500</b>	<b>186,000</b>	<b>164,500</b>	<b>98,000</b>	<b>530,000</b>		
<b>OUTCOME 4: Four biomass projects are successfully financed, constructed and operating by the end of the project</b>	MoME	62000	GEF	72600	Grants	0	0	1,600,000	0	1,600,000	21	
					<b>sub-total GEF</b>	<b>0</b>	<b>0</b>	<b>1,600,000</b>	<b>0</b>	<b>1,600,000</b>		
					<b>Total Outcome 4</b>	<b>0</b>	<b>0</b>	<b>1,600,000</b>	<b>0</b>	<b>1,600,000</b>		
<b>OUTCOME 5: At least 12 additional Biomass Projects are being supported by the Biomass Support Unit / Investment Grant Mechanism by the end of the Project</b>	MoME/UNDP	62000	GEF	71200	International Consultants	2,500	2,500	2,500	2,500	10,000	22	
				71300	Local Consultants	12,500	12,500	12,500	12,500	50,000	23	
				71400	Contractual services individuals	-	2,500	2,500	2,500	10,000	23	
				71600	Travel	2,500	2,500	2,500	2,500	10,000	24	
				72100	Contractual services companies	-	-	7,500	7,750	7,500	22,750	25
				74500	Miscellaneous	1,250	1,250	1,250	1,250	5,000	26	
				72400	Communication	1,250	1,250	1,250	1,250	5,000	25	
					<b>sub-total GEF</b>	<b>22,500</b>	<b>30,000</b>	<b>30,250</b>	<b>30,000</b>	<b>112,750</b>		
		4000	UNDP	72100	Contractual services companies	-	15,000	15,000	15,000	15,000	60,000	27
					<b>sub-total UNDP</b>	<b>15,000</b>	<b>15,000</b>	<b>15,000</b>	<b>15,000</b>	<b>60,000</b>		
					<b>Total Outcome 5</b>	<b>37,500</b>	<b>45,000</b>	<b>45,250</b>	<b>45,000</b>	<b>172,750</b>		
<b>MONITORING &amp; EVALUATION</b>	UNDP	4000	UNDP	71300	Local Consultants	10,000	10,000	10,000	10,000	40,000	28	
				74100	Professional Services	2,500	2,500	2,500	2,500	10,000	29	
					<b>sub-total UNDP</b>	<b>12,500</b>	<b>12,500</b>	<b>12,500</b>	<b>12,500</b>	<b>50,000</b>		

					<b>Total M&amp;E</b>	<b>Outcome</b>	12,500	12,500	12,500	12,500	50,000	
--	--	--	--	--	--------------------------	----------------	--------	--------	--------	--------	--------	--

<b>PROJECT MANAGEMENT COST</b>	<b>UNDP</b>	<b>62000</b>	<b>GEF</b>	71400	Contractual services - individuals	32,000	32,000	32,000	32,000	128,000	30
				74599	Direct project cost	1,500	1,500	2,000	2,000	7,000	31
					<b>sub-total GEF</b>	<b>33,500</b>	<b>33,500</b>	<b>34,000</b>	<b>34,000</b>	<b>135,000</b>	
	<b>4000</b>	<b>UNDP</b>	71400	Contractual services - individuals	2,500	2,500	2,500	2,500	10,000	30	
				<b>sub-total UNDP</b>	<b>2,500</b>	<b>2,500</b>	<b>2,500</b>	<b>2,500</b>	<b>10,000</b>		
				<b>Total Outcome PM</b>	<b>36,000</b>	<b>36,000</b>	<b>36,500</b>	<b>36,500</b>	<b>145,000</b>		
	<b>GEF PROJECT TOTAL</b>					<b>255,250</b>	<b>374,000</b>	<b>1,954,500</b>	<b>261,250</b>	<b>2,845,000</b>	
<b>UNDP PROJECT TOTAL</b>					<b>76,000</b>	<b>79,000</b>	<b>78,500</b>	<b>76,500</b>	<b>310,000</b>		
<b>PROJECT TOTAL</b>					<b>331,250</b>	<b>453,000</b>	<b>2,030,000</b>	<b>337,750</b>	<b>3,155,000</b>		

#### Budget notes:

##### Outcome 1

- Two international consultants for a week each year by \$3000 / week equals \$24,000.
- Professional services including IT expert, Biomass local experts (mechanical engineers, agricultural & forest engineers, economists, etc.) will be employed to ensure the development of the Serbian Biomass Atlas, the regional seminars, the operation and necessary updates of the e-trade platform, the website and other foreseen activities in the Outcome. Local short-term consultants are budgeted at US\$ 500 per week and it is estimated that at least 10 experts will be employed for 16 weeks (a month per year on average).
- Contractual services individuals (both the GEF & UNDP contributions) include the salary costs for the BSU Coordinating Officer and the Project Assistant. An estimated budget of US\$ 54,000 per year is included.
- Travel costs include one international flight per year, local travel and DSAs. The calculation for international travel is this: 20 days at \$250 per day totals \$5,000. Plus \$5,500 for 4 tickets (one per year) plus miscellaneous travel expenses (visas, terminals etc) in the amount of \$1,500, and 100 DSA in total for the DSA \$20,000. Total for the travel is \$32,000.
- Professional services including translation services specifically for Outputs 1.2 and 1.3 during planning and presentation workshops/ seminars.
- This is a margin allowed for possible unexpected rises in costs associated with implementation.
- Costs for preparation of communications on policy and regulatory work, printing and presentation materials for the Outcome. Miscellaneous print and presentation material for communication purposes and to materials for workshops and training seminars exist in all outcomes.
- Contractual services individuals (both the GEF & UNDP contributions) include the salary costs for the BSU Coordinating Officer and the Project Assistant. An estimated budget of US\$ 20,000 per year is included.
- The calculation for local travel is this: \$5,000 for gasoline/car rent for the year 2 and 3 and \$3,000 for the year 1,4 in total for the rent \$16,000 and 20 DSA for local travel in total for the DSA \$4,000. Total for the local travel is \$20,000.

##### Outcome 2

- Two international consultants on biomass policy, strategy & legislation for a week each year by \$3000 / week equals \$24,000.

11. Professional services including IT expert, Biomass local experts (mechanical engineers, agricultural & forest engineers, economists, etc.) will be employed to ensure the development of the appropriate secondary legislation and standardisation for biomass as well as other foreseen activities in the Outcome. Local short-term consultants are budgeted at US\$ 500 per week and it is estimated that at least 10 experts will be employed for 20 weeks in total each.

12. Travel costs include local travel and DSAs. The calculation for local travel is this: \$1,600 for gasoline/car rent for the year 2 and \$1,000 for the years 1, 3, 4 in total for the rent \$4,600 and 27 DSA for local travel in total for the DSA \$5,400. Total for the local travel is \$10,000.

13. Contractual services to companies, institutes and other organisations for consulting services surrounding various aspects of Component 2: standardisation, sustainability, etc.

14. Miscellaneous print and presentation material for communication purposes and to materials for workshops and training seminars exist in all outcomes. This is a margin allowed for possible unexpected rises in costs associated with implementation.

### Outcome 3

15. International consultants to provide technical assistance for the projects selected during the first call and prepare the due diligence for the EBRD approval. The cost is estimated at approx. \$45,000 per project and is included in Outcome 3.

16. Professional services including Biomass local experts (mechanical engineers, agricultural & forest engineers, economists, etc.) will be employed to cover technical assistance for the development of business plans for the selected projects as well as other foreseen activities in the Outcome. Local short-term consultants are budgeted at US\$ 500 per week.

17. Travel costs include one international flight per year, local travel and DSAs. The calculation for international travel is this: 40 days at \$250 per day totals \$10,000. Plus \$12,000 for 8 tickets (two per year) plus miscellaneous travel expenses (visas, terminals etc) in the amount of \$3,000. The total for international travel is thus \$25,000. The calculation for local travel is this: \$5,000 for gasoline/car rent per year, in total for the rent \$20,000 and 175 DSA for local travel in total for the DSA \$35,000. Total for the local travel is \$80,000.

18. Contractual services to companies, institutes and other organisations for consulting services surrounding various aspects of Component 3 and mainly the preparation of bankable projects that can be evaluated by EBRD in order to choose the ones that will receive the grants

19. This is a margin allowed for possible unexpected rises in costs associated with implementation.

20. Translation cost, print and presentation material for communication purposes and materials for workshops and training seminars exist in all outcomes.

### Outcome 4 (see also page 9)

21. A public call for proposals will be made by the BSU and the submitted proposals for potential projects will be evaluated under strict criteria by the BSU and EBRD. Evaluation of the applications will be closely observed by UNDP

Following, the BSU will use its technical capacity and also employ technical consultants to improve the bankability of the selected projects with assistance for feasibility studies and business plans on a 1:1 basis (\$1 from the project developer, \$1 from GEF).

Then the respective projects will be referred to EBRD for possible financing. EBRD will conduct a separate evaluation of the potential projects and if it finds them eligible will structure and provide debt financing for their implementation. The projects will be subject to the regular approval process (applied by the EBRD to small projects) and will be expected to meet the rigorous standards of the EBRD about sound banking, environmental and health and safety regulations, among others. The EBRD will notify UNDP in writing when a project meets all criteria and it is approved for financing.

The GEF grants will be then provided by the BSU as an incentive payment which will be offered only to the projects successfully evaluated from EBRD in two sets:

- a) 30% of the grant will be provided once the project receives positive written response from EBRD in order to get the debt financing (i.e – the debt financing has been approved)
- b) the remaining 70% will be given upon project completion.

Each project will get up to 20% of the capital costs.

### Outcome 5

22. International consultants to provide technical assistance for the additional twelve projects. The cost is estimated at US\$ 2,500 per year.

23. Professional services including Biomass local experts (mechanical engineers, agricultural & forest engineers, economists, etc.) will be employed to cover technical assistance for the selection and evaluation of the additional twelve projects as well as other foreseen activities in the Outcome. Local short-term consultants are budgeted at US\$ 500 per week.

