



**United Nations Development Programme**  
**Country: Moldova**  
**PROJECT DOCUMENT<sup>1</sup>**



**Project Title:** ESCO Moldova - Transforming the market for Urban Energy Efficiency in Moldova by introducing Energy Service Companies.

**Outcome 3.2 - Low Emission and Resilient Development:** Strengthened national policies and capacities enable climate and disaster resiliency, low emission economic development and sustainable consumption.

**UNDP Strategic Plan:** Growth and development are inclusive and sustainable, incorporating productive capacities that create employment and livelihoods for the poor and excluded

**Output 1.5.** Inclusive and sustainable solutions adopted to achieve increased energy efficiency and universal modern energy access (especially off-grid sources of renewable energy)

**Expected CP Outcome(s): Outcome 3.2 - Low Emission and Resilient Development:** Strengthened national policies and capacities enable climate and disaster resiliency, low emission economic development and sustainable consumption.

**Expected CPAP Output (s):** Output 3.2.1- Public and private sector and individual consumers change production and consumption patterns towards increased energy and resources efficiency and use of renewable energy.

**Executing Entity/Implementing Partner:** Ministry of Environment

**Brief Description:** The project objective is to create a functioning, sustainable and effective ESCO market in Moldova by converting existing energy service provider companies into ESCOs, as the basis for scaling up mitigation efforts in the whole municipal building sector in Moldova in line with the Green Urban Development Plan leading to at least 68,000 tonnes of direct CO2 emission reductions from EPC projects supported by the project and 240,000 tonnes of indirect CO2 emission reductions during the period of project influence. The municipal sector faces a city-level capacity constraint towards adoption of a green urban development plan and in response to this the project aims to support the municipality of Chisinau in addressing the legal, institutional and financial barriers for promoting and carrying out improvements of the efficiency energy usage in Moldovan buildings, particularly those in the institutional and multi-storey residential sub-sectors. The project examines the largely untapped energy efficiency market in the municipal sector, especially in facilities owned and operated by municipalities, in the Chisinau area for the first stage and then to other parts of Moldova.

Programme Period:	2014-2018
Atlas Award ID:	00079687
Project ID:	00089623
PIMS #	5135
Start date:	November
2014	
End Date	December
2018	

Total resources required	US\$ 8,915,000
Total allocated resources:	US\$ 8,915,000
GEF	US\$ 1,300,000
UNDP (cash)	US\$ 150,000
Government EEF	US\$ 1,000,000
City of Chisinau	US\$ 6,425,000
M of Environment (in-kind)	US\$ 40,000

Agreed by (Ministry of Environment): *V. G. G. 28.11.14*  
 Date/Month/Year

Agreed by (UNDP): *[Signature] 28.11.2014*  
 Date/Month/Year

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

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**List of Acronyms**

BAU	Business As Usual case without GEF involvement
CO	UNDP Country Office
CO <sub>2</sub>	Carbon dioxide
DESEE	Department of Energy Security and Energy Efficiency
EBRD	European Bank for Reconstruction and Development
EE	Energy Efficiency / Energy Efficient
EE	Energy Efficiency
EEA	Energy Efficiency Agency
EEF	Energy Efficiency Fund
EOP	End of Project
EP	Energy Performance
EPS	Expanded Polystyrene Foam
ESCO	Energy Service Company
EU	European Union
GEF	Global Environment Facility
GHG	Greenhouse Gas(es)
GoM	Government of Moldova
HOB	Heat only Boiler
HVAC	Heating, Ventilation and Air Conditioning
Ktoe	kilotons of oil equivalents
Kton	Kilo tone
KWh	kilowatt hour
LEDS	Low Emission Development Strategy
MDL	Moldovan Leu (currency)
M&E	Monitoring and Evaluation
MoENV	Ministry of Environment of Moldova
NBS	National Bureau of Statistics
NGO	Non-Governmental Organization
PBP	Payback period
PIF	Project Implementation Form
PIR	Project Implementation Review
PMU	Project Management Unit
PPA	Public Private Agreement
PPG	Project Preparation Grant
QPR	Quarterly Progress Report
RCU	UNDP Regional Coordination Unit
RFQ	Request for Qualification
RFP	Request for proposal
RTA	UNDP Regional Technical Adviser
SEAP	Sustainable Energy Action Plan
TCE	Ton Coal Equivalent
toe	ton of oil equivalent
TWh	Tetra watt hour
UDP	Urban Development Plan
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change

## SECTION 1 SITUATION ANALYSIS

### 1.1 Context and global significance

1. The Republic of Moldova is located in Central Europe between Romania and Ukraine, in the region of the Black Sea. In 2008, Moldova's population stood at 4.1 million people with an urban population of 1.8 million or 44.9% of the population. The capital Chisinau is the largest city of Moldova. The climate of Moldova is moderately continental, characterized by relatively mild winters with little snow and long hot summers with low humidity. The main industries in Moldova are the agricultural production and food industry businesses. During the period of 1990 and 2005, national GHG emissions decreased by 72.3 percent: from 42.9 Mt CO<sub>2</sub> equivalents in 1990 to 11.9 Mt CO<sub>2</sub> equivalents in 2005. In recent years, as the Moldovan economy has started to grow again, GHG emissions have started to increase and are projected to continue rising, mainly from urban centres.

2. In Moldova, there are no cities that can currently be described as green cities, only cities that aspire to become green, such as Chisinau. Urban development is primarily driven by economic considerations and 'greening' considerations are for the most part not taken into account. Most Moldovan cities are increasingly in decay and have outmoded urban infrastructure, deteriorated communal housing, poor planning, and a lack of municipal budget to meet the needs of growing urban populations and urban poverty. All these problems are present in the capital city of Chisinau. Specifically, ensuring maintenance and communal services for multi-storey housing remains a key priority for all cities. Multi-storey apartment blocks account for 157.2 million m<sup>2</sup> or 60% of the housing stock; one out of three (or 50 million m<sup>2</sup>) is in need of capital renovation, while 3.8 million m<sup>2</sup> is in an emergency state and has to be demolished. Regardless of technical conditions, over 70% of multi-storey apartment buildings have very low thermal performance (especially buildings constructed in 1950 - 1980s): thermal losses account for up to 50% of heat consumption.

3. The Republic of Moldova is part of the Convention on Climate Change from 1995 and also joined the Kyoto Protocol in 2003. In line with the provisions of the given Convention, the Republic of Moldova is part of the group of non-annexed countries which are not bound to reduce greenhouse gas emissions, but may benefit from support offered by developed countries for the implementation of technologies with an advanced level of energy efficiency and reduced GHG emissions. The Republic of Moldova associated itself with the Copenhagen Accord (COP 2009) and submitted an emissions reduction target that is specified in Annex II of this Agreement "National Appropriate Mitigation Actions in Developing Countries." The target of mitigation actions for Republic of Moldova under this Agreement is "to reduce, to not less than 25% compared to the base year (1990), the total national level of greenhouse gas emissions by 2020, by implementing economic mechanisms focused on global climate change mitigation, in accordance with the principles and provisions of the Convention".

The municipal sector faces a city-level capacity constraint towards the adoption of a green urban development plan, in response to which the project aims to support the municipal sector, especially the city of Chisinau, in addressing the legal, institutional and financial barriers for promoting and carrying out improvements of the efficiency energy usage in Moldova buildings, particularly those in the public institutional and multi-storey residential sub-sectors, owned and operated by municipalities through the ESCO business model<sup>2</sup>. The project looks at the largely untapped energy efficiency market in the municipal sector, focusing in the Chisinau area in the first stage. The potential for efficiency gains is substantial (estimated at 20% in the building sector), but the implementation of energy savings programs in the public sector is complicated by numerous factors, including a lack of commercial orientation on the part of public agencies and municipal authorities, limited incentives to lower energy costs, complex and strict budgeting and procurement procedures, and limited access to budgetary or project financing.

4. The realization of this objective will be facilitated through the removal of barriers for the uptake of energy efficiency technologies, EE projects financing, energy management best practices, capacity building to convert existing energy services companies into ESCOs, the environment for new companies to follow the ESCO business model, and the preparation of the overall Green Urban Development Plan. To this end, the project will

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<sup>2</sup> An ESCO, or Energy Service Company, is a business that develops, installs, and arranges financing for projects designed to improve the energy efficiency and maintenance costs for facilities over a period of time corresponding to the investment payback period from energy savings. ESCOs generally act as project developers for a wide range of tasks and assume the technical and performance risk associated with the project.

implement energy performance contracts (EPCs<sup>3</sup>) as a means of overcoming some of the more difficult obstacles in promoting energy efficiency in public facilities. As a result of the project implementation, it is envisaged that at least 20 EE projects will be implemented through EPC modalities and 381kt CO<sub>2</sub> emissions reduction will be achieved<sup>4</sup>.

5. As a rule, several forms of financing are barriers found in the public sector. Municipal borrowing capacity is sometimes limited by regulation. Too often municipal authorities cannot differentiate traditional loans from the EPC approach. There is a lack of information about opportunities with ESCOs or EPC and there is little experience in that field in Moldova. Procurement difficulties biased to cost-related items only, coupled with political fear of redundancy suspicions also limit municipalities' willingness to engage in ESCO projects. Furthermore, municipal authorities are often suspicious of the financial schemes and feel uneasy about sharing an EE project's financial benefits with a private company even within a limited period of time. In addition, in the institutional sector, split incentives with investment and operational expenses coming from different budget lines have always been a major obstacle to ESCO development. As a result, proposed EPC projects are either postponed or not implemented at all. Such a situation is different in a country having a track record for third party financing to advance the ESCO business model, but it is not the situation in Moldova. Until now, Moldova has not developed any experience in that field, mainly because the concept was not well-known, and most importantly because the Energy Services Providers did not get access to project financing.

6. The ESCO Moldova Project intends to support the Chisinau municipal administration to overcome institutional and financial barriers and to create the basic business environment with the aim of enabling the private ESCO sector development from 2014 to 2018 so that by the end of the project there are businesses in Moldova successfully and profitably implementing the ESCO business model. Rather than supporting the creation of a new public private partnership ESCO, the project now aims to support the conversion of existing energy service provider companies into ESCO and thereby facilitate the development of an ESCO market in Moldova.

7. Project financing is so fundamental to the ESCO business model that an ESCO cannot consider doing business in a country where it cannot obtain a long-term reliable source for financing its EE projects. The project financing barrier is normally difficult to overcome for ESCOs when the interest rate is high and their financial capacity is limited due in large part to the fact that the local financing institutions (LFIs) are unfamiliar and uncomfortable with providing project-based lending to energy savings projects on a medium to long-term basis. Virtually few LFIs are willing to recognize and accept energy savings from EE projects as collateral. The problem is compounded by the relative small project size and the high transaction cost related to EPC modalities. The small project size is equated to a perceived small market size, which makes it difficult to convince an investor or a banker to invest the time and resources required to learn about a new lending product or service like financing EE projects. The learning curve is high due to the perceived intricacies of EE projects, which use the measured savings stream and general creditworthiness of energy end-users as collateral and basis for repayment versus traditional hard assets such as land and buildings. It is very beneficial for an ESCO to start implementing its business model with sufficient equity to be able to self-finance a certain number of EE projects and start generating corporate cash flow. In addition, an adequate level of capitalization can help overcome the reluctance of LFIs to provide debt, especially if the ESCO can demonstrate a track record of successfully implemented projects, and if the new ESCO manages to concentrate its service activities on qualified energy end-users and short payback periods that can generate revenue streams quickly.

8. The project intends to overcome these barriers by setting up the needed financial mechanism (a loan guarantee fund), supporting the municipal sector to implement EE projects through the EPC modality and by providing established energy service providers and financial institutions with a comprehensive capacity building program. Finally, the ESCO Moldova project will significantly help the municipality of Chisinau to develop and implement the Green Urban Development Plan (GUDP). Such a plan is crucial to green value chain at all steps of future urban development, especially in regards to the building sector owned and operated by the municipal authorities in Moldova. In other words, ESCO Moldova will support an integrated approach through:

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<sup>3</sup>EPC: Energy Performance Contract

<sup>4</sup>Direct (20EE projects from 2018 to 2038) and post-project (20 EE projects from 2018 to 2038) impact plus indirect impacts (causality factor of 0.4) on the same period of time will result in cumulative GHG emissions reduction of 381ktons CO<sub>2</sub>.

- the GUDP, which will serve as a broad umbrella under which EE project initiatives can be seen as an important component;
- the needed EE projects implementation instrument and financial tools.

10. Under the traditional approach, the beneficiary (private company or public organization) which wants to implement a project of energy efficiency must go through several stages and have numerous contractual partners: designers, financial institutions, manufacturers of equipment, contractors, and suppliers.

11. On such complex projects problems may arise from dealing with the large number of parties. If a change occurs, the beneficiary has to update all parties involved, leading to long delays in implementing a project.

12. If the energy efficiency projects (EE) are implemented through the ESCO firms (model), the entire project is treated with a single entity for all components and for all stages.

13. Working with a single intermediary helps to reduce the projects implementation costs, which are often a significant barrier to the implementation of investments in energy efficiency.

14. Such an integrated approach requires a payment security mechanism through the establishment of a trust account in a financial institution selected by the UNDP/GEF. In practice, the EE security fund will be a loan guarantee fund (LGF). The LGF will enable EPC (energy performance contracts) to take place that otherwise would not. The UNDP CO will make a deposit to share the risk of bad debts or the underperformance of one or several EE projects.

15. The reason that the project has chosen to support the establishment of a LGF and not the creation of a single new company, a public-private partnership ESCO Moldova, as was originally envisaged in the PIF is firstly because municipal co-financing was not forthcoming and secondly because stakeholder consultations in Chisinau with private sector actors revealed very limited appetite for a public-private partnership.

16. The primary objective of a LGF is to expand the availability of commercial financing for energy efficiency projects in order to develop a sustainable commercial lending market for energy efficiency investments. The PMU will be accountable for LGF management to the UNDP CO but the final decision to provide a guarantee relies on the selected commercial bank. A comprehensive LGF regulation/procedure will be drafted by the PMU and jointly reviewed with the selected bank at the earliest stage of the project implementation.

## **1.2 Energy Sector and Climate Change Policy**

### **1.2.1 Climate Change Policy and Commitment**

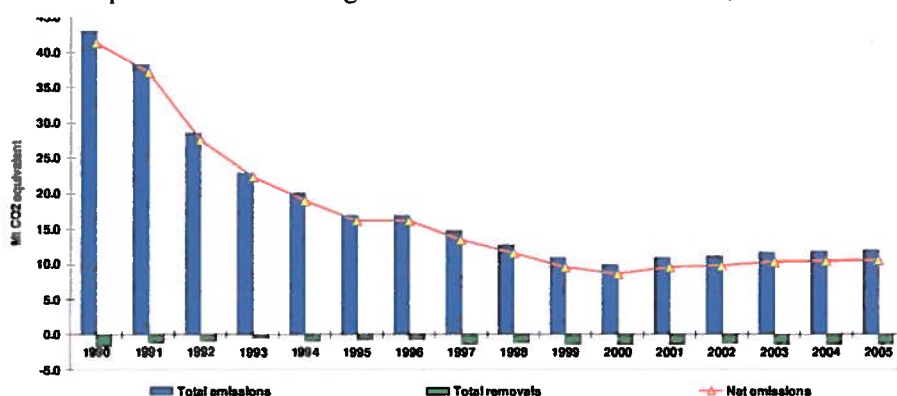
17. The agreed target (25% reduction of the base year 1990) is presented without indicating specific national appropriate mitigation actions, identified and quantified, and without further clarification of the necessary support to achieve it. Simultaneously, it is recognized that achieving this target will require significant financial, technological and capacity-building support, which can be provided through the UNFCCC mechanisms.

18. During 2010-2013 the Low Emission Development Strategy (LEDS) of the Republic of Moldova until 2020 was prepared, a strategic document that will allow the country to adjust its development path towards a low carbon economy and to achieve a green sustainable development, based on the socio-economic and development priorities of the country. In addition, LEDS supports overall objectives, providing strategic national context for mitigation efforts for which countries receive international support. LEDS was developed in accordance with the Republic of Moldova's Governmental Program "European Integration: Freedom, Democracy, Welfare" (2011-2014), Chapter "Environmental Protection" and the provisions of chapter "Climate Change" of the Association Agreement with European Union. LEDS contains a set of mitigation measures that contribute to the decrease of GHG emissions; they also help to quantify the corresponding reduction of emissions for each mitigation measure, and the financial requirements for their implementation.

19. The Action Plan annexed to the Strategy includes a list of prioritized national appropriate mitigation actions. The strategy envisages the implementation procedures, timeframes and provisions on monitoring, reporting and verification. LEDS has been developed by the Ministry of Environment of the Republic of Moldova, the process being guided by an Interministerial working group for climate change, with support from the UNDP Country Office. The strategy development process has involved a wide consultation with stakeholders, including ministries, academic and research institutions, donor organizations, NGOs and civil society. The LEDS strategy to Year 2020 stipulates that the Government will develop a program to gradually

increase the number of buildings with almost zero energy consumption in the public sector. Following the national circumstances, the Government will determine the most relevant instruments for financing and stimulating the energy performance of buildings. By facilitating EE investments, the ESCO business model can have a direct impact on the low carbon strategy through EE projects in the building sector, although the project does not comply with the target set (zero consumption).

20. The Republic of Moldova consistently monitors and estimates emissions of greenhouse gases (GHG) through national inventories of their sources and sinks. A series of assessments were made in 2000, 2004, and 2009 as part of Moldova's "First and Second National Communication to the UNFCCC" and a regional GHG capacity building program. "National Inventory Report: 1990-2005, Greenhouse Gas Sources and Sinks in the Republic of Moldova" (2009) reveals a decreasing trend of GHG emissions in the Republic of Moldova. Between 1990 and 2005, national GHG emissions fell by about 72.3 percent: from 42.9 Mt CO<sub>2</sub> equivalents in 1990 to 11.9 Mt CO<sub>2</sub> equivalents in 2005. After bottoming out in 2000, Moldova's CO<sub>2</sub> emissions increased between 2000 and 2005 by about 20.7 percent, mostly due to a 45.5 percent increase in CO<sub>2</sub> emissions primarily caused by increased emissions from the stationary combustion of fossil fuels. The Energy Sector is the most important source of national direct GHG emissions (without LULUCF<sup>5</sup>), its share varying from 80.5 percent to 65.0 percent over the time span from 1990 through 2005. Between 1990 and 2010, the total direct greenhouse gas emissions dynamic, expressed in CO<sub>2</sub> equivalent, revealed a decreasing trend in the Republic of Moldova, reducing by about 69.3 percent: from 43.2598 Mt CO<sub>2</sub> equivalent in 1990 to 13.2761 Mt CO<sub>2</sub> equivalent in 2010. This is due mainly to the collapse of the Soviet Union in early 90s.



Source: LOW EMISSIONS DEVELOPMENT STRATEGY OF THE REPUBLIC OF MOLDOVA TO THE YEAR 2020, November 2011

### 1.2.2 Energy Sector Update and Policy

21. Final energy consumption in 2005 was still 77% lower than in 1990. This reduction in energy consumption is not a sign of improved energy efficiency, but is due to many other factors inherent to the transitional period, including production crisis, financial difficulties and irregular energy supply. Despite this large decrease, Moldova's economy still has a high level of primary energy consumption per unit of GDP compared to averages for countries in the OECD. According to IEA, in 2005, the energy intensity of Moldova (energy use compared to GDP at purchasing power parity (PPP)) is 0.45 toe/US\$ 1000 at PPP, nearly three times higher than the EU-27 average.

22. The residential sector is the greatest energy consumer (40% of total final consumption), followed by industry (21%) and transports (15%) sectors. Agriculture, although dominating in the economy of the country, has a small share in the final consumption of commercial energies (4%).

23. The economic and structural reforms in the country resulted in substantial reduction of industrial production, which in turn resulted in reduced energy consumption. However, the energy efficiency of the industrial sector remains low. The specific energy consumption in processes is high and the energy losses are substantial. Both energy audits and implemented energy efficiency projects demonstrate high energy efficiency potential in all sub-sectors of industry. Nonetheless, energy efficiency is still not a matter of great concern in industry. For instance, in 2007 the energy intensity of industrial production was 0.118 t.c.e./thousand MDL, almost twice as low as that of 2001.

<sup>5</sup>LULUCF: Land Use, Land Use Change and Forestry



24. In 2007, the Energy Strategy of the Republic of Moldova until the year 2020 was adopted. The Strategy acknowledges energy efficiency as one of the priorities for the national economy and for the energy sector. Energy Efficiency has also been declared as a key objective under the EU Moldova Action Plan (Objective 66). It is estimated that a well-planned and concerted implementation of an energy efficiency program in Moldova could reduce the financial impact of the energy sector on the GDP by 1.6-1.7% per year, starting with 2008. The pursuit of higher energy efficiency does not concern only the energy sector but cuts across all sectors of the economy and energy consumption and, therefore, has a highly decentralized character. As a result, it requires a variety of approaches and types of measures, which generally differ from one sector to another.

25. The key principles of state policy in the field of energy efficiency are:

- gradual approximation of national legislation with EU secondary legislation on energy efficiency until the year 2010;
- increasing awareness and providing technical-scientific and information support for energy saving and energy efficiency activities;
- harmonization of interests of energy consumers, suppliers and generators for energy saving;
- transparent granting of incentives for energy efficiency interventions;
- mandatory implementation of energy saving measures by legal entities;
- effective monitoring by the State of the progress in efficient use of energy resources.

### 1.3 Regulatory Environment to advance Energy Efficiency and ESCO

#### 1.3.1 General Energy Sector Regulation

26. National Development Strategy "Moldova 2020" approved by Law no. 166 of 11.07.2012, inter alia, provides objective of reducing energy consumption by increasing energy efficiency and use of renewable energy sources.

27. At the moment, in Moldova there are a number of regulations that promote efficient energy consumption:

- Government Decision no. 102 of 05.02.2013 "On the Energy Strategy of the Republic of Moldova until 2030;
- Energy Efficiency Law no. 142 of 02.07.2010;
- Renewable Energy Law no. 160 of 12.07.2007;
- Law on joining the Energy Community Treaty, no 117-XVI of 23.12.2009;
- Government Decision no. 833 of 10.11.2011 "On the National Energy Efficiency Programme 2011-2020;
- Government Decision no. 113 of 02.07.2013. On the approval of the National Action Plan for Energy Efficiency for 2013-2015, etc.

28. As the reference to the ESCO and third party financing contracts *Law no. 142 on Energy Efficiency* provides in art. 24 basic conditions to promote ESCO:

- (1) Energy service companies can provide energy services and energy performance contracts if the contract stipulates:
  - a) primary energy consumption before the energy performance contract is signed;
  - a) the energy savings guaranteed and procedures for achieving them;
  - b) arrangements for financing the EE project;
  - c) the recovery of investments made by the ESCO or, where appropriate, by third parties.
- (2) Energy distributors, distribution systems operators and energy suppliers will not undertake any activity that would hinder the development of the energy services market and the making of other energy efficiency improvement measures.
- (3) Energy distributors, distribution systems operators, and energy suppliers are obliged, by law, to provide directly and / or indirectly through other providers of energy services, upon request, energy services to final consumers at competitive prices, to perform competitively and independently priced energy audits and / or measures to improve energy efficiency, promote these audits and measures.

29. The same law in Art. 21 states that energy efficiency improvement measures *could* be funded under a written agreement, in accordance with the stipulation of Law. 179-XVI of 10 July 2008 on public-private

partnership (it is not an obligation but a right) and according to the Regulation on ESCOs, approved by the Government.

30. This regulation on ESCOs, a sub law, was developed by the Ministry of Economy and submitted to the Government for adoption. This Regulation may serve as a guide (non-mandatory) for energy efficiency measures implemented in private facilities, but its provisions are mandatory for energy efficiency measures in public facilities. Details on this Regulation are provided further in this document.

31. ESCOs and other third parties involved in financing of energy efficiency projects could be eligible for tax reliefs under the provisions of the Tax Code (art. 21 (2)). Such facilities have not been adopted and most probably will not be necessary if the Moldovan legislation will stipulate that cost-efficiency principle is a precondition for procurement. The cost-efficiency principle is to be proposed in the near future by the Ministry of Economy to be included as an amendment to the Public Acquisition Law.

32. To reduce dependency on imported energy resources, as well as the impact of the energy sector to climate change, the Government Decision no. 833 of 10.11.2011 "On the National Energy Efficiency Programme 2011-2020" pursues the following objectives in relation to the base year of 2009:

- Primary energy consumption reduced by 20% through the energy efficiency measures by 2020 and
- Reduction by at least 25% of greenhouse gas emissions compared to base year 1990 by 2020.

33. In line with the Government decision, the Ministry of Economy will create conditions for the development of ESCOs by drafting a secondary regulation related to EPC modality, but this does not include any provision/conditions for any loan guarantee mechanism. In addition, with reference to the ESCOs, the Government Decision provides in Section 3 (Energy service companies (ESCOs), Chapter VII. Sectoral and cross-sectoral measures to promote energy efficiency), the following:

- The Ministry of Economy will create conditions for the development of ESCOs by establishing economic incentives;
- The energy performance contracts, must stipulate: (i) the basic energy consumption before ESCO intervention; (ii) the energy savings guaranteed, and (iii) procedures to achieve their funding arrangements, investment recovery modality, etc.

34. Further, the Government Decision no. 113 of 02.07.2013 on the approval of the National Action Plan for Energy Efficiency for 2013-2015, aims at reducing energy consumption in all sectors of the national economy with 428 ktoe<sup>6</sup>, and reducing GHG emissions by 962,848 tons of CO<sub>2</sub> over the period of 2013-2015, compared to the base year of 2009.

### 1.3.2 Regulation on Provision of Energy Services

35. The Ministry of Economy, with the support of E&E Energy Security and Regional Market Development/ Program SYNENERGY, funded by USAID, developed the draft regulation on energy services in the public sector, creating a regulatory framework for the introduction of energy services in the public sector, as well as for the removal of legislative and non-legislative barriers to the implementation of energy performance contracts in the country.

36. This draft regulation will ensure both the implementation of Law no. 142 of 2 July 2010 on energy efficiency, and transposition of Directive no. 2012/27/UE European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC .

37. This regulation on ESCOs which is a sub law was developed by the Ministry of Economy and has been already submitted to the Government for adoption.

38. Based on this regulation, the requirements for public authorities on the provision of energy services are the following:

1. Public authorities sign the Energy Performance Contract in accordance with the Local Action Plan for Energy Efficiency, and inform the Energy Efficiency Fund on the following:
  - a) signing of energy performance contract;

<sup>6</sup>Kilo tonnes of oil equivalent

- b) measure of the expected costs and savings.
  - 2. Public authorities organize tenders for procuring energy services and sign energy performance contracts in accordance with the Law on Public Procurement. Energy performance contract is prepared in advance and is included in the tender documents.
  - 3. Public Authority signs the energy performance contract for a period of up to 10 years, with establishment of contract payment instalments over the period.
39. According to this Regulation the Energy performance contract must include the following structural elements:
- a. standard conditions remain intact during the execution of energy performance contracts. Standard conditions are used to adjust the energy consumption during the contract period in the event of any deviation from these conditions;
  - b. the recalculation in the event of deviations from standard conditions;
  - c. obligation of the energy service company to obtain the total amount of guaranteed energy savings stipulated in contract;
  - d. beneficiary's obligation to pay the energy savings from implementing energy efficiency measures, in accordance with the terms and timing of instalments under the contract;
  - e. energy services company's obligation to prepare annual reports, a clear and transparent method of calculating the results of energy efficiency measures, implemented in accordance with the contract;
  - f. the methodology of a split between the beneficiary and energy companies *of any additional profits*, if the savings achieved by implementing efficiency measures exceed the guaranteed savings for a year or cumulative for all previous years. Beneficiary's share of additional savings is equal to or greater than 60%;
  - g. that the energy service company will compensate for the differences between real savings and guaranteed savings stipulated in the contract, in case when the savings are less than the guaranteed savings. If savings last year were higher than the guaranteed savings, the excess savings may be taken in calculating the results for the current year.

As a rule the current and upcoming regulation framework for implementing the Energy Performance Contract modalities is appropriate in the municipal sector to advance the ESCO business model

## 1.4 Stakeholders Analysis

### 1.4.1 EE Institutional Framework

40. The Ministry of Environment (MoENV) is a key stakeholder since the MoENV is responsible for climate change, UNFCCC, and Kyoto Protocol and reducing GHG emissions and therefore it has been selected as the National Implementing Partner for this project. Given the cross-cutting nature of the CC and EE, the key players in these areas are both the MoE and MoENV of Moldova. The Ministry of Environment, being responsible for promoting the state policy in the field of environment protection, is directly interested in the result of EE implementation – greenhouse gas emissions reduction. The MoEnv is one of the main implementation partners in terms of providing support for the green urban development and for the replication and dissemination of ESCO activities (see textbox below). The MoENV is also promoting the state policy in the field of environment protection and rational of natural resources, wastes and water management.

41. The other key player in the field of energy efficiency is the Ministry of Economy (MoE). The responsibility for policies and legal framework development rests primarily with the Department for Energy Efficiency and Security (DESEE), while their implementation was put under the responsibility of the Energy Efficiency Agency.

42 The Department of Energy Security and Energy Efficiency (belonging to MoE), being directly involved in the development of legal and strategic policy framework in the area of energy efficiency, and specifically in the field of Energy Services, shall have a clear understanding of the peculiarities of Energy Performance Contracting, both in private and public sectors, implementation phases and milestones, as well as potential risks for all involved parties. For this purpose, an eventual TA should focus on raising the capacities of the DESEE staff involved in policy making in the ESCO field. This could be arranged through training sessions or workshops on related subjects.

43. The EEA, as an implementation agency, has the responsibility to promote the ESCO mechanism in Moldova. The staff members of this institution have a good understanding of the ESCO mechanism, its advantages and importance for full deployment of EE implementation activities in the country. Nevertheless the staff of the EEA do not have any practical experience in EPC contracting or design of ESCO type energy-efficiency project. Therefore, it will be very important for the project to provide detailed training and capacity building support to the EEA staff related to the ESCO business model and EPC project design and project evaluation.