24. Travel costs include local travel and DSAs. The calculation for local travel is this: \$1,200 for gasoline/car rent per year in total for the rent \$4,800 and 26 DSA for local travel in total for the DSA \$5,200. Total for the local travel is \$10,000.

25. Miscellaneous print and presentation material for communication purposes and materials for workshops and training seminars exist in all outcomes.

26. This is a margin allowed for possible unexpected rises in costs associated with implementation.

27. Contractual services to companies, institutes and other organisations for consulting services surrounding various aspects of the Outcome mainly prefeasibility studies for the additional 12 projects, etc.

#### Monitoring and Evaluation

28. Local consultants team to perform continuous monitoring and evaluation of the project activities and results. Contract value estimated at US\$ 10,000 per year.

29. Audit cost for external audit company. Contract value estimated at US\$ 2,500 per year.

#### Project Management

30. Contractual services individuals (both the GEF & UNDP contributions) include the salary costs for Project Manager. An estimated budget of US\$ 32,000 per year is included.

31. Direct project cost

**Summary of Funds:**

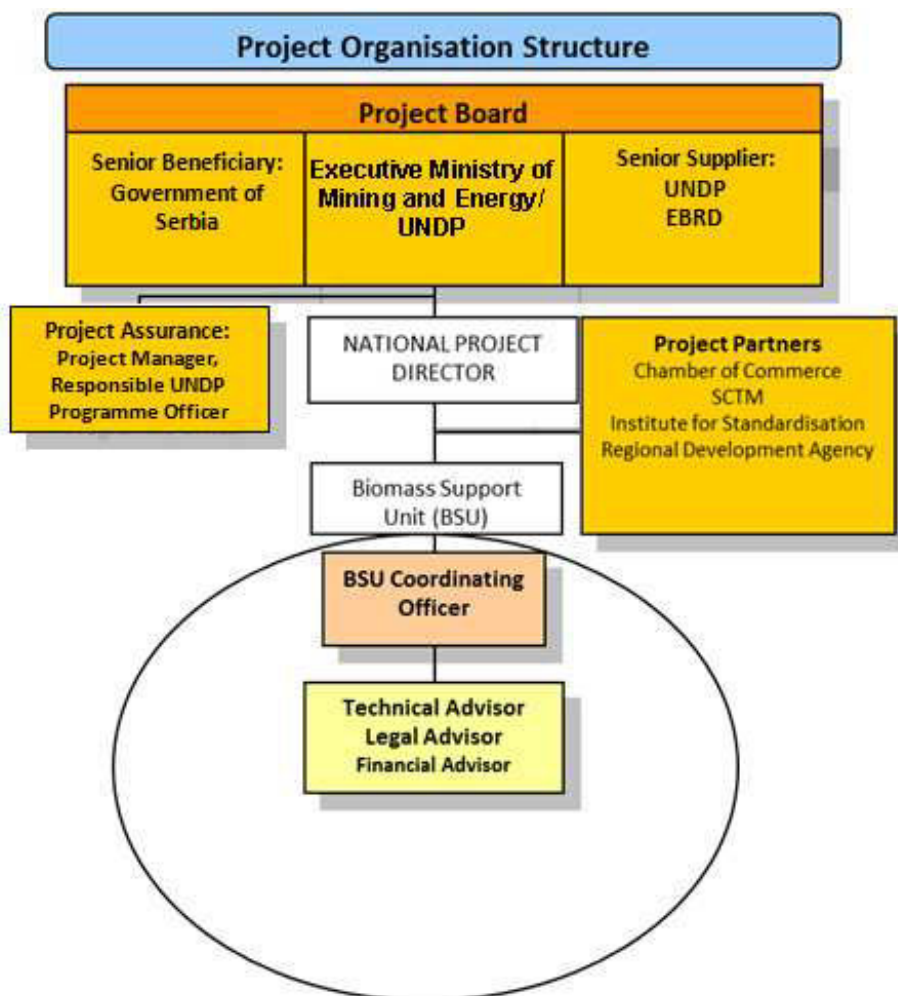
	<b>Amount Year 1</b>	<b>Amount Year 2</b>	<b>Amount Year 3</b>	<b>Amount Year 4</b>	<b>Total</b>
GEF	255,250	374,000	1,954,500	261,250	2,845,000
UNDP	140,000	140,000	140,000	140,000	560,000
Ministries in charge of natural resources	125,000	125,000	125,000	125,000	500,000
Ministry of Agriculture and Environmental Protection	125,000	125,000	125,000	125,000	500,000
Ministry of Mining and Energy - MoME	200,000	200,000	200,000	200,000	800,000
Chamber of Commerce - PKS	110,000	110,000	110,000	110,000	440,000
Institute for Standardization - ISS	60,000	60,000	60,000	60,000	240,000
Standing Conference of Towns and Municipalities - SCTM	75,000	75,000	75,000	75,000	300,000
Regional Development Agency of Srem - RRA Srem	12,500	12,500	12,500	12,500	50,000
Municipality of Alibunar	25,000	25,000	25,000	25,000	100,000
Municipality of Ruma	85,000	85,000	85,000	85,000	340,000
Bogas Holding	0	4,000,000	0	0	4,000,000
Poliester	0	4,500,000	0	0	4,500,000
Global Seed	0	3,500,000	0	0	3,500,000
NICCO	0	4,000,000	0	0	4,000,000
Netinvest	0	4,000,000	0	0	4,000,000
Ekoposlovi		3,800,000	0	0	3,800,000
<b>TOTAL</b>	<b>1,212,750</b>	<b>25,131,500</b>	<b>2,912,000</b>	<b>1,218,750</b>	<b>30,475,000</b>

## 5) MANAGEMENT ARRANGEMENTS

The project will complement the Government activities to promote the use of biomass as an energy source in Serbia, by combining a technical assistance package addressing the barriers described above with a financial support scheme to leverage other sources of financing, and to reduce the risk and to support the learning costs of the first “demonstration” projects.

As such, the project seeks to gain more information and experience on the

- (i) security of biomass feedstock supply and demand
- (ii) policy and legislative development related to licensing procedures for biomass projects
- (iii) dissemination of information on biomass projects
- (iv) technology and knowledge about biomass projects
- (v) financial and economics of biomass projects
- (vi) implementation and monitoring of biomass projects.



**Figure 2. Project organisation structure**

The focus of the project is on the use of agricultural and wood biomass, which in many communities have already been identified as an attractive alternative to fossil fuels.

The target of the project is to develop, construct and operate at least 2 agricultural and 2 wood small to medium (up to 2 MWe) biomass electricity/ CHP projects over its duration of 4 years, and based on



the experiences from these projects to encourage and leverage development of at least 12 similar projects in other communities.

Besides promoting the biomass projects, the project will also promote the increased and more efficient use of biomass in energy applications through dedicated capacity building and training actions for a variety of stakeholders from the industry, governmental and financial sectors.

The project will be executed by the Ministry of Mining and Energy (MoME) following UNDP guidelines for nationally executed projects. The MoME will provide office space to the project team as part of its contribution and sign a grant agreement with UNDP and will be accountable to UNDP for the disbursement of funds and the achievement of the project goals, according to the approved work plan. The MoME will assign a senior officer as the **National Project Director** to: (i) coordinate the project activities with activities of other Government entities; (ii) certify the expenditures in line with approved budgets and work-plans; (iii) facilitate, monitor and report on the procurement of inputs and delivery of outputs; (iv) approve the Terms of Reference for consultants and tender documents for sub-contracted inputs; and (v) report to UNDP on project delivery and impact.

A **Biomass Support Unit** (hereafter referred to as the **BSU**) will be established within MoME with the objective to facilitate the investments on agricultural and wood biomass energy projects, which due to various financial barriers cannot attract enough financial resources from other sources.

The BSU will facilitate the implementation of the Investment Mechanism with EBRD to complement existing financial resources, with the ability to absorb significantly higher risks and lower rates of return than financial resources available in the commercial market.

Once the BSU has identified suitable projects for financing, it would refer them to EBRD for financing. EBRD will conduct a separate evaluation of the potential projects and if it finds them eligible will structure and provide debt financing for their implementation. The projects will be subject to the regular approval process (applied by the EBRD to small projects) and will be expected to meet the rigorous standards of the EBRD about sound banking, environmental and health and safety regulations, among others.

The BSU will also include permanent members from i) the other relevant ministries (Agriculture and Environmental Protection) and ii) external project partners from different institutions relevant for the project (EBRD, Serbian Chamber of Commerce, Standing Conference of Towns and Municipalities, Institute for Standardization and Regional Development Agency Srem).

A **cross-sectoral Project Board**, chaired by the National Project Director and consisting of the representatives of the relevant ministries and the other project partners mentioned above, will be established to guide, provide advice and input for the implementation of the project. The Project Board will also play an important role in further resource mobilisation for the project. It will also be directly the co-ordinating body for the formulation of the cross-sectoral National Programme for Supporting Biomass Projects. Based on the decision of the Project Board, smaller working groups can be established to implement or to oversee specific project activities.

The Project Board will contain three distinct roles:

- **Executive Role:** This individual will represent the project “owners” and will chair the group. It is expected that the Ministry of Mining and Energy will appoint a senior official - National Project Director to this role who will ensure full government support of the project.
- **Senior Supplier Role:** This role requires the representation of the interests of the parties concerned which provide funding for specific cost sharing projects and/or technical expertise to the project. The Senior Supplier's primary function within the Board will be to provide guidance regarding the technical feasibility of the project. This role will rest with UNDP-Serbia represented by the Resident Representative and EBRD.
- **Senior Beneficiary Role:** This role requires representing the interests of those who will ultimately benefit from the project. The Senior Beneficiary's primary function within the Board will be to ensure the realization of project results from the perspective of project beneficiaries. This role will rest with MoME

Project Assurance: The Project Assurance role supports the Project Board Executive by carrying out objective and independent project oversight and monitoring functions. The Project Assurance role will rest with the UNDP Serbia Environment Focal Point.

A full time **Project Manager** will be recruited by UNDP, who will be delegated the authority for the day to day implementation of the project, which includes supervision, management and co-ordination of all project activities and financial matters, and to provide advice on the technical, legal and financial aspects of the project. The Project Manager's prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost. The decision making discretion of the Project Manager, without a Project Board decision, is limited to 10% deviation in funds from the agreed upon Annual Work Plan and 1 month deviation in terms of the deadlines set for implementation by the Annual Work Plan.

A Biomass Support Unit Coordinating Officer will also be recruited to handle the operation of the Biomass Support Unit and ensure the accomplishment of its role.

The Biomass Support Unit Coordinating Officer will be supported by the project's technical, legal and financial advisers, for which tasks separate part time experts will be appointed by the Ministry as part of it in kind contribution. Together with the Ministry of Mining and Energy, they will form the "Biomass Support Unit" (BSU). Detailed description is presented in section 4.2. The selection of the key local personnel / subcontractors (Biomass Support Unit Coordinating Officer, technical, legal and financial adviser) and selection of all the international experts recruited under the project will be done in consultation with UNDP.

The project manager will report quarterly to the Project Board and to the UNDP Serbia on the status of the BSU including, as necessary, independently audited financial statements.

The project manager will participate as a non-voting member in the Project Board meetings and will also be responsible for compiling a summary report of the discussions and conclusions of each meeting.

The UNDP Serbia will provide support to the MoME and BSU as needed during the project implementation. Specifically, support will be provided in the following areas: assistance in the project launching, potential participation in the Project Board meetings, monitoring the implementation of the work plan and timetable, field visits and preparing and circulating reports after the visit, project documentation revision, reviewing, editing and responding to the project reports, technical backstopping, support to the policy negotiations, financial management and accountability, advising and consulting during the audit process, preparation of budget revisions, financial completion activities, direct payments, advance payments, other support services as networking and exchange of best practices, preparation of the Annual Project Reports, Project Implementation Reports, and arranging the independent evaluations.

The UNDP/GEF funds are released by the UNDP Serbia for the implementation of project activities as "Project Advances" based on the request of the BSU and authorised by the MoME – subject to the satisfactory financial reports and overall progress of the project.

A detailed work plan and implementation strategy for each component of the project (together with a proposal for the first budget revision) will be prepared at the outset of project operations by the project manager, in co-operation with the project's technical, legal and financial advisers. Prior to starting the actual implementation of the work plan, the work plan will be reviewed and must be approved, together with the associated revised budget, by the Ministry of Mining and Energy and the UNDP Serbia.

Senior Serbian experts in the field will be involved (case specific selection) to implement the different project activities taking stock of results from relevant prior or ongoing national or international activities. The necessary external support will be provided by strengthening and encouraging the information exchange between the national and relevant regional and international expert institutions,

and hiring short-term international consultants to assist in the implementation of the project through the critical stages.

BSU will seek international expertise when required to ensure the project will be implemented by taking into account the most update and appropriate scientific and technological expertise. Specific emphasis will be given on promoting the information exchange between the national, regional and international expert institutions and on building the problem-solving capacities of the local experts, through on-the-job training and otherwise, to undertake similar activities independently after the project has ended.

Specific emphasis throughout the project is also laid on facilitating the full public participation in the implementation of the project activities through information dissemination events, training seminars, etc. In proposing the individual biomass projects for financing, the commitment of the majority of the foreseen clients to join the new system needs to be demonstrated (e.g. by a specific letter) as a pre-requisite to any investment decisions.

#### Co-ordination arrangements

BSU within MoME, working in collaboration with the Project Board and UNDP, will have the responsibility for the overall co-ordination of the activities and of ensuring that the expected outputs will be achieved on a timely manner.

The project manager will be charged with “day to day” management and co-ordination of these activities, which includes supervision, management and co-ordination of all project activities and financial matters, and to provide advice on the technical, legal and financial aspects of the project, and he will report quarterly to the Project Board on the progress of the project.

By promoting information exchange between the participating institutions both through the Project Board and otherwise, the project seeks to identify, to create links to, and to use the results of all the other prior or ongoing activities relevant to the project.

From the financial point of view, the project activities will be co-ordinated closely with the activities supported by other sources of financing such as the EU/IPA and the different bilateral organizations (KfW, GiZ, USAID etc).

#### Financing and support

The total costs to reduce barriers and accelerate the development of Biomass market in Serbia and getting 4 projects developed, constructed and operating during the next four years have been estimated to be US\$ 16.8 million. Of this amount, the GEF is requested to cover the incremental costs consisting of a technical assistance component of US\$ 1.1 million and a financial support component of US\$ 1.6 million.

The Ministry of Mining and Energy will provide US\$ 400,000 in-kind to support the Biomass Support Unit activities over the next four years.

EBRD, through its Western Balkans Sustainable Energy Direct Financing Facility (“WeBSEDFF”) and/or its Local Enterprise Facility (“LEF”) will be available to provide debt financing on a limited recourse basis to the eligible developers/borrowers for the implementation of the 4 projects. The financial structure will demonstrate the applicable practices in project finance with the intention to provide a positive example to local commercial banks and encourage them to replicate the financial structure in future projects of the same kind.

WeBSEDFF is a direct lending facility aimed at small to medium sized renewable energy and industrial energy efficiency projects in the Western Balkans (Albania, Bosnia and Herzegovina, Croatia, FYR Macedonia, Montenegro and Serbia (including Kosovo)).

The facility provides debt financing between EUR 2.0 million to EUR 6.0 million with tenors of up to 15 years (12 years is the baseline for renewable energy projects done on project finance basis). The total endowment for investments is EUR 100 million coupled with incentive payments funds (EUR 13 million), technical cooperation funds (EUR 4.5 million) and institutional capacity building funding (EUR 3.5 million). By the end of 2012, it has invested about EUR 64 million in 15 projects. Most of these are small

hydropower plants, but the facility has so far financed 2 biomass (CHP) projects (in BiH and Croatia) and 2 industrial energy efficiency projects.

The rest of the project costs will be covered by the UNDP, co-financing from the private sector, the local municipalities, or other contributions (e.g. Standing Conference on Towns and Municipalities, Serbian Chamber of Commerce and Institute for Standardization of Serbia). The final amount of their contribution will depend on the detailed financial design of the proposed activities and demonstration projects and of the final, adopted design of the Government/GEF grant mechanism.

The Project Board will play an important role in ensuring that these resources are mobilised.

In addition to the US\$ 400,000 of in-kind contribution for project activities from MoME, other institutions of the Republic of Serbia will participate in the project with an in-kind contribution (the total estimated amount is US\$ 400,000). This in-kind contribution will cover the costs of:

- (i) the cost of the National Project Director and Project Board;
- (ii) the cost for the financial legal and technical advisors
- (iii) provision of experts from different government organizations to participate in the implementation of the project, as needed;
- (iv) provision of office space for the project management and other local and international experts working on the project, as needed;
- (v) provision of information and data to the project staff and consultants as may be required for the implementation of project activities and the realization of project objectives; and
- (vi) provision of information gathering services and logistic support to the project staff for the implementation of the project's activities.

#### *Project prerequisites*

The Government of Serbia will allocate the necessary funds to support the project. In addition, it will ensure that the project execution and implementation arrangements will be in place at the outset of project operations. This will include the establishment of the Project Board, consisting of the representatives of the relevant ministries, local municipalities, private sector entities, research institutes and environmental NGOs, to provide advice for and oversee the overall implementation of the project.

Should the national experts that will be hired by the project currently work under direct employment of the Government of Serbia, they will have to obtain a leave of absence without payment for the duration of their work for the project. A document to this effect, signed by an authorised person, has to be attached to the request for payment.

The Project Document will be signed by the Government of Serbia and UNDP. Assistance for the project will be provided only if the prerequisites stipulated above have been fulfilled or are likely to be fulfilled. When anticipated fulfilment of one or more prerequisites fails to materialise, UNDP may, at its discretion, either suspend or terminate its assistance.

---

## 6) MONITORING FRAMEWORK AND EVALUATION

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 and BSU 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 required.
- 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 Management 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 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 Evaluation at the mid-point of project implementation (estimated start date: October 2014 & mid-term evaluation: November 2015). The Mid-Term Evaluation 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 evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation 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).

During the mid-term project evaluation a thorough evaluation of the need for additional grant provisions will also be conducted.

The relevant GEF Focal Area Tracking Tools will also be completed during the mid-term evaluation 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 evaluation, 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 Terminal 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 through lessons learned. The project will identify, analyze, 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](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](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 workplan and budget

Type of M&E activity	Responsible Parties	Budget US\$ <i>Excluding project team staff time</i>	Time frame
Inception Workshop and Report	<ul style="list-style-type: none"> <li>▪ Project Manager</li> <li>▪ UNDP CO, UNDP GEF</li> </ul>	None	Within first two months of project start up
Measurement of Means of Verification of project results	<ul style="list-style-type: none"> <li>▪ UNDP GEF RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members</li> <li>▪ Monitoring and Reporting consultant</li> </ul>	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 <i>output and implementation</i>	<ul style="list-style-type: none"> <li>▪ Oversight by Project Manager</li> <li>▪ Project team</li> </ul>	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	<ul style="list-style-type: none"> <li>▪ Project manager and team</li> <li>▪ UNDP CO</li> <li>▪ UNDP RTA</li> <li>▪ UNDP EEG</li> </ul>	None	Annually
Periodic status/ progress reports	<ul style="list-style-type: none"> <li>▪ Project manager and team</li> </ul>	None	To be determined by Project team and UNDP CO
Mid-term Evaluation	<ul style="list-style-type: none"> <li>▪ Project manager and team</li> <li>▪ UNDP CO</li> <li>▪ UNDP RCU</li> <li>▪ External Consultants (i.e. evaluation team)</li> </ul>	Indicative cost: 20,000	At the mid-point of project implementation. During this a thorough evaluation of the need for additional grant provisions will also be conducted.
Final Evaluation	<ul style="list-style-type: none"> <li>▪ Project manager and team,</li> <li>▪ UNDP CO</li> <li>▪ UNDP RCU</li> <li>▪ External Consultants (i.e. evaluation team)</li> </ul>	Indicative cost : 20,000	At least three months before the end of project implementation
Project Terminal Report	<ul style="list-style-type: none"> <li>▪ Project manager and team</li> <li>▪ UNDP CO</li> <li>▪ local consultant</li> </ul>	0	At least three months before the end of the project
Audit	<ul style="list-style-type: none"> <li>▪ UNDP CO</li> <li>▪ Project manager and team</li> </ul>	Indicative cost per year: 2,500	Yearly
Visits to field sites	<ul style="list-style-type: none"> <li>▪ UNDP CO</li> <li>▪ UNDP RCU (as appropriate)</li> <li>▪ Government representatives</li> </ul>		As needed
<b>TOTAL indicative COST</b> Excluding project team staff time and UNDP staff and travel expenses		<b>US\$ 50,000</b>	



---

## 7) LEGAL CONTEXT

Standard text has been inserted in the template. It should be noted that although there is no specific statement on the responsibility for the safety and security of the executing agency in the SBAA and the supplemental provisions, the second paragraph of the inserted text should read in line with the statement as specified in SBAA and the supplemental provision, i.e. "the Parties may agree that an Executing Agency shall assume primary responsibility for execution of a project."