44. Also, there are some other relevant ministries directly engaged in promotion of energy efficiency activities, such as: the Ministry of Regional Development and Construction (MRDC), responsible for policy in the field of energy performance of buildings. The Chisinau Municipality, as main implementation partner and client, as well as other local public authorities (where the project shall be later on replicated) need to develop their capacities related to all implementation stages. They would need both theoretical and practical skill development to manage EPC modalities, as clients and primary project implementation beneficiaries.

45. The UNDP CO in Moldova asked the MoENV to serve as implementing partner because of its involvement in the green urban development, its responsibility as national representative in most of the international organizations working near and far in GHG emissions reduction, and international conventions which Moldova joined over the last 10 years. In addition the MoENV set up the Ecological Fund with the aim of advancing environmental projects. The MoENV is the GEF and UNFCCC national focal point steering the process of national adaptation and mitigation and is the Implementing Partner of the project. Roles and involvement of central and local public authorities in the field of energy efficiency are summarized in the table below:

**Table 1-1 EE institutional framework at the national and local level**

Public authorities	Responsibilities – Roles and Purpose
1 Ministry of Environment	State authority responsible for the development and promotion of state policies and strategies in the area of environment protection and rational use of resources as well in the area of climate change. MoENV is the GEF and UNFCCC national focal point leading the process of national adaptation and mitigation and is the primary Implementing Partner of the project.
2 Ministry of Economy	Central public authority empowered to set the state policy priorities in the area of energy efficiency and the main activity directions in the field of energy efficiency for public authorities. The MoE drafted the new regulation related to ESCO development and Energy Performance Contract and in the framework of the present project will further contribute to development of the relevant by-laws and regulations with regards to ESCO operation.
3 Energy Efficiency Agency	Administrative body in the area of energy efficiency, which implements the state policy in the field of energy efficiency and renewable energy sources, being subordinated to the central public authority in the energy field. The EEA has been identified the key technical partner to advance the ESCO Moldova project. The EEA will intensively support the UNDP project in terms of training deliveries, feasibility studies and case studies.
4 Energy Efficiency Fund	The main Government body involved in EE investment established by Government Decision No. 401 of 12 June 2012. Independent government body established with the aim of attracting and managing financial resources to finance and implement energy efficiency and renewable energy projects, in accordance with strategies and programs developed by the Government. The EEF is a key partner and co-financer within the ESCO Moldova project through the provision of grants to ESCOs with the aim of shortening the pay-back period of energy efficiency investments. By regulation the EEF is not allowed to provide a grant and a loan or guarantee to the same EE project. This regulation excludes the EEF as LGF manager due to its involvement as co-financer in providing grants. However the project design team still recommends transferring the LGF ownership to the

		EEF at the end of the project timeframe because ownership (currently the UNDP) and the LGF management (FI) are different. The selected partner financial institution will continue to make the decisions and provide the guarantee to ESCOs, regardless of who is the owner of the Trust Account meaning UNDP up to the end of the project and then EEF after the project ends. The EEF is committed to provide a significant in-cash contribution to EE projects implemented in accordance with the EPC modality. Appendix 6 provides detailed information on the EEF regulation and program
5	Ministry of Regional Development and Constructions	MRDC's mission is to develop, promote and implement state policy on regional development, land use planning, architecture, design and construction. The Ministry has the function to develop the legal and regulatory framework necessary to achieve the objectives in the fields of activity bringing it closer to the European standards, especially standards related to EPBD. The Ministry coordinates the implementation of sustainable development principles in urban planning design.
6.	Local Public Authorities, i.e. District Councils, two Municipal Councils (Chisinau <sup>7</sup> and Balti) and other local councils including from the Administrative-Territorial Unit Gagauzia	Local Public Authorities responsible for the promotion and implementation of state policy in the field of energy efficiency at local level. These LPAs shall appoint an energy manager, aiming at monitoring the implementation of Local Energy Efficiency Programs (LEEPs – three-year programming document) and Local Energy Efficiency Action Plans (annual EE planning document). Chisinau is the priority beneficiary of the project and will select residential and public buildings subject to EE improvements as part of this project. The project is sought to be replicated in at least another major city.

#### 1.4.2 Other National/International Organizations

46. Many international organizations and cooperation agencies are involved in Moldova for providing technical and financial support to EE project initiatives. Table 2 lists other organizations and donors still or having been recently involved in the field of EE in Moldova.

47. The PMU will work in synergy with most of these organizations with the aim of avoiding duplication and promoting co-financing or joint-venture projects in the building sector.

48. For this purpose, the Energy efficiency donor coordination meetings hosted by the Swedish Embassy will serve as a platform of information-sharing on the project's progress and implementation challenges to be flagged and advocated for. The UNDP must pay special attention to the likely co-financing synergy between donors involved in EE projects development. This is particularly true for the USAID, EU and EBRD programs. With the aim of information-sharing the donor community (mentioned at the table below) should attend the GUDP workshop and the workshop related to the financial mechanism.

**Table 1-2 Other Organizations involved in activities related to EE in Moldova**

Organization	Activity
Swedish International Development Agency (SIDA)	Sweden's assistance for Moldova within the period of 2011-2014 focuses on three sectors: democracy, human rights and equality, sustainable urban development and market development. The total annual Swedish budget for Moldova is declared to be SEK 110 million.
EBRD	The EBRD, one of the largest investors in Moldova, has to date signed 99 investment projects in the country, covering the energy, transport, agribusiness, general industry and banking sectors, for a cumulative investment of €747 million. Most significantly, in 2012 the Bank introduced two Energy Efficiency Facilities - MoSEFF II and MoREEFF – which will extend credit lines to local banks for on-lending to corporate and residential borrowers willing to undertake energy efficiency projects and sustainable energy investments. The municipal sector already takes advantage of the investment facilities

<sup>7</sup>Chisinau includes 35 localities: 1 municipality (with 5 sectors), 6 towns (which include 2 villages), 12 communes (including 14 villages).

	made available by the EBRD for infrastructure and major-retrofitting of public building projects, including EE components. These projects are capital-intensive and fit in with its objectives and interests while small EE projects including ESCO projects in the residential sector are not attractive to EBRD because of the transaction cost related to small projects assessment, analysis and follow-up.
EU Delegation	<p>EU Delegation in Moldova supports the Government of Moldova to reform the energy sector. A total of €42.4 million is allocated during 2011-2014 for the energy sector and to facilitate technical improvements in its operation. This is intended to offer a flexible instrument to support the Government of Moldova efforts towards further progress on the implementation of the Moldovan energy strategy and energy sector development. This will be achieved through the support of interventions in the preparation and adoption of appropriate legislation that are set out in the policy matrix, as well as technical assistance and policy dialogue.</p> <p>The Government of Moldova intends to use more than half of this direct budget for supporting EE investments through the Energy Efficiency Fund. As a result the EEF is committed to provide a significant co-financing estimated at 1 million dollars to support EE projects implemented by the ESCO Moldova project.</p>
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)	GIZ launched a new five-year €3 million project (2010-2014) which aims at modernizing local authority services. Projects include water, sewage, solid waste and EE in buildings.
The USAID	In 2009 the USAID launched a new Local Government Support Project with a grant fund of \$2 million for investment in municipal energy efficiency projects. The aim is to improve the energy efficiency and strengthen the energy management within local public authorities.
World Bank	A budget of US\$ 25.20 million was approved in January 2010 and allocated to the Second Additional Financing to the Second Social Investment Fund Project. The Fund supports the implementation of the national development strategy through enabling poor communities and vulnerable groups to manage their priority needs. The project invests in planning, management, and infrastructure of communities, as well as in social care services.
UNIDO	Currently, a project called “Reducing Greenhouse Gas Emissions through improved Energy Efficiency in the Industrial Sector in Moldova” is implemented by the United Nations Industrial Development Organization (UNIDO) and funded by the Global Environment Facility (GEF). The project started in January 2011 and finished at the end of 2013.

### 1.4.3 Private Sector

49. Equipment suppliers and Energy Service Providers are already active on the EE market but in the absence of a new business model and the related financial mechanism, the private sector is lightly involved in public buildings and city-owned residential buildings. Energy audits (8) were recently carried out but EE investments had not come to reality because of the constraint and lack of project financing. The project design team met with already established energy services providers. They are 10 companies (Energy Service Providers) involved at different stages of EE project development and implementation. The Eco Energetica Award, organized by the Ministry of Economy acknowledged the positive experience of some of them at the award ceremony in December 2013. As a rule, ESPs need a special training related to the ESCO business model and EE project financial analysis. On the other hand, their technical capacity in the building sector in both passive and active EE measures is a great asset for successfully implementing the ESCO Moldova project. The issue of EE project financing was discussed and in the absence of a favourable financial mechanism to support EE investments, most of ESPs were not eager to shift their current core business activity as ESP towards the ESCO business model due to their lack of financial capacity to support investments. The letters of support provided in Annex 8 of this document show how with this project, the private sector will be more interested in investing in energy savings projects following an ESCO model. An ESCO is defined as an energy service provider company which provides both a technical and a financial solution for energy-efficiency investments. . In Moldova, as well as elsewhere, ESPs are engineering or consulting firms providing technical services and equipment and receiving the full payment at the EE project commissioning. In other words, the ESCO takes a double risk (both technical and financial) while the ESP limits its risk to technical issues. The question is to know the incremental advantage of using the ESCO business model rather than the traditional way (ESP) to implement EE projects. In the municipal sector,

where the borrowing capacity is restricted by regulations, the ESCO involvement allows to transfer the investment cost to the annual budget of operation. By doing so, the municipal decision-makers can use the investment budget line for projects having more visibility than improving the insulation in roofs and walls. In addition, the ESCO business model is more readily suited towards replication and scaling up. Most importantly, however, such a business model provides a guarantee of performance all over the project payback period. For the reasons listed ESCO involvement in the municipal sector as opposed to a ESP traditional (BAU) approach is strongly justified.

See letters of interest at Appendix 8.

## 1.5 Barriers Analysis

50. The legal and regulatory frameworks have been already developed for advancing EE project initiatives in the public sector. The Ministry of Economy is currently drafting a new regulation and draft Law on condominiums dealing with ESCO involvement and Energy Performance Contract (EPC) modalities. Based on a comprehensive review of current regulations and upcoming decisions and sub-regulations, the regulation framework is seemingly appropriate for guiding ESCOs' activities. In addition, there is no special regulation barrier in the municipal sector (local level) to implement EE projects through the ESCO business model and as per the EPC requirements defined by the Ministry of Economy (MoE). The EEF agreed to be a co-financer for the implementation of the UNDP/GEF project. In accordance with its current regulation the EEF deals with EE project beneficiaries that do not have liability related to the national budget. In the situation where the request comes from solvent ESCOs, the current regulation works with the project objective. Although the project design team did not identify any significant legal or regulatory barriers, the project will provide tight support to the MoE to develop needed sub-regulation in regards to EPM modality and M&V requirements through the project Component 2. The "applicant" is primarily the municipality (Chisinau). The municipality estimated its short-term needs, in term of EE investments, at about five million \$USD in its co-financing letter<sup>8</sup>. The Municipality has already agreed to invest \$125k to carry out the EA program at the earliest stage of the Project implementation but providing these funds for energy audits. Such double-commitment (funds for investment and funds for energy audits) is a strong signal indicating its intention to go ahead with the EE investment program.

51. The main barriers are related to:

- EE project financing
- The eagerness of existing Energy Service Providers to embark on the ESCO business model
- Institutional barriers at the local level.
- Green urban development and EE awareness in the municipal sector

52. The ESCO Moldova Project gives the highest priority to these barriers by rolling out a comprehensive set of technical assistance, a tailored training program targeting ESPs, financial institutions and the municipality decision makers as well as the technical staff members. The setting up of a special financial mechanism will ease the access to EE project financing to ESCOs. Finally, the Green Urban Development Plan will be the best promoting tool to Chisinau authority for removing institutional barriers at the municipal level to go ahead with EE improvement as a component of the GUDP.

### Financial Barrier

53. In mature markets, ESCOs have developed relationships with commercial financial institutions to arrange financing for energy efficiency projects. In these markets, commercial lenders have experience in financing EE projects; they understand the nature of EPC and that the risks of non-performance lie on the individual track records of the ESCOs.

54. By setting up a financial mechanism, so called Loan Guarantee Fund (LGF), the ESCO Moldova Project should overcome the financial barrier related to collateral requirements. In the absence of required equity, the most appropriate financing mechanism that has been successfully used by ESCOs to build a sustainable financial capacity is project-based financing where the credit risks are assumed by entities other than the ESCO, often called the "third party."

<sup>8</sup> Which is corresponding to \$250,000 per project (more or less).

55. The relevance of the project-based financing and third-party guarantor exists in allowing ESCOs to focus on their core energy services business from both an operating and corporate funding (working capital) perspective. They are not required to continually have available substantial amounts of corporate investment capital needed for equity investment and/or collateral to secure debt financing burden. Another significant benefit of having a third-party guarantor is that it allows the ESCOs to pay off equipment suppliers and installation costs before or at the stage of project commissioning through the EE loan. Such a financial scheme has a great advantage to the project beneficiary (building owner) because the project performance is guaranteed and the project cost is not a liability in balance sheets meaning that the project owner does not have to risk cash that can now be used for other investments. The project beneficiary is only committed to reimburse the investment through its operating budget line dedicated to energy supply. As a result, the municipality will be in a position to use its long-term borrowing capacity for infrastructure projects or major retrofitting projects in the public buildings.

56. Taking into consideration that EE projects performance risk is low in terms of equipment (no cutting-edge technology) and the revenue stream generated by the project's savings is considered fairly reliable. Given that the public sector credit risk is typically low in these markets, the overall risk profile of the project can be viewed as reasonably low. Although the performance risk does exist especially in regard to inappropriate usage of EE equipment or other unexpected occupancy conditions, the tight M&V procedure spread out all over the PBP should mitigate this risk. In addition, to face such a situation where a negative deviation occurs, the EPC contract must encompass an amendment clause for that purpose.

57. In Moldova, however, this model can be difficult to implement. Local ESPs (candidate ESCOs) do not have a track record of delivering EPC projects, local banks may not fully understand the concept of energy efficiency projects and the EPC modalities and, as a rule, the ESPs may not be as creditworthy as required because of the lack of equity. Taking into consideration the current situation, the project may, therefore, need to consider alternative ways to bring EPC/EE projects to financial closure. Because local financial institutions expressed some concerns about the security and timeliness of payments and from the project beneficiaries a "payment security mechanism" must be established for creating enabling conditions and boosting the development of the ESCO business model in Moldova. To this end, the ESCO Moldova Project will roll out the needed support to implement a loan guarantee fund and allocate significant budget provisions corresponding to more than 70% of the GEF grant.

#### Energy Service Providers (ESP)

58. Private sector companies with a business model based around investing in energy efficiency are not yet established in Moldova, with no previous experience with the ESCO business model either. The project aims at enabling the business environment through the GUDP, the Loan Guaranty Fund, the comprehensive training program, and the selection of EE projects having a reasonable payback period (5 years). On the other hand, in accordance with the BAU business model, the private technical partners, namely Energy Service Providers, are willing to implement EE projects in public or private buildings if the energy end-user has the capacity to pay the whole investment at the EE project commissioning stage in one payment milestone. They are typically, at the current time, not in a position to take on financial risk investing their equity and waiting 5 years to get back their investment. If some of them can do it, it will be possible for only one EE project because of the lack of equity. The ESCO business model is the appropriate alternate way to boost EE investments at the condition that ESCOs can have access to project-based financing through the issue of a loan guarantee by a third party (LGF).

59. Another important barrier to attracting the interest of the identified private implementation partners is the difficulty in figuring out the baseline of EPC projects because of inadequate current energy service levels in Moldova. For instance, when satisfactory comfort standards are not met prior to the intervention (e.g. under-heated or under-lit rooms, etc.), baseline estimates are difficult to gauge and inevitably results in some savings absorbed to reach acceptable comfort levels. Moldovan schools and hospitals, for example, complained about the insufficient heating and lighting levels, old and unsafe wiring, noisy luminaires etc. Such a technical barrier can be overcome by taking into consideration the energy consumption required to meet basic standard occupancy conditions in a building rather than the current situation.

60. The UNDP project recommends a detailed EE projects implementation procedure broken down in 3 stages and 9 steps with the aim of mitigating the risk, to an extent, on both ESCOs and EE projects beneficiaries (see paragraph 2.1.1.2). In terms of ESCO market transformation, the target is not too ambitious taking into consideration the limited number of Energy Service Providers in the Chisinau area. About 10 ESPs have shown



their interest and attended meetings with the project design team at the stage of the project preparation. At a glance, the project expects that 5 ESPs will be successfully involved within the ESCO Moldova project by the end of 2018. In addition to activities related to risk mitigation at the stage of EE projects selection and implementation, the ESCO Moldova Project plans to provide a comprehensive training to ESCOs broken down in 3 tiers: (i) ESCO business model; (ii) Technical guidelines and tools; (iii) Financial Analysis.

### Institutional Barriers

61. Energy performance contracting (EPC) in the public sector in Moldova requires public procurement and therefore needs to follow public procurement rules, such as a tendering obligation. Unfortunately, public procurement decisions right now are centered on assets rather than energy services and based only on the best price without taking into account the lifecycle costs of new equipment. The new regulation currently developed by the Ministry of Economy should overcome that barrier by setting rules and the EPC modality to be enforced in the public sector.

62. Another barrier in regard to EPC in the public sector is the annual budgetary issues experienced by the public administration. Because the UNDP project will implement EE project in buildings owned and operated by the City of Chisinau and because the municipality already agreed to adjust its budgeting procedure, the problem can be readily overcome in line with the new regulation developed by the Ministry of Economy.

63. Significant opportunities for energy and cost savings exist in Moldova, as clearly identified during the preparation phase of the project, but decision makers at all levels (state, regional, local) are sometimes not well informed of the energy saving sink since priorities are often focused on more popular project initiatives such as education, health, public infrastructure or unemployment. In other words, EE projects compete with other investment projects to be achieved with scarce capital and staff time. Because of the EPC modality, the ESCO Moldova Project promotes EE projects that will be achieved by ESCOs and do not compete with other public investment because the investment cost is repaid through the standing budget related to energy consumption.

64. A more general institutional barrier at the municipality level is related to the fact that the City of Chisinau has no clear institutional division of responsibilities for green urban planning. The new State Energy Efficiency Authority has no particular focus on urban level EE initiatives. The project will work with the City of Chisinau to develop a Green Urban Development Plan where institutional structures and roles will be better defined. The Green Procurement Guide will be prepared and widely distributed. To this end, the UNDP/GEF project will play a major role by supporting the municipality at all stages of the preparation of the GUDP (Component 1: GUDP Plan and Procurement Plan) and capacity building activities through 4 workshops related to GUDP and Green Procurement Plan (the knowledge and capacity to manage the EPC modality, as well as the energy savings monitoring and verification within Component 2). Three training sessions are provisioned: (i) ESCO development and EPC; (ii) Project financial analysis and financing; (iii) building managers and maintenance staff members. The project will also address the green urban development in at least one other major city and the implementation of the EPC modality through the project Component 4.

### Awareness Barrier

65. There is a lack of information available and/or awareness among municipal managers, government officials, private sector, and the general public concerning green cities and green urban development issues and about the ESCO business model and EPC contracts. Municipal managers do not have clear idea about what constitutes a GUDP and do not understand the benefits of the ESCO business model.

66. Seminars and workshops (4) will be held throughout the project Component 1 to increase awareness and understanding in regard to green urban development issues and improve knowledge on the options available to develop green cities with a particular focus on energy efficiency.

## **1.6 Project Baseline and Significance of the Building Sector**

### **1.6.1 National Energy Supply/Demand**

#### **1.6.1.1 Electricity National Growth Outlook**

67. Between now and 2030, global primary electricity consumption is expected to rise by an average of 5% per annum or 140% in total in the next 18 years. In Moldova, the final electricity consumption is forecasted to reach 8490.8 GWh in 2030. This is almost a 2.4 fold increase compared to the electricity consumption registered in

2012 (3 571 GWh).

68. Overall electricity consumption in Moldova is forecasted to grow consistently between 3,5 to 6,5 percent per year<sup>2</sup> until 2030. The electricity supply in Moldova is carried out by three utility companies, which are distribution system operators at the same time. The bulk of consumption is in Chisinau area, which is also where the vast majority of multi-storey and major institutional buildings are located. In 2011, electricity was generated in Moldova through gas-fired CHP plants (92%), hydro power plants (7,5%).

69. In Moldova there are no Thermal Power Plants, excluding 2 520 MW Thermal Power Plant located on the left side of the Dniester River in Transnistria. The total electrical power plants capacity installed in Moldova (right side of the Dniester River) was 390 MW in 2011. The national production was 1 016 GWh in 2011 or 28,5% of energy distributed on the grid (3 571 GWh in 2011). In addition to its national production Moldova imports its energy from neighbouring areas (Ukraine, Transnistria).

In 2011 imports represented 2 555 GWh or 71,5% of energy distributed on the grid. It may therefore be estimated that the average grid emission factor is currently 0,549 kg CO<sub>2</sub>/KWh<sup>9</sup>.

#### 1.6.1.2 Heating and Hot Water National Growth Outlook

70. Due to its cold climatic conditions, Moldova consumes significant amounts of energy for heating. As an average, the length of the heating period is about 3 720 to 4 080 hours per year with average outside temperature of +0,3°C. In 2011, the heat demand constituted 2.72 million Gcal or about 47% of the total consumption of energy (heat and power). More than 70% of heat energy is consumed in the Chisinau area, of which approximately 78% within the residential sector and 22% in commercial, office and institutional public buildings.

71. District heating systems (DHS) are very common in Moldova. Over 80% of the urban heating demand in Chisinau is supplied by DHS. There are one large DH system connected to two large co-generation plants (CHPs) and two big central heat only boilers (HOBs). Total heat capacity of the CHPs located in Chisinau constitutes 1 690 MW and their total power generation capacity is 304 MW, or about 63% of all power generation (electricity and heating) capacity in Moldova (out of imports). The total heat capacity of central HOBs is about 825 MW. Annual quantity of heat generated by CHPs and central HOBs totals to approximately 1,7 million Gcal, of which 75% is produced by CHPs and the rest by central HOBs. All CHPs and HOB are gas fired. Total annual amount of fuel used by CHPs and central HOBs for heating purpose is about 157,8 ktoe, or about 46% of total quantity of fuel used in the energy sector (electricity and heating). The rest of heat demand in the cities is covered by decentralized heating, including 62 800 wall gas-fired boilers with a capacity between 11-100 kW, 31 building HOBs with a capacity between 110-1600 kW, 2 HOBs for a group of buildings with a capacity between 915-3 050 kW, owned by municipalities and the private sector. The total production of thermal energy in the country in 2011 was about 2,721 million Gcal, corresponding to about 55% of the heat demand in the residential sector of the cities. The Chisinau area accounts for 80% of the yearly heating load in Moldova (1,77 million Gcal), that is to say around 1,41 mil Gcal or an equivalent of 1,64 GWh a year.

72. Apart from using co-generation as a source of heat in some systems, the efficiency of the DH systems is otherwise low with heat losses reaching up to 22-23% of the primary energy used. The high level of heat losses is primarily due to old, obsolete equipment (typically having reached an age between 25 and 40 years) and inadequate maintenance. As a comparison, the overall system losses of modern, well maintained DH systems are typically 8-12% of the primary energy used or even less. Nevertheless in 2003 the GoM<sup>10</sup> rolled out the Energy II project to improve the availability, quality and efficiency of heating in selected public buildings (schools, hospitals and kindergartens), primarily in small to medium-sized towns. The original heating component was completed in 2008 and the Republic of Moldova still needs additional financing to scale up its impact. Heating and hot water improvements included demand-side investments consisting of rehabilitation of building internal heat and hot water distribution systems to reduce heat losses<sup>11</sup>. By addressing the issue of energy savings in the capital of Moldova for institutional and multi-level residential buildings and as a result

<sup>9</sup><http://emissionfactors.com/factors/>

<sup>10</sup> Government of Moldova along with the World Bank, the Swedish International Development Cooperation Agency (SIDA) co-financed the project, financing technical assistance for project implementation and contract supervision, as well as rehabilitation of heating systems for several educational and health institutions.

<sup>11</sup>23 schools and 12 medical institutions.

reducing the energy demand, the UNDP project is in line with EE initiatives carried out in Chisinau area and other small cities.

## 1.6.2 Building Sector in Moldova and GHG emissions

73. The buildings sector in Moldova consists predominantly of commercial, government, institutional (kindergartens and schools) and residential buildings (a few high-rise, multi-level and single dwellings). In 2011, the estimated electricity use in the buildings sector amounted to about 1 547 GWh in the whole country. In the Chisinau area the electricity consumption is estimated at 460 GWh for the same year. For the same year the total consumption for the heating load was 1,77 mil. Gcal or 2,06 TWh<sup>12</sup> for the whole country and 1,41 mil. Gcal or 1,64 TWh for Chisinau area over the same period. In 2011 the total energy consumption of the building sector (electricity and heating load) was an equivalent of 3.6 TWh for the whole Moldova and 2.13 TWh for Chisinau area.

74. The present growth in annual electricity consumption in buildings is expected to continue to significantly contribute to GHG emissions (about 1 176 ktons in 2011) growth if nothing is done to improve energy efficiency. The growth in energy consumption is brought about both by an increase in new building constructions (about 1.4% in 2011), inefficient energy utilization and continuously increasing stock of electrical appliances in new and existing buildings. The total energy resources consumption by the Moldovans and commercial sector (including buildings) was 865 ktoe or 10 TWh in 2011 broken down between the energy consumed by the population (82% or 8,23 TWh in 2011) and the energy consumed in commercial, office and institutional sectors (18% or 1,83 TWh in 2011).

75. The CO<sub>2</sub> emissions from the building sector (mainly from electricity use and heating) in 2011 were about 1 176 ktons. Considering that the growth in electricity and gas consumption in buildings is higher than in other sectors, and the fact that the potential for improvements are substantial in this sector<sup>13</sup>, there are strong reasons to address the situation comprehensively through the UNDP project that will facilitate the installation of a widespread application of EE technologies and practices in this sector.

76. The estimation of heat consumption was done based on the following assumptions:

1. In urban areas all inhabited areas of residential buildings are heated.
2. In rural areas only 50% of the inhabited areas of residential buildings are heated.
3. For the data presented in the Energy Balance in 2011 the following assumptions were made:
  - only 10% of the natural gas consumption was used for heating;
  - real consumption of wood log was increased 4 times comparing to the official data (NBS<sup>14</sup>);
  - the coal consumption for heating was calculated according to the NBS presented data for 2011.

77. In 2011, according to some studies carried out in similar situations (weather and climate), an EE public or institutional building in Moldova should have average energy consumption for heating of 80-100 kWh/M<sup>2</sup>/yr. In the multi-level residential sector the per unit index should be 60-75 kWh/M<sup>2</sup>/yr. Based on a recent energy audit reports in Moldova the energy consumption for heating can easily be improved: the current energy index for multi-level typical residential buildings is 110-140 kWh/M<sup>2</sup>/yr (46% potential savings) and 140-180 kWh/M<sup>2</sup>/yr (44% potential savings) in office/institutional buildings. About 90% (or 72 million M<sup>2</sup>) of the residential building stock, as well as institutional buildings, needs a major retrofit with the aim of implementing basic EE measures:

- Wall insulation with mineral wool or EPS (thickness 100 mm), saving potential 50%;
- Windows replacement, saving potential 14%;
- Implementation of individual heating substation for buildings connected to DHS, savings potential 10%;
- Implementation of new internal heating systems (two pipes, thermostats etc.), savings potential 15%.

78. Most of these multi-level buildings are in the Chisinau area. Based on statistics the residential building stock in Moldova and in the Chisinau area is expected to increase respectively by 0.5-0.6 % and 2-2.5% a year during the

<sup>12</sup>National Bureau of Statistics of Moldova, Energy Balance 2011. The NBS reported figure for the total energy consumption for heating load in the country (in the residential, commercial and public buildings sectors) takes into consideration only the amount of energy delivered to the mentioned sectors' buildings by district heating companies. Despite of this, it shall be taken into consideration that a big amount of energy resources for heating load is consumed in individual HOB or home made stoves, which is not registered in the statistics as a separate figure.

<sup>13</sup> There is no reliable and comprehensive data on building average age

<sup>14</sup> NBS: National Bureau of Statistics

upcoming 20 years. Although the current project deals with existing buildings (residential and institutional-public), EE improvements and best practices in energy management should be replicated in most of the retrofitted and new buildings.

### 1.6.3 Energy Consumption and Energy Savings Residential Buildings in the Chisinau Area

#### 1.6.3.1 Energy Consumption in Residential Sector

79. Table Appendix 1/2.1 provides the aggregate data on energy consumption in the Chisinau area and in the whole country, including total and per sq. m. and the energy demand growth over the last 5 in the residential sector.

80. Table 6, Appendix 1 provides additional information on the situation in the residential sector: (i) Energy Consumption in Residential Sector; and (ii) ES and EE Potential in Residential Buildings.

#### 1.6.3.2 ES and EE Potential in Residential Buildings

81. The estimate of ES potential, as well as EE measure implementation costs and PBP<sup>15</sup> in multi-level residential buildings are presented in consolidated tables for Chisinau whole area and per representative types of buildings (see Appendix 1: tables 2.4 & 2.5, 2.4.1 & 2.5.1, 2.4.2 & 2.5.2).

82. The energy savings estimate is based on the target of 67.5 kWh/M2/year, opposite the current situation where the energy index is 125 kWh/M2/year.

83. The consolidated tables are structured per typical EE measure. For estimating the annual ES potential and PBP for each typical EE measure, an average ES ratio was determined by using an Excel simulation tool used by energy auditors in Moldova.

84. A series of synthetic<sup>16</sup> coefficients were determined to estimate total windows, roof, external walls, and floor areas. The investment costs per type of ES measure were calculated using these coefficients and market prices for respective type of works. The average costs per square meter are calculated based on the bill of quantities for each EE measure. The current DHS thermal energy tariffs were used to calculate the PBP of the investments.