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 [or other appropriate governing agreement] 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.

## 8) Annexes

### Annex 8.1 Agreements.

[Refer to separate file for letters of co-financing commitment]

Organisation	Type of Organization	Type of co-financing	Amounts in letters USD	Amounts considered as project co-financing (in USD)
UNDP	GEF Agencies	Cash	\$310,000	\$310,000
UNDP		In-kind	\$250,000	\$250,000
EBRD <sup>19</sup>		Cash	-	-
Ministries in charge of natural resources	Serbian Government Institutions	In-kind	\$500,000	\$500,000
Ministry of Agriculture and Environmental Protection		In-kind	\$500,000	\$500,000
Ministry of Mining and Energy		In-kind	\$800,000	\$800,000
Chamber of Commerce - PKS	Specalised Organizations	In-kind	\$440,000	\$440,000
Institute for Standardization - ISS		In-kind	\$240,000	\$240,000
Standing Conference of Towns and Municipalities -SCTM	Municipalities and Municipal Associations	In-kind	\$300,000	\$300,000
Regional Development Agency of Srem - RRA Srem		In-kind	\$50,000	\$50,000
Municipality of Albunar		In-kind	\$100,000	\$100,000
Municipality of Ruma		In-kind	\$340,000	\$340,000
BogasHoldng	Private Investors	Cash	\$4,000,000	\$4,000,000
Poliester		Cash	\$4,500,000	\$4,500,000
Global Seed		Cash	\$3,500,000	\$3,500,000
NICCO		Cash	\$4,000,000	\$4,000,000
Netinvest		Cash	\$4,000,000	\$4,000,000
Ekoposlovi		Cash	\$3,800,000	\$3,800,000
<b>Total (without GEF)</b>			<b>\$27,630,000</b>	<b>\$27,630,000</b>
<b>Total (with GEF)</b>			<b>\$30,475,000</b>	<b>\$30,475,000</b>

<sup>19</sup>Co-financing from EBRD will be determined once the projects are defined and approved through the EBRD process

## Annex 8.2 Terms of Reference:

### Draft ToR for Biomass Support Unit and Project Staff

A Biomass Support Unit (hereafter referred to as the BSU) will be established with the objective to facilitate the investments on agricultural and wood biomass energy projects, which due to various financial barriers cannot attract enough financial resources from other sources. The BSU will facilitate the implementation of the Investment Mechanism with EBRD to complement existing financial resources, with the ability to absorb significantly higher risks and lower rates of return than financial resources available in the commercial market.

The main aim of the Biomass Support Unit is to provide a coherent framework for effective policy interactions and coordination in biomass use in Serbia in order to facilitate the implementation of appropriate bankable projects.

The aim will be accomplished through two distinct but strongly interrelated pillars:

- 1) Coherent & effective policy & support framework
  - Strengthen links between existing policy and funding instruments for the promotion of the biomass.
  - Provide a coordination unit for all relevant policy portfolios related to the biomass and a focal point for international cooperation in the field.
- 2) Support to biomass-based markets, economic growth and sustainable employment
  - Improve access to finance (including training & targeted networking activities).
  - Provide assistance for investors (one- stop shop) in terms of administrative & procedural terms required to apply for new biomass based plants (for energy, fuels & materials).

### Mission

During the four years of the BSU's operation, to fully invest its resources to facilitate the financing for at least 3 agricultural and 3 wood biomass energy projects, and based on the experiences from these projects to encourage and leverage development of at least 12 similar projects in other communities.

The success criteria under which the BSU should be evaluated are:

- The number of biomass energy projects facilitated by the BSU; and
- The amount of greenhouse gas emissions reduced as a result of the projects realised.

The main operational criteria of the Biomass Support Unit are listed below:

- The BSU can provide financing for the projects promoting the use of agricultural and wood biomass as an energy source;
- The BSU can provide financing through grant mechanism as well as on the related decisions of the Project Steering Committee/Executive Board of the Fund and UNDP, after the public tender procedures have been finalized and the properly evaluated for each candidate project.
- All project risk will be shared with other investors/guarantors. The maximum allowable unsecured contribution (grant) by the BSU is 20% of their respective total amount in the project;
- Should an individual project supported by the BSU fail to meet its objectives (see above), the percentage of the BSU's contribution will be returned, or the contribution will be forgiven according to specified terms and conditions as detailed in the contract between the BSU and its clients signed for each project; and
- The funds returned will be fully invested in other agricultural and wood biomass energy projects until the BSU is exhausted or the project has fully met its broad development objectives in line with the national biomass energy program.

### Management and supervision of BSU funds

The initial capital of the BSU will be transferred from the GEF to the Government of Serbia as a grant without the obligation to return the funds to the GEF, should the funds be disbursed and managed according to the criteria set up in the Project Document and the attached Terms of Reference. For the first four investments, the funds will be transferred by UNDP to the assigned account in "tranches" based on the actual needs. Should the criteria for disbursing and managing the funds not be met or the project will not progress otherwise as expected, the UNDP reserves the right to suspend or terminate its assistance as specified in Annex V.

The GEF contributions will be placed in their own designated account managed by the Ministry of Mining and Energy as the “BSU Manager”. The interest gained during the lifetime of the Fund will be fully incorporated into the operating capital of the BSU.

The Ministry of Mining and Energy will cover the cost for the financial legal and technical advisors who will be employed part time to meet the needs of the BSU.

The Terms of Reference for the project manager are attached. The Ministry of Mining and Energy will provide to the Project Board of the BSU and UNDP independently audited financial statements and report on the operation of the BSU as specified in section “Project Review, Reporting and Evaluation” of this project document.

After the formal termination of the UNDP/GEF project (which is scheduled in four years after the project’s start up), the BSU will continue its operations following the agreed operational procedure until the fund is exhausted or the objectives of the national biomass energy program have been fully met. The operational criteria for the continuation of the BSU’s operations (including the financial aspects of it) will be reviewed at the Terminal Tripartite Review of the project (as envisioned after four years from the starting date), based on the experiences of the project until then. The management fee (for the continuing operation of the fund) is to be agreed before the final Terminal Project Review. The reporting requirements are as specified in section H.

The projects to be supported will be selected based on a public call for tender. For the first full round of disbursements, this tender will be organised in co-operation with the Ministry of Mining and Energy so as to facilitate full co-ordination between the GEF and of Energy, Development and Environmental Protection in support for biomass energy projects.

The selection criteria and the guidelines for the preparation of proposals will be presented as a part of the public call for tender (see section 6). Feasibility studies should follow a common format and methodology developed by the project’s technical and financial advisers. All feasibility studies should include a long-term fuel supply agreement (see Annex \*\*), as well as information on the minimum secured sales price of the heat for the first three years of operation of the company. The price should be determined from a thorough market analysis within the community concerned. The results of the market analysis should be presented as a part of the feasibility studies and investment proposals.

Technical and financial assistance for communities to prepare the feasibility studies and business plans, according to the agreed criteria and format, will be made available through the technical assistance component of the project.

The feasibility studies and business plans received will be reviewed and evaluated by the Project Board (PB), consisting of the National project director, the project manager, the Biomass Support Unit Coordinating Officer and the technical adviser. Based on the results of the evaluation and further consultations with the applicants (companies and/or municipalities), a prioritised list of projects with proposed financing arrangements will be presented for final approval by the Project Board of the BSU. When evaluating and prioritising the proposals, the PB will bear in mind the most rational and cost-effective use of the combined support from the BSU, UNDP, EBRD, the Ministry, and other national and international sources of financing.

## Terms of Reference

### Project Board

#### Duties and responsibilities:

The Project Board is the main body to supervise the project implementation in accordance with UNDP rules and regulations and referring to the specific objectives and the outcomes of the project with their agreed performance indicators;

The main functions of the Project Board are:

- General monitoring of the project progress in meeting of its objectives and outcomes and ensuring that they continue to be in line with the national development objectives;
- Facilitating the co-operation between the different Government entities, whose inputs are required for successful implementation of the project, ensuring access to the required information and

resolving eventual conflict situations raising during the project implementation when trying to meet its outcomes and stated targets;

- Supporting the elaboration, processing and adoption of the required institutional, legal and regulatory changes to support the project objectives and overcoming of related barriers;
- Facilitating and supporting other measures to minimize the identified risks to project success, remove bottlenecks and resolve eventual conflicts;
- Approval of the annual work plans and progress reports, the first plan being prepared at the outset of project implementation;
- Approval of the project management arrangements;
- Approval of any amendments to be made in the project strategy that may arise due to changing circumstances, after the careful analysis and discussion of the ways to solve problems.