#### 1.6.3.3 Description of target residential buildings and EE measures

85. A cumulative payback period (PBP) of 13 years was estimated for the following package of EE measures:

- Roof insulation (EPS 100 mm)
- Windows replacement
- Walls insulation (EPS 100 mm)
- Implementation of individual heating substation

86. The list of EE measures to be implemented goes beyond EE investments related to insulation of walls and roofs. The target remains to reduce the energy consumption per sqm from 110-140 kWh/M2/yr to 60-75 kWh/M2/yr in multi-level residential buildings. This target is in accordance with the building energy index for similar buildings in similar climate conditions. GHG emission reduction was estimated accordingly. The final decision about projects selection, technologies and EE measures will be made when the energy audit reports will be submitted at the early stage of the project implementation. The municipality of Chisinau has agreed to pay an amount of \$125,000 to carry out 40 energy audits. In accordance with the methodology, the municipality will make the final selection of 20 buildings (sites) by taking into consideration among others, the payback period, the energy savings and greenhouse gas emissions reduction. Some EE measures are more cost-effective than others and the municipality and the ESCOs will make the selection in a way that best suits to EPC modality.

Indicative EE investment project details in multi-levels residential buildings are as follows:

<sup>15</sup> PBP: Payback Period

<sup>16</sup> Data from Municipal Housing Fund management Enterprises (MHFM) was summarized to determine the ratio between area of windows, roof, external walls and 1<sup>st</sup> floor to total area of the analyzed buildings.

**Table 1-3 Typical multi-storey building built in the 60s : 15 similar (bigger or smaller) projects should be implemented**

EE measure	Unit	Average impl. Costs with VAT	Area sq.m or unit	Total cost Euro	Average energy Saving ratio	Annual estimated ES		PBP years	GHG	
						kWh	EUR		tons CO2/year	tons CO2/year
Roof insolation (EPS 100 mm)	MDL / sq.m	500	372	10 000	4%	8 652	415	25,31		1,83
Windows replacement	MDL / sq.m	1 725	281	27 000	14%	30 282	1 452	18,86		6,39
Walls insolation (EPS 100 mm)	MDL / sq.m	580	1 239	41 000	50%	108 149	5 185	7,83		22,82
Implementation of individual heating substations	MDL / unit	146 200	1	8 000	10%	14 708	705	11,71		3,10
Total				86 000		161 791	7 757	20		34,14

#### 1.6.4 Energy Consumption and Energy Savings in Public Buildings

##### 1.6.4.1 Public Buildings Stock in Chisinau

86. Aggregate data on energy consumption in public buildings of Chisinau area is available at Appendix I Table 3 and others.

87. Because of limited data availability two types of public buildings were analyzed:

- Preschool institutions (kindergartens) – 152 units
- Gymnasiums/Lyceums – 168 units

88. Such a limited sample is relevant because of the similar typology of buildings design. Usually the above mentioned institutions consist of one building and several interconnected blocks with an integrated heating system and other relevant engineering networks, while the rest usually have more buildings with separate engineering systems. Most of them are connected to DHS and energy consumption data is available and reliable.

89. According to TERMOCOM data the thermal energy consumption for heating in the above mentioned types of buildings in 2010 was equal to 37 542 Gcal for Kindergartens and 64 936 Gcal for schools. This accounts for more than half of the total consumption (182 447 Gcal) in institutional buildings of Chisinau.

##### 1.6.4.2 Description of target public buildings and EE measures

90. The list of EE measures to be implemented goes beyond only insulation of walls and roofs. The target remains to reduce the energy consumption per sqm f 140-180 kWh/M2/yr to 80-100 kWh/M2/yr in public buildings. The final decision related to public building selection will be made at the earliest stage of the project implementation based on 40 energy audit (EA) reports. The project design team estimated the EE potential of public buildings in accordance with EA recently carried out in a sample of 8 buildings owned and operated by the municipality. Some EE measures are more cost-effective than others and this will be taken into consideration by the municipality and ESCO to do the selection in a way that best suits to EPC modality.

Indicative EE project details in public buildings are as follows:

**Table 1-4 Typical public building built in the 80s: 5 similar projects should be implemented**

EE measure	Unit	Average impl. Cost with VAT	Area sq.m or unit	Total cost Euro	Average ES ratio	Annual estimated ES		PBP years	GHG tons CO2/year
						kWh	EUR		
Roof insolation (EPS 100 mm)	MDL / sq. m	5 00	1 789	51 000	11%	73 560	3 527	14,33	15,52
Windows replacement	MDL / sq. m	1 725	589	57 000	16%	106 996	5 130	11,19	22,58
Walls insolation (EPS 100 mm)	MDL / sq. m	5 80	2 633	86 000	36%	240 741	11 543	7,47	50,80
Implementation of heating substation	MDL / unit	338 000	1	19 000	8%	33 704	1 616	11,82	7,11
<b>TOTAL</b>				213 000		455 001	21 816	9,7	96,01

91. Appendix 1 (Table 4 and 5) provides detailed information on the Institutional/Public Building Sector Basic Information related to:

- Status of EE improvements over the last 5 years by the public institutional buildings in Chisinau
- ES and EE in Public Buildings
- Cumulative GHG Emissions Reduction in the Public Buildings Sector

92. The number of sites in the residential and public buildings will be determined later on in accordance with the actual EE savings potential and the EE investment cost as well as the payback period shown by EA reports. Figures used in this section are not a recommendation, and surely not a decision. Appendix 1 Table 4 and 5 stipulate an indicative number of sites for the purpose of calculation only. The municipality of Chisinau will make such a recommendation when at least 30 energy audits will have been carried out at the earliest stage of the project implementation.

### 1.6.5 Total Cumulative GHG Emissions Reduction and Abatement Cost

93. Detailed calculations of the cumulative direct (2018-2024) and post-project impacts (2024-2038), and based on a conservative estimate (causality factor of 0.4) of indirect impacts (2018-2038), GHG reductions calculation and abatement cost are presented at Appendix 2.

**Table 1-5 Total CO2 Emissions Reduction Attributed to ESCO MOLDOVA PROJECT and Abatement Cost**

Particulars	ktons	Comments
Direct CO2	68	Cumulative lifetime CO2 emission reductions from 20 EPC demonstration projects (2018-2038)
Direct Post Project	40	Replication projects (20 EE projects) carried out by ESCOs as a direct result of the ESCO Moldova project and commissioned during the period 2018-2024 <sup>17</sup>
Indirect CO2	240	Indirect impact taking into consideration the causality factor from EE building projects during the ESCO Moldova project's influence period (2018-2038)
<b>TOTAL</b>	<b>381</b>	<b>Abatement Cost<sup>18</sup>: USD 3.4</b>

### 1.6.6 Energy Supply Tariffs Structure

94. Tariff growth over the last 5 years and expectation over the upcoming 5 years.

During the last 5 years the tariffs for energy varied as follows:

- During 2008-2009 the natural gas tariffs registered the biggest growth (21%) compared to the following periods. For the last 5 years the tariffs for natural gas increased more than 2 times.

<sup>17</sup> Assumption: for the purpose of estimating the impact of post-projects (20), a shorter timeframe was considered because EE projects will be implemented gradually from 2018 to 2024.

<sup>18</sup> GEF funding USD1,300,000 / 381,000 tonCO2 (Direct ; Post Direct and Indirect) : Excluding indirect impacts, the abatement cost is \$12.8

- As a direct consequence of gas price increase, the tariffs for heat increased by 30% in Chisinau during 2008-2009. Similar to gas price, it was the biggest increase in tariffs compared to the following periods.
- The tariffs for electricity were also affected by the increase of prices for natural gas. During 2008-2009 the prices for kWh increased by 11-12% for all consumers.
- The tariffs for electricity are unique for all types of consumers. The only price difference is related to the operator. In the case of Gas Natural Fenosa in 2013, the price of 1 kWh is 9% lower comparing to the highest price on the market. Table 7, Appendix 1 describes the tariffs structure.

95. While the electricity tariff per kWh in Moldova is less expensive than in neighbouring countries, the growth in tariff rates over the past five years is making energy efficiency investments increasingly more attractive. The electricity tariff per kWh in neighbouring countries is as follows:<sup>19</sup>:

- Ukraine : 0.023 Euro/kWh
- Romania: 0.108 Euro/kWh
- Czech Republic: 0.150 Euro/kWh

96. At 0.093 Euro/kWh the Moldovan tariff is lower than the average tariff for electricity (household usages) in EU where the average is about 0.175 Euro/kWh.

### **Incremental Changes with GEF Involvement**

97. The residential sector owned and operated by the municipal sector is in a pitiful condition, not only in regards to energy efficiency but also in regards to comfort and occupancy conditions of building users. Municipalities, especially Chisinau, are not in a position to invest in EE improvements and the proposed project make available an appropriate business model to transfer the cost of EE measure implementation to tenants through the energy supply cost. The use of Energy Performance Contract modality is a brand new concept in Moldova. The municipality of Chisinau, in line with the upcoming Green Urban Development Plan, intends to support various EE improvements in the multi-storey apartment buildings but in the absence of a reliable network of ESCO and the required third-party financing (EE project financing by FIs), it is expected that the roll-out of EE projects in the municipal residential sector will never take place.

98. In public buildings owned and operated by the municipality the situation is quite similar. The office of the mayor and a few other prestigious public buildings were improved but most of other buildings, especially schools, hospitals, kindergartens, and other districts office buildings need drastic EE improvements to reach the target of 90 kWh/M2/Yr. The Mayor, Deputy Mayors, maintenance staffs and building managers all highlighted the urgency to proceed with basic EE improvements. The Green Urban Development Plan and Strategy encompasses many features, but at the end of the day, the GUDP cannot have a significant impact if the municipal buildings sector, both public facilities and municipal/social housing, is not address in priority by the GUDP. In the absence of the proposed project, the GUDP has no chance, or very low chance, to achieve its objective and even to be drafted and enforced. On the other hand, because of the drastic lack of collateral, the private sector, namely ESCOs, cannot invest in EE green projects, especially in EE projects that will be repaid in 5 years. Without the GEF involvement, Chisinau is going to intervene in its facilities through the minimum building maintenance (BAU), with little regard to energy efficiency improvements. The GEF involvement should have a significant incremental impact in the field of building management.

99. The proposed project mainly focuses on the Chisinau area building sector although the project has a component related to replication in another major city (TBD). If the ESCO Moldova Project is not successfully implemented in Chisinau through a strengthened network of Energy Service Providers and ESCOs, Chisinau, as well as other major cities, are going to intervene only when the situation, for instance in terms of security of building users or salubrity, are at stake.

100. For the municipal sector the proposed project rolls out the appropriate business solution to a public investment problem. Under the BAU scenario, the City of Chisinau is required to invest upfront in its EE projects because its capacity to borrow is quite limited. Such a situation lasts for decades and as a result, there are not substantive activities and investment in EE projects. In addition it is not easy for the City of Chisinau to

<sup>19</sup>European Union / EuroStat 2013.

[http://cpp.eurostat.ec.europa.eu/statistics\\_explained/index.php?title=File:Half-yearly\\_electricity\\_and\\_gas\\_prices.png&filetimestamp=20131106132508](http://cpp.eurostat.ec.europa.eu/statistics_explained/index.php?title=File:Half-yearly_electricity_and_gas_prices.png&filetimestamp=20131106132508)

get co-financing from the EEF because, by regulation the EEF is not allowed to provide project financing if the project beneficiary is not in a position to upfront invest at least 20% of the whole investment cost. At the end of 2013 the design team noted that the EEF had never signed any co-financing agreement with the municipality of Chisinau. Within the UNDP project framework the borrower is the private sector (ESCO) which agrees to invest 20% of the EE project costs through the EPC modality. As a result the EEF indicated its willingness (letter of Commitment) to co-finance investment in EE projects up to 1 million dollars.

101. In addition, because of the UNDP project, the EEF agrees to co-finance the ESCOs although they are not the final EE project beneficiary. This is a significant improvement of the EEF financing modality. As per BAU, other financing facilities, e.g. EBRD, are not useful to ESCOs because commercial banks, who are managing these funds, ask for a significant guarantee or collateral. Such a situation is unsuitable to Energy Service Providers because of their lack of assets; the ESCO business model will never take off.

102. The project has been designed in such a way as to make incremental progress and changes as a result of the GEF incremental financing. In addition, by setting up a tailored financial mechanism (LGF) the GEF involvement has a crucial impact toward the implementation of EE investment projects in the municipal sector. Although commercial banks are not familiar with EE investment risk assessment and with the ESCO business model or EPC modality they should, with the assistance of this project, start to understand the EPC performance risk and therefore in future be better positioned to provide financing for EPC projects. In a few years, because of the EE projects that will have been commissioned, the ability of banks to lend for ESCO projects should have been significantly enhanced.

## SECTION 2 - PROJECT STRATEGY

### Justifications for the PIF Adjustments

103. The project design submitted to the GEF is consistent with the PIF approved by the GEF in 2013. The Objectives and Outcomes are the same but the way to implement the proposed project approach is different in regard to the GHG emissions reduction priority sectors and the way to develop and implement the ESCO business model. In particular, the project now supports a broader ESCO market development approach, as opposed to the original concept which supported the creation of a single company, a public private partnership called ESCO Moldova, which would act as a catalyst to the development of the ESCO market. Instead of a supporting PPP, the GEF will now support the launching of a loan guarantee fund to support ESCOs and the energy performance contracting (EPC) modality. The rationale behind these adjustments is as follows:

- The 2013 PIF mentioned two priority sectors to reduce the GHG emissions in Moldova: (i) the building sector and (ii) the industrial sector. The residential multi-storey and public buildings sector remains the key priority sector but the industrial sector has been dropped. Although the PIF identified the industrial sector as a priority, the project design team does not recommend an involvement in this sector anymore. The residential sector is the greatest energy consumer (40% of the total final consumption), followed by industry (21%). The economic and structural reforms (1990 to 2010) in the country resulted in substantial reductions of industrial production, which in turn resulted in reduced energy consumption. Even if the energy efficiency of the industrial sector is low, the specific energy consumption in processes is high, and the energy losses are substantial, efficiency is still not a matter of great concern in industry where energy is often treated as a fixed cost. For instance, in 2007 the energy intensity of industrial production was 0.118 t.c.e./thousand MDL, almost half of that of 2001. In addition, most of the time, EE investments in the industrial sector are more capital-intensive and risky in terms of energy savings than in the building sector. Finally, the industrial sector has been identified as an area of UNIDO, not UNDP, comparative advantage. Taking into consideration these facts and the very limited ESCOs' capacity to mobilize financing, the project design team recommends focussing on the building sector only and the project strategy and activities have been modified accordingly.
- The second major adjustment to the project concept outlined in the PIF is related to the set-up of a PPP (public-private partnership) to advance the ESCO business model in the municipal sector through the creation of single company. Based on many meetings with key EE players in the private sector, financial institutions and the Chisinau municipal authority, the project design team revised the approach (PPP) because only the GEF was potentially willing to invest real money in the PPP as a shareholder and no cash financing from other potential shareholders was forthcoming. The City of Chisinau was not in a financial position to invest the proposed 1.5 million dollars in the PPP, no commercial banks or financial institutions were willing to



finance or invest in the PPP, and all private energy services providers met in Moldova affirmed that the PPP concept was not interesting for them taking into consideration a questionable track record of the public sector as cost-effective investors or company shareholders. Among the 10 ESPs met, none of them expressed any interest to embark as a partner in the PPP. In such a situation and based on the recommendation of key players in the private sector, the project design team adjusted the concept and gave the highest priority to ESCO market development through the existing private Energy Service Providers (ESPs) already established on the market in Moldova aiming to convert them from ESPs into ESCOs. The municipality of Chisinau confirmed its agreement to improve energy efficiency in residential and public buildings by investing the money saved from energy savings in EE projects initiated and financed by the private sector (ESCOs). Rather than investing \$900 000 in the PPP as mentioned in the PIF, the UNDP/GEF project will set up a financial mechanism to advance EE project implementation by the ESPs (ESCOs) in accordance with the energy performance contract modality.

- Accordingly with the ESCO market development objective, rather than investing in the PPP, the recommendation is to set up a Loan Guarantee Fund (LGF) managed by an independent financial institution over the whole project timeframe and transferred later on to the GoM to be used for the same purpose in the future. The funds which were to have been earmarked for the PPP in the PIF will now instead be earmarked for the loan guarantee mechanism. The recommended approach has the double advantage of giving access to project financing to ESCOs as well as allowing leveraging, as the loan guarantee enables banks to lend more easily to ESCOs. Finally, the loan guarantee fund should help to secure the sustainability of the GEF investment even after the end of the project, as the loan guarantee fund can continue to operate.

## 2.1 Project Objective, Outcomes, Output and Activities

104. The GEF's experience to date has shown that the barriers that need to be removed to advance EE projects in the building sectors generally relate to four market characteristics: (i) policy and regulation; (ii) awareness and decision making; (iii) EE project financing; and (iv) the national EE business skills and business model to advance EE investments. The proposed project is consistent with Objective 2 of the GEF 5 Strategy: "Promote market transformation for Energy Efficiency in Industrial and the Building sector". Projects under this objective aim at stepping up policy interventions as well as scaling up energy efficiency investments. Emphasis will be placed on integrated and systemic approaches and high performance buildings, appliances, and equipment. In Moldova, the first identified barrier has been removed because the GoM appropriately addressed it through a few new regulations. The second barrier is on the way to being overcome since Moldova, and in particular Chisinau, decided to embark on the Green Urban Development Plan in line with the EU Covenant of Mayors. The proposed project encompasses a set of activities under Component 1 to advance the Green Urban Development Plan and its implementation. Barriers (iii) and (iv) still exist and the main purpose of the ESCO Moldova Project is to remove these barriers. By making available an appropriate financial mechanism and advancing an enabling environment for cost-effective EE investments, the project expects to remove these barriers. That is the project's strategy.

105. The **long-term goal of the project** is to accelerate the sustainable market development of a business model in a position to offer both financial and technical solutions to EE investments with the aim of having an impact in term of GHG emissions reduction in Moldova. The ESCO business model is prioritized as the most appropriate business model to make EE investments a reality. In this regard, the project is taking into consideration that the municipal sector in Moldova is not in a position to deal with upfront (in-cash) EE investments in its residential and institutional buildings.

106. To this end, the **project objective** is to create a functioning, sustainable and effective ESCO market in Chisinau as the basis for scaling up mitigation efforts in other major cities in Moldova. As a result 381 ktons of GHG emissions will be avoided.

107. In addition to the expected impacts in term of GHG emissions reduction and energy savings, the project provides the municipality of Chisinau with a Green Urban Development plan. The GUDP aims at integrating the urban greening objective towards the recent approved urban municipal development plan (UDP). By linking the GUDP to the UDP, Chisinau will take efficiently into consideration the "green option" in the building sector at the stage of decision making related to EE investments in its facilities.

## 2.1.1 ESCO Development Strategy and Financial Mechanism

### 2.1.1.1 ESCO Development Strategy

108. An energy services company (ESCO) is defined as a company engaged in developing, installing and financing comprehensive, performance-based projects centered on improving the energy efficiency of facilities owned or operated by commercial, industrial, institutional, and other types of customers. Projects are performance-based because the ESCO's compensation, and often project-financing are meaningfully tied to the amount of energy actually saved. The ESCO business model is at its embryonic stage in Moldova. EPC modality has never been used by any energy service providers (ESPs) in Moldova. ESPs are seemingly technically capable but have not embark on the ESCO business model because of the lack of project financing from their own working capital or project financing from a lending institution.

109. For this reason, ESCOs are fundamentally different from consulting engineers specializing in identifying potential efficiency improvements, which are typically paid a fee for their advice and undertake no risk that their recommendations will yield results.

110. ESCOs are turn-key service providers who are responsible for a wide spectrum of tasks in that they:

- a) identify, design and often finance projects;
- b) install and supervise the maintenance of most of the equipment involved in their projects, and
- c) measure and monitor the EE projects energy savings.

111. Most importantly the ESCO typically guarantees that the energy and operating costs will be reduced to an amount sufficient to repay the investment cost over the payback period. In the situation where the savings are insufficient to repay the investment cost, the ESCO will be responsible for the shortfall, not the client.

112. The ESCO development strategy focuses on the strengthening of already established Energy Service Providers through the three key deliverables:

- an intensive Technical Assistance from national and international experts;
- a comprehensive Training Program;
- the set-up of the required financial mechanism.

These key deliverables are detailed in the Project Results Framework at section 3.

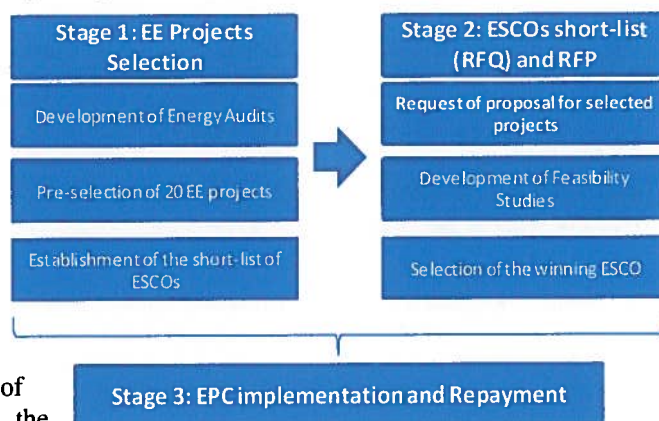
#### 2.1.1.2 EPC development and implementation steps

113. At Stage 1 the "client", that is to say mainly Chisinau, will select EE projects (20) to be implemented by ESCOs<sup>20</sup>. Only shortlisted ESCOs will be invited to submit a proposal in accordance with the standard Request for Proposal procedure used by the municipality of Chisinau.

Stage 2 is the selection of the best proposal mainly based on the technical capacity, the quality of equipment, the implementation schedule and the payback period.

Stage 3 is related to EE project implementation (equipment installation) and investment cost recovering over the estimated payback period.

Detailed EPC implementation steps are presented at Appendix 4.



<sup>20</sup> Although ESCOs do not exist in Moldova, there are at least 10 Energy Service Providers (Appendix 5) considering to shifting from ESP to ESCO. Such a new business approach is made possible because of the set-up of the financial mechanism and the support from the UNDP/GEF involvement.

### 2.1.1.3 Financial Mechanism

114. EE Projects financing has been pointed out as the major barrier to EE project implementation through the Energy Performance modality. The ESCO Moldova Project gives a major priority to the set-up of a sustainable financial mechanism. To this end the UNDP/GEF grants the most important budget provision to the financial mechanism: 70% of the GEF's financing is allocated to the financial mechanism financing.

115. The EE projects financing scheme can rely on three sources of financing as follows:

- ESCO investment: The ESCO will finance about 20% of the whole investment. Such a project financing component is related to technical services and soft costs.
- EE project financing by a commercial bank: The selected financial institution (commercial bank) will provide the financing up to 80% of the project cost. The guarantee is provided to the local lending institution by the LGF. On March 2014 the base rate is 7-8% on USA and 11-12% on MDL loans.
- Energy Efficiency Fund (EEF) project co-financing: The EEF will provide a grant up to 50% of the project costs with the aim of shortening the payback period under 4 years.

#### Key Features of the Loan Guarantee Fund

- First-loss guarantee fund;
- Ceiling loan 200k\$ per 1 subproject;
- Guarantee provided to the lending financial institution;
- The lending FI selected for managing the LGF applies a multiplier on the Trust Account deposit owned by the UNDP up to the end of the project; the multiplier enables the LGF to provide several times the amount of the trust account (one of the main selection criteria for choosing a financial institution to manage the Loan Guarantee Fund will be the size of the multiplier with financial institutions offering a higher multiplier scoring more points on the request for proposals)
- Decision related to guarantee is made by the FI;
- The UNDP Project provides a technical recommendation related to the EE relevance and acceptance by the client (Chisinau) of the proposed EE project;
- The guarantee is reduced as per the reimbursement pace up to the last payment by the borrower (ESCO).
- The LGF manager will be a commercial bank selected through a transparent bidding procedure by the UNDP MD.
- The guarantee coverage is provided to the lending institution at no cost by the LGF. The fee to be paid by the ESCO will be discussed and decided at the time of the preparation of the final LGF regulation. In any event, it can be more than 3%.

116. It is foreseen that some EE projects will have a payback period longer than 4 years. Such a long payback period is not convenient to ESCOs on a nascent market. To mitigate this, alternatives such as grant provisioning exist as a part of the EEF specific program to support EE investments with the aim of keeping the payback period under 4 years. The EEF co-financing would be up to 50 000 USD per project, with a target of 1 million USD as total co-financing in 4 years for 20 EE projects.

The LGF draft design is outlined at Appendix 3.

### 2.1.1.4 Exit Strategy and Sustainability

117. The project will create a unique mechanism to reinvest the reflows of bank disbursed loans to ESCOs during the period of LGF effectiveness. In this regard it is important to make sure that LGF will be effective beyond the project lifetime. The LGF Trust Bank account should be transferred to the EEF in accordance with the Asset transfer agreement to be duly signed between the GoM and the UNDP at the end of the current project timeframe. Such an approach ensures that the bank loans are effective to ESCOs beyond the original 4 years agreements with the GEF/UNDP. The impact on the ESCO sector and the systemic market changes in EE investments are significantly more sustainable compared to situations without this institutional LGF mechanism. As mentioned previously (Table 1-1) by its regulation the EEF is not allowed to provide grant and loan guarantees for the same project. Because the UNDP project relies on the EEF as a key financial partner and co-financer, it is not relevant to consider the EEF as the LGF manager. Over the project timeframe (2014-2018) the LGF will be managed by an independent FI although the Trust Account will belong to the UNDP. The project attempts to set up a risk-sharing partnership with the selected FI. When the UNDP will be in a position

to transfer the project assets to the GoM (at the end of the project timeframe), the LGF should be transferred to the EEF as per the government’s decision. At this point, the EEF will play a similar role to the UNDP (2014-2018) but the LGF management must remain with the FI. As this can be a sensitive matter, it will take quite a long time to reach an agreement about the LGF management at the post-project stage. The project design team advises the PMU to launch discussions with the GoM by the end of Year 2 to make sure that modalities will be clearly presented and accepted by the end of 2017. The LGF draft design is outlined at Appendix 3.

118. In addition to the set-up of a permanent financial mechanism, the project will have many other sustainable impacts:

- increased investments in energy efficiency, which would allow lower investments in power plants and other supply infrastructure, thereby substantially lowering overall energy expenditures in the residential, and public buildings, and district heating systems.
- the set-up and strengthening of at least 5 private ESCOs and jobs creation;
- long-term impact on the market development for EE equipment and construction materials;
- a long-term improvement of quality of life in the residential sector;
- better occupancy conditions in kindergarten as schools (lyceum) have a long-term impact on health of kids and teachers;
- Beyond the EE concerns, the Green Urban Plan will impact a new knowledge production and innovation that will have a profound influence on ways in which to transform society, including the “green” aspects of planning in the building sector;
- The municipality of Chisinau will move forward on the “green” sustainability-oriented climate and energy solutions towards urban development and investment, not only limited to EE in the building sector.

### 2.1.2 Outcomes – Outputs and Activities

119. The proposed project is broken down in 4 project Components and 4 expected Outcomes as follows:

- **Component 1:** Green Urban Development Plan for Chisinau  
*Outcome 1: Green Urban Development Plan Adopted by City of Chisinau*
- **Component 2:** Creation and Operation of ESCOs  
*Outcome 2: ESCO Business Model in Moldova is operational*
- **Component 3:** ESCO Market Operation  
*Outcome 3: Financial Mechanism and Financial Support available to ESCOs*
- **Component 4:** ESCO Market Operation - Replication and Dissemination  
*Outcome 4: EPC Projects Replicated in Other Municipalities and Information Disseminated*

#### **Outcome 1: Green Urban Development Plan Adopted by City of Chisinau**

120. Component 1 focuses on developing the green urban development plan for Chisinau in line with the Urban Development Plan (UDP) in order to give a “green focus” and special emphasis on energy efficiency in the building sector. Component 1 is important as it will help define: i) the specific areas in which the municipal ESCO will invest; ii) a strategy to finance the necessary investments to achieve the emissions reduction targets established by the City; iii) the development of a ‘Green Procurement Guide’. Its adoption will ensure that all public tenders meet minimum standards of environmental integrity, and iv) to provide guidelines to other major municipality to implement the same green strategy towards their urban development objectives. The Green Procurement Guide will be prepared with the aim to be readily transferred to other towns and cities of Moldova.

#### ***Output 1.1: The Chisinau Urban Green Development Plan***

121. The Urban Development Plan (UDP) has already been drafted by the municipal authority. The project team will provide TA to the municipality with the aim of drafting GUDP in line with the updated and approved UDP. The TA will be carried through the following set of sub-activities:

##### ***Activity 1.1.1: Conduct Green Urban Development Situation Analysis***

122. Conduct a situation and gap analysis, including a review of the 2025 Urban Development Plan, national and municipal energy efficiency programs and action plans, ongoing programs, the legal and regulatory framework, and capacity.

- Activity carried out by the PMU with the assistance of international and national consultants.
- Expected Output: Comprehensive Review Report

*Activity 1.1.2: Design the Baseline Inventory*

123. Construct a Baseline Emissions Inventory (BEI) and Energy Consumption Baseline, a Business as Usual (BAU) Scenario and an Energy Efficiency Scenario.

- Sub-activity carried out by the PMU with the assistance of national consultants.
- Expected Output: Baseline Report

*Activity 1.1.3: Green Development Status and Trends in Chisinau*

124. Describe the status and trends of key sustainability indicators, including biodiversity, air and water quality indicators in accordance with the National Report<sup>21</sup> for UNCSO 2012 “Rio+20”.

- Activity carried out by the PMU with the assistance of international and national consultants.
- Expected Output: input to 1.1.4

*Activity 1.1.4: Municipal GHG Emissions Reduction Target*

125. Propose sustainability targets and conduct a Gap Analysis. Energy consumption and emissions targets are consistent with sector-based targets in Activity 1.3 and Baseline 1.1.2

- Activity jointly carried out by the PMU and the municipal authority with the assistance of international and national consultants.
- Expected Output: Agreement on targets.

*Activity 1.1.5: Review of Key Barriers*

126. Review key barriers in Moldova and Chisinau to reaching sustainability targets and for the creation of sustainable and profitable ESCOs, and make recommendations.

- Activity carried out by the PMU with the assistance of international and national consultants.
- Expected Output: input to 1.1.7

*Activity 1.1.6: Green Growth Economic Instruments*

127. Review the potential of green growth economic instruments to increase energy efficiency and reduce GHG emissions in Chisinau.