#### Project Board Structure and Reimbursement of Costs

The Project Board will be chaired by the National Project Director or other person assigned by the executing agency. The Project Board will include a representative from the key Ministries and Agencies involved in the project, a representative of UNDP and, as applicable, representatives of project's other co-financing partners. Other members can be invited by the decision of the Project Board, however by taking care that the Project Board still remains operational by its size. The project manager will participate as a non-voting member in the Project Board meetings. Members of the Project Board, chaired by the National Project Director, will consist of the representatives of the relevant ministries and other relevant key stakeholders of the project (e.g., local municipalities, private sector entities, research institutes, UNDP, environmental NGOs etc.) Other participants can be invited into the Board meetings by the decision of the Project Board.

The costs of the Project Board work shall be considered as the Government's or other project partners' voluntary in-kind contribution to the project and shall not be paid separately by the project. Members of the Project Board are also not eligible to receive any monetary compensation from their work as experts or advisers to the project.

#### Meetings

It is suggested that the Project Board will meet at least twice a year, including the annual TPR meeting. A tentative schedule of the Project Board meetings will be agreed as a part of the annual work plans, and all representatives of the Project Board should be notified again in writing 14 days prior to the agreed date of the meeting. The meeting will be organized provided that the executing agency, UNDP and at least 2/3 of the other members of the Project Board can confirm their attendance. The project manager shall distribute all materials associated with the meeting agenda at least 5 working days in prior to the meeting.

#### Project Manager

Duties and responsibilities:

Operational project management in accordance with the project document and the UNDP guidelines and procedures for nationally executed projects, including:

- Assume primary responsibility for daily project management - both organizational and substantive matters– budgeting, planning and general monitoring of the project;
- General coordination, management and supervision of project implementation;
- Managing the procurement and the project budget under the supervision of the MoME and with support from UNDP to assure timely involvement of local and international experts, organization of training and public outreach, purchase of required equipment etc. in accordance with UNDP rules and procedures;
- Submission of annual Project Implementation Reviews and other required progress reports the Project Board, MoME and the UNDP in accordance with the section "Monitoring and Evaluation" of the project document;
- Assume key role of Project Management by supervising and coordinating project activities to ensure its results are in accordance with the relevant Project Documents and the rules and procedures established in the UNDP Programming Manual;
- Manage the execution of the project by applying a client-oriented approach, consistent with donor requirements and UNDP rules and procedures;

- Assume primary responsibility for the daily management of activities, ensuring that operational procedures (HR, procurement, etc.) are undertaken in a timely and quality manner and adherence to the project's work plan are ensured, revisions of work plans and budgets, if required are prepared adequately and in time;
- Prepare, and agree with MoME and UNDP on, terms of reference for national and international consultants, subcontractors and project personnel, ensure proper guidance of their work and towards high-quality deliverables by supervising and backstopping of their activities, the use of project funds and preparation of quality results;
- Assume overall responsibility for reporting on project progress vis-à-vis indicators in the logframes and ensure timely preparation and top-quality of regular and ad-hoc project reports, and that monitoring and evaluation of the project is conducted in accordance to donor requirements and UNDP rules and procedures;
- Ensure adequate information flow, discussions and feedback among the various stakeholders of projects, and maintain regular contact with UNDP Country Office and the MoME on project implementation issues of their respective competence;
- Contribute to visibility of projects and results to relevant national and international stakeholders and audiences;
- Support development of partnerships with the UN Agencies, IFI's, government institutions, bi-lateral and multi-lateral donors, private sector and civil society organizations in the specific thematic areas of the portfolio;
- Provide inputs for the formulation of project outcomes, outputs and activities in accordance with donor requirements and UNDP's Results Based Management standards;
- Performs other duties as required by the supervisor.

#### Expected Qualifications:

- Master degree or equivalent in energy or other relevant discipline the project is dealing with.
- At least 8 years of professional experience with master degree in project management in the public sector and/or in the United Nations;
- Strong organization development/management experience and proven ability to manage people;
- Demonstrated ability to communicate complex ideas verbally and in writing;
- Proven ability to communicate with high level government officials;
- Previous experience in dealing with international and bilateral organizations;
- Familiarity and prior experience with UNDP and GEF requirements and procedures
- Working experience in Serbian public institutions is considered as an asset
- Fluency in both English and Serbian.

#### Biomass Support Unit Coordinating Officer (full-time)

##### Duties and responsibilities:

Operational project management in accordance with the project document and the UNDP guidelines and procedures for nationally executed projects, including:

- Be responsible and accountable for the overall management and administration of the Outputs of the Project related to Biomass Support Unit, and the timely and quality delivery of its activities;
- Develop and manage in coordination with partners an implementation strategy for Outputs of the Project related to Biomass Support Unit.
- Contribute to Project Work Plans and Project reports (Progress reports including the Final report and their presentation to the National Project Director/Project Board for review/approval).
- Monitoring of the Project progress related to Biomass Support Unit to ensure that it is in accordance with the timetable set out in the Project Document and preparation of regular updates and reports to Project Boards on projects' progress, implementing issues, emerging risks/problems and proposals for necessary remedial actions.
- Maintaining good cooperation and coordination between national counterparts, projects' partners and other relevant stakeholders. Maintaining regular contacts with beneficiaries, trainers to ensure relevance and quality of projects' outputs.
- Preparation of briefs, talking points and relevant materials.
- Draft terms of reference for consultants and project personnel.

- Active participation in and coordination of meetings, training sessions, conferences and public promotion of projects.
- As required, prepare official correspondence for national and international partners.
- Maintaining close cooperation of Biomass Support Unit with responsible partners and institutions to ensure effective implementation of the agreed activities and delivery of outputs in a timely manner.
- Maintains an established network of contacts for general information sharing and to remain up-to-date on partnership related issues
- Participates at the relevant UN Theme Group work, as required
- Assume responsibilities in line with the Internal Control Framework
- Performing other duties as required.

#### Expected Qualifications:

- Advanced university degree in the specific areas the project is dealing with and at least 8 years of professional experience with master degree.
- Experience in managing projects of similar complexity and nature, including demonstrated capacity to actively explore new, innovative implementation and financing mechanisms to achieve the project objective;
- Demonstrated experience and success in the engagement of and working with the private sector and NGOs, creating partnerships and leveraging financing for activities of common interest;
- Ability and demonstrated success to work in a team, to effectively organize it works and to motivate its members and other project counterparts to effectively work towards the project's objective and expected outcomes;
- Good communication skills and competence in handling project's external relations at all levels;
- Fluent in Serbian and English languages
- Familiarity and prior experience with UNDP and GEF requirements and procedures are considered as an asset

#### Project Assistant (full-time)

- Assist the PM in managing the project staff;
- Assist the PM on preparing GEF quarterly project progress reports, as well as any other reports requested by the Biomass Support Unit and UNDP;
- Assist the PM in managing the administrative and finance staff and ensure that all information is accurate;
- Overall, provide all necessary support to the PM in implementation of the project.
- Project logistical support to the PM, Biomass Support Unit Coordinating Officer and project consultants in conducting different project activities (trainings, workshops, stakeholder consultations, arrangements of study tour, etc.);
- During the visits of foreign experts, bear the responsibility for their visa support, transportation, hotel accommodation etc;
- Organize control of budget expenditures by preparing payment documents, and compiling financial reports;
- Maintain the project's disbursement ledger and journal;
- Control the usage non expendable equipment (record keeping, drawing up regular inventories);
- Arrange duty travel;
- Perform any other administrative/financial duties as requested by the Project Manager;
- Assist PM and Biomass Support Unit Coordinating Officer in organizing and coordinating the procurement of services and goods under the project.
- Under supervision of PM, responsible for all aspects of project financial management

#### Expected Qualifications:

- Bachelor degree in the specific areas the project is dealing with preferably with a focus to economy.
- At least 3 years of professional experience in project implementation in the public sector, and/or in the United Nations or other International Organization;

- Strong organization development experience and proven ability to coordinate activities and resources ;
- Previous experience in dealing with international and bilateral organizations would be an asset;
- Knowledge of UNDP rules and procedures and methodology for project management is an advantage
- Fluency in both English and Serbian.

#### Financial Advisor (part-time)

##### Duties and responsibilities:

Financial aspects of project implementation in accordance with the project document and the UNDP guidelines and procedures for nationally executed projects, including:

- overall support to the project implementation ensuring that the expected outputs are completed on time and that they comply with the specific project criteria and requirements;
- management of the project budget under the supervision of the MoME and UNDP, ensuring that the experts are recruited and the equipment and other materials are procured in a timely and cost-effective manner in accordance with the UNDP rules and procedures;
- preparation and dissemination of information concerning the available financing possibilities for the biomass energy projects in co-operation with the technical expert on the project team;
- identification of existing barriers to structuring financing for the proposed projects based on financial analysis of the feasibility studies and on the consultations with the participating companies;
- development of the procedures for the Investment Grant Mechanism in further detail and elaboration of possible co-operation with the other national and international sources of financing to leverage additional financial resources towards achieving the project objectives;
- evaluation of investment proposals sent to the BSU and, as applicable, provision of assistance for finalising these proposals;
- conducting negotiations regarding the terms and conditions of the BSU's grant with the applicants selected;
- provision of training in financial analysis and preparation of business plans and "bankable" project proposals;
- provision of assistance and advice on preparing tender documents for procurement, and on organising procurement.

All the guidebooks, manuals and model feasibility studies, business plans and tender documents will be prepared in Serbian language and translated into English.

#### Expected Qualifications

- Advanced university degree in economy and at least 8 years of professional experience with master degree
- extensive knowledge of and working experience in the financial and banking sector of Serbia;
- extensive experience with project financing -familiarity with the financing modalities developed for energy efficiency and renewable energy technologies is considered a plus;
- extensive experience with project and corporate management and a demonstrated ability to manage projects of this kind and complexity;
- good interpersonal and training skills;
- Fluent in Serbian and English languages
- Familiarity and prior experience with UNDP and GEF requirements and procedures are considered as an asset

#### Technical adviser (part-time)

##### Duties and responsibilities:

Supervising and supporting the finalisation of the tender documents for biomass energy projects and technical aspects of project implementation in accordance with the project document and the UNDP guidelines and procedures for nationally executed projects, including:

- establishment of contacts with companies that possessing the biggest potential to increase the use of agricultural and woody biomass for energy production purposes;



- review and compilation of the technical and economic parameters and the lessons learned from biomass energy projects realised in Serbia and abroad;
- preparation and dissemination of information on biomass energy, and an assessment of technical capabilities of the companies interested to participate in the project;
- preparation of a model feasibility study, business plan and tender documents for biomass projects (to be used as a reference);
- in co-operation with the other experts working for the project, organisation of training for the relevant stakeholders for preparing feasibility studies, investment proposals, and other required documents for biomass energy projects;
- review and evaluation of the submitted tender applications;

All the guidebooks, manuals and model feasibility studies, business plans and tender documents will be prepared in Serbian language and translated into English.

#### Expected Qualifications

- Advanced university degree in the specific technical areas the project is dealing with and at least 8 years of professional experience with master degree
- extensive knowledge of state-of-the-art biomass energy technologies and experiences and lessons learned in Serbia and/or other countries with biomass energy projects;
- extensive experience with preparing technical documents for biomass energy projects in Serbia and/or abroad;
- good interpersonal and training skills;
- good computer skills; and
- Fluent in Serbian and English languages
- Familiarity and prior experience with UNDP and GEF requirements and procedures are considered as an asset

#### Legal adviser (part-time)

##### Duties and responsibilities:

Legal aspects of project implementation in accordance with the project document and the UNDP guidelines and procedures for nationally executed projects, including:

- overall support to the project implementation ensuring that the expected outputs are completed on time and that they comply with the specific project criteria and requirements;
- preparation and dissemination of information concerning the legal/permitting procedures for the biomass energy projects in co-operation with the technical expert on the project team;
- identification of legal barriers for the proposed projects based on legal analysis of the feasibility studies and on the consultations with the participating municipalities and companies;
- development of the legal procedures for the Investment Grant Mechanism in further detail in cooperation with financial adviser;
- evaluation of investment proposals sent to the BSU and, as applicable, provision of assistance for finalising these proposals;
- conducting negotiations regarding the terms and conditions of the BSU's grant with the applicants selected in cooperation with financial adviser;
- provision of training in the legal/permitting procedures for the biomass energy projects;
- provision of assistance and advice on preparing tender documents for procurement, and on organising public tender.

#### Expected Qualifications:

- Advanced university degree in law and at least 8 years of professional experience with master degree
- Familiarity with national policy priorities in the area of renewable energy;
- Familiar with renewable energy and/or biomass related issues in the international and national context;
- Extensive experience in public tendering procedures in Serbia;
- Familiarity with Public Administration and institutions at national and local levels;
- Fluent in Serbian and English languages

### Annex 8.3 Summary of findings from the PPG study

#### Key findings:

- A. There is biomass available in Serbia which can support significant investments in the future.
- The total potential of biomass from forestry for energy production in Serbia equals to 32 PJ, which is 5.3% of the total primary energy supply of Serbia, and is found mainly in the central and southern part of Serbia. From these forest residues (e.g. tops, branches and stumps) that are left over at the logging sites and are estimated at 2.8 PJ.
  - The theoretical potential of biogas from livestock is estimated at 22 PJ. Since most of this resource cannot be aggregated between farming units to provide sufficient feedstock that a typical AD unit may require, it is assumed that ~30% of theoretical potential could be technically exploitable (~ 7 PJ).
  - Field crop residues are found mainly in the northern part of Serbia, in the region of Vojvodina. It is estimated that approximately 4 million tonnes of field crop and arboricultural residues could be annually exploited for energy purposes. This is equivalent to 64 PJ of energy or 10.2% of the total final energy consumption in 2009.
- B. Based on the findings of the PPG, it is clear that both the heat and electricity sectors present significant opportunities for the future bio energy market development in Serbia.
- However, in the biomass for heat market, KfW has recently initiated a big project covering biomass use in district heating plants with public ownership only. In the framework of this project, the Serbian government and KfW on behalf of the German government plan to support several district heating companies in their efforts to switch to biomass as fuel and/or to build new biomass-based CHP plants. Thus, to avoid duplication of efforts and increase the added value of the proposed GEF project the work will focus on removing barriers for biomass to electricity technologies in the agricultural (biogas) and wood sectors to facilitate the future deployment of efficient technologies and increase the share of sustainable bio energy in the Serbian electricity sector.
  - In summary, based on the preliminary results from the PPG study, the theoretical annual potential supply for biogas is estimated at 23 PJ. In real terms, much of this resource cannot be aggregated among farming units to provide sufficient feedstock that a typical AD unit may require. It is therefore assumed that ~30% of theoretical potential could be technically exploitable (~ 7 PJ). The installed capacity could be 102 MWe.
  - On the other hand, forest residues in Serbia (e.g. tops, branches and stumps) that are left over at the logging sites and are estimated (from the PPG study) at 2.8 PJ. It is assumed that ~50% of this potential could be exploited for small to medium scale CHP. The installed capacity could be 19 MWe.
- C. Despite the favourable fore-mentioned potentials the market for biomass energy (both agricultural and wood biomass) in Serbia can only really develop if both (i) demand is created and (ii) if biomass projects offer investors a good rate of return and can be seen to be succeeding.
- The project will complement the Government activities to promote the use of biomass as an energy source in Serbia for electricity generation, by combining:
    - a technical assistance package which includes building the institutional capacity required to address the legal and institutional barriers as well as creating awareness among all relevant stakeholders from the industry, government and financing sectors; A Biomass Support Unit (BSU) will be established in the Ministry of Mining and Energy (MoME) –on the approval of the GEF project- with the objective to facilitate the investments on agricultural and wood biomass energy projects, which due to various legal, institutional and financial barriers cannot attract enough financial resources from other sources.
    - and an Investment Support Mechanism (combining the GEF grants with EBRD loans) to develop bankable projects through innovative financial packaging and to leverage other sources of financing, and to reduce the risk of projects not being commercially viable or able to attract debt finance; An investment grant mechanism was selected as the most appropriate financial support mechanism for the Serbian biomass industry only after careful and thorough analysis, including several discussions with investors and financing institutions (EBRD, IFM,

etc.) active in the region which concluded that this type of mechanism has the greatest potential to overcome barriers and help develop the biomass market in Serbia. The BSU will also facilitate the implementation of the Investment Support Mechanism (1.6 million dollars from GEF) while EBRD will complement existing financial resources, with the ability to absorb significantly higher risks and lower rates of return than financial resources available in the commercial market.

A copy of the baseline report and the report for the selection of the appropriate financing mechanism, carried out as part of this PPG is available upon request.

## Annex 8.4 Greenhouse gas emission reduction analysis

This Annex calculates the CO<sub>2</sub> emission reductions associated with the implementation of the present project based on the “GEF Manual for Calculating GHG Benefits of GEF Projects: Energy Efficiency and Renewable Energy Projects”.

### A. Direct Emission Reductions

The main aim of this project is to accelerate the development of biomass for electricity generation projects in Serbia by developing and successfully launching a biomass support unit and implementing a sustainable financial mechanism to support biomass projects. As part of this, project targets the development, construction and operation of 4 agricultural and 2 wood small to medium (total 6.9 MW biomass electricity/ CHP projects over its duration of 4 years. The final project selection/ configuration will be subject to technical assistance and final approval through the EBRD process.

As a result of these activities during the project implementation period of 4 years, direct greenhouse gas emission reductions totalling 1,247,481 tonnes of CO<sub>2</sub> equivalent will be achieved over the lifetime of the investments of 20 years. In the non-GEF case, these energy needs would be satisfied by similar generators currently providing grid electricity, with an emission factor of 0.945 tCO<sub>2</sub>e/MWh, or by a similar expansion of heat provision, with an emission factor of 0.32 tCO<sub>2</sub>e/MWh.

The estimate is calculated based on the following formula and assumptions:

$CO_{2direct} = E * L * C$ ; where

- C – CO<sub>2</sub> emission factor, i.e. 0.945 tCO<sub>2</sub>e/MWh for grid electricity and 0.32 tCO<sub>2</sub>e/MWh for heat provision.
- L – average useful lifetime of investments, i.e. 20 years; and
- E – annual energy production as per Table 8-1 below

**Table 8-1: Lifetime emissions from projects**

Company		Biogas Holding	Global Seed	NICCO	Netinvest	Poliester	Ekoposlovi
Project type		Biogas	Biogas	Biogas	Biogas	Wood CHP	Wood CHP
Capacity	MWe	1	0.6	1.7	1	1	1.6
Capacity	MWth					4	5
Load factor	%	80%	80%	80%	80%	80%	80%
Assumed lifetime	years	20	20	20	20	20	20
Annual operation	hours	7,008	7,008	7,008	7,008	7,008	7,008
Annual electricity output	MWh	7,008	4,205	11,914	7,008	7,008	11,213
Annual heat output	MWh					28,032	35,040
Annual emissions	tCO <sub>2</sub> e	<b>651</b>	<b>391</b>	<b>1,107</b>	<b>651</b>	<b>271</b>	<b>434</b>
Lifetime emissions	tCO <sub>2</sub> e	<b>13,021</b>	<b>7,813</b>	<b>22,135</b>	<b>13,021</b>	<b>5,424</b>	<b>8,679</b>

This leads to emissions reductions compared to the baseline electricity production of 843,821 tCO<sub>2</sub>e and a reduction of 403,661 tCO<sub>2</sub>e compared to the baseline for heat provision, totalling in 1,247,481 tCO<sub>2</sub>e.

## B. Direct Post-project Emission Reductions

The project does not include activities that would result in direct post-project greenhouse gas emission reductions.