- Activity carried out by the PMU with the assistance of international and national consultants.
- Expected Output: input to 1.1.7

*Activity 1.1.7: Institutional Recommendations towards Targets*

128. Make policy, financing, regulatory, and institutional recommendations to reach the sustainability targets.

- Activity jointly carried out by the PMU and the municipal authority with the assistance of international and national consultants.
- Expected Output: A set of recommendations to remove barriers, roll out the green growth Instruments with the aim of achieving targets.

*Activity 1.1.8: Institutional Recommendations towards ESCO Development*

129. Make policy, financing, regulatory, institutional recommendations to create an enabling environment towards the market development of ESCOs.

- Sub-activity jointly carried out by the PMU and the municipal authority with the assistance of international and national consultants.
- Expected Output: Plan to advance the ESCO business model as a green growth instrument within the GUDP.

*Activity 1.1.9: Draft the Green Urban Development Plan*

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<sup>21</sup>This report was developed as part of the National preparatory process of the Republic of Moldova to the United Nations Conference on Sustainable Development 2012 “Rio+20” (UN CSD 2012). The document was prepared within a broad participatory process, coordinated by the National Working Group Rio+20 (formed from representatives of the Office of the President, Parliament, Governmental Agencies (ministries), representatives of major stakeholders and NGOs and chaired by the Ministry of Environment and State Chancellery), followed by national consultations of the draft report and recommendations and launching of the report at the National Conference on Sustainable Development.

130. Prepare the draft and final version of the GUDP and recommendations on the best way to adapt the Chisinau GUDP for other Moldovan Cities. The GUDP must encompass the replication strategy in other cities in Moldova.

- Sub-activity jointly carried out by the PMU, international and national consultants and the municipal authority.
- Expected Output: GUDP and Synthesis Report as well as information dissemination

**Output 1.2:** *Resource Mobilization Plan for the Sustainable Energy Action Plan (SEAP) for Chisinau.*

131. Efficient energy demand management is crucial for the sustainable development of any country, as it has a direct influence on the advancement of green urban development and the well-being of the population. Taking into account the deficit in traditional energy sources and the increasing cost of energy on the national market, efforts of the municipal authorities are focused on increasing energy efficiency, among others, in institutional and residential buildings owned and operated by the municipality. The importance of energy management for the emergence of a 'greener' municipal development is covered by the SEAP already drafted by the municipality. Its purpose is to encourage and support local authorities in beneficiary countries to allow municipalities to achieve and implement a more sustainable local energy policy via signing up to the Covenant of Mayors. By committing to this initiative, the goal of the SEAP Covenant signatories is to meet and exceed the European Union's objective to reduce CO<sub>2</sub> emissions by 20% by 2020.

132. The SEAP is a key document that shows how a Covenant signatory will reach its commitment by 2020. It uses the results of BEIs to identify the best fields of action and opportunities to reach the local authority's CO<sub>2</sub> reduction target. It also defines concrete reduction measures, together with timeframes and assigned responsibilities. Signatories commit themselves to submitting their SEAP within the year following adhesion.

133. The main target sectors of the SEAP are: buildings, equipment/facilities and urban transport. The updated SEAP may also include actions related to local electricity production and to local heating/cooling generation.

- Activity jointly carried out by the PMU, international and national consultants.
- Expected Outputs: (i) The development of BEIs in Chisinau based on output 1.1.2; (ii) Resource Mobilization Plan for the implementation of Sustainable Energy Action Plan (SEAP) for Chisinau.

Within the current UNDP project framework, Activity 1.2 focuses on the building sector. To this end, the project will carry out the following sub-activities:

*Activity 1.2.1: Conduct SEAP Gap Analysis*

134. Building on the Gap Analysis (Sub-activity 1.1.1), identify resource and capacity needs to implement and comply with the SEAP requirements.

- Activity carried out by the PMU with the assistance of international and national consultants.
- Expected Output: Working material reviewed and discussed with the municipal authority. Input to Sub-activity 1.2.3.

*Activity 1.2.2: Review Financing Options/Opportunities*

135. Review public, private, external and other financing options, private sector financing opportunities, and project financing.

- Activity carried out by the PMU with the assistance of international and national consultants.
- Expected Output: Investor Guide for ESCO development. Input to Sub-activity 1.2.3.

*Activity 1.2.3: Draft of the Platform towards Chisinau's Cooperation with the EU Covenant of Mayors.*

136. Review of jurisdictional and institutional relationship between Chisinau and other EU Covenant of Mayors, and make recommendations for cooperation and coordination to reach sustainability targets. Create an enabling environment for ESCOs and make rulings on a list of voluntary commitments to fulfil requirements related to the membership in the EU Covenant of Mayors, including case studies on existing SEAPs.

- Activity carried out by the PMU with the assistance of international and national consultants.
- Expected Output: Guidelines in preparation for signing up to the EU Covenant of Mayors.

*Activity 1.2.4 Support in the identification of GUDP implementation Partners*

137. The Project Manager (PMU) will meet with all donors identifies in Table 2 with the aim of advancing the GUDP implementation. Within the UNDP project framework, the main deliverable of Component 1 is the GUDP and there is no provision in terms of TA for the challenging implementation phase.

- Sub-activity jointly jointly carried out by the Project Manager and the UNDP.
- Expected Output: RMP drafted and additional Technical Assistance for implanting the GUDP

**Output 1.3: Green Procurement Guidelines (GPG) for the City of Chisinau**

*Activity 1.3: Drafting of the Green Procurement Guidelines (GPG) for the City of Chisinau.*

138. The GPG is a basic tool for implementing the GUDP. Within the UNDP project framework, the project team provided GPG for the building sector, inclusive of institutional and residential buildings owned and operated by the municipality.

139. The GPG define Chisinau’s minimum requirements for Green Procurement Management. The responsibility for implementing GPG lies not within any single municipal department, but with every person involved in the procurement process. This includes maintenance, management, administrative staff, as well as building and project managers who requisition products or services in the building sector. Each person has a role to play in ensuring that the City of Chisinau complies fully with procurement preference requirements. In other words, virtually every employee has some level of responsibility.

140. The Green Procurement Guidelines to be developed and possibility adopted deal with:

- (i) Green procurement processes for goods, services and construction across all stages from planning and acquisition through use, maintenance and disposal.
  - (ii) Minimum and target environmental standards for tenders regarding inter alia, greenhouse gases and climate change, resource efficiency, solid waste, hazardous waste, and biodiversity.
  - (iii) Green procurement tools for the Moldovan context, including a Green Procurement Checklist and a tool to integrate green procurement processes into existing departmental management systems.
- Activity carried out by the PMU with the assistance of international and national consultants.
  - Expected Output: Green Procurement Guidelines in the building sector.

**Output 1.4: Targets for Emissions Reduction and Prioritization by the City of Chisinau**

*Activity 1.4: Review and Define Targets for Emissions Reduction and Prioritization by the City of Chisinau.*

141. Activity 1.4 summarizes Activities 1.1 to 1.3 to deal with the sector-based targets to be included in the GUDP as follows:

- (i) Define sector-based targets from the Baseline and Energy Efficiency Scenario.
  - (ii) Building on the baseline emissions inventory (BEI) and cost-effectiveness analysis identify priority areas of reform.
  - (iii) Recommend energy efficiency and emissions reduction measures and estimate associated costs and highlight barriers.
- Activity carried out by the PMU with the assistance of international and national consultants.
  - Expected Outputs: GUDP Report and information dissemination.

**Outcome 2 ESCO Business Model in Moldova is operational as e result of strengthening Energy Service Providers capacities and implementation of EE projects using EPC modality**

142. Activities and Sub-activities to achieve Outcome 2 aim at strengthening the capacity of established Energy Service Providers and creating EE project opportunities. As a result of Component 2, a series of 20 EE projects will be implemented in the Chisinau area and the ESCO business model will work in Moldova.

**Output 2.1: Training Program Design and Delivery**

*Activity 2.1: Conduct training needs assessment and training program design*

143. In Moldova a few consulting firms (Appendix 5) claim to be ESCOs, but in practice the ESCO business model is not truly developed. Based on meetings and site visits of a few EE projects in the building sector, one can say that the technical capacity is available on the market. This is indeed a solid asset. The project can rely

on 10 Energy Service Providers to implement the ESCO business model. As a result of the project, the target is to have at least 3 ESCOs that are fully operational and active on the market in Moldova over the upcoming 4 years and for longer.

144. The training sessions and modules will be delivered to target groups, including a few EEA staff members, which will be involved as trainers later on at the stage of dissemination and replication in other municipalities.

145. The training beneficiaries are broken down in 4 target groups:

- Candidate ESCOs, currently acting as Energy Service Provider or Consulting Firms (List at Appendix 5);
- Building managers and maintenance managers at the municipal level;
- Financial institutions or commercial banks, and
- Likely Trainers (EEA)

146. The first stage is to proceed with a comprehensive needs assessment among those target groups in regard to the following training priority topics:

- ESCO Concept Review
- Feasibility Studies and IGA
- EE Projects Risk Mitigation
- ESCO Contractual Approaches
- M&V of Project Performance
- ESCO Project Financial Analysis
- Project Development Cycle and Sales Strategies
- ESCO Business Plan Development
- EPC Modality, ESCO Registry and Tendering Procedures.

- Activity carried out by the PMU with the assistance of international and national consultants and EEA. Training material prepared by the Int'l expert.
- Expected Outputs: Training plan, training materials and training deliveries to trainers of trainees. The EEA acting as trainers of trainees, will review the training materials and attend all training sessions.

*Activity 2.1.1: Deliver training components to ESCOs*

147. ESCOs are the key and priority target group. Based on meetings with 10 Energy Service Providers (ESP: Appendix 5), most of them have the appropriate technology-based technical capacity to deal with EE projects. On the other hand, although they are aware of the ESCO business model, the capacity and knowledge related to EPC modality and financial analysis are quite limited. The ESCO training program component will aim at developing their capacity to become involved as technical and financial partners (that is to say, as ESCOs).

148. The ESCO training program is broken down in three modules:

Module 1: ESCO Business Model:

- ESCO Concept Review
- Project Development Cycle and Sales Strategies
- ESCO Business Plan Development
- ESCO Contractual Approaches
- ESCO Registry and Tendering procedures.

Module 2: Technical Training

- Feasibility Studies and IGA
- EE Projects Risk Mitigation
- M&V of Project Performance

Module 3: Financial Analysis and EPC modality

- ESCO Project Financial Analysis and Project Financing
- EPC modality

- Activity carried out by the PMU with the assistance of international and national consultants and EEA. The training material will be mainly developed by the international consultant. The EEA should be



involved in the training component related to feasibility studies. A few EEA team members will attend the training sessions with the aim of replicating the training delivery in other municipalities. The expected training duration is 2 days per module.

- Expected Outputs:

- (i) at least 5 ESPs can intervene as ESCOs in the implementation of EE projects as per the EPC modality and can proceed with the ESCO market development in Chisinau and other cities in the building sector.
- (ii) 3 training modules will be delivered;
- (iii) at least 30 ESP staff members will be trained.

*Activity 2.1.2: Deliver training components to Financial Institutions (FIs)*

149. Capacity building program to enhance the knowledge and skills of professionals within financial institutions and EEF in order to help banks to understand and assess the opportunities and risks, as well as to overcome perception barriers associated with financing EE projects carried out in accordance with EPC modality. The main focus will be on the principles and backgrounds of ESCO/EPC financing schemes especially from the perspective of financing institutions.

150. The training session (or workshop) will address the following priority topics:

- (i) EPC modality and contract review;
- (ii) EE project cost estimates and technical analysis;
- (iii) M&V procedures and billing;
- (iv) Risk analysis and management

- Activity carried out by the PMU with the assistance of international and national consultants and EEA. The training material will be mainly developed by the international consultant. The EEA should be involved in the training component related to EE project cost estimates and technical analysis.
- Expected Output: EEF and at least 3 commercial banks will attend the training session. Financing decision makers must be knowledgeable of EPC modality and costs, pros and cons, risks and constraints. Training session: 1/2 day.

*Activity 2.1.3: Deliver training to Building Managers, Maintenance Staff and Building Users*

151. The EPC cannot achieve its objective without the implementation of a tight and continuous energy management procedure, at least during the payback period (3 to 4 years). To perform on the long run, active EE measures and even passive ones must be maintained and correctly used by maintenance people, building managers and building users. With the aim of securing the energy performance of EE measures and to increase energy efficiency in their facilities, relevant staff members and building users must be involved at the earliest stage. In this context the trainer (international expert) will deal with the following training priority targets:

- EPC modality, ESCO roles, tasks and responsibilities; technical features of EE measures and M&V procedures. The target group will be municipal managers and decision makers.
- Energy management in institutional and residential buildings: The target group will be building managers.
- Energy efficiency measures features and operation, cost effectiveness and M&V (reporting): The target group will be technical and maintenance staff.
- Activity carried out by the PMU with the assistance of international and national consultants and EEA. The training material will be mainly developed by the international consultant. The EEA should be involved for the components related to energy efficiency measures features and operation, cost-effectiveness and M&V. A few EEA team members will be trained with the aim of replicating the training delivery in other municipalities.
- Expected Output: Efficient building operation and successful implementation of EPCs in municipal buildings. Three workshops will be held and at least 100 individuals will be trained. Training duration: 1 day per workshop.

**Output 2.2: Technical Partnerships and Working Agreements with key partner institutions**

*Activity 2.2: Draft and Formalize the Technical Partnerships and Working Agreements*

152. The project involves two key technical institutional partners: the EEA and the municipality of Chisinau. A clear and comprehensive working agreement must be duly agreed between key technical partners to know

“who-do-what” at different stages from Year 1 to Year 4.

153. In regards to technical issues, it is crucial to rule on who is doing what with the aim of avoiding effort duplication or a misunderstanding of expectations. All parties must share the same understanding and agree on their role and responsibility through a flexible Technical Partnership Agreement between the PMU, EEA and Chisinau technical department. The EEA’s agreement will be in line with the in-kind co-financing commitment.

- Activity carried out by the PM and technical partners. The PM will draft the preliminary Partnership Agreement to be discussed and revised by Chisinau and the EEA.
- Expected Output: Standing Technical Agreement duly approved by all parties (EEA, Chisinau and the PMU).

**Output 2.3: EE Projects Selected for piloting the EPC modality**

*Activity 2.3: Conduct EE project Analysis and Screening*

154. Activity 2.3 is spread on 2 years or shorter with the aim of carrying out 40 energy audits and selecting 20 EE projects through sub-activities as follows:

*Activity 2.3.1: Support in carrying out Energy Audits (EA) Program in Public and Residential Buildings in Chisinau.*

155. Energy Audit reports are a basic tool to identify sites and buildings with the most attractive EE potential. Because the ESCO project intends to implement 20 EE projects through the EPC modality, it is recommended to carry out about 40 EA with the aim of selecting 20 EE projects. EE projects will be implemented over a period of 3 years, from Year 1 to Year 3. The EA will identify a few EE projects for each site or building. EE projects cannot be achieved all at the same time in a particular building. The EE project implementation should be preferably split in 2 or 3 phases spread over 2 or 3 years through different EPCs duly signed for that purpose. In other words, having more than one EPC project in the same building is possible if the projects are phased.

156. The PMU will prepare or revise and improve the existing EA templates (2). The templates will be reviewed by the EEA. Energy Audits will be outsourced by the municipality in batches of 10 sites or buildings per lot. At least 20 EA will be carried out during the first 6 months of the project implementation, and others (20) later on during Year 2 with the aim of having carried out 40 energy audits by the end of Year 2.

- Activity carried out by the municipality and the selected national consultants. The PMU will provide assistance in terms of quality control and planning.
- Expected Outputs: 20 EA reports in Year 1 and 20 in Year 2.

*Activity 2.3.2: Conduct EE Project Screening and Pre-Selection.*

157. The EA reports deal with a few EE measures that are not equally attractive in terms of cost effectiveness and payback period. In essence, the PMU will recommend EE measures mainly based on three criteria: (i) the implementation cost and (ii) the payback period<sup>22</sup> and energy savings, and (iii) readily measurable savings. To be selected, EE measures must have an implementation cost (equipment and installation) lower than \$250,000 and a payback period shorter than 5 years<sup>23</sup>. Based on EA reports, the PMU will draft a review note to evaluate each site and recommend the priority EE measures and sites. The decision on the EE projects and measures to be implemented will be made by the municipality.

158. The EE projects screening procedure is carried out as follows:

- (i) Preliminary EE project sites identification: By the PMU and the municipality.
- (ii) Energy Audits in 40 buildings by Chisinau (2 stages: 20 in Yr 1 and 10 in Yr 2)
- (iii) Pre-selection of 20 EE project sites: By Chisinau and provision of technical advice by the PMU and EEA.

<sup>22</sup> The EA will analyse a series of EE measures regardless of the PBP. The EA will recommend a basket of EE measures having average gross PBP of 5 years or shorter. Other EE measures will be recommended for implementation through the long-term investment budget and achieved out of the EPC modality. Because of the EEF’s grant, the effective PBP of the EPC should be between 3 and 4 years. By making the selection on the PBD criteria, ESCOs and the FI mitigate the risk and will have a better business turnover in regard to EE investments. The NPV criterion is appropriate in the situation where the investor is the facility owner. The ESCO business model is quite different: the investor is the ESCO and the financier is a third party and both parties intend to mitigate the risk. In the ESCO business the risk increases with the PBP because of deviations than can occur with the duration.

<sup>23</sup> It is expected that the EEF will provide a grant with the aim of shortcoming the payback period under 4 years, preferably 3 years.

- EE projects screening by the PMU and joint decision by the municipality and the PMU.
- Expected Outputs: 20 EE projects selected.

**Output 2.4:** EE projects implemented using the EPC modality

The PMU will implement 20 EE projects from Year 1 to Year 3 through sub-activities as follows:

*Activity 2.4.1: Prepare and launch the Request for Qualification for short listing ESCOs.*

159. During the project preparation stage, the project design team met with 10 Energy Service Providers (ESPs) with the aim of getting their feedback on the project objectives and the best way to advance the development of the ESCO business model. Some of them are very specialized in terms of EE technologies, others are consulting firms, while a number of others are construction firms. Although their various technical capacities will be useful to carry out EE projects, they all needed to learn more about the EPC modality, financial analysis and ESCO business model development.

160. Because the UNDP project aims at supporting the ESCO market development rather than setting up a PPP or brand new companies, the prioritized approach will be to pre-select at least 5 ESPs with the aim of implementing 20 EPC projects. Because ESCOs must carry out a Feasibility Study (FS) for each site or building, it would be inefficient asking several ESCOs to carry out the same FS. In addition, ESCOs are required to carry out FS at their own budget. Consequently, the most appropriate way to proceed is by establishing a shortlist of 5 ESCOs to limit the number of FS and mitigate any disturbance of building maintenance staff and occupants. Pre-selected firms can be a joint-venture between existing firms.

161. To this end, the PMU will carry out 4 sub-activities:

- (i) Draft of detailed selection criteria and guidelines mainly related to:
  - Technical capacity;
  - Financial capacity;
  - EE track record in the building sector.
- (ii) Hold an information sharing and dissemination workshop for ESPs to:
  - Explain the guidelines for short listing candidate ESCOs;
  - Get the ESPs' feedback in regard to the criteria; and
  - Explain the Request for Qualification (RFQ) procedure.
- The PMU will draft the RFQ documents and will jointly manage the pre-selection procedure with Chisinau.
- Expected Output: 3 ESPs selected.

*Activity 2.4.2: Support the launch of the Request for Proposal (RFP) for the Implementation of EPC Projects*

162. Based on the selected sites or buildings, the municipality will launch a series of 5 RFPs that will include 4 EE projects per RFP. The series of RFPs will be spread over Years 1 to 3.

163. The EE projects granting criteria will be as follows:

- (i) The payback period (with preference given for projects with shorter payback periods);
- (ii) The implementation costs;
- (iii) The quality of the EE equipment,
- (iv) The implementation calendar, and;
- (v) Reliable M&V protocol and savings metering procedures.

164. The Feasibility Study (FS) is mandatory to submit proposals. The FS will comply with the template outlined by the PMU. The ESCOs will not be required to bid for 4 EE projects included in the lot. Each ESCO will define its priority according to its capacity.

165. The RFP stage is broken down in 2 steps as follows:

- Request for Proposals - EE project implementation (a total of 4 EE projects per lot): The same procedure will be repeated 5 times. The key document of the proposal will be a thorough Feasibility Study for each project. After the project evaluation stage the selected ESCO(s) will receive Notification EE project-based. Based on this Notification, the ESCO(s) will draft a bankable document to be submitted to EEF and the selected FI. ESCOs can bid for 1 to 4 EE projects per lot.

- **Project financing recommendations to FI and EEF:** Based on the selected EE projects and ESCO(s), the LGF Committee will submit a technical recommendation to the financial partners (bank and EEF) to support the bankable document prepared by selected ESCO(s).
- Request for Proposal documents and RFP management will be carried out by the PMU on behalf of the municipality in accordance with municipal regulations.
- Expected Outputs: Notification to selected ESCOs for 4 EPC projects. The RFP procedure will be repeated 5 times over 3 years.

*Activity 2.4.3: Set up Financial Arrangement Related to Loan Guarantees, Grants and Project Financing: EPCs Ready for Implementation.*

166. Project financing arrangements with the financial institution (loan and guarantee) and EEF (project-based grants for EE investments) will be based on the bankable documents and FS: The financial institution will be selected by tender as this institution will benefit from a \$900,000 loan guarantee facility.

167. Financial arrangements and agreements with financial institutions and EEF are made by the ESCOs.

- Outputs expected:
  - (i) Loan Guarantee approval by the FI;
  - (ii) Loan approval by the FI;
  - (iii) Grant agreement approval by the EEF;
  - (iv) EPC duly signed: ESCO and Chisinau

*Activity 2.4.4: Conduct EE Projects Implementation-Commissioning and Completion*

168. The EPC Projects Implementation and Completion takes place within 3 months of the EPC signature. The project completion is broken down into 9 steps as follows:

- EE Project implementation approval (EPC signature): By Chisinau and ESCO
  - Equipment installation and EE improvements: By ESCO(s)
  - Commissioning report: by ESCO
  - EE Project Commissioning approval (EE project-based): By Chisinau
  - First payment to ESCO(s): Commissioning report confirms the acquisition of equipment, its installation and full operation (test results and energy savings), the service and equipment supply costs are fully paid off to the equipment suppliers and ESCO(s) through the EE loan: By the FI.
  - Equipment ownership will then be transferred to Chisinau: by ESCO(s).
  - Two heating seasons M&V and quarterly reports for billing: By ESCO(s)
  - During the first two heating season periods, payments are made as per the M&V results: by Chisinau.
  - The whole project cost payments stream to FI: After two heating seasons, the steady payments stream will be calculated in accordance with the M&V results throughout the payback period: by Chisinau.
- Activity carried out by ESCOs
  - Expected output: 20 EE projects implemented in accordance with the EPC modality

*Activity 2.4.5: Conduct Monitoring and Verification reports and EPC Billing to Chisinau*

169. The EPCs projects supported by the ESCO Moldova Project will be required to comply with the International Performance Measurement and Verification Protocol (IPMVP) for the development of the Monitoring & Development protocol or the M&V protocol developed by the *Association of Energy Engineer of Moldova*. Monitoring and Verification over 2 heating seasons is an essential step to demonstrate that the installed EE measures are really working. EPCs require explicit proof that savings really occur.

170. Stipulating a certain performance requires that all parties agree on:

- i) The baseline for estimating savings;
- ii) How to estimate partial savings during installation;
- iii) Impact of cross effects between measures, if any;
- iv) The procedure and technology to proceed with energy consumption metering of EE equipment or building component. As a rule four options are considered: (a) Engineering calculations based on spot measurements; (b) Engineering calculations based on short-term monitoring; (c) Billing analysis at the whole-building level using statistical methodology; (d) Calibrated engineering simulation models.

The most appropriate procedure to figure savings will be selected in accordance with the EE measures;

- v) Correction for weather (degrees-days), occupancy changes, and structural modifications or other modifications that might interfere with simply comparing the pre- and post-retrofit utility bills;
- vi) Reporting schedule (Quarterly) and format;
- vii) ESCO's billing to client: format and schedule (quarterly);
- viii) Spot Cross-checking procedure.

171. Basically, the IPMVP is a set of common sense procedures. The important requirement is that the M&V reports state the accuracy of the savings estimate.

172. The training related to the IPMVP or the national M&V protocol is planned in Sub-activity 2.1.

173. ESCOs will be required to submit M&V reports in accordance with the EPC requirement and the M&V report template.

174. The PMU will outline the M&V report template in accordance with the agreed protocol.

175. The EEA will increasingly proceed with spot inspection of sites with the aim of double checking data provided by the ESCO, at least once a year.

#### **Output 2.5: ESCO M&E System and Reporting mechanism**

##### *Activity 2.5: Design and Implementation of the ESCO Moldova M&E System and Reporting*

176. The M&E system aims at providing reliable data and progress in accordance with the UNDP and GEF requirements.

- M&E system design and report templates: by the PMU
- Output expected: Reliable M&E system and report templates.

#### **Outcome 3 Financial Mechanism is available to ESCOs**

177. The project Outcome 3 is achieved through a series of 8 activities that will be mainly carried out by the PMU with the aim of developing the financial mechanism (LGF) and making available EE projects financing through the EEF and the selected financial institution (bank).

#### **Output 3.1: Agreement on LGF Regulation and Operational Guidelines**

##### *Activity 3.1.1: Draft the Agreement on LGF Regulation and Operational Guidelines*

178. This activity must be carried out at the very early stage of the project implementation. The PMU will outline the first draft of the regulation. The final regulation and procedure must be jointly adjusted by the PMU and the selected financial institution responsible for managing the LGF. The final LGF regulation must be approved by the UNDP CO, the City of Chisinau, the selected Bank and other relevant players.

- Although the PMU will be primarily responsible for drafting the LGF Regulation, the EEF will serve as key advisor in addition to input as an international advisor.
- Expected Output: The LGF regulation is approved and ready for implementation.

##### *Activity 3.1.2: Prepare the LGF Information Booklet*

179. ESCOs, municipal decision-makers as well as building managers and ESCOs must clearly understand the financial mechanism in term of modalities and conditions. The PMU will draft the LGF Booklet for that purpose and will hold a workshop to announce the establishment of the LGF and to explain the procedures and conditions.

- The PMU (PM and national consultant) is primarily responsible for drafting the LGF Booklet.
- Expected Output: ESCOs and stakeholders as well as EE project beneficiaries are knowledgeable about the LGF.

#### **Output 3.2: Financial Institution and Partnership Agreement**

##### *Activity 3.2: Select the Financial Institution and Partnership Agreement*

180. Request for Proposal (RFP) to select the FI and duly sign the agreement on the operation of the LGF in line with the LGF regulation. Draft TORs for selecting the financial institution, as well as the list of potential banks, are provided at Appendix 10.

- The RFP procedures will be carried out by the PMU. The agreement signatories will be: the UNDP, PMU and municipality of Chisinau.
- Expected Output: LGF fully operational.

**Output 3.3: Financial Partnership and Working Agreement with the EEF**

*Activity 3.3: Draft and Formalize the Financial Partnership and Working Agreement with the EEF*

181. Beyond the LGF regulation, merely a set of requirements, procedures and conditions to commit the loan guarantee to ESCOs, the PMU must also draft a working agreement to involve the key institutional financial partner (EEF) within the EE projects financing scheme. Other partners in this agreement will be the City of Chisinau and UNDP. The working agreement will contain provisions to transfer ownership of the LFG to the EEF at the end of the project to ensure that the LFF continues to operate after the project has finished.

- Activity to be carried out by the PMU with the support of national consultants.
- Expected Output: Working Agreement ESCO Moldova Project and the EEF duly signed.

**Output 3.4: Model Energy Performance Contract - EPC**

*Activity 3.4: Draft the Model EPC*

182. This activity intends to draft 2 ‘‘first-out’’ model EPC documents: The first for institutional/public/office buildings, the second for the residential sector.

- Activity to be carried out by the PMU and international/national consultants.
- Expected Output: 2 Model EPCs

**Output 3.5: LGF Management and Accountability Arrangements**

*Activity 3.5: Set up the LGF Management and Accountability Arrangements.*

183. Set up of the LGF Management Committee (LGFMC) with the aim of recommending to FIs EE projects that are subject to securing (i) a financing guarantee, (ii) an EE Loan and EEF grant. For each ESCO’s project, the recommendation will be based on the technical quality of the EE project and its compliance to the EPC modality and conditions. The committee members should belong to:

- the PMU
- Municipality of Chisinau
- EEA

184. FIs (commercial banks and EEF) cannot be committee members because the LGFMC’s responsibility is to provide recommendations to FIs.

**Output 3.6: LGF Operations Monitoring and Reporting mechanism**

*Activity 3.6: Prepare templates related to LGF Operations monitoring and reporting.*

185. The commercial bank is required to submit Quarterly Operation Reports related to the LGF and the performance of the EE projects in terms of commitments, reimbursements and/or payment defaults. The report will be a Table (format to be jointly defined by the PMU and the commercial bank) and a narrative discussion on outstanding issues.

186. The PMU will be responsible for submitting annual LGF performance and operation reports to the UNDP CO, Chisinau, EEF, EEA, MoF, MoE and MoEnv.

- The commercial bank will submit quarterly LGF Activity reports to the PMU. The PMU will then draft the annual reports to be sent to the UNDP CO, MoEnv, EEF, EEA, and obviously to Chisinau.
- Output expected: Quarterly LGF Operations Reports and Annual Reports.

**Output 3.7: LGF Exit Strategy and New Regulation Framework**

*Activity 3.7: Draft the Exit Strategy and New Regulation Framework*

187. The LGF should continue its operations after completion of the UNDP project. The exit strategy must

focus on the standing LGF operations with the aim of keeping the current objective. The LGF should become one of the financial mechanisms available in Moldova and should work together with and in addition to other EEF financing components and programs. Based on its successful implementation, the standing LGF should serve as a teaser to raise other funds available from the donor community involved in Moldova. Conditional to GoM's approval, the ownership of the LGF should be transferred from the UNDP to the EEF for a similar and sustainable purpose over a period of 5 years or longer, after project completion

188. The exit strategy must be outlined and drafted in Year 3 of the project timeframe. An adjusted and improved LGF regulation should be drafted at that time. For reasons of independence and effectiveness, the LGF management should be still in the hands of the selected financial institution. The exit strategy and decision must be discussed at the end of Year 2 and after the loan guarantee fund has been operational for at least 6 months and has already signed its first agreements with the aim of reaching a joint agreement as soon as possible and well before the end of the project.

189. The outline, first draft and final exit strategy will be prepared by the PMU in line with significant input from the EEF and other key ministries. The strategy must also be approved by the UNDP as a key document prior to proceeding with the asset transfer at the end of the UNDP project timeframe.

- Activity to be carried out by the PMU and national consultant.
- Expected Output: Approved Exit Strategy.

#### **Outcome 4 EPC Projects and GUDP replicated in other Municipalities and Information Dissemination**

190. Outcome 4 focuses on a transformative impact on the greening of cities and towns in the Republic of Moldova. A replication strategy for ESCO activities towards the green urban development needs will be elaborated at the stage of the preparation of the Green Urban Development Plan (Outcome 1). At least one other city should embark on the greening investments. At the stage of the EE projects implementation through the Energy Performance Contract approach, other municipalities will be invited to attend the training sessions related to the municipal sector. In addition, the project will provide other municipalities with reports, studies and templates as well as the needed TA within Component 4. At least 1 other municipality must replicate EE efficiency improvements with the support of ESCOs.

191. The lessons learned study from the implementation of Chisinau GUDP will be prepared which will help inform other municipalities and complement the final project evaluation. Finally, an end of project workshop should disseminate the lessons learned and project results (Case Studies). Component 4 also encompasses activities related to M&E.

##### **Output 4.1: EPC Case Studies and GUDP Lessons Learnt Study**

###### *Activity 4.1: Prepare EPC Case Studies and GUDP Lessons Learnt Study*

192. Drafting of Case Studies related to the most successful EPC projects.

- Case Studies drafted and GUDP lessons learnt report: by the PMU.
- Expected Outputs: 10 EPC Case Studies and 1 GUDP Lessons learnt report.

##### **Output 4.2: GUDP and EPC replication in other cities**

###### *Activity 4.2: Prepare information dissemination materials*

193. Support at least two other Municipalities to implement EE projects in accordance with the EPC modality in public buildings and Green Urban Development Plan (GUDP). Provision of TA to other municipalities to develop their own GUDP on the model established in Chisinau.

194. The basic material for promoting the ESCO business model will be a set of Case Studies (10) and the Chisinau GUDP developed at the earliest stage of the ESCO Moldova project implementation (Outcome 1).

195. In the first stage the target municipalities will be required to carry out a survey to preliminarily estimate the "greening needs" and energy savings potential and to identify a few target buildings, both residential and public/institutional. A baseline of Municipalities (2) will be required to be carry out the energy audits in the target buildings. To this end, the PMU will provide guidelines and guidance to municipalities.

- Support and TA to other municipalities provided by the PMU.
- Expected Outputs: 1 other municipalities implemented EPC projects and embarked on the GUD pattern

### Output 4.3: Information- Sharing and Project Closing Workshop

#### Activity 4.3: Prepare the project final report and closing workshop

196. The basic material prepared by the project will be made available to all major cities in Moldova. An EPC and GUDP kit containing all needed documents will be shared with other municipalities and other institutional decision makers in key ministries and agencies.

197. The EPC and GUDP kit will be presented to a large range of stakeholders (public, municipal and private) during the project closing workshop.

- Closing workshop: by the PMU.
- Expected Output: Information shared with key decisions makers and closing workshop.

### Output 4.4: Mid-term Evaluation

#### Activity 4.4: Carry out the mid-term evaluation by an independent team of national and international consultants.

198. The mid-term evaluation will be carried out in accordance with the GEF guidelines by independent consultants.

### Output 4.5: Final Evaluation

#### Activity 4.5: Carry out the final evaluation by an independent team of national and international consultants.

199. The mid-term evaluation will be carried out in accordance with the GEF guidelines by independent consultants.

## 2.2 Project Risks

200. To be successful, the project requires continuing commitment and full engagement of the municipality of Chisinau, private (ESCOs) and financial institutions (Banks and EEF) to work collaboratively in order to implement the Green Urban Development Plan in the building sector. At the project design stage, the UNDP met many times with high level decision makers working in the most important financial institutions, all Energy Service Provider (private), and the municipal authority. Because of the implementation of the financial mechanism (LGF) and the quality of the project beneficiary (Chisinau), most banks established in Moldova confirmed their interest to embark on the project and provide the needed project financing to ESCOs. Banks will make their decision based on the detailed design of the financial mechanism and the related regulation. To mitigate that risk, the Project will give the highest priority to joint-drafting of the LGF regulation in coordination with the financial institutions and the Energy Efficiency Fund ([www.fee.md](http://www.fee.md)). The failure of obtaining the support of financial institutions is consequently considered as a main project risk. This risk is considered to be manageable due to discussions with financial institutions during the preparatory phase which revealed their interest in a loan guarantee mechanism. Other project risks are presented in the table below:

**Table 2-1 Risks Matrix**

#	Description	Type	Impact & Probability (NOTE)	Countermeasures / Mgt response	Owner
1.	Resistance of local public authorities to engage in ESCO business model creation and promotion	Political	P=3 I=5	The program will support capacity building and awareness raising activities about the practicalities as well as benefits of applying ESCO business model. Regular meetings will be conducted with key stakeholders like Chisinau municipality Mayor and Local Council, relevant public servants and representatives of municipal enterprises/home owners associations.	PMU
2.	Lack of inter-institutional ownership and co-operation	Political & Organizational	Targets requiring institutional co-operational and	Fostering the co-operation by early engagement of the key stakeholders and using the Project Steering Committee as a complementary	Project Board



	in implementing the project activities.		cross-sectoral ownership not met. P = 2 I = 4	platform for raising issues requiring institutional co-operation. Furthermore, the institutional ownership and co-operation is further fostered by project's training and awareness raising activities.	
3.	Lack of interest of the managers of the construction companies and other building professionals to attend and apply in practice the training provided by the project.	Strategic	Low level of EE compliance and quality implementation P = 3 I = 3	The roll-out of the ESCO business model and conversion of existing energy service providers into ESCOs is the key mitigation tool for: 1) involving practitioners at the tailored training program stage included into the project Component; 2) having a constant quality control by ESCOs and a double check by the PMU and EEA.  The project training component starts with the training needs assessment to identify the main drivers guiding the work of practitioners, to test the different training approaches and to demonstrate the common and sustainable benefits of the training sessions, thereby gradually raising the interest among the broader group and developing the training up to the point. To this end, the training of trainers approach is promoted.	PMU and EEA.
4.	Low Awareness and understanding of the Green Urban Development Plan, amongst decision makers and relevant stakeholders		The risk is related to the Green Development Plan. If the municipality does not go further in term of GUDP approval and implementation, EE project initiatives could be slowed down. P = 1 I = 5	By drafting the Green Urban Development Plan and the Green Procurement Plan, the project supports the municipality of Chisinau to enforce key regulations and investments to advance EE measures implementation in the building sector owned and operated by the municipality.	City of Chisinau
5.	Inadequate and/or non-capacitated human resources to successfully implement the project and support the mainstreaming of its results.	Operational	Project not meeting the stated targets. P = 3 I = 5	Open tendering and thorough screening of the candidates (Project Manager, Project Administrative Assistant, International and National Experts, and ESCOs) applying for an assignment of a contract will mitigate that risk.  The usual UNDP procurement procedures will be applied in a pragmatic and efficient way to meet the project support requirements in a timely fashion and to ensure the highest professional level of the support provided.  Adequate training of the key project team members through the training	UNDP

				program, and the hands-on training provided by the international consultants.	
6.	The projected co-financing does not materialize		Project not meeting the stated targets. P = 2 I = 5	In addition to obtained co-financing letters, re-confirming the co-financing commitments in-prior starting the project implementation	UNDP
7.	Lack of adequate and reliable market data to facilitate the monitoring of project impact and planning of further policy measures.		Inadequate information for monitoring project impact and for planning new policy measures P = 4 I = 3	<p>Close cooperation with the EEA, local construction companies, producers and sellers of different construction materials and equipment, industry associations and Government entities collecting related statistical information.</p> <p>The implementation of a tight Monitoring and Verification (M&amp;V) protocol is a key tool to get reliable data and proceed with the constant follow-up of the EE projects performance. The M&amp;V is a mandatory requirement under the EPC modality.</p> <p>The PMU and EEA will cross-check the reliability of the data by comparing the results from different sources and approaches (e.g. top-down / bottom-up).</p>	ESCOs PMU and EEA
8.	Inadequate local availability of certified, cost-effective construction materials and EE equipment to meet the revised energy efficiency targets.		Lower compliance and therefore lower impact on energy savings P = 2 I = 4	<p>As a result of the ongoing efforts of the government to improve energy efficiency of buildings in a few facilities in Chisinau area, a relatively good selection of energy efficient building materials and equipment (such as EE windows, boilers, etc.) is already available in the market. According to the feedback from the local stakeholder consultations, the lack of availability of national certified construction materials is not going to present a major bottleneck to improving the energy efficiency of buildings,</p> <p>As with the previous risk, however, the situation will be monitored and further studied during the project implementation, including random tests of some construction materials used in order to verify their compliance with the stated performance.</p>	ESCOs and PMU
9.	Lack of financing for technical assistance		The project does not meet targets in term of outputs P = 2 I = 4	The project made a strategy decision by strongly involving Energy Service Providers, candidate ESCOs, that knowledgeable and technically skilled to deal with EE measures implementation. It is important to mention that the EE projects implementation relies on ESP-ESCOs, not on the PMU. However, Outcome 1 related to the Green Urban	PMU and UNDP CO

				Development Plan Development (GUDP) needs additional TA to be implemented. The municipality of Chisinau agreed (letter of commitment) to invest 1.3 million dollars in the GUDP implementation (2014-2018), but the lack of capacity available at the municipality level could jeopardized the effective development of activities that will be recommended in the GUDP. In order to mitigate that risk, the project includes Activity 1.2.4 related to fund-raising and resource mobilization through the donor community with the aim of provisioning the needed TA for implementing the GUDP.	
10.	Energy-efficiency sensitivity to variation in energy price		The energy supply (electricity and gas) cost negative impact on EE investment and cost-effectiveness..  P = 1 I = 1	The energy supply cost is out of the control of energy end-users and the scope of this project. EE measures in the building sector will mainly deal with the heating load (air and water), and heating demand is rather price-inelastic. The inelasticity comes from characteristics of energy as a necessity in a cold country. The risk of a negative impact on EE investments is rated LOW because the energy supply cost is currently quite low in Moldova. EE projects carried out in accordance with the EPC modality are not sensitive to variation in energy price because the per unit money saving (resulting of per unit energy saving) is agreed by contract (EPC) and remains unchanged until the end of the payback period. .	ESCO

NOTE: Probability on a scale from 1 (low) to 5 (high) / Impact on a scale from 1 (low) to 5 (high)

### 2.3 Expected Global and National Benefit

201. On a global level, the project will lead to a direct reduction of GHG from the projects commissioned as a result of the project. The project will directly save 68 ktCO<sub>2</sub>-eq and post-project 78.4 ktCO<sub>2</sub>-eq from 2014 to 2038, and because of the project influence, an additional indirect emissions reduction of 240 ktCO<sub>2</sub>-eq from 2018 to 2038 (See Appendix 2).

The main national and local benefits are expected to be:

- Creation of a sustainable ESCO industry.
- Reduction of energy import through the cumulative energy savings of 766 GWh (direct, post-project and indirect).
- General socio-economic benefits in the major urban areas, especially Chisinau where the EE projects will be implemented through employment opportunities.

### 2.4 Project Rational and GEF Policy Conformity

202. Within the GEF climate change focal area, the project supports the objectives of Strategic Priority #4 to “Promote energy efficient , low carbon transport and urban system.” The GEF support under this objective may involve technical assistance, innovative financing mechanisms, awareness campaigns, and investments in demonstration and deployment of high-performance technologies. To this end, the proposed project aims to

support removal of barriers to the adoption a new business model (ESCO) in Moldova. The project stresses the importance of developing sound regulatory frameworks in the local government bodies and the enabling business environment that support and secure EE investments in the building sector owned and operated by municipalities in Moldova. The project aims to create conditions for long-term and sustainable ESCO business development opportunity through the sustainable financial mechanism rolled out by the proposed project.

203. The UN Partnership Framework of the Republic of Moldova for 2013-2017 identifies energy and resource efficiency as one of the key programming areas seeking to promote changes in production and consumption patterns in both the public and private sector. In line with this the proposed project includes a component related to advance the Green Urban Development Plan development in Chisinau.

## 2.5 Country Ownership

204. Moldova has ratified the UNFCCC on June 1995 and as a country with an economy in transition is eligible for UNDP/GEF funding. The signing of the Convention by the Republic of Moldova on June 9, 1995 was a step of courage aimed at assuming a high responsibility to become a part of a global process committed to addressing climate change issues. As signatory party to the Convention the Republic of Moldova has prepared its first National Communication in order to honour its commitments under the Framework Convention submitted in Year 2000.

205. The proposed project is supporting the Government of Moldova in implementing the National Energy Saving Programme (2011-2020) and the energy efficiency-related legislation, such as the Energy Efficiency Law (2010) and the upcoming Law on Energy Efficiency of Buildings, which have identified the improvement of the energy efficiency of the building sector as a priority measure.

206. The project is strongly supported also by the municipal administrations of Chisinau, the capital of Moldova which is demonstrated by its commitments to co-finance the project up to \$6.3 million dollars.

## 2.6 Financial Modality and Cost-Effectiveness

207. The GEF support will primarily consist of a grant of \$1.3 million dollars that will be mainly used to support the financial mechanism with the aim of implementing 20 EE projects from 2014 to 2018. The GEF funding will be complemented by the direct co-financing of at least \$7.615 million. The co-financing will be used for: (i) repaying EE investments to ESCOs (about \$5 million); (ii) \$1 million in grant to EE projects for shortening the payback period under 4 years; (iii) about \$1.425 million to carry out 40 energy audits and for implementing additional EE activities (TBD) in accordance with the GUDB; (iv) and \$40,000 (in-kind) to support activities carried out by the MoEnv. Finally the UNDP will invest \$0.150 million to support various project management activities, including among others, the salary paid to the project manager (management component) and for financial audits.

208. Each \$1 of GEF funding allocated to the financial mechanism will be leveraged by 3 by the financial institutions (EEF and Bank). As a result, at least \$3 million will be lent to ESCOs for implementing planned EE projects (20).

## 2.7 Sustainability

209. The sustainability of the ESCOs supported by LGF investment loans appears to be high based on the results in other countries around the world where the ESCO business model has been proven to be an effective tool to leverage additional investments in energy-efficiency. This is reflected by a number of indicators including yearly annual growth in sales, profits, gradual growth of the business and by the increase in retained earnings estimated in the cash flow. Energy Service Providers in Moldova will clearly continue to use the ESCO business model, even after the project is over, if it provides them with additional profits at an acceptable level of risk.

210. By setting up the tailored financial mechanism (LGF) to support EE investment/project financing, the main barrier should be overcome for EE projects requiring an investment capital lower than 200 000\$. Based on our estimate the guarantee fund (trust bank account) should be fully committed for 20 projects within the project timeframe and another 20 EE projects over the next five years after 2018 through the new investment as loans repayment proceeds.

211. The whole project could not be sustainable if LGF is not extended beyond the project timeframe. The exit strategy is clear: at the end of the project timeframe, in accordance with the government decision, the LGF (trust bank account) will be transferred to the EEF and to be used for the same purpose for another period of at least 5 years. Because the LGF is being transferred to a public institution (the EEF) there should be no problems with transferring of the fund to the EEF at the end of the project. The continued operation of the LGF after the lifetime of the project is the key activity to support project sustainability.

## **2.8 Replicability**

212. Replication potential for developing Green Urban Development Plans, for the ESCO business model and for EPC contracting is substantial as this methodology can be used in all major municipalities in Moldova and elsewhere in the sub-region. To achieve its objectives the project addresses the key barriers (awareness, technical, institutional and financial). Lessons learnt from the proposed project will be useful to advance the ESCO business model in other parts of Moldova. The project aims to achieve this goal by creating a template for attracting private EE investments through the financial mechanism made available by the Loan Guarantee Fund (LGF). Such a sustainable fund (LGF) is not allocated to Chisinau only and can be used by all other municipalities in Moldova to replicate the same business model. In accordance with the Moldovan Government approval and in accordance with UNDP and GEF rules and procedures, the LGF will be transferred to the EEF at the end of the project to be used for the same purpose. In addition the proposed project includes a component related to replication in other municipalities. The objective is to have at least two other municipalities in Moldova willing to implement EE projects in the building sector in line with the ESCO business model and EPC modalities.

**Section 3 - Project Results Framework**

**3.1 Project Result Framework**

**Table 3-1 Project Results Framework**

<p>UNDP Strategic Plan: Growth and development are inclusive and sustainable, that create employment and livelihoods for the poor and excluded Output 1.5. Inclusive and sustainable solutions adopted to achieve increased energy efficiency and universal modern energy access (especially off-grid sources of renewable energy) Expected CP Outcome 3.2 – Low Emission and Resilient Development: Strengthened national policies and capacities enable climate and disaster resilient, low emission economic development and sustainable consumption</p> <p>Country Programme Outcome Indicator: Energy Intensity reduced by 7% till 2017 in comparison with 2010</p> <p>Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one): 1. Mainstreaming environment and energy OR 2. Catalyzing environmental finance OR 3. Promote climate change adaptation OR 4. Expanding access to environmental and energy services for the poor.</p> <p>Applicable GEF Strategic Objective and Program: Climate Change Objective 2: Promote market transformation for energy efficiency in industry and the building sector</p> <p>Applicable GEF Expected Outcomes: CC Objective 2: Sustainable financing and delivery mechanism established and operational</p>					
Project Objective	Indicator	Baseline	Targets End of Project	Source of verification	Risks and Assumptions
<p>The project objective is to create a functioning, sustainable and effective ESCO market in Moldova, as the basis for scaling up mitigation efforts in the whole municipal building sector in Chisinau and Moldova in line with the Green Urban Development Plan</p>	<p>Number of EE projects implemented under the EPC modality and loan guarantee to ESCOs</p>	<p>0</p>	<p>20 buildings financed using EPC modality</p>	<p>Project monitoring system and reporting. EE projects completion reports Number of ESCO submitting proposals</p>	<ul style="list-style-type: none"> <li>- Feasibility studies prove cost-effectiveness of EE projects</li> <li>- Required investments are forthcoming through the EEF and the selected commercial bank.</li> <li>- Private investors (ESCOs) can get access to project financing from the financial institution and are in a position to invest about 20 to 25% of the EE project costs (equity).</li> <li>- The Municipal Council is willing to approve the Green Urban Development Plan</li> </ul>
	<p>Loan Guarantee Fund</p>		<p>Loan guarantees of at least \$2.7 million USD have been signed with the financial institution managing the Loan Guarantee Fund</p>		
	<p>Energy Service Providers (ESPs) operating as ESCOs</p>	<p>0</p>	<p>At least 5 companies in Moldova which previously worked as ESPs now operate as ESCOs (it could also be new companies)</p>		

	Energy savings and Cumulative direct, post direct and indirect CO2 emissions reduction from the building sector	0	Cumulative (20 year) energy saving of 295 GWh as a result of 20 demo projects Cumulative (2014-2038) Direct: 68 ktonsCO2 Post-project (2024-2038): 40 ktonsCO2 Indirect (2018-2038): 240 ktonCO2 Total: 381 ktonsCO2		
<p><b>Outcome 1:</b> Urban Development Plan Adopted by City of Chisinau and additional emission reduction projects are financed and implemented in Chisinau. In addition, Green Urban Procurement Guide is being utilized by City of Chisinau</p>	Green Urban Development Plan (GUDP)	There is no green urban development plan but Chisinau already approved the Urban Development Plan.	Chisinau Green Urban Development Plan approved and the Resource Mobilization Plan is implemented.	GUDP Report Decision of the Municipal Council	<p>Sustained and consolidated political support and commitment to promote low-carbon development. Key stakeholders understand the benefits of the greening the policy document and engage in implementation. The donor community is responding and supports the GUDP implementation.</p>
	The municipal Green Procurement Plan	There is no Green Public Procurement guidelines enforced in Chisinau.	Public Green Procurement Plan applied by Chisinau.	Report and decision of the Municipal Council	
	A awareness raising and replication mechanism	No information available.	Information related to GUDP is available to all other municipalities through documents and workshops.	Documents (Cases studies, lessons learned)	

<p><b>Outcome 2:</b> ESCOs are successfully investing in energy savings green urban development projects in the building sector using Energy Performance Contracting modality (EPC)</p>	<p>- Number of municipal staff members capable of implementing EPC projects and evaluating results - Number of building managers trained in ESCO business model - Staff from financial institutions in a position to evaluate EPC projects and ESCO proposals</p>	<p>ESCO business model does not exist in Moldova and there are no dedicated trainings in the area for the relevant stakeholders.</p>	<p>3 target beneficiaries groups and 3 training sessions: - At least 20 ESPs are trained on the ESCO business model - Public Building managers and Maintenance Managers, at least 20 staffs are trained on ESCO business model - Financial Institutions (5), including the EEF are trained on the ESCO business model.</p>	<p>Training sessions evaluation reports Quality of ESCOs' technical and financial proposals FIs readiness to analyse and approve (or reject) loan and loan guarantee request</p>	<p>ESCOs must agree to attend the training sessions, no fee.  EEA agrees to intensively support the project by providing key experts to attend the training sessions and further to serve as trainers in other municipalities.  EEA and the municipality express their willingness to work together</p>
	<p>Long-term agreement between the EEA, Chisinau and PMU</p>	<p>Although the EEA is active in the building sector, the EEA did not develop any special acquaintance with the municipal sector to advance EE in the public and residential building sector owned and operated by the municipality.</p>	<p>Framework Agreement jointly signed by 3 parties</p>	<p>Framework Agreement EEA's readiness to provide effective, quality and relevant TA.</p>	<p>Energy Audit Reports</p>
<p>Documented long-list of EE projects</p>	<p>9 EA were already carried out by Chisinau.</p>	<p>30 to 40 Energy Audits carried out in buildings owned and operated by the municipality.</p>	<p>20 EE projects selected and documented</p>	<p>Joint decision: Chisinau, PMU and EEF</p>	<p>EE projects meeting the selection criteria in term of cost, payback and measurable savings.</p>
<p>Short-list of 20 EE projects selected for investment using EPC contracting modality</p>	<p>no EE projects are identified yet</p>				



<p><b>Outcome 3:</b> Financial Mechanism is set up and functional, providing financing to ESCOs</p>	<p>Steady stream of payments by Chisinau in line with the EPC modality</p>	<p>There are no EE projects using EPC modality currently under implementation in Moldova</p>	<p>20 EE projects using EPC modality are under implementation using EPC modality</p>	<p>Quarterly LGF activity reports from the selected financial institution.</p>	<p>Project financing available from the financial institution and grants provided by the EEF to shorten the payback period. The municipality is in a position to face its obligations in regard to EPC Quarterly payments) EE projects reach on target in term of energy savings and timeliness to carry out quality EE projects. ESCO are in a position to provide the expected co-financing</p>
	<p>Data available in regard to actual ESCO Moldova progress</p>	<p>UNDP BAU M&amp;E guidelines</p>	<p>M&amp;E plan drafted and implemented within 3 months after the project start-up.</p>	<p>M&amp;E Plan Quarterly and Annual progress reports</p>	<p>The UNDP project monitoring reporting systems and template are appropriate for the purpose of the current project. If needs be the UNDP CO will provide guidelines and guidance to this end.</p>
<p><b>Outcome 3:</b> Financial Mechanism is set up and functional, providing financing to ESCOs</p>	<p>Loan Guarantee Fund (LGF) Regulation and Operational Guidelines</p>	<p>EE project loan guarantee scheme is already available in its draft version</p>	<p>LGF Regulation Document negotiated and duly signed by all parties: Chisinau, PMU, UNDP and the financial partner (bank) to be selected through a Request for Proposal Procedure by the PMU and UNDP. Financial Working Agreement dully signed</p>	<p>LGF regulation enforced</p>	<p>Tripartite joint agreement on the way to manage the LGF bank account is drafted at the earliest stage of the project. The LGF trust bank account belongs to the UNDP up to the end of the project (EOP).</p>
	<p>Financial Framework Agreement between the Project (PMU), the municipality, and the Energy Efficiency Fund (EEF): - Number of projects approved by the EEF - Total project-based co-financing (EEF's grant)</p>	<p>The EEF agreed on the principles of the Financial Framework Agreement, but this is not finalized yet.</p>		<p>Framework Agreement</p>	<p>The EEF will redesign the grant component to support ESCOs rather than energy users.</p>

	<p><b>LGF Performance indicators:</b></p> <ul style="list-style-type: none"> <li>- number of projects approved by the FI;</li> <li>- Total amount of loans (\$)</li> <li>- Total amount of loan guarantees (commitment)</li> <li>- Default of payment: total amount and %</li> <li>- Number of requests rejected by the FI</li> <li>- Duration of the decision making procedure from the LGF request and the final approval</li> </ul>		<ul style="list-style-type: none"> <li>- 20 Loan Guarantee approvals: (i) 5 in year 1; (ii) 10 in year 2, and (iii) 5 in year 3.</li> <li>- At least \$2.7 million approved (LGF and loans)</li> <li>- There is no target in regard to default of payment. A default of payment means the project investment is not fully repaid.</li> <li>- If the training program has the expected impact in term of EE projects design and financial analysis, the rate of reject should be very low. No special target.</li> <li>- LGF approval delay should be 1 month if the request does not need improvements.</li> </ul>	<p>LGF quarterly and Annual Activity reports</p>	<p>ESCOs are in a position to submit a quality technical project design and comprehensive and reliable financial analysis in accordance with guidelines. ESCO are in a position to co-finance 20% of the whole project cost (out of the financing cost) The selected FI is efficient as expected. EEF provides grants to EE projects</p>
<p><b>Outcome 4:</b> ESCO(s) are designing, financing and successfully implementing energy efficiency projects using EPC modality in at least one (1) other city in Moldova outside of Chisinau</p>	<p>EPC projects</p>	<p>EPC projects were not implemented in Moldova: no case studies or lessons learnt reports were drafted. EPC and ESCO concept (model) start from scratch.</p>	<p>10 EPC Case Studies identified and made available EPC replicated in another town/city. One short project video is made available on the EPC projects carried out by the project At least 3 EPC projects are implemented at least in one other city GUDP lessons learnt reports made widely available At least another town will have developed or started to develop a Green Urban Development Plan</p>	<p>Documents: - EPC projects and learnt lessons - Mid-term and Final Project Review reports - Project final report</p>	<p>At least 1 other city will be willing to develop a GUDP and carry out energy-efficiency investment projects using the ESCO business model and EPC modality</p>

**3.2 Budget and Work Plan**  
**Table 3-2 Budget and Work Plan**

Award ID:		00079687		Project ID(s):		00089623					
Award Title:		Country Name Project Title: <b>ESCO Moldova- Transforming the market for Urban Energy Efficiency in Moldova</b>									
Business Unit:		MDA/0									
Project Title:		Country Name Project Title: ESCO Moldova									
PIMS no.		5/35									
Implementing Partner (Executing Agency)		Ministry of Environment /Ministry of Economy / City of Chisinau / Energy Efficiency Fund									
GEF Outcome/Atlas Activity	Responsible Party/ Impl. Agent	Fund ID	Donor Name	Atlas Budget 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: See Below
<b>COMPONENT 1 - Green Urban Development Plan for Chisinau</b>											
<b>OUTCOME 1: Green Urban Development Plan Adopted by City of Chisinau</b>	City of Chisinau	62000	GEF	71200	Int'l Consult.	13,000				13,000	NOTE 1
				71300	Local Consultant	27,000				27,000	NOTE 1
				71600	Travel	7,500				7,500	NOTE 1
				75700	Training, Workshops and Confer.	4,000				4,000	NOTE 2
<b>Sub-total Outcome 1</b>					<b>51,500</b>				<b>51,500</b>		
<b>COMPONENT 2 - Creation and Operation of ESCOs</b>											
<b>OUTCOME 2: ESCO Business Model is operational in Moldova</b>	MoENV	62000	GEF	71200	Int'l Consult.	42,725	17,875			60,600	NOTE 3
				71300	Local Consultant	27,975	21,875	14,750	1,500	66,100	NOTE 4
				71600	Travel	14,875	7,125			22,000	NOTE 5
				74200	Audio Visual & Print Prod. Cost	2,000				2,000	NOTE 6

Sub-total Outcome 2						87,575	46,875	14,750	1,500	150,700
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<b>COMPONENT 3 - ESCO Market Operation including support for financial mechanism development</b>											
<b>OUTCOME 3: Financial Mechanism available to ESCOs</b>	MoENV	62000	GEF	71200	Int'l Consult.	20,150				20,150	NOTE 7
				71300	Local Consultant	21,900	3,000			34,650	NOTE 8
				71600	Travel	2750				2,750	NOTE 9
				75700	Training, Workshops and Confer.	2,000				2,000	NOTE 10
				72600	Grants	400,000	400,000	100,000		900,000	NOTE 11
<b>Sub-total Outcome 3</b>						<b>446,800</b>	<b>403,000</b>	<b>103,000</b>	<b>6,750</b>	<b>959,550</b>	
<b>COMPONENT 4 - ESCO Market Operation - Replication and Dissemination</b>											
<b>OUTCOME 4: EPC Projects and GUDP replicated in other municipalities, Information shared and Disseminated, project monitored (MTR, FE and Financial Audits)</b>	MoENV	62000	GEF	71200	Int'l Consult.			14,400	16,000	30,400	NOTE 12
				71300	Local Consultant	4,500	1,500	3,100	5,000	14,100	NOTE 13
				74100	Professional Services		2,000	2,000	4,000	8,000	NOTE 13
				71600	Travel			3,750	3,700	7,450	NOTE 14
				75700	Training, Workshops and Confer			2,000	2,000	4,000	NOTE 15
				74200	Audio Visual & Print Prod. Cost				2,300	2,300	NOTE 16
<b>Sub-total Outcome 4</b>						<b>4,500</b>	<b>3,500</b>	<b>25,250</b>	<b>33,000</b>	<b>66,250</b>	
<b>TOTAL OUTCOMES 1 TO 4</b>						<b>590,375</b>	<b>453,375</b>	<b>143,000</b>	<b>41,250</b>	<b>1,228,000</b>	