## C. Indirect Emission Reductions (bottom-up)

Using the GEF bottom-up methodology, indirect emission reductions attributable to the project are 3.742 MtCO<sub>2</sub>e calculated over the 20 years of useful lifetime of the investments. The GEF methodology specifies the following formula for this calculation:

$$CO2_{indirect\ BU} = CO2_{direct} * RF, \text{ where}$$

- CO<sub>2</sub><sub>direct</sub> = estimate for total direct emission reductions
- RF = replication factor

The direct CO<sub>2</sub> emission reductions were estimated in step A at 1,247,481 tCO<sub>2</sub>e. Using a *default replication factor of 3* for a demonstration project with capacity building, suggested in the GEF GHG calculation manual, bottom-up indirect emission reductions were calculated as follows:

$$1,247,481 \text{ tCO}_2\text{e} * 3 = 3.742 \text{ MtCO}_2\text{e}$$

## D. Indirect Emission Reductions (top-down)

Using the GEF top-down methodology, indirect emission reductions attributable to the project are 769.623 MtCO<sub>2</sub>e.

The GEF top-down assesses indirect GHG impacts by estimating the combined market potential for the proposed approach or technology within the 10 years after the project lifetime and is calculated per following formula:

$$CO2_{indirect\ TD} = P10 * CF, \text{ where}$$

- P10 = technical and economic potential for GHG savings with the respective application within 10 years after the project;
- CF = GEF causality factor.

For P10 in the calculations it is assumed that the total technological and economic potential for GHG emission reductions in this area over 10 years is 20 MWe for biogas and 5 MWe for wood CHP, which is 20% and 25%, respectively of the total potential over 20 years that was estimated by this project. Further assumptions and the calculations are presented in Table 8-2.

The calculations follow the “GEF Manual for Calculating GHG Benefits of GEF Projects: Energy Efficiency and Renewable Energy Projects”. Key assumptions for the estimation of direct emissions reductions achieved by 4 agricultural and 2 wood small to medium projects over its duration of 4 years (total 6.9 MWe biomass electricity/ CHP projects) are the Serbian baseline CO<sub>2</sub> emission factors for grid electricity (0.945 tCO<sub>2</sub>e/MWh) and heat (0.32 tCO<sub>2</sub>e/MWh), 20 year asset lifetime and the estimated annual energy production of the planned projects. Indirect emission reductions were calculated both bottom-up and top-down methodology.

In the bottom-up methodology a replication factor of 3 was assumed.

In top-down methodology, the assumptions were 20 MWe for biogas and 5 MWe for wood CHP for the 20-year technological/economic potential, and a GEF causality factor of 60%.

Summary of GHG reductions:

Direct: 1.247 MtCO<sub>2</sub>e

Indirect BU: 3.742 MtCO<sub>2</sub>e

Indirect TD: 397.711MtCO<sub>2</sub>e

Table 8- 2: Indirect GHG reduction – top-down methodology

	Unit		
Annual electricity potential biogas	MWh	175,200	
Annual electricity potential wood CHP	MWh	35,040	
P10 electricity potential biogas	MWh	1,752,000	
Reduced P10 electricity potential biogas	MWh	438,000	<i>considering relatively slow ramp-up to full installed capacity by year 10</i>
P10 electricity potential wood CHP	MWh	350,400	
Reduced P10 electricity potential wood CHP	MWh	87,600	<i>considering relatively slow ramp-up to full installed capacity by year 10</i>
Total reduced P10 electricity potential	<b>MWh</b>	525,600	
assumed heat/electricity ratio		1.875	
Reduced P10 heat potential wood CHP	MWh	657,000	
BAU emissions of reduced P10 electricity potential	tCO <sub>2</sub> e	496,692,000	
BAU emissions of reduced P10 heat potential	tCO <sub>2</sub> e	210,240,000	
BAU emissions TOTAL	<b>tCO<sub>2</sub>e</b>	706,932,000	
Biogas emissions of reduced P10 electricity potential	tCO <sub>2</sub> e	40,690,200	
Wood CHP emissions of reduced P10 electricity potential	tCO <sub>2</sub> e	3,390,120	
Project effect - emissions TOTAL	<b>tCO<sub>2</sub>e</b>	44,080,320	

Multiplying the total P10 figure calculated in Table 8-2 by the GEF causality factor of 60%, one gets to a total of 397.711 MtCO<sub>2</sub>e .

### Summary

The project related GHG reductions are presented in Table 8-3.

Table 8-3: Summary of GHG reductions

Type of emissions reductions	MtCO <sub>2</sub> e
Direct	1.247
Indirect BU	3.742
Indirect TD	397.711

## **Annex 8.5 Selecting appropriate ISM (Investment Support Mechanism)**

### **Existing support mechanisms for renewable energy projects in Serbia**

Governmental Support: The one major support mechanism for renewable energy (RE) currently in place in Serbia is a feed-in tariff (FiT). FiTs in Serbia are fixed prices that are paid per unit of electricity generated, and are not linked to either the maximal generating power in some period, the generation of reactive power, or the time of a day or season of a year. In doing so, feed-in tariffs create simple incentives for power producers. The overall structure and application of feed-in tariffs in Serbia is in line with those in the majority of other European countries.

Specifics of the design of the FiTs are intended to capture Serbian reality, and illustrate some of the issues that have to be considered in the design of investment support financial mechanisms in Serbia:

1. With depressed electricity prices in Serbia and lack of a real electricity market, feed-in tariffs are not defined as the current market price plus different premiums for different technologies, but just as fixed values. Another motivation for such a concept was also an intention to create a stable and secure framework for investors. Obviously, it was assumed that future investors would appreciate fixed purchase prices much more than a variable price depending on the market circumstances, as fixed feed-in tariffs provide financial security in terms of revenue level and consequently the economic viability of the project.
2. All feed-in tariffs are fixed during the whole 12 years period and expressed in €/kWh instead of the national currency. In addition, it was assumed that fixed prices expressed in the common European currency contain the minimal possible risk for interested investors, eliminating Serbian currency and political risk. Adopted feed-in tariffs are subject to annual correction for the inflation in Euro zone.

The Decree on Incentives for Privileged Power Producers set new feed-in tariffs in effect from 1 February 2013.

Commercial financing: In addition to the Feed-in Tariffs, several commercial loans with favourable conditions are available:

- 1) EBRD – WeBSECLF&EBRD – WeBSEDF
- 2) KfW – A regional Facility for Renewable Energy and Energy Efficiency offered via selected local commercial banks
- 3) KfW – The Municipal Infrastructure Credit Line Project (MICLP) offered through a local
- 4) EIB Apex III available through seven local intermediary banks.
- 5) Italian Credit Line for which a minimum 70% of individual loan must be used to acquire equipment from Italy
- 6) National Bank of Serbia - Revolving Credit Fund through intermediary banks

### **Grant vs non-grant financial mechanism**

Biomass CHP technologies are inherently capital-intensive, with relatively high construction costs. For this reason, these technologies are typically more sensitive to the availability and cost of financing.

The number of investors active in renewable energy and the biomass in Serbia has declined sharply, as a result of the financial crisis that began unfolding across the globe in 2008. The resulting shortage and increased cost of project financing has, in turn, slowed the development of new biomass projects.

It should be recognized that income-based policy incentives (tax exemptions or accelerated depreciation), are not effective when revenues are shrinking or non-existent, and there is necessity to design incentives for biomass CHP technologies in a more useful way, from developer/owner perspective.

For investors into renewable energy, the choice between different technologies available for the production of renewable energy will depend on the relative financial value of each incentive obtainable in Serbia.

Although the relative financial value is no doubt one of the most important considerations - in choosing investment between different renewable energy technologies, it is by no means the only factor. A number of other, more qualitative considerations - also play important roles in driving the decision. For attracting investments into biomass CHP and accelerate development of biomass market in Serbia, the following findings should be considered, based on analysis of grant vs. non-grant incentives:

- Given the lack of venture investors active in the Serbian biomass market today, the grant option reduces or eliminates the need for venture investors (and their expensive development capital) – which could be significantly more valuable to project owners than the non-grant incentives, even if the grant and the non-grant incentive provide the same amount of value. In other words, the grant instead of other type of incentive – is likely to have some essential value of its own in today's difficult financial environment. This may be especially the case if the grant allows the project developer to access less-expensive debt or equity capital than might otherwise be available, and could potentially drive developers and investors more strongly towards the biomass CHP investments.
- In today's turbulent economic times, investors have difficulty with a long-term projection related to biomass CHP projects, because of biomass price developments. With the cash grant, the need to forecast is greatly reduced and the full incentive is realized in the project's first year, rather than being spread over time. This leads to a relatively better liquidity position at the beginning of the project operational phase.
- Government sponsored, low-interest loan programs are not available on the Serbian market and the project financing could be secured more easily through cash grant incentives (which could be used as equity investment) than by using other instruments for project financing. One of concerns includes the relatively short window of opportunity (only four biomass projects will receive the grant), and the fact that the grant may not eliminate the need for third-party financing: therefore, collaboration with an international financing institution should be established, to support sustainability and replication of the projects. By receiving the grant incentive rather than a non-grant incentive, the project is less dependent on third-party investors, and can rely more heavily on conventional forms of finance.
- Community biomass CHP projects are projects that are locally owned – meaning that one or more members of the local community have a direct financial stake in the project. Development of community biomass CHP projects is logical top policy priority: through local ownership and greater use of local contractors, community biomass provides greater local economic development benefits than the commercial development. Greater local benefits, in turn, lead to increased public acceptance of biomass CHP projects. Cash grant removes one of the barriers to the participation of local/individual investors in community developed biomass CHP projects. Finally, by appealing to a broader investor base, community biomass has the potential to tap into a largely untapped pool of capital held by local/individual investors.
- Though it is true that the grant does not directly encourage lower costs and higher performance private investments, it is important to keep in mind that grant is only one of several revenue sources required to make a project economical, and its failure to ensure cost reductions and performance improvements could lead to unsatisfying project performance. Profit motives still provide a strong incentive for successful completion of the project through low-cost and high-performing, because a significant portion of revenue is earned through electricity sales.