Project Management											
Project Management PMU	UNDP		UNDP	71300	Project Manager (PM)	19,500	19,500	19,500	19,500	78,000	NOTE 17
	UNDP		UNDP	74599	UNDP cost recovery charges-Bills	14,500	9,500	9,500	16,500	50,000	NOTE 18
	UNDP		UNDP	72200	Equipment and logistic	7,000	5,000	5,000	5,000	22,000	NOTE 19
	GEF	62000	GEF	71400	Contractual services - individual	18,000	18,000	18,000	18,000	72,000	NOTE 20
Sub-total Management Cost GEF	GEF	62000	GEF			18,000	18,000	18,000	18,000	72,000	
Sub-total Management Cost UNDP	UNDP		UNDP			41,000	34,000	34,000	41,000	150,000	
<b>TOTAL GEF</b>	<b>GEF</b>		<b>GEF</b>			<b>60,8375</b>	<b>471,375</b>	<b>161,000</b>	<b>59,250</b>	<b>1,300,000</b>	
<b>TOTAL UNDP</b>	<b>UNDP</b>		<b>UNDP</b>			<b>41,000</b>	<b>34,000</b>	<b>34,000</b>	<b>41,000</b>	<b>150,000</b>	
<b>TOTAL Project Cost</b>						<b>649,375</b>	<b>505,375</b>	<b>195,000</b>	<b>100,250</b>	<b>1,450,000</b>	

Summary of Funds:<sup>24</sup>

	Amount Year 1	Amount Year 2	Amount Year 3	Amount Year 4	Total
GEF	608,375	471,375	161,000	59,250	US\$ 1,300,000
Donor 2 (e.g. UNDP)	41,000	34,000	34,000	41,000	US\$ 150,000
<b>Donor 3 (cash and in-kind) e.g. Government</b>	265,000	2,400,000	2,400,000	2,400,000	US\$ 7,465,000
<b>TOTAL</b>	<b>914,375</b>	<b>2,905,375</b>	<b>2,595,000</b>	<b>2,500,250</b>	<b>US\$ 8,915,000</b>

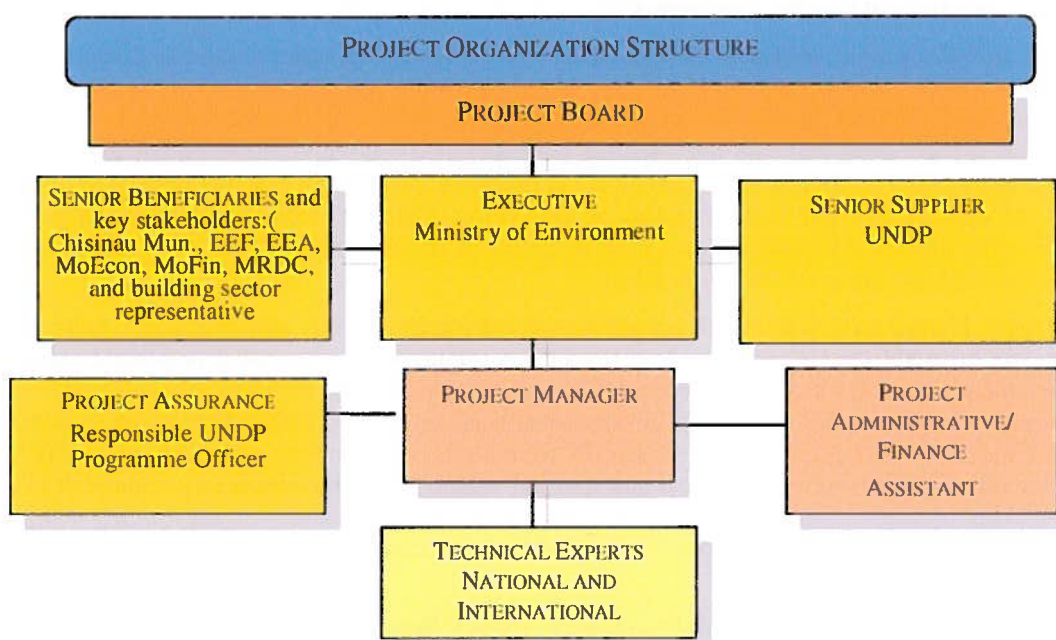
<sup>24</sup>Summary table should include all financing of all kinds: GEF financing, co-financing, cash, in-kind, etc.

NOTES

1	Nat'l Consultant: GUDP Specialist –180wd@150\$ Int'l Consultant: GUDP Specialist – 20 wd@650 2 Int'l trip 1 @2000\$ DSA 14@250\$
2	Provision for 4 Workshops
3	Int'l Consultant ESCO: 27 wd@800\$ Int'l Consultant ESCO 60 wd@650\$
4	Nat'l Consultants ESCO 440.4 wd@150\$
5	1 Int'l trips@2000\$ 7 Int'l trips@1000\$ 52DSA@250\$
6	Translation and Printing of training materials
7	Int'l Consultant Finance: 31wd@650\$
8	Nat'l Consultant Finance 231 wd@150
9	Int'l Consultant Financing: 1 trip@1000\$ and 7DSA@250\$
10	2 Workshops related to LGF
11	Budget provision to transfer in the LGF trust bank account owned by the UNDP
12	MTR - Int'l Independent Evaluator: 18WD@800\$ FE - Int'l Independent Evaluator: 20WD@800\$
13	MTR - Nat'l Evaluator: 15WD@150\$ FE - Nat'l Evaluator: 15WD@150\$ Nat'l consultant Final Report and Case Studies: 20 WD@150\$ Nat'l consultant: support to dissemination and replication in other cities from Yr 1 to Yr 4: 44 WD@150\$ Including Financial Audit 4 Audits@2000
14	MTR ticke@2000\$ and 7DSA@250\$ FE ticke@2000\$ and 7DSA@250\$
15	1 WS (Year 3) Project results information dissemination and replication 1 WS (Year 4): Project closing WS
16	10 Case Studies printing
17	The total cost for the expert acting as PM is 120k\$: 78k\$ paid for project management And 42k\$ paid as technical expert Full-time 4 yrs
18	Various UNDP costs recovery, including the Inception WS
19	To be determined : Computers and other equip.
20	Project administrative assistant - Full-time 4 yrs paid by the GEF grant



## SECTION 4 - MANAGEMENT ARRANGEMENTS



203. The Ministry of Environment is the government institution responsible for the implementation of the project and will act as the Senior Executive. UNDP is the Responsible Party for the project, providing implementation support services. The project is nationally implemented (NIM), in line with the Standard Basic Assistance Agreement (SBAA, 1992) and the United Nations – Republic of Moldova Partnership Framework and Action Plan 2013 – 2017 signed between UNDP and the Government of Moldova.

204. The Ministry of Environment will take overall responsibility for the project implementation, and the timely and verifiable attainment of project objectives and outcomes. It will provide support to, and inputs for, the implementation of all project activities. The Ministry of Environment will nominate a high level official who will serve as the national coordinator of the project implementation and who will not be paid from the project funds.

205. UNDP Moldova will support the Ministry of Environment with implementation support services according to the Agreement between the Government of Moldova and UNDP for the provision of support services of 27 May 2003, including identification and recruitment of project personnel, identification of training activities and assistance in carrying them out, procurement of goods and services, financial monitoring and reporting, processing of direct payments, supervision of project implementation, monitoring and assistance in project assessment. UNDP will recover the costs for its services based on the UNDP Moldova Local Price List. The Project will be implemented in line with UNDP rules and procedures (<http://content.undp.org/go/userguide/results>).

206. A Project Board (PB) will be established at the inception phase of the project to monitor the project progress, to guide its implementation and to support the project in achieving its listed outputs and outcomes. The project Board will have 9 members, made up of one representative of each of the following institutions: Ministry of Environment (MoENV: Senior Executive and chairing the PB), Ministry of Economy (MoE), Municipality of Chisinau, Energy Efficiency Fund (EEF), Energy Efficiency Agency (EEA); Energy End-users representative (building sector), Ministry of Finance, Ministry of Regional Development and Construction, and UNDP Moldova. LPAC members concluded that Project Board can be co-chaired. The Project Board will meet regularly, at least 3 times per year or more often as required.

207. The Project Board will be the group responsible for making management decisions for a project when guidance is required by the Project Manager, including recommendation for UNDP/Implementing Partner approval of project plans and revisions. In order to ensure UNDP's ultimate accountability, Project Board decisions should be made in accordance to standards that shall ensure best value to money, fairness,

integrity transparency and effective international competition. Project reviews by this group are made at designated decision points during the running of a project or as necessary when raised by the Project Manager. This group is consulted by the Project Manager for decisions when PM tolerances (normally in terms of time and budget) have been exceeded.

208. Based on the approved annual work plan (AWP), the Project Board may review and approve project quarterly plans when required and authorizes any major deviation from these agreed quarterly plans. It is their authority that signs off the completion of each quarterly plan as well as authorizes the start of the next quarterly plan. This ensures that required resources are committed and will arbitrate on any conflicts within the project or negotiate a solution to any problems between the project and external bodies. In addition, it approves the appointment and responsibilities of the Project Manager and any delegation of its Project Assurance responsibilities. Formal minutes shall be prepared and adopted for each meeting of the Board, detailing any proposals made and decisions taken.

209. A Project Management Unit (PMU), staffed with a Project Manager and Financial/ Administrative Assistant, will be established to assist the Ministry of Environment as well as other responsible institutions in the implementation of the project at the local (Chisinau) and national level. The PMU will ensure results-based project management and successful implementation of the project within 4 years, close monitoring and evaluation of project progress, observance of procedures, transparency and efficient use of funds, quality of works, and involvement of local and national stakeholders and beneficiary communities in the decision-making processes. The PMU will be hosted by the Energy Efficiency Agency which will provide support to project implementation as per its mandate and commitments made in the co-financing letter provided.

210. Project Assurance is the responsibility of each Project Board members; however the role can be delegated. The Project Assurance role supports the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed. On behalf of UNDP, the function is delegated to a UNDP Portfolio Manager. Specific 'Assurance' tasks are to:

- Ensure that funds are made available to the project;
- Ensure that risks and issues are properly managed and monitored, and that the logs are regularly updated;
- Ensure that Project Progress/Financial Reports are prepared and submitted on time, and according to standards in terms of format and content quality and submitted to the Project Board.

## **SECTION 5 - MONITORING AND EVALUATION FRAMEWORK AND PLANNING**

211. The project team and the UNDP Country Office supported by the UNDP Regional Technical Advisor in Istanbul will be responsible for project monitoring and evaluation conducted in accordance with established UNDP procedures. The Project Results Framework provides performance and impact indicators for project implementation, along with their corresponding means of verification.

212. Carbon monitoring: Given the important focus of the project on emission reductions from the building sector, particular emphasis will be placed on monitoring these reductions.

213. The following sections outline the principle components of the M&E plan and indicative cost estimates related to M&E activities.

### **Project start**

214. 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. If possible, an international technical advisor, expert in ESCO operations, will also attend the inception workshop. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.

- a. The Inception Workshop should address a number of key issues including: Assisting all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RCU staff with respect to 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.

- b. Based on the project results framework, 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 to and scheduled.
- d. Discuss financial reporting procedures and obligations.
- e. Plan and schedule Project Board meetings (separate or joint Project Board meetings with the GEF project on protected areas): roles and responsibilities of all project organization structures should be clarified and meetings planned.

### **Quarterly**

215. Progress made will be reported on a quarterly basis to the Project Board and will be recorded in the UNDP Enhanced Results Based Management Platform. Based on the initial risk analysis submitted, the risk log will be regularly updated in ATLAS. An Issue Log will be activated in ATLAS and updated by the Project Manager to facilitate tracking and resolution of potential problems or requests for change.

### **Annually**

216. Annual Project Review/Project Implementation Reports (APR/PIR): This key annual report will be prepared to monitor progress made since project start and in particular for the previous reporting period (reports will cover calendar years). The APR/PIR will be submitted to UNDP RCU no later than 1 month after the end of the previous calendar year. The APR/PIR includes, but is not limited to, reporting on the following:

- Section 1. Brief summary and context;
- Section 2a. Progress and achievements made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative);
- Section 2b. Project outputs delivered per project outcome (annual);
- Section 2c. Activities carried out during the reporting period under each output;
- Section 3a. Lesson learned/good practice;
- Section 3b. Difficulties encountered and measures taken to overcome problems;
- Section 4. AWP and other expenditure reports (Note: Financial reports shall be submitted in US dollars);
- Section 5a. Risk and adaptive management;
- Section 5b. Changes introduced to activities, outputs or indicators;
- Section 6. Project work-plan for the following 12 months period, including forecasted progress in the achievement of objective(s) and indicators, as well as financial plan (budget for next 12 months).

217. To cover and reclaim direct costs for the project staff who, while working for this project, at the same time are working for other project(s), managed by the Country Office, only part of their time devoted to this project would be reclaimed. This will be confirmed by timesheets for use of EC in case of verification.

### **Periodic Monitoring through site visits**

218. 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 will be prepared by the Country Office and UNDP RCU and will be circulated no less than one month after the visit to the project team and Project Board members.

### **Project Evaluation**

219. An independent project evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP guidance. The project evaluation will focus on the delivery of the project's results as initially planned. The project 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 Country Office based on guidance from the Regional Coordinating Unit. The Project Review and Evaluation should also provide recommendations for follow-up activities and will require a management response.

220. 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 encountered 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, and information on the measures taken to make the GEF visible as the source of

financing, as well as details on the transfers of assets and full summary of the project's income and expenditure and payments received, in line with article 2.5 of the Annex II (General Conditions). Final report will be submitted no later than 3 months after closure of the project.

221. In the beginning of Year 3 of the project timeframe, the UNDP will call for the Mid-term Review. An independent evaluator, supported by a national independent evaluator will carry out the mid-term project review in accordance with the GEF guidelines. The MTR is crucial not only for evaluating the progress but more importantly to recommend minor or major improvements to the project logframe, indicators and project staffing.

**Learning and knowledge-sharing**

222. Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyse, and share lessons learned that might be beneficial in the design and implementation of similar future projects.

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

**Communications and visibility requirements**

224. With the aim to ensure coherence and coordination between related projects and activities under the UNDP/GEF project, the project will keep stakeholders informed on developments and progress relevant to the Agreement, upcoming relevant meetings and exchange related documents, press releases, publications when these are issued, and provide meeting and mission reports and share necessary links to project websites. Information will be channeled through UNDP Regional Centre to other regional stakeholders.

225. UNDP will take all appropriate measures to publicize the fact that the activities have been receiving funding from the GEF. Information given to the press, the beneficiaries of the project, all related publicity material, official notices, reports and publications, will acknowledge that the project was carried out "with funding by the GEF and will display in an appropriate way the GEF logo. In cases where equipment and major supplies have been purchased using funds provided by the GEF, UNDP will include appropriate acknowledgement on such equipment and major supplies provided that such actions do not jeopardize UNDP privileges and immunities and the safety and security of the UNDP staff. The size and prominence of the acknowledgement will be clearly visible in a manner that will not create any confusion regarding the identification of the project as an activity of UNDP, the ownership of the equipment and supplies by UNDP, and the application to the project of UNDP privileges and immunities.

226. All publications of UNDP pertaining to the GEF-funded activities, in whatever form and whatever medium, including the internet, shall carry the following or a similar disclaimer: "This document has been produced with the financial assistance of the GEF and UNDP.

**Table 5-1 M&E Work Plan and Budget**

Type of M&E activity	Responsible Parties	Budget US\$ Excluding project team staff time	Time frame
Inception Workshop and Report	<ul style="list-style-type: none"> <li>▪ Project Manager</li> <li>▪ UNDP CO, UNDP/GEF</li> </ul>	\$1,000	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 output and implementation	<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 Review	<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>	\$ 20,400	At the mid-point of project implementation.
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>	\$ 22,000	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>▪ Independent financial auditors</li> </ul>	\$8,000	\$2,000 Annually
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>	none	Included into the regional office fee.
<b>TOTAL indicative COST</b> Excluding project team and UNDP staff time and travel expenses, if needs be.		<b>US\$ 51,400</b>	

## SECTION 6 - LEGAL CONTEXT

### Compliance with Basic Agreements

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

228. Consistent with the Article III of the Standard Basic Assistance Agreement (SBAA), 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.

229. 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.

230. 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.

231. 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.

232. This document together with the CPAP signed by the Government and UNDP which is incorporated by reference constitute together the instrument envisaged in the [Supplemental Provisions](#) to the Project Document, attached hereto.

233. 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

234. Audit clause: The Audit will be conducted in accordance with the UNDP Financial Regulations and Rules and applicable audit policies on UNDP projects.

## Appendix 1 Baseline Tables

### Cumulative GHG Emissions Reduction in the Residential Building Sector

Based on the survey carried out at the stage of project design (Appendix 1, Table 2.6 and 3.6), if projects in residential multi-storey buildings are similar to projects analysed<sup>25</sup>, the cumulative energy savings (2018-2038) should be 91.7 GWh and 50.3 ktons CO<sub>2</sub>. EE measures studied were related to:

- Roof insulation (EPS 100 mm)
- Windows replacement
- Walls insulation (EPS 100 mm)
- Implementation of individual heating substitution
- Internal heating system

Appendix 1 Table 3 Aggregate data on energy consumption in public buildings of Chisinau area (source: Electricity, heating and gas suppliers)

Units	2004	2005	2006	2007	2008	2009	2010	2011	2012
th. Gcal	n/a	n/a	n/a	186	178	200	182	175	172,2
ktoe	n/a	n/a	n/a	19	18	20	18	17	17,2
th. Gcal	n/a	n/a	n/a	16	23	20	16	16	16,2
ktoe	n/a	n/a	n/a	1,6	2,3	2,0	1,6	1,6	1,6
mil. kWh	70	73	77	75	78	78	79	81	81
ktoe	70	73	77	75	78	78	79	81	81
mil. m3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ktoe	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

<sup>25</sup> Information available was related to 15 residential buildings. At this point in time it is not possible to rule on the final breakdown between office/institutional buildings and residential buildings where EE projects will be implemented. If the UNDP project implements EE projects in 10 residential buildings, the energy savings and emissions reduction must be adjusted accordingly.

**Appendix 1 Table 2.6: GHG Emissions Reduction in multi-storey Residential buildings**

	buildings '60			buildings '80			Total
	# projects	GHG reductions/pr object (tons of CO2)	total GHG reductions (tons of CO2)	# projects	GHG reductions/pr object (tons of CO2)	total GHG reductions (tons of CO2)	
2016	2	38,79	77,59	3	253,87	761,60	839,19
2017	2	38,79	155,17	3	253,87	1523,20	1678,37
2018	2	38,79	232,76	3	253,87	2284,80	2517,56
2019	0	0	232,76	0	0	2284,80	2517,56
2020	0	0	232,76	0	0	2284,80	2517,56
2021	0	0	232,76	0	0	2284,80	2517,56
2022	0	0	232,76	0	0	2284,80	2517,56
2023	0	0	232,76	0	0	2284,80	2517,56
2024	0	0	232,76	0	0	2284,80	2517,56
2025	0	0	232,76	0	0	2284,80	2517,56
2026	0	0	232,76	0	0	2284,80	2517,56
2027	0	0	232,76	0	0	2284,80	2517,56
2028	0	0	232,76	0	0	2284,80	2517,56
2029	0	0	232,76	0	0	2284,80	2517,56
2030	0	0	232,76	0	0	2284,80	2517,56
2031	0	0	232,76	0	0	2284,80	2517,56
2032	0	0	232,76	0	0	2284,80	2517,56
2033	0	0	232,76	0	0	2284,80	2517,56
2034	0	0	232,76	0	0	2284,80	2517,56
2035	0	0	232,76	0	0	2284,80	2517,56
2036	0	0	232,76	0	0	2284,80	2517,56
Grand total							50 351



**Appendix 1 Table 2.7: Likely cumulative GHG emissions reduction during the project timeframe and over the upcoming 15 years after the project time horizon; 5 EE projects in institutional buildings (2 EE projects in 2015 and 3 in 2016).**

	liceum (built in '80)			Kindergarden (built in '80)			Total
	# projects	GHG reductions/project (tons of CO2)	total GHG reductions (tons of CO2)	# projects	GHG reductions/project (tons of CO2)	total GHG reductions (tons of CO2)	
2016	1	126,40	126,40	1	103,12	103,12	229,51
2017	1	126,40	252,80	1	103,12	206,24	459,03
2018	0	0	252,80	1	103,12	309,36	562,15
2019	0	0	252,80	0	0	309,36	562,15
2020	0	0	252,80	0	0	309,36	562,15
2021	0	0	252,80	0	0	309,36	562,15
2022	0	0	252,80	0	0	309,36	562,15
2023	0	0	252,80	0	0	309,36	562,15
2024	0	0	252,80	0	0	309,36	562,15
2025	0	0	252,80	0	0	309,36	562,15
2026	0	0	252,80	0	0	309,36	562,15
2027	0	0	252,80	0	0	309,36	562,15
2028	0	0	252,80	0	0	309,36	562,15
2029	0	0	252,80	0	0	309,36	562,15
2030	0	0	252,80	0	0	309,36	562,15
2031	0	0	252,80	0	0	309,36	562,15
2032	0	0	252,80	0	0	309,36	562,15
2033	0	0	252,80	0	0	309,36	562,15
2034	0	0	252,80	0	0	309,36	562,15
2035	0	0	252,80	0	0	309,36	562,15
2036	0	0	252,80	0	0	309,36	562,15
Grand total							11 369

**Appendix 1 Table 2.4.& 2.5 Estimates of ES potential and EE measures in residential multi-level buildings for whole Chisinau Area**

EE measure	Unit	Average implementation costs with VAT	Total estimated area sq.m or unit	Total cost		Average energy saving ratio	Annual estimated ES			PBP Years	Emissions reduction tons CO2/Year
				th. MDL	th. Euro		kWh	th. MDL	th. EUR		
Roof insulation (Mineral wool 100 mm)	MDL / sq. m	660	1 612 968	1 064 559	60 145	4%	40 360 138	34 252	1 935	31,08	8 516
Roof insulation (EPS 100 mm)	MDL / sq. m	500	1 612 968	806 484	45 564	4%	40 360 138	34 252	1 935	23,55	8 516
Windows replacement	MDL / sq. m	1 725	1 219 327	2 103 339	118 833	14%	141 260 483	119 883	6 773	17,54	29 806
Walls insulation (Mineral wool 100 mm)	MDL / sq. m	750	5 376 560	4 032 420	227 820	50%	504 501 724	428 154	24 189	9,42	106 450
Walls insulation (EPS 100 mm)	MDL / sq. m	580	5 376 560	3 118 405	176 181	50%	504 501 724	428 154	24 189	7,28	106 450
Implementation of individual heating substation	MDL / unit	146 200	3 332	487 138	27 522	10%	68 612 234	58 229	3 290	8,37	14 477
Internal heating system	MDL / app.	17 700	230 000	4 071 000	230 000	15%	102 918 352	87 343	4 935	46,61	21 716

Total area of multi-storey buildings connected to DHS in Chisinau		9 601 000
S Roof/S total		0,168
S windows / S total		0,127
S walls / S total		0,560
Reference exchange rate	MDL/1 EUR	17,700
Thermal energy tariff	MDL	987
Total Th. Energy consumption MSB	Gcal/year	867 587
Total Th. Energy consumption MSB	kWh/year	1 009 003 448
Thermal energy tariff	MDL/kWh	0,85
Transformation coefficient	Gcal/kWh	1163
CO2 emissions factor for DHS	tons CO2/MWh	0,211

**Appendix 1 Table 2.4.1 & 2.5.1. Estimates of ES potential and EE measures for Domo building type (built in '60)**

EE measure	Unit	Average implementation costs with VAT	Total estimated area sq.m or unit	Total cost		Average energy saving ratio	Annual estimated ES			PBP years	Emissions reduction tons CO2/ year
				MDL	Euro		kWh	MDL	EUR		
Roof insulation (Mineral wool 100 mm)	MDL / sq. m	660	372	245 291	13 858	4%	8 652	7 343	415	33,41	1,83
Roof insulation (EPS 100 mm)	MDL / sq. m	500	372	185 826	10 499	4%	8 652	7 343	415	25,31	1,83
Windows replacement	MDL / sq. m	1 725	281	484 642	27 381	1.4%	30 282	25 699	1 452	18,86	6,39
Walls insulation (Mineral wool 100 mm)	MDL / sq. m	750	1 239	929 132	52 493	50%	108 149	91 783	5 185	10,12	22,82
Walls insulation (EPS 100 mm)	MDL / sq. m	580	1 239	718 529	40 595	50%	108 149	91 783	5 185	7,83	22,82
Implementation of individual heating substitution	MDL / unit	146 200	1	146 200	8 260	10%	14 708	12 482	705	11,71	3,10
Internal heating system	MDL / app.	17 700	60	1 062 000	60 000	15%	22 062	18 724	1 058	56,72	4,66

Total area of the building	2 212
S Roof/S total	0,168
S windows / S total	0,127
S walls / S total	0,560
Reference exchange rate	MDL/1 EUR 17,700
Thermal energy tariff	MDL 987
Total Th. Energy consumption	Gcal/year 186
Total Th. Energy consumption MSB	kWh/year 216 298
Thermal energy tariff Transformation coefficient	MDL/kWh 0,85
CO2 emissions factor for DHS	Gcal/kWh tons CO2/MWh 1163 0,211

**Appendix 1 Table 2.4.2 and 2.5.2**  
**Estimates of ES potential and EE measures Ismail str. type of building (built in '80)**

EE measure	Unit	Average implementation costs with VAT	Total estimated area sq.m or unit	Total cost		Average energy saving ratio	Annual estimated ES			PBP years	Emissions reduction tons CO2/ year
				MDL	th. Euro		kWh	MDL	EUR		
Roof insulation (Mineral wool 100 mm)	MDL / sq. m	660	2 191	1 445 875	81 688	4%	56 619	48 051	2 715	30,09	11,95
Roof insulation (EPS 100 mm)	MDL / sq. m	500	2 191	1 095 360	61 885	4%	56 619	48 051	2 715	22,80	11,95
Windows replacement	MDL / sq. m	1 725	1 656	2 856 738	161 398	14%	198 168	168 178	9 502	16,99	41,81
Walls insulation (Mineral wool 100 mm)	MDL / sq. m	750	7 302	5 476 800	309 424	50%	707 742	600 637	33 934	9,12	149,33
Walls insulation (EPS 100 mm)	MDL / sq. m	580	7 302	4 235 392	239 288	50%	707 742	600 637	33 934	7,05	149,33
Implementation of individual heating substation	MDL / unit	146 200	4	584 800	33 040	10%	96 253	81 687	4 615	7,16	20,31
Internal heating system	MDL / app.	17 700	249	4 407 300	249 000	15%	144 379	122 530	6 923	35,97	30,46

Total area of the building	sq. m.	13 040
S Roof/S total		0,168
S windows / S total		0,127
S walls / S total		0,560
Reference exchange rate	MDL/1 EUR	17.700
Thermal energy tariff	MDL	987
Total Th. Energy consumption	Gcal/year	1 217
Total Th. Energy consumption MSB	kWh/year	1 415 484
Thermal energy tariff	MDL/kWh	0,85
Transformation coefficient	Gcal/kWh	1,63
CO2 emissions factor for DHS	tons CO2/MWh	0,211

**Appendix 1 Table 3.4.1. & 3.5.1 Estimates of ES potential and EE measures in public (lyceum type built in '80) building in Chisinau**

EE measure	Unit	Average implementation costs with VAT	Total estimated area sq.m or unit	Total cost		Average energy saving ratio	Annual estimated ES		PPB	Emissions reduction tons CO2/year	Total annual estimated ES for gymnasiums/lyceums of this type	
				MDL	Euro		kWh	MDL			EUR	kWh
Roof insulation (XPS 100 mm)	MDL / sq. m	660	2 572	1 697 520	95 905	6%	52 544	44 593	38,07	11,09	4 531 234	217 260
Roof insulation (EFS 100 mm)	MDL / sq. m	500	2 572	1 286 000	72 655	6%	52 544	44 593	28,84	11,09	4 531 234	217 260
Windows replacement	MDL / sq. m	1 725	1 004	1 731 900	97 847	32%	283 739	240 800	7,19	59,87	24 468 664	1 173 206
Walls insulation (Mineral wool 100 mm)	MDL / sq. m	750	2 970	2 227 500	125 847	21%	179 526	152 358	14,62	37,88	15 481 716	742 307
Walls insulation (EPS 100 mm)	MDL / sq. m	580	2 970	1 722 600	97 322	21%	183 905	156 074	11,04	38,80	15 859 319	760 412
Implementation of individual heating substitution	MDL / unit	338 000	1	338 000	19 096	8%	41 615	35 317	9,57	8,78	6 041 645	289 681
Internal heating system	MDL / unit.	678 000	1	678 000	38 305	8%	41 615	35 317	19,95	8,78	6 041 645	289 681

Total area of the building	sq.m	7 871	Transf. coef.	Gcal/kWh	1163
Reference exchange rate	MDL/1 EUR	17 700	CO2 emiss factor for DHS	tons CO2/MWh	0,211
Thermal energy tariff	MDL	987	Consumption	kWh/sq. m. year	111,26
Total Th. Energy consumption	Gcal/year	753	Total # of lyceums buildings	units	168
Total Th. Energy consumption MSB	kWh/year	875 739	Total annual energy consumpt for heating in 2010	Gcal	64 936
Thermal energy tariff	MDL/kWh	0,85			

Appendix 1 Table 3.4.2. & 3.5.2 Estimates of ES potential and EE measures in public (kindergarten type built in '80) building in Chisinau

EE measure	Unit	Average implementation costs with VAT	Total estimated area sq.m or unit	Total cost		Average energy saving ratio	Annual estimated ES		PBP years	Emmissions reduction tons CO2/year	Total annual estimated ES for all kindergartens		
				th. MDL	th. Euro		kWh	EUR			kWh	Euro	
Roof insulation (XPS 100 mm)	MDL / sq. m	660	1,789	1,181	67	11%	73,560	62,428	3,527	18.91	15.52	4,802,748	230,279
Roof insulation (EPS 100 mm)	MDL / sq. m	500	1,789	895	51	11%	73,560	62,428	3,527	14.33	15.52	4,802,748	230,279
Windows replacement	MDL / sq. m	1,725	589	1,016	57	16%	106,996	90,804	5,130	11.19	22.58	6,985,815	334,951
Walls insulation (Mineral wool 100 mm)	MDL / sq. m	750	2,633	1,975	112	36%	240,741	204,309	11,543	9.67	50.80	15,718,085	753,640
Walls insulation (EPS 100 mm)	MDL / sq. m	580	2,633	1,527	86	36%	240,741	204,309	11,543	7.47	50.80	15,718,085	753,640
Implementation of individual heating substitution	MDL / unit	338,000	1	338	19	8%	33,704	28,603	1,616	11.82	7.11	3,492,908	167,475
Internal heating system	MDL / unit.	678,000	1	678	38	8%	33,704	28,603	1,616	23.70	7.11	3,492,908	167,475

Total area of the building	sq.m	2,765	Transformation coefficient	Gcal/kWh	1163
Reference exchange rate	MDL/1 EUR	17,700	CO2 emissions factor for DHS	tons CO2/MWh	0.211
Thermal energy tariff	MDL	987	Consumption	kWh/sq. m year	241.9
Total Th. Energy consumption	Gcal/year	575	Total number of kindergartens buildings	units	152
Total Th. Energy consumption MSB	kWh/year	668,725	Total annual energy consumption for heating in 2010	Gcal	37,542
Thermal energy tariff	MDL/kWh	0.85			

**Appendix 1 Table 2.1**

Table 2. 1 Aggregate data on energy consumption in the whole country and Chisinau area

	Units	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Residential section. Energy consumption in the whole Country</b>										
<b>Total</b>	ktoe	656	704	691	598	632	660	689	708	n/a
Thermal energy*	th.Gcal	1 129	1 395	1 330	1 274	1 262	1 291	1 324	1 283	n/a
	ktoe	113	140	133	127	126	129	132	128	n/a
Electricity	mil. kWh	964	1 041	1 154	1 295	1 371	1 450	1 514	1 547	n/a
	ktoe	83	90	99	111	118	125	130	133	n/a
Natural gas	mil. m3	316	357	375	314	332	343	364	343	n/a
	ktoe	253	286	300	251	266	274	291	274	n/a
<b>Energy consumption in the residential sector of Chisinau area (source: Electricity, heating and gas suppliers)</b>										
<b>Total</b>										
Thermal energy	th. Gcal	843	1 078	1 140	1 112	1 093	1 120	1 144	1 106	1 053,7
	ktoe	84	108	114	111	109	112	114	111	105,4
Electricity	mil. kWh	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	ktoe	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Natural gas	mil. m3	n/a	n/a	n/a	n/a	n/a	127	136	134	n/a
	ktoe	n/a	n/a	n/a	n/a	n/a	101	109	107	n/a
<b>Energy consumption in the multi-storey buildings of Chisinau area (source: Electricity, heating and gas suppliers)</b>										
<b>Total</b>										
Heating	th. Gcal	811	881	904	863	828	869	898	864	853,0
	ktoe	81	88	90	86	83	87	90	86	85,3
DHW	th. Gcal	30	195	232	245	261	246	241	238	197
	ktoe	3	19	23	25	26	25	24	24	20
Electricity	mil. kWh	261	269	288	315	341	354	364	377	379,5
	ktoe	22	23	25	27	29	30	31	32	32,6
Natural gas	mil. m3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	ktoe	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
<b>Surfaces of residential building stock in the country</b>										
<b>Total</b>	th. m2	n/a	n/a	n/a	n/a	n/a	30 101	30 423	30 859	31 077,5
Inhabited	th. m2	n/a	n/a	n/a	n/a	n/a	19 217	19 490	19 727	19 840,3
Annual commissioning of residential buildings	th. m2	n/a	461	579	558	680	502	546	589	502,5
<b>Surfaces of building stock in Chisinau area (source: "Statistical Yearbook" of Chisinau, 2011)</b>										
<b>Total</b>	th. m2	13 323	13 432	13 287	13 642	14 124	14 456	14 844	15 248	15 447,1
Inhabited** (source: NBS, table "Dwellings at the end of the year", 2009-2012)	th. m2	n/a	n/a	n/a	n/a	n/a	9 111	9 378	9 601	9 687,1
Annual commissioning of residential buildings	th. m2	n/a	327	427	388	536	378	425	435	359,4
Specific energy consumption in the whole country	kWh/m2	n/a	n/a	n/a	n/a	n/a	154	157	154	n/a
Specific energy consumption in multi-storey buildings of Chisinau area	kWh/m2	n/a	n/a	n/a	n/a	n/a	182	181	173	n/a

n/a = not available

Note:

\* The total thermal energy consumption in the whole country was collected from the Energy Balance Report of the National Bureau of Statistics and includes only the amount of thermal energy delivered to final consumers through DHS

\*\* 85% of the total inhabited area is connected to district heating system, the rest having individual heating systems.

Source: NBS, ANRE web page, Chisinau statistic yearbook, SEAP of Chisinau municipality.

**Appendix 1 Table 2. 1: Per type of buildings and year of construction (period 1960 to 1980, and 1981 to 2000) in Chisinau area: total and per sq. m and the building stock in Chisinau (sq. m broken down as per categories of year range).**

Number of floors	3-5	6-8	9-12	13-17	18-24	Total
Total number of buildings	2338	174	901	112	20	3545

NOTE: During 1960-1980 and 1980-2000 periods 1453 and respectively 815 residential buildings have been built (source: NBS, 2012).

**Appendix 1 Table 4: European Union through CIUDAD Programme”, Chisinau municipality developed energy audits for 9 buildings listed below:**

1. Energy Audit of Chisinau Town Hall
2. Comparative energy audit for 4 multi-level buildings:
  - a. Building 143 series (concrete blocks), str. Dosoftei 102, Chişinău
  - b. Building MS series (concrete blocks), str. Cuza Vodă 14, Chişinău
  - c. Reinforced concrete monolith building, bd. Dacia 32, Chişinău
  - d. Limestone blocks building, str. Teilor 6, Chişinău
3. Water pumping station SACET, owner: SA TERMOCOM
4. Energy audit of water pumping station, SA Apă Canal Chişinău
5. Energy audit of a public lighting of a boulevard, 3 km (ValeaTrandafirilor – ValeaCrucii)
6. Energy audit of PETRU ZADNIPRU lyceum
7. Energy audit of kindergarten NR. 40
8. Energy audit of MINERVA lyceum
9. Energy audit of ŞTEFAN CEL MARE lyceum

**Appendix 1 Table 5 Institutional/Public Building Sector Basic Information**

- Status of EE improvements over the last 5 years by the public institutional buildings in Chisinau

Since 2003, several projects were implemented within healthcare institutions, i.e Republican Clinic Hospital, Oncologic Institute, “Mother and Child” healthcare Center, Republican Clinic Hospital for Children “Emilian Cotaga”. The implemented measures targeted only the rehabilitation of heat source, internal heating and DHW supply systems. Also, in the framework of the “Increasing the Energy Efficiency of Chisinau and Sevastopol municipalities based on existing positive experience, supported by European Union through CIUDAD Programme”, Chisinau municipality developed energy audits for 9 buildings listed at Table 4 Appendix 1 (above Table):

- ES and EE in Public Buildings

The estimate for ES potential, as well as EE measures implementation cost and PBP in public buildings are presented in consolidated tables for Chisinau whole area and per representative type of building (Appendix 1: see tables 3.4.1 & 3.5.1, 3.4.2 & 3.5.2).

The energy savings estimate is based on the target of 90 kWh/M2/year, opposite to the current situation where the energy index is 160 kWh/M2/year.

The consolidated tables (Appendix 1) are structured per typical EE measures. Such as it has been done for the residential sector, the annual ES potential and PBP for each typical EE measure an average ES ratio was determined by using an Excel simulation tool used by energy auditors in Moldova.

The investment costs per type of EE measure were calculated using market prices for these types of works. The average costs per square meter are calculated based on the bill of quantities for each EE measure. The ES potential per each type of measure was calculated based on the thermal energy consumption data for heating in these two types of buildings (for 2010 year). The current DHS thermal energy tariffs were used to calculate the PBP of the investments.

The total annual ES potential for kindergartens and lyceums in Chisinau area was calculated based on the total thermal energy consumption for heating in 2010 in 152 kindergartens and 168 gymnasiums/lyceums and ES ratio for each typical measure (see Appendix 3: tables 3.4.1 & 3.5.1, 3.4.2 & 3.5.2).

As a result of that analysis, the average PBP for both type of buildings is of 12.5 years was estimated for the following package of EE measures:

- Roof insulation (EPS 100 mm)
- Windows replacement
- Walls insulation (EPS 100 mm)
- Implementation of individual heating substation
- Internal heating system



## Appendix 1 Table 6 Residential sector

### Energy Consumption in Residential Sector

The housing stock of Chisinau is about 15,4 mil. sq. m. of which 14.1 mil. sq. m. urban, and 1.7 mil. sq. m. rural housing. The average per capita area in municipalities is 20.1 sq. m., the average area of a house is around 55.7 sq. m., urban – 19.7 sq. m., rural – 24.6 sq. m. The ownership structure of housing stock is 92% private and 7.8% public.

The multi-storey buildings energy consumption index in Chisinau area is 110-140 kWh/M2/year, opposite to 154kWh/M2/year in the whole country<sup>26</sup> and 80-100 kWh/M2/yr in other similar countries. The heating load was 1,77 mil. Gcal or 2,06 TWh<sup>27</sup> for the whole country and 1,41 mil. Gcal or 1,64 TWh for Chisinau area over the same period. In 2011 the total energy consumption of the building sector (electricity and heating load) was an equivalent of 3,6 TWh for the whole Moldova and 2,13 TWh for Chisinau area.

Data on total energy consumption per type of buildings is *unavailable* because the energy suppliers do not keep any statistics on consumption per building year of construction and/or number of floors. We propose to use as reference the data collected from representative residential buildings.

Over the last 5 years, there were very few EE measures reported by Chisinau municipality in residential sector.

## Appendix Table 7: Tariffs Structure

Dynamics of energy tariffs							
	u.m.	2008	2009	2010	2011	2012	2013
Natural gas (EURO/m3)	MDL/1 m3	2,775	3,523	3,542	4,098	4,599	5,666
	EUR/1 m3	0,181	0,227	0,216	0,251	0,295	0,347
Thermal energy in Chisinau (EURO/Gcal)	MDL/Gcal	540,82	699	821	896	987	987
	EUR/Gcal	35,371	45,008	50,065	54,857	63,414	60,378
Electricity prices for final consumers							
Electricity Gas Natuaral Fenosa (EUR/kWh)	MDL/kWh	0,98	1,1	1,3	1,365	1,52	1,58
	EUR/kWh	0,064	0,071	0,079	0,084	0,098	0,097
Electricity Red Nord (EUR/kWh)	MDL/kWh	1,08	1,2	1,43	1,502	1,67	1,71
	EUR/kWh	0,071	0,077	0,087	0,092	0,107	0,105
Electricity Red Nord Vest (EUR/kWh)	MDL/kWh	1,08	1,2	1,43	1,512	1,68	1,73
	EUR/kWh	0,071	0,077	0,087	0,093	0,108	0,106

<sup>26</sup>The total thermal energy consumption in the whole country was collected from the Energy Balance Report of the National Bureau of Statistics and includes only the amount of thermal energy delivered to final consumers through DHS.

<sup>27</sup>National Bureau of Statistics of Moldova, Energy Balance 2011. The NBS reported figure for the total energy consumption for heating load in the country (in the residential, commercial and public buildings sectors) takes into consideration only the amount of energy delivered to the mentioned sectors' buildings by district heating companies. Despite of this, it shall be taken into consideration that a big amount of energy resources for heating load is consumed in individual HOB or homemade stoves, which is not registered in the statistics as a separate figure.

## Appendix 2 Calculation of GHG Emissions Reductions

### CO2 Emissions Reduction and Abatement Cost

The ESCO Moldova project is intended to remove barriers to the widespread application of energy efficiency technologies, techniques and practices in the Moldova buildings sector. The energy savings from the implementation of energy efficiency measures in existing buildings is expected to lead to a cumulative CO2 emissions reduction, direct<sup>28</sup> and direct post-project<sup>29</sup> of about 114 ktons, and a total of 344 kton CO2 by end of project influence (2038) inclusive of indirect<sup>30</sup> impacts.

Data related to EE projects-based GHG emissions reduction come from the Baseline Report (PPG component) prepared by the national consultant and data made available by the Energy Efficiency Agency. All relevant data is in Appendix, especially in Tables 2.6 and 2.7.

### Direct CO2 Emission Reductions

The ESCO Moldova project includes the implementation of activities intended to promote the wide spread applications of EE building technologies in the buildings sector of Moldova both residential and public buildings. However, not all of the potential savings can be achieved and attributed to the implementation of the ESCO MOLDOVA PROJECT. As direct impacts, the project design team expects that direct impacts will result of the implementation of 20 EE projects.

#### Assumptions

The major assumptions used in the estimation of CO2 emissions reductions are as follows:

1. Growth rate in buildings sector (in terms of m<sup>2</sup> floor area) is estimated at 1.4% (2011 and should be about 2% for upcoming 20 years).
2. The current Building Energy Index (BEIs): Average all multi-level residential buildings is 125 kWh/m<sup>2</sup>/yr and Institutional/office buildings is 160 kWh/m<sup>2</sup>/yr.
3. Whole country floor area (2011) of institutional/office buildings: 11 million m<sup>2</sup>.
4. Chisinau floor area (2011) of public/office buildings: 7.7 million m<sup>2</sup>.
5. Whole country floor area (2011) of multi-level residential buildings is 80 million m<sup>2</sup>.
6. Chisinau floor area (2011) of multi-level residential buildings is 14.1 million m<sup>2</sup>.
7. Chisinau floor area (2011) owned and operated by the municipality (7.8%) is 1.1 million m<sup>2</sup>.
8. Percentage of municipal building stock that are EE buildings (both residential and institutional/office) is about 10% (2011); as per the project target 30% of building stock should be EE buildings by 2038 (after ESCO Moldova project).
9. Increasing by 1% a year (target) of the municipal buildings that shifts to EE buildings on the period of time from 2016 to 2036.
10. Grid CO<sup>2</sup> emissions conversion factor is 0.549 ton/MWh.
11. District Heating Conversion Factor: 0.211 ton/MWh
12. Lifetime of EE improvements (not retrofitted) is estimated to 20 years.
13. Influence period of the GEF project is estimated to 20 years after end of ESCO Moldova project (2018).

Based on the survey carried out at the stage of project design (Appendix 1, Table 2.6 and 3.6), if projects in residential multi-storey buildings are similar to projects analysed, the average annual energy savings (2018-2038) should be 11.3 GWh(thermal) as the result of 15 EE projects implemented in that building sector. The same estimate for public buildings: for 5 EE projects the cumulative energy saving is 2.66 GWh(thermal).

<sup>28</sup>Ref. to GEF EE Methodology rev. April 2013: *Direct GHG emission reductions* are those achieved by project investments such as technology demonstrations and discrete investments financed or leveraged during the project's supervised implementation period (from the project start to the project closure).

<sup>29</sup>*Direct post-project* emission reductions, has been used to quantify the GHG emission reductions of GEF-supported revolving financial mechanisms that are still active after the project's closure (*ex post*).

<sup>30</sup>GHG emission reductions achieved, for example, as a result of market facilitation and development through project-supported policy and institutional frameworks, capacity building, information gathering, and replication effects of demonstration activities, are considered *indirect GHG emission reductions*

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

$$CO_{2direct} = (\text{Energy Savings Yr 1 to 4} + E * L) * C; \text{ where}$$

- C – CO<sub>2</sub> emission factor (DHS), i.e. 0.211tCO<sub>2</sub>-eq/MWh for DHS systems
- L – average useful lifetime of investments, i.e. 20 years; and
- E – annual energy production equal to the product of 20 years, 14.6 GWh (thermal)of energy savings a year (or 322 000 MWh on 20 years)

$$CO_{2direct} = (29\,778\text{ MWh} + 14\,600\text{ MWh} * 20) * 0.211\text{ tCO}_2\text{-eq/MWh} = 68\text{ KtCO}_2\text{-eq}$$

- This leads to cumulative emissions reduction of 68 KtCO<sub>2</sub>-eq.

**Table 11: Direct Energy Savings and CO2 Emission Reductions during the Lifetime (20-Year) of EPC Demo Projects (20)**

Year	Annual Energy Savings (GWh)	Cumulative Energy Savings (GWh)	Annual CO2 Emissions Reduction (ktons)	Cumulative CO2 Emissions Reduction (ktons)
20 EE projects				
2014-2018		29.78		6.28
2018-2038	14.6	291.8	3.08	61.6

The project activities include providing assistance to Chisinau City in various aspects of EE building project through the implementation of EE measures. Such assistance could be on the conduct of feasibility analyses and replication of building retrofitting design. Based on the Chisinau energy savings target of 20% in the building sector, it is estimated that a number of additional EE retrofit projects will be carried out by ESCOs. These full-sized EPC projects carried out over a period of 6 years after the ESCO MOLDOVA PROJECT completion will be impacted by the GEF/UNDP activity. Such number of projects would potentially account for at least the same savings per EPC project than the EPC demo projects implemented during the project timeframe (2014-2018). This translates to an annual (average) energy savings of about 14.6 GWh during the period 2024-2038:

- C – CO<sub>2</sub> emission factor, i.e. 0.211tCO<sub>2</sub>-eq/MWh for DHS
- L – time base considered: 2024-2038: 15 years;
- E – annual thermal energy production equal to the product of 15 years, 14.6 GWh (or 219 000 MWh on 15 years).

$$CO_{2post-direct} = 14,600\text{ MWh} * 15 * 0.211\text{ tCO}_2\text{-eq/MWh} = 46\text{ KtCO}_2\text{-eq}$$

- This leads to cumulative emissions reduction of 46 KtCO<sub>2</sub>-eq.

Year	Annual Energy Savings (GWh)	Cumulative (13 Year) Energy Savings (GWh)	Annual CO2 Emission Reductions (ktons)	Cumulative (13 Year) CO2 Emissions Reduction (ktons)
2024	14.6	14.6	3.08	3.08
2038	14.6	219	3.08	46

### Indirect CO2 Reductions

ESCO Moldova helps create the enabling environment that will facilitate the widespread application of energy efficiency technologies, techniques and best practices in the building sector of Moldova. The primary targets of the project are the municipal institutional and residential buildings. The capacity development activities and the implementation of the ESCO business model are expected to influence the relevant stakeholder entities in the promotion, support, design and installation, financing, operation and maintenance of EE building (retrofits) projects.

The project will also involve interventions that will bring about the necessary institutional, regulatory and financial policies and mechanisms that would enhance the promotion of the applicable and feasible building energy management systems, including energy efficient building services systems, and encourage the target groups in taking on such technologies, techniques and best practices.

The transformation of additional 20% (Chisinau Municipal target: 77 000 M<sup>2</sup> a year)) of *municipal public buildings* from relatively high overall average BEI of 160 kWh/m<sup>2</sup>/yr to a benchmark BEI level (target) of 90 kWh/m<sup>2</sup>/yr, that is influenced and induced by the enabling environment established and ESCO business model developed under the ESCO MOLDOVA PROJECT, is expected to bring additional savings in public/office buildings to be EE efficient at a pace of 1% of the municipal building (institutional/office) stock per year from 2018 to 2038. As a result, additional cumulative energy savings should be 1.1 TWh<sup>31</sup> and cumulative CO<sub>2</sub> emissions avoidance of about 621 ktons (2018-2038) through EE retrofitting of 20% municipal institutional buildings in Chisinau area (on 20 years).

The same calculation related to multi-level residential buildings owned and operated by Chisinau 1.1 million M<sup>2</sup>) which should target a BEI of 67.5 kWh/m<sup>2</sup>/yr (rather than 125 kWh/M<sup>2</sup>/yr) will result to additional cumulative (2018-20138) energy savings of 0.133 TWh and cumulative CO<sub>2</sub> emissions avoidance of about 73 ktons (2018-2038) through EE retrofitting of 20% multi-level residential buildings owned and operated by Chisinau.

Considering the significant barrier removal impact, the approval of the Green Urban Development Plan (GUDP), and the creation of the appropriate enabling environment that will be done under the ESCO MOLDOVA PROJECT, it is deemed that the GEF influence in achieving the abovementioned CO<sub>2</sub> emission reductions is about 694 ktons CO<sub>2</sub> during the influence period, which in this case is 20 years after the ESCO MOLDOVA PROJECT (2018-2038).

In that regard, most of the indirect CO<sub>2</sub> reduction can be attributed partly to the interventions that will carried out during the ESCO MOLDOVA PROJECT implementation period such as the enforcement of the GUDP, the establishment and enforcement of EE building policies and financing mechanisms, market enhancement, and the successful demonstration programs.

Assuming an influence period of 20 years (2018-2038), the indirect CO<sub>2</sub> emissions reduction based on a “Bottom-up” approach, is about 694 ktons (due to EE market transformation, new regulation, ESCO development and EPC demonstrations). Based on a “Top-down” approach, the potential CO<sub>2</sub> emissions reductions during the period 2018-2038 (i.e., 694 ktons) is multiplied by the appropriate GEF Causality Factor (CF). In this case, the CF used was 0.4, resulting in 278 Ktons.

**Table 12: Total CO<sub>2</sub> Emissions Reduction Attributed to ESCO MOLDOVA PROJECT and Abatement Cost: Overall Results**

	Total	Cumulative		Annual	
		2014-2018	2018-2038	2014	2018
Direct Energy Savings (GWh)	322	29,78	292		14,59
Direct Emission savings (ktons)	68	6,28	62		3,08
Direct-post project Emission savings (ktons)	46		46		
Indirect Bottom-up Emission savings(ktons)	694		694		
Indirect Top-down Emission savings (ktons)	278		278		

<sup>31</sup>TWh: TeraWh or 1,000 GWh or 1,000,000 MWh

### Appendix 3 Loan Guarantee Fund Draft Design

#### LGF Management and Implementation

NOTE: Look at Appendix 4 below for details related to EE projects implementation steps.

#### LGF Commitment Planning and EE Projects Financial Analysis

- The UNDP will transfer the needed cash into the Trust Bank Account in accordance with the EE projects portfolio. It is expected 400k\$ Year 1; 400k\$ Year 2 and 100k\$ Year 3. The Trust Bank account is managed by the selected bank but it belongs to the UNDP up to the end of the project timeframe (4 years).
- The Trust Account is used as guarantee by the partner bank to provide loans to the selected ESCOs. The grant provision of EFF would shorten the payback period of the EE investments to under 4 years.
- The 4 years maturity of the loan presumes that during the project lifetime, loans will be repaid, thus this money shall be made available to guarantee other investments.

The following table presents the flow of disbursed loan based on the 900k\$ Loan Guarantee Fund:

#### **LFG commitment and loans disbursement stream**

Description	Year 1	Year 2	Year 3	Year 4	Total
LGF guaranteed loans	400 000	400 000	100 000		<b>900 000</b>
Reimbursement of LGF loans	71 574	182 807	221 126	241 028	<b>716 535</b>

As it could be noticed the ESCO shall repay some 716k\$ of loans guaranteed by the LGF, money which would be used for other EPC projects each year accordingly.

Additionally the partner bank will be asked to provide additional loan under the same LGF in the amount of some 617 k\$, the total loan portfolio being estimated at 2 233 559 USD which is equal to 2.48 multiplication factor.

#### Loan guarantee and financing schedule (USD)

Description	Year 1	Year 2	Year 3	Year 4	Total (USD)
LGF guarantee loans	400 000	400 000	100 000		900 000
Reimbursement LGF loans	71 574	182 807	221 126	241 028	716 535
Bank additional loans		353 870	263 154	0	617 024
<b>Total loans disbursed</b>	<b>471 574</b>	<b>936 677</b>	<b>584 280</b>	<b>241 028</b>	<b>2 233 559</b>

During the preparation phase of the project, a detailed assessment of the possible EE measures was carried out by the EA study. The EA report provide a rough figure of estimated cost for different EE measures as well as the likely energy and cash savings.

The most attractive EE measures must be selected. As an instance the project would select “Walls insulation (EPS 100 mm)” as the energy measure for this facility, due to its payback period and better return on the investment.

In order to offset the too long payback period, the EEF will provide a grant, under certain conditions, with the aim of shortening under 4 years the payback period of the ESCOs investments.

Acceptable EE measures	Investment USD	Annual savings USD	PBP without grants	PBP with grants
1 Public building	109 588	13 685	8	4
2 Residential building	283 220	40 091	7	6

As per the project financing scheme (ESCO-EEF and FI), the ESCO Moldova project can carry out 20 EE projects on target, as follows:

	year 1	year 2	year 3	year 4	Total
No. of public subprojects implemented	4	6	4	0	14
No. of residential subprojects implemented	1	3	2	0	6

Financing					Total
Loans disbursed under LGF	400 000	400 000	100 000	0	900 000
LGF loans repaid and re-disbursed	71 574	182 807	221 126	241 028	716 535
Bank loans as multiplication to LGF	0	353 870	263 154	0	617 024
Grant	250 000	450 000	300 000	0	1 000 000
<b>Total financing</b>	<b>721 574</b>	<b>1 386 677</b>	<b>884 280</b>	<b>241 028</b>	<b>3 233 559</b>

For the purpose of estimating the EE project cost (equipment and EPC transaction costs), the project design team analyzed two types of building, as follows:

Kindergarten with EE of “Walls insulation (EPS 100 mm)”, hereafter Public Building

Residential building with EE of “Walls insulation (EPS 100 mm)” hereafter Residential Building

The investment plan for the EE measure at the Public Building is estimated at 167 404 USD, of which 109 588 is capital investment (construction material and installation). The investment plan and repayment requirements would be the following:

Investment plan of public building, USD (per institutional building)

Description	Cost (USD)
Walls insulation (EPS 100 mm) Kindergarten	109 588
Installation Supervision and Engineering: paid to ESCO (10%)	10 959
Feasibility Study: paid to ESCO (2%)	2 192
Commissioning report: paid to ESCO: (0,5%)	548
<i>Sub-total financed by the Guarantee Loan</i>	<i>123 287</i>
M&V and reporting: 5% (5 years)	5 479
Energy end users training	5 000
Interest payment	13 984
Profits (15% on investment loan)	19 654
<i>Sub-total EPC transaction cost financed by ESCOs</i>	<i>44 117</i>
<b>Total investment</b>	<b>167 404</b>
<b>Quarterly payment by Chisinau (Financing and transaction cost)</b>	<b>7 338</b>

The ESCOs will sign the EPC with the municipal authority and the loan agreement with the financial institution. In addition to the equipment and installation costs covered by the guarantee loan, the ESCOs will co-finance a few incremental costs including (i) Monitoring and Verification (M&V); (ii) training delivery to maintenance staff, and (iii) its profit on the project. These costs account for about 30% of the basic investment in equipment and installation. The capital cost (Loan Interest rate) is also figured as a cost to be repaid by savings over the whole payback period as well as other costs (equipment/installation and ESCO co-financing). The capital cost (interest) account for 13% of the basic investment cost. With this approach, the municipality does not have to make any upfront investment and receives a positive cash flow throughout the life cycle of the project once the investment has been reimbursed by savings. The EE project will be fully monitored by the ESCOs (M&V Protocol) over the 2 years (or 2 heating seasons) after the project's commissioning. In accordance with such a financial scheme, 100% of the basic investment costs (equipment and installation, FS and commissioning report) will be paid off by the FI to the ESCOs at the EE project's commissioning<sup>32</sup>. The remaining transaction costs (~25%) and financing costs will be paid off in quarterly payments after the commissioning over the whole payback period. As far as the municipality is concerned, it will proceed with quarterly payments directly to the FI for all project costs (equipment and services) from the project commissioning up to the end of EPC. The ESCOs will submit an annual project-based savings report from Year 2 up to the end of the payback period. The municipality will stop its payments from the moment the whole investment is reimbursed. In a situation where the project does not perform as expected, the ESCOs' risk is *de facto* limited to about 25%. In such a situation, the loan guarantee covers the unpaid debt, including current financial costs.

The capital investment (excluding soft and interest costs) in the institutional buildings is to be financed by a guarantee loan and a grant, as follows:

**Project-based Investment Breakdown  
Structure in Institutional Facilities**

Source of Financing	Amount (USD)
Guarantee Loan	59 588
EEF grant	50 000
Payback Period	4

Applying the same principle for residential building, the investment plan and repayment requirements would be the following:

**Investment plan of the Residential building (USD)**

Description	Cost (USD)
Walls insulation (EPS 100 mm) Residential	283 220
Installation Supervision and Engineering: paid to ESCO (10%)	28 322
Feasibility Study : paid to ESCO (2%)	3 500
Commissioning report : paid to ESCO: (0,5%)	3 000
Sub-total financed by the Guatantee Loan	318 042
M&V and reporting 5% (5 years)	10 000
Energy end users training	5 000
Interest payments	66 465
Profits (15% on investment loan)	42 483
Sub-total EPC transaction cost financed by ESCOs	123 948

<sup>32</sup> The project commissioning should take place about 3 months after the EPC signature.