Following several consultations with the government and the other financial institutions in the country (IFC, KfW, EBRD) the option that was favoured as the most sustainable, already successfully implemented in the region and transparent was the one of combining the GEF grant funds with a direct lending facility.

Given this panorama and these insights, the collaboration of UNDP/ GEF and EBRD should ensure an efficient investment mechanism with transparent tendering process and minimal additional administrative burden, while giving project developers financial support in the start-up phase of the project.



### **Implementation of the Investment Support Mechanism**

The BSU will also facilitate the implementation of the Investment Support Mechanism (1.6 million dollars from GEF) while EBRD will complement existing financial resources, with the ability to absorb significantly higher risks and lower rates of return than financial resources available in the commercial market.

Firstly the BSU will identify suitable projects for financing based on two Calls for proposals. Following, the BSU will use its technical capacity and also employ technical consultants to improve the bankability of the selected projects.

Following, it would refer them to EBRD for financing. EBRD will conduct a separate evaluation of the potential projects and if it finds them eligible will structure and provide debt financing for their implementation. The projects will be subject to the regular approval process (applied by the EBRD to small projects) and will be expected to meet the rigorous standards of the EBRD about sound banking, environmental and health and safety regulations, among others.

The GEF grants will be then provided as a phased-out incentive payment which will be offered only to the projects successfully evaluated from EBRD in two sets:

- a) 30% of the grant will be provided once the project receives positive response from EBRD in order to get the debt financing.
- b) the remaining 70% will be given upon project completion.

Each project will get up to 20% of the capital costs as GEF grant and up to a maximum of 400,000 dollars per project.

**Capacity Assessment:** *Results of capacity assessments of Implementing Partner (including HACT Micro Assessment)* - forming Ministry of Energy, Development and Environmental Protection of the Republic of Serbia.

UNDP Serbia conducted HACT Macro and Micro Assessment for all UNDP Implementing Partners in the Republic of Serbia. Macro-Assessment was conducted in 2010 by an independent authority indicating the lack of the capacity and resources of the Supreme Audit Institution as well as the immanent risk related to the cash management, budget reporting and internal audit function of public sector in the Republic of Serbia. In November 2011 UNDP Serbia also conducted Micro-Assessment of all key Implementing Partners of UNDP Serbia, including the Ministry of Environment, Mining and Spatial Planning.

Assessment was conducted by the independent Audit Company “Baker Tilly, Ltd” procured through UNDP procurement. The key audit areas with medium risk finding were “Staffing, Internal Audit and Reporting and Monitoring”. All other risk areas were defined as “low” as follows: Implementing Partner, Funds Flow, Accounting Policies and Procedures, External Audit, Information Systems. The overall report indicated low risk status of the Ministry of Environment, Mining and Spatial Planning.

After the elections in the Republic of Serbia in July 2012, i.e. since 26 July 2012, the Ministry has been merged (Energy and Environment) forming Ministry of Energy, Development and Environmental Protection of the Republic of Serbia. The part dealing with environmental protection has had a long-lasting cooperation in the implementation of GEF projects in cooperation with UNDP. The part dealing with energy has previous experience in cooperation with UNECE, thus, the newly formed Ministry has had cooperation with United Nations Organizations which made a solid ground for continuation of the cooperation in developing new proposals.

Due to the fact that the new Ministry was established, in line with UNDP requirements, separate 2013 Micro-Assessment was performed by UNDP Country Office with the new Ministry, in line with UNDP POPP, Project Implementation, Project Definition/Initiation requirements, Prince2 based methodology. Assessment was conducted by UNDP Serbia Prog/Finance and Ministry’s Head of Finance Unit. In the meantime, UNDP Serbia will continue engaging external private audit firms to conduct annual audits for NIM/NGO projects until further notice. Since 2003 (year of initial NIM project implementation) UNDP Serbia has had annual external audits every year. All reports have been unqualified with no high audit risks. Every year UNDP Serbia conducts review and recommendation on all audit findings for all projects in Country Office.

Moreover, UNDP has contacted Republic of Serbia Supreme Audit Institution and inquired about the possibility to include UNDP projects into regular SAI annual audits but no positive response was received from SAI due to the lack of staff and no possibility to commit to additional work to be performed by the Institution that started audit exercises in 2007 only. Full Micro-Assessment is attached to the project proposal. Key audit areas defined were: Staffing, Internal Audit and External Audit. UNDP is of the opinion that the Ministry is to be appointed as fully-fledged Implementing Partner to this project

**Special Clauses.** *In case of government cost-sharing through the project which is not within the CPAP, the following 10 clauses should be included:*

1. The schedule of payments and UNDP bank account details.
2. The value of the payment, if made in a currency other than United States dollars, shall be determined by applying the United Nations operational rate of exchange in effect on the date of payment. Should there be a change in the United Nations operational rate of exchange prior to the full utilization by the UNDP of the payment, the value of the balance of funds still held at that time will be adjusted accordingly. If, in such a case, a loss in the value of the balance of funds is recorded, UNDP shall inform the Government with a view to determining whether any further financing could be provided by the Government. Should such further financing not be available, the assistance to be provided to the project may be reduced, suspended or terminated by UNDP.
3. The above schedule of payments takes into account the requirement that the payments shall be made in advance of the implementation of planned activities. It may be amended to be consistent with the progress of project delivery.
4. UNDP shall receive and administer the payment in accordance with the regulations, rules and directives of UNDP.
5. All financial accounts and statements shall be expressed in United States dollars.
6. If unforeseen increases in expenditures or commitments are expected or realized (whether owing to inflationary factors, fluctuation in exchange rates or unforeseen contingencies), UNDP shall submit to the government on a timely basis a supplementary estimate showing the further financing that will be necessary. The Government shall use its best endeavours to obtain the additional funds required.
7. If the payments referred above are not received in accordance with the payment schedule, or if the additional financing required in accordance with paragraph above is not forthcoming from the Government or other sources, the assistance to be provided to the project under this Agreement may be reduced, suspended or terminated by UNDP.
8. Any interest income attributable to the contribution shall be credited to UNDP Account and shall be utilized in accordance with established UNDP procedures.

In accordance with the decisions and directives of UNDP's Executive Board:

The contribution shall be charged:

- (a) 10% cost recovery for the provision of general management support (GMS) by UNDP headquarters and country offices
  - (b) Direct cost for implementation support services (ISS) provided by UNDP and/or an executing entity/implementing partner.
9. Ownership of equipment, supplies and other properties financed from the contribution shall vest in UNDP. Matters relating to the transfer of ownership by UNDP shall be determined in accordance with the relevant policies and procedures of UNDP.
  10. The contribution shall be subject exclusively to the internal and external auditing procedures provided for in the financial regulations, rules and directives of UNDP.

## **Annex 8.6 Environmental and Social Screening**

[Refer to separate file for letters ESSP]

## **Annex 8.7 Letter of agreement**

### **STANDARD LETTER OF AGREEMENT BETWEEN UNDP AND THE GOVERNMENT FOR THE PROVISION OF SUPPORT SERVICES**

## SIGNATURE PAGE

Country: Republic of Serbia

## UNDAF Outcome(s)/Indicator(s): Outcome 2. Sustainable Development and Social Inclusion Enhanced

2.5 - Improved mechanisms to protect the environment, ensure sustainable management of natural resources, and mitigate and/or adapt to the impacts of global climate change on social, economic, and ecologic systems/% of energy generated from renewable energy sources in relation to the total primary energy consumption <http://www.undp.org.rs/download/UNDAF%202011-2015%20ENG.pdf>

**CPAP Outcome(s)/Indicator(s):**2.5.: Improved mechanisms to protect the environment, ensure sustainable management of natural resources, and mitigate and/or adapt to the impacts of global climate change on social, economic, and ecologic systems

**CPAP Output(s)/Indicator(s):**2.5.4.3: Improved energy sector performance through enhanced market mechanisms, renewables and demand-side initiatives/Percentage of energy generated from renewable sources in relation to the total primary energy consumption

[http://www.undp.org.rs/download/UNDP%20CPAP%202011-2015%20\(ENGLISH\)%20-%20signed.pdf](http://www.undp.org.rs/download/UNDP%20CPAP%202011-2015%20(ENGLISH)%20-%20signed.pdf)

**Implementing Partner:** Ministry of Mining and Energy

**Implementing Entity/Responsible Partners:** Ministry of Mining and Energy, Ministry of Agriculture and Environmental Protection/UNDP

Programme Period:	2011-2015	<i>Total resources required</i>	<u>US\$ 14,000,000</u>
Atlas Award ID:	00074238	Total allocated resources:	<u>US\$ 30,475,000</u>
Project ID:	00086739	Total cash-contributions:	<u>US\$ 3,155,000</u>
PIMS #	4382	Regular (UNDP) (cash)	<u>US\$ 310,000</u>
Start date:	9 June 2014	Other (GEF) (cash)	<u>US\$ 2,845,000</u>
End date:	9 June 2018	Parallel Funding:	
Management Arrangements	NIM	o Government (in-kind)	<u>US\$ 1,800,000</u>
PAC Meeting Date	18 February 2014	o Other (cash)	<u>US\$ 23,800,000</u>
		o Other: (in-kind)	<u>US\$ 1,720,000</u>

**Agreed by the Ministry of Mining and Energy of the Republic of Serbia:**

  
 Aleksandar Antić  
 Minister  
 SIGNATURE  
 21.05.2014  
 Date/Month/Year

**Agreed by the Ministry of Agriculture and Environmental Protection of the Republic of Serbia:**

  
 Snežana Bogosavljević Bošković  
 Minister  
 SIGNATURE  
 29.05.2014  
 Date/Month/Year

**Agreed by UNDP:**

  
 Irena Vojáčková Sollorano  
 Resident Representative  
 SIGNATURE  
 20/5/14  
 Date/Month/Year