Total investment cost	441 990
Quarterly payment by Chisinau (Financing and transaction cost)	24 499

The capital investment (excluding soft and interest costs) in the residential buildings is to be financed by a guarantee loan and a grant, as follows:

**Project-based Investment Breakdown  
Structure in Residential Facilities**

Source of Financing	Amount (USD)
Guarantee Loan	233 220
EEF grant	50 000
Payback Period	6

In order to achieve the project target of 20 financed subprojects and taking into consideration the restricted volume of financing, a mixture of Public and Residential subprojects the project design team recommends to implement EPC mainly in public buildings, as follows:

**Project target EE measures (USD)**

Identification of the subprojects	no. of EE subprojects	Capital investment for 1 subproject	Total investment
Public buildings	14	109 588	1 534 237
Residential buildings	6	283 220	1 699 322
<b>Total</b>	<b>20</b>	<b>x</b>	<b>3 233 559</b>

The cash flow of the expected ESCOs investment is presented in the following table:

**Project ESCOs cash flow**

No. of public subprojects implemented	4	6	4	0	14
No. of residential subprojects implemented	1	3	2	0	6
Loans disbursed under LGF	400 000	400 000	100 000	0	900 000
LGF loans repaid and re-disbursed	71 574	182 807	221 126	241 028	716 535
Bank loans as multiplication to LGF	0	353 870	263 154	0	617 024
EEF Grant	250 000	450 000	300 000	0	1 000 000
Net cash from financing activities	721 574	1 386 677	884 280	241 028	3 233 559
Public subprojects implemented	438 354	657 530	438 354	0	1 534 237
Residential subprojects implemented	283 220	849 661	566 441	0	1 699 322
Net cash from investing activities	721 574	1 507 191	1 004 794	0	3 233 559



Total cash received (+)	243 171	774 583	1 128 858	1 128 858	3 275 469
Total cash paid (operational costs) (-)	185 127	593 883	866 386	866 386	2 511 782
Net cash from Operations	58 044	180 700	262 472	262 472	763 687
Net cash increase	58 044	60 186	141 957	503 499	763 687

After repaying its principal and interest to partner bank before taxes, the ESCO would generate USD763 687 as net cash, money which could be reinvested by the ESCOs in other EE projects, and should be considered as potential replication of the project.

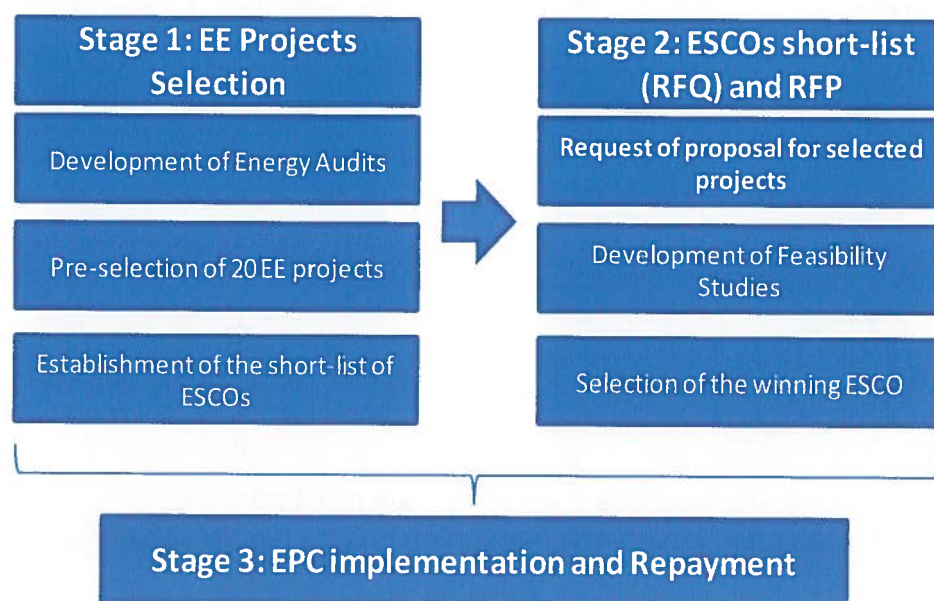
The ESCO investment would generate an internal rate of return of 14% and an average return on investments equal to 34%, both indicators proving that this can be a feasible business in Moldova.

#### Detailed breakdown of the ESCOs operational activity and related cash flow(USD)

Operations	year 1	year 2	year 3	year 4	Total
<b>Total cash received (+)</b>	<b>243 171</b>	<b>774 583</b>	<b>1 128 858</b>	<b>1 128 858</b>	<b>3 275 469</b>
Payments to ESCO for walls insulation	135 577	439 520	642 148	642 148	1 859 394
Payments to ESCO for Supervision and Engineering	20 745	64 077	92 965	92 965	270 752
Payments to ESCO for Feasibility Study	3 527	10 326	14 859	14 859	43 572
Payments to ESCO for Commissioning report	1 493	5 025	7 380	7 380	21 279
Payments to ESCO for M&V and reporting	9 176	27 253	39 305	39 305	115 039
Payments to ESCO for Energy end users training	7 188	20 125	28 750	28 750	84 813
Payments to ESCO for capital expenses (interest payment)	35 190	116 638	170 937	170 937	493 701
Payments to ESCO Profits (15% on investment loan)	30 275	91 618	132 514	132 514	386 920
<b>Total cash paid (operational costs) (-)</b>	<b>185 127</b>	<b>593 883</b>	<b>866 386</b>	<b>866 386</b>	<b>2 511 782</b>
Walls insulation	117 893	382 191	558 390	558 390	1 616 864
Supervision and Engineering	18 039	55 719	80 839	80 839	235 436
Feasibility Study	3 067	8 979	12 921	12 921	37 889
Commissioning report	1 298	4 370	6 418	6 418	18 503
M&V and reporting	7 979	23 699	34 178	34 178	100 034
Energy end users training	6 250	17 500	25 000	25 000	73 750
Capital expences (interest payment)	30 600	101 424	148 641	148 641	429 305
Net cash from Operations	58 044	180 700	262 472	262 472	763 687

## Appendix 4 Energy Performance Contract implementation Steps

A detailed step by step LGF management and implementation arrangement is presented below. This is broken down into 3 stages and 9 steps.



### Stage 1: EE Projects Selection

- 1 Project identification: Preliminary EE projects identification is carried out by the municipality, assisted by the PMU.
- 2 Projects Analysis: Development of Energy Audits (EA) for up to 40 sites. EA are carried out by Chisinau municipality through its annual budget.
- 3 Selection of 20 EE projects: The municipality, supported by the PMU, will select 20 EE projects among 40 EA carried out. The EEF will be involved at this stage as within a screening process to assess eligibility for grants of the preselected 20 EE projects sites.
- 4 ESCOs pre-selection: Request for Qualification (RFQ) (screening capacity and financial situation) launched by the municipality. Establishment of the short-list of ESCOs by the municipality, assisted by the PMU. At this stage the partner bank will also screen the RFQ submissions and give a preliminary statement of “creditworthiness” of the respective ESCO (as a criterion for pre-qualification).

### Stage 2: ESCOs short-list (RFQ) and RFP

- 5 Request for Proposals (RFP): Tender procedure in lots of around 4 EE projects is carried out by the municipality with the PMU assistance. The same procedure will be repeated around 5 times during Year 1 to 3. The bidding ESCOs will be required to carry out FSs for each project site in the lot as part of bidding documentation and selection will be based upon a combination of technical criteria (50%) and financial criteria (50%) with more points being given to the ESCOs that have the highest co-financing ratio as part of their bids. The final decision is made by Chisinau but the PMU and EEA will be involved at the evaluation stage.
- 6 Notification: ESCO is notified after the FS approval by the PMU and Municipality, after which the ESCO will prepare the bankable documents to be submitted to EEF and the FI. In parallel, based on the FS, the LGF Committee (composed of municipality, PMU, EEA) will make a technical recommendation to FI and EEF.

### Stage 3: EPC implementation and Repayment

- 7 Project Financing: Project financing arrangement signed by the ESCO (borrower) with the FI (loan, backed by the LGF) and EEF (project-based grants for EE investments and potentially an additional loan guarantee) based on bankable documents and FS. EEF and FI individually assess and approve the projects by their own mechanisms. If rejected by EEF and/or FI, the project will be dropped, if no other financing is found by the selected ESCO.

- 8 EE Projects implementation approval and EPC signature between ESCO and by Chisinau municipality. The ESCO carries out the following tasks:
  - Equipment installations and EE improvements by ESCO.
  - EE Project Commissioning (site-based) by Chisinau municipality.
  - Equipment ownership is transferred to Chisinau municipality by the ESCO.
  - One Year M&V (or 2 heating season) and quarterly reports by the ESCO.
- 9 Investment repayment: Stream of Payments to ESCO done by Chisinau municipality via the partner bank according to EPC payment schedule and agreed energy savings. After the project commissioning, parties agree on a set quarterly payment by municipality (directly to FI) based on the agreed savings during the first year (based on M&V of the first year or every year) over the whole payback period.

**Appendix 5 List of Energy Service Providers – Candidate ESCOs and Financial Institutions**

	<b>Company</b>	<b>Site/Email</b>	<b>Contact person</b>	<b>GSM</b>	
1	TechnoTest	<a href="http://technotest.md/">http://technotest.md/</a> <a href="mailto:info@technotest.md">info@technotest.md</a>	Gheorghe Burdila	+373 69160950	Wide range of products and services in the areas of process management, climate technologies, network power, storage solutions, professional tools, appliance solutions, motor technologies, and industrial automation
2	ESCO-Voltaj	<a href="mailto:esco.voltage.2007@gmail.com">esco.voltage.2007@gmail.com</a>	Valeriu Galetchi	+373 79268293	Energy audit and engineering services in electricity
3	Di&Trade	<a href="http://www.climate.md/onnian@climate.md">http://www.climate.md/onnian@climate.md</a>	Andrei Cecoi	+373 79102406	Engineering of Heating, Ventilation and Air Conditioning systems
4	Casa Inteligenta	<a href="mailto:limethx@gmail.com">limethx@gmail.com</a>	Mihai Litcai	+373 69968438	Energy audit of buildings and processes, design of the Smart Building Automation
5	Salonix-teh	<a href="http://salonix.md/">http://salonix.md/</a> <a href="mailto:info@salonix.md">info@salonix.md</a>	Valeriu Butanu	+373 69101406	Projects for automation and process control of complex technological processes in industry, SCADA systems
6	Promstroi-Grup	<a href="mailto:promstroi.grup@gmail.com">promstroi.grup@gmail.com</a>	Serghei Sanalatii	+373 79438438	Designing and Construction company working as general contractor and real estate developer
7	Romany Gaz Group	<a href="http://www.rgg.md/">http://www.rgg.md/</a> <a href="mailto:romannicu_rgg@yahoo.com">romannicu_rgg@yahoo.com</a>	Roman Nicu	+373 69602463	Computerized control for automating industrial boiler house, information systems for dispatching and telemetry of boiler house and small CHP, modulating gas burners producer
8	Diolum	<a href="mailto:diolum@mail.md">diolum@mail.md</a>	Alexandru Matrohin	+373 78033337	Energy audit and engineering in LED Lighting
9	Modern term	<a href="mailto:modern.term@mail.ru">modern.term@mail.ru</a>	Iurie Tidva	+373 69144264	Installation of geothermal heat pumps and HVAC systems
10	Termoconstruct	<a href="mailto:termoconstruct@mail.md">termoconstruct@mail.md</a>	Iurie Razlovan	+373 79748730	Energy audit, Design work for the construction, installations and utility networks, Construction and renovation of buildings and installations

## Appendix 6 Energy Efficiency Fund: Regulation and programs requirements

### Energy Efficiency Fund Legal Framework

The Fund is an independent legal entity and financially autonomous, have own banking accounts and seal with its name. The Ministry of Economy proposes annual allocation of funds from the state budget, by addressing a request to the Ministry of Finance to include the requested amount in the draft state budget law for the respective year.

### Objective of Energy Efficiency Fund

The main objective of the Energy Efficiency Fund (the Fund) is to attract and manage financial resources to finance and implement energy efficiency and renewable energy projects, in accordance with strategies and programs developed by the Government by:

1. promoting investment projects in energy efficiency and renewable energy sources;
2. providing technical assistance for energy efficiency and renewable energy projects development;
3. providing financial assistance to the projects;
4. direct financial contributions;
5. acting as the agent or mediator for other sources of financing;
6. providing full or partial guarantees in case of financing by banks;
7. providing assistance in identifying optimal combinations for projects funding

The Fund shall meet its objectives by promoting and financing economically, technically and environmentally feasible energy projects which will ensure sustainable energy consumption and will lead towards low energy intensity and polluting or greenhouse gas emissions economy.

The purpose of the Fund is to achieve a demonstration effect by successful implementation of projects and to enhance the interest of external donors to support investment in energy efficiency and renewable energy sources in Moldova.

In accordance with its objective and strategy, the EEF will be a key financial implementation partners by providing EE grants and loan guarantee to ESCOs involved within the ESCO Moldova project.

### EEF Financial Resources and EE Project selection Criteria

According to the monetary policy of the EEF for 2012, there were allocated 100 million MDL (about 8 mln. USD), 80% financed public sector projects and 20% for private sector. Given that only in November-December (2012) there was adopted the regulatory framework for conducting efficiency measures (energy auditors rules), the funds started to be allocated in 2013.

Current eligible projects criteria to be financed by the EEF:

- Achieving maximum efficiency at minimum cost;
- At least a third of the project's benefits come from measurable energy savings. Other benefits of the project may come from other like economic indicators, techniques and so on;
- The project involves technologies for efficient energy consumption;
- The amount requested for project financing from the Fund is consistent with project limits of financing, 50 000 -3 000 000 lei (2500 – 240 000 USD)
- The beneficiary contribution to total investment must be at least 20%;
- Energy efficiency projects have a maximum payback period of 7 years;
- Projects in the renewable energy field have a maximum payback period of 15 years;
- Project beneficiaries have no liability related to the national budget and be solvent.

The financial resources of the Fund are formed of:

- a) financial allocations from the state budget, at least 10% of the Fund needs to achieve the objectives of energy efficiency indicators and the use of renewable energy sources;
- b) donations from individuals and businesses from Moldova and abroad, including international financial institutions and funds;

- c) Financial income consisting of interest rates on bank deposits or current accounts of the Fund and the interests and commissions for contracts concluded with customers of the Fund;
- d) loans and other financial instruments from banks and investors engaged exclusively in the promotion of the Fund.

The financial resources of the Fund are used exclusively for:

- a) financing, free of charge of the investment projects to increase energy efficiency and use of renewable energy sources in the Republic of Moldova;
- b) providing guarantees for loans offered by financial institutions for investment projects in energy efficiency and use of renewable energy sources;
- c) payment of technical assistance, if it is deemed necessary for the implementation of projects eligible for funding;
- d) implementation of pilot projects on energy efficiency and renewable energy proposed Energy Efficiency Agency.

## Appendix 7 Terms of Reference for PMU staffs

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### TERMS OF REFERENCE

**Title:** Project Manager (PM)  
**Duty Station:** Chisinau-Moldova

The Project Manager will be primarily focused on the day to day operation of the project including administrative, financial and operational aspects of the project. The project manager's role is to manage and coordinate the implementation of various project activities in ensuring quality and timeliness of activities and delivery of outputs. In addition to the management tasks, the PM will also intervene as support-expert in project components 1 to 4.

### Duties and Responsibilities

The Project Manager (PM) shall report directly to the UNDP Portfolio Manager and shall be responsible for:

- Managing and coordinating the implementation of project activities to ensure the maintenance of quality and timeliness, and delivery of outputs;
- Liaising and working closely with the project partners and beneficiaries;
- Reporting regularly to the Project Board and municipality of Chisinau on the project's progress;
- Maintaining close contact with designated focal points from UNDP, MoENV and other stakeholders, indicating any estimated changes to the work plan, and proposing a budget revision when appropriate;
- Ensuring that the requisite allocations are available in accordance with the agreed budget and established schedules of payment, if any, in consultation with MoENV and UNDP;
- Working closely with key stakeholders in the drafting and preparation of relevant Terms of Reference for local and international consultants;
- Monitoring the project budgets, funds and resources;
- Preparing progress and financial reports of the project when required (e.g.: QPR/APR/PIR);
- Maintaining an up-to-date accounting system to ensure accuracy and reliability of financial reporting;
- Being actively involved in the preparation of relevant knowledge products (including publications and reports);
- Performing the function of ATLAS External User, creating requisitions and vouchers, and other relevant ATLAS processes;
- Coordinating the management and implementation of activities of the project as set out in the project document and recommending any such modifications/revisions as may be necessary to the Project Board through the NPD;
- Delivery of the Project Inception Reports and the results as per the agreed results framework in the Project Document;
- Preparing the annual work plan (AWP) and budget of the project and its timely submission to the NPD and Project Board;
- Chairing the monthly progress meetings with the program managers;
- Submitting regular progress reports to the national implementing agency MoENV and UNDP;
- Reporting to the Project Review Committee the status and progress of the project and seek appropriate recommendation if required toward the adaptive management approach;

- Collating deliverables from all components and being responsible for the write up of progress reports;
- Reviewing and editing technical reports in cooperation with the national and international experts;
- Assisting the National Project Director in the preparation of the Annual Progress Report (in line with the Annual Work Plan); Project Implementation Report, Quarterly Operational Reports for submission to the Executing Agency and UNDP;
- Facilitating the work of the Project Board and Project Review Committee by presenting to the Project Board regular progress reports and results of project development.

### **Requirements**

- Advanced Degree in Mechanical/Electrical/Civil Engineering or Architecture or any other science-based background;
- Possess a professional qualification or a member of an acknowledged professional organization or society;
- At least 5 years extensive working experience in the field of energy efficiency and possesses a strong knowledge of the local energy service providers;
- Extensive experience in project management with adequate exposure to financial management, financial mechanism and the banking systems in Moldova.
- Have a good command of the English and the national language.

### **Duration**

The Project Manager will be appointed under UNDP service contract for the duration four(4) years, following UNDP rules and regulations on performance evaluation and contract extension.



*Appendix cont'd*

**TERMS OF REFERENCE**

**Title:** Administrative Project Assistant

**Duty Station:** Chisinau

**Duties and Responsibilities**

The Project Administration Officer shall report directly to the Project Manager and shall be responsible for:

- Providing administrative and logistic support to the project team;
- Executing secretarial tasks and related activities;
- Managing schedules and project implementation within specified project constraints;
- Undertaking secretariat services to specific project activities;
- Providing limited backup support to the team and translation during meetings (if needs be).

**Requirement**

- Minimum qualification is a tertiary education in secretarial science degree/diploma or related professional qualifications;
- At least 3 years of administrative and logistic experience;
- Have a good command of the English and national language;
- Experiences in project management and the energy sector are preferred.

**Duration**

The Project Assistant will be appointed under the UNDP service contract for the duration of four (4) years following UNDP rules and regulations on performance evaluation and contract extension.

Appendix 8 Letters of Commitment

MINISTERUL MEDIULUI  
AL REPUBLICII MOLDOVA



MINISTRY OF ENVIRONMENT OF  
THE REPUBLIC OF MOLDOVA

Our Ref:

Date:

To: **Ms. Adriana DINU**  
Deputy GEF Executive Coordinator  
[adriana.dinu@undp.org](mailto:adriana.dinu@undp.org)

**Dr. Naoko ISHII**  
CEO and Chairperson for the Global Environment Facility  
[Gcoordination@thegef.org](mailto:Gcoordination@thegef.org)

Subject: **Co-financing letter for “ESCO Moldova - Transforming the market for Urban Energy Efficiency in Moldova by introducing Energy Service Companies (ESCO)” (ESCO Project)**

Dear Ms. Dinu,

On behalf of the Ministry of Environment of the Republic of Moldova and in my capacity as GEF Political and Operational Focal Point, I would like to express the full support for the proposal of the project entitled “ESCO Moldova - Transforming the market for Urban Energy Efficiency in Moldova by introducing Energy Service Companies (ESCO)”.

I reconfirm that the above project proposal is in accordance with my government's national priorities and our commitment to the relevant global environmental conventions and that it has been discussed with all relevant stakeholders, including the global environmental convention focal points.

I am pleased to confirm our preliminary commitment to co-finance this UNDP-GEF project as in kind contribution estimated at US\$40,000 over the next 4 years and covering such costs as the time of the staff of the Ministry and other subordinated institutions, office space and equipment to be used for project related activities, as well as other operating expenses necessary to achieve successfully the objectives of the ESCO Project.

Looking forward to further collaboration for the promotion and implementation of this project.

Sincerely,

**Gheorghe SALARU,**  
Minister of Environment,  
GEF Political and Operational Focal Point and  
Convention Focal Point for UNFCCC

9, Cosmonautilor str., Chisinau MD 2005, Republic of Moldova  
Tel (+ 373 22) 20 45 07 Fax (+ 373 22) 22 68 58 E-mail: [egreta@mediu.gov.md](mailto:egreta@mediu.gov.md)

00023165



**MUNICIPIUL CHIŞINĂU  
PRIMĂRIA**

MD-2012, Republica Moldova, municipiul Chişinău, bd Ştefan cel Mare şi Sfânt, 83  
Telefon: 227-236, 222-380, fax: 223-145, E-mail: primaria@pmc.md

Nr. 01.15/205 / 11 Oct. 2011

Dear Mrs. Nicola Harrington-Buhay,  
UNDP Resident Representative  
In the Republic of Moldova

Herby, on behalf of Chisinau Municipality I would like to express our full support for the project "ESCO Moldova - Transforming the market for Urban Energy Efficiency in Moldova by introducing Energy Service Companies (ESCO)"

As a beneficiary of the ESCO project, the Municipality of Chisinau will provide co-financing in the framework of the respective project for the following:

- The City Hall of Chisinau confirms that it will reimburse the investments made by the ESCO Companies based on the Energy Performance Contracts, estimated at 5 mln USD.
- The City Hall of Chisinau confirms the financing of 30-40 energy audits of the buildings to be selected for energy efficiency investments by ESCOs, estimated at 125.000 USD.
- The City Hall of Chisinau confirms the planning of funds to finance various energy efficiency projects in public buildings and residential sector in the annual budgets and which are also in line with the Urban Development Plan, estimated at 1.3 mln USD.

The co-financing will be assessed and recorded each year by the project team in accordance with GEF policies and procedures for recording and reporting the co-financing.

Sincerely yours,

Dorin Chirtoaca  
General Mayor of Chisinau

Gabriela Ciunac (022) 20-15-04

UNEP MOLDOVA Country Office
Date: 11. Oct 2011
Document #: 2011-08-117
From: Chisinau City Hall
Subject: Chisinau Municipality provide co-financing
Responsible: VY
As soon to be taken: VY
Comments:

United Nations Development Programme



Empowered lives.  
Resilient nations

Ref. No. 2014-02-213 /VI

**Subject:** *Co-financing letter for "ESCO Moldova - Transforming the market for Urban Energy Efficiency in Moldova by Introducing Energy Service Companies (ESCO)" (ESCO Project)*

20 February 2014

Dear Ms. Dinu, *Adriana*

I have the pleasure to reconfirm our strong interest to act as the implementing agency for the project "ESCO Moldova - Transforming the market for Urban Energy Efficiency in Moldova by introducing Energy Service Companies (ESCO)" in partnership with the Government of Moldova.

In this context, I am further pleased to confirm our preliminary commitment to co-finance the project in the amount of US\$150,000 over the next 4 years of implementation, which will be allocated as a contribution towards the successful management and operation of the project, including auditing and office equipment costs.

We believe that the ESCO business model promoted by this project will contribute to creation of a sustainable, effective and functioning ESCO market in Chisinau, and at the same time will serve as an innovative financing mechanism for green development.

We look forward to a continuing fruitful collaboration.

Sincerely yours,

*W.k my love  
Maha*

  
Nicola HARRINGTON-BUHAY  
Resident Representative

Ms. Adriana DINU  
Deputy Executive Coordinator  
Global Environmental Facility  
United Nations Development Programme

UNDP in Moldova • 131, 31 August 1989 str., Chisinau 2012, Moldova  
Tel: (+373 22) 22 00 45 • Fax: (+373 22) 22 00 41 • E-mail: registry.md@undp.org • www.undp.md

Fondul pentru Eficiență  
Energetică



Energy Efficiency Fund

MD-2004, Chișinău, bd. Ștefan cel Mare 180, etaj 6  
tel: +373 22 000807, mob: +373 60 809709  
fax: +373 22 000809  
e-mail: info@fee.md, web: www.fee.md

180 Ștefan cel Mare bd. 6<sup>th</sup> floor, MD-2004, Chișinău  
tel: +373 22 000807, mob: +373 60 809709  
fax: +373 22 000809  
e-mail: info@fee.md, web: www.fee.md

24.11.2014 nr. 47

**Ref:** Intention confirmation for the co-financing of ESCO Project

**Subject:** Co-financing letter for "ESCO Moldova - Transforming the market for Urban Energy Efficiency in Moldova by introducing Energy Service Companies (ESCO)" (ESCO Project)

Dear Sirs/Madams,

On behalf of the Energy Efficiency Fund (the Fund) I would like to express my interest for the project "ESCO Moldova - Transforming the market for urban energy efficiency in Moldova by introducing Energy Service Companies (ESCO)" (ESCO Project).

I have got acquainted with the submitted draft project documentation, which makes reference to the EEF co-financing of 20 ESCO sub-projects. In this regard, I would like to confirm our intention to co-finance the project in line with the financial instruments, the co-financing mechanism specified in the project document, and the relevant legal provisions.

In this line, we commit to co-finance the energy efficiency sub-projects identified by the ESCO Project at the implementation stage and submitted to the Fund in accordance and once the eligibility criteria are available.

This financial contribution will be managed by the Fund and the co-financing will be assessed and recorded each year by the project team in accordance with GEF policies and procedures for recording and reporting co-financing. Our initial estimate is that the amount of co-financing over the life-time of the project will be at least \$1 million USD. However, co-financing of all ESCO sub-projects will need to be carried out on a case by case basis and so it is not possible to give a more precise estimate at this stage.

By mandate the financial resources of the Fund are used *inter alia* for financing energy efficiency and renewables investment projects and to guarantee the loans provided by the financial institutions in the area of energy efficiency and renewables, as well as for the technical assistance in the framework of projects eligible for financing by the Fund.

Yours sincerely, Mihail LUPU

MINISTERUL ECONOMIEI  
AL REPUBLICII MOLDOVA



MINISTRY OF ECONOMY  
OF THE REPUBLIC OF MOLDOVA

AGENȚIA PENTRU  
EFICIENȚĂ ENERGETICĂ

ENERGY EFFICIENCY  
AGENCY

MD#2068 Chișinău, str. Alecu Russo 1  
tel. +373-22-49-94-44, fax +373-22-31-10-01  
E-mail: [office@aec.md](mailto:office@aec.md)  
Pagina web: [www.aec.md](http://www.aec.md)

1, Alecu Russo Str. Chișinău MD-2068  
tel. +373-22-49-94-44, fax +373-22-31-10-01  
E-mail: [office@aec.md](mailto:office@aec.md)  
Web site: [www.aec.md](http://www.aec.md)

31 ianuarie 2014 nr.29 - 1115

Mrs Nicola Harrington-Buhay,  
UNDP Resident Representative

Dear Madam,

Hereby, on behalf of the Energy Efficiency Agency of Moldova (EEA) I would like to express my interest and commitment to support the Project "ESCO Moldova - Transforming the market for Urban Energy Efficiency in Moldova by introducing Energy Service Companies (ESCO)" (ESCO Project).

The overall mission of the EEA is to oversee the energy efficiency and renewable sector developments and to provide for implementation and achievement of objectives in the national plans and programs in the respective field. The Agency has also the mandate to participate in the evaluation of investments projects in the area of energy efficiency and renewables, develop normative acts and to establish and maintain a database with sector-relevant information.

In this context, I confirm that the Energy Efficiency Agency of Moldova will provide full support to the ESCO Project, including but not limited to: screening of the feasibility studies developed within the project (quality control), providing recommendations for financing of ESCOs investments to Financial Institutions and Energy Efficiency Fund, facilitating the organization of training and seminars by the project, development and promotion of amendments to the laws concerning the energy efficiency sector in general, and ESCO business development in particular.

The support provided by the EEA to the ESCO Project will also materialize in the time allocated by the Agency staff, office space, and other operating expenses required for implementation of the respective project and essential for achieving its objectives.

Looking-forward to fruitful collaboration in the framework of the ESCO Project.

Yours sincerely,

UNDP MOLDOVA Country Office	
Date: 05.01.2014	
Document #: 2014-01-053	
From: Energy Efficiency Director Agency	
Subject: The EEA support to the ESCO Project	
Responsible: VY	cc: NFI, NS, VIT
Action to be taken: VY	
COMMENTS: (22.49) 444 ext.3	

Mihail STRATAN



Nr. 01/249/04  
February 24, 2014

NICOLA HARRINTON-BUHAY  
UN resident coordinator and  
UNDP resident representative in RM

**Subject:** Expression of interest for the Project "ESCO Moldova - Transforming the market for Urban Energy Efficiency in Moldova by introducing Energy Service Companies (ESCO)" (ESCO Project)

Dear Madam,

Hereby, on behalf of the CB "MOBIASBANCA- Groupe Societe Generale" (Mobiasbanca), I would like to express my interest and commitment to support the Project "ESCO Moldova - Transforming the market for Urban Energy Efficiency in Moldova by introducing Energy Service Companies (ESCO)" (ESCO Project).

Considering the demand-driven nature of the grants component of the ESCO Project, we confirm to finance the sub-projects identified at the implementation stage, by providing loans, when such requests are submitted to the Bank and if these sub-projects meet the Bank eligibility and loan criteria.

Mobiasbanca is one of the first commercial banks in Moldova. It is an innovative and dynamic bank that has advanced significantly over the years of activity. The main shareholder of Mobiasbanca is Societe Generale, one of the largest banking groups in the euro area. Mobiasbanca is also a leader bank in financing energy efficiency initiatives in Republic of Moldova.

Looking forward to fruitful collaboration.

Yours sincerely,  
Ridha Tekala  
The President of the bank

Ex. Serghei Manolov  
tel. +373 22 812 393

UNDP MOLDOVA Country Office	
Date:	24-02-2014
Document #:	2014-02-04.d
From:	Mobiasbanca
Subject:	Interested in supporting the ESCO Project
Responsible:	VH CC: NH, NS, SH
Actions to be taken:	VH
Comments:	

Bd. Ștefan cel Mare și Sânt 81a  
MD-2012, Chișinău, Moldova  
Cod MOGBM022  
Cont de corespondență: 15213897  
la Centrul de Depozit și BMM

Contacte  
+373 22 84 56  
www.mobiasbanca.md

SC Mobiasbanca - Groupe Societe Generale SA  
Capital Social: 100 000 000 000  
Număr de înregistrare de stat: 1401000000000000000

GRUPE SOCIETE GENERALE



**Techno Test s.r.l.**

Mihai Eminescu Str., 66,  
MD-2012, Chisinau, Moldova,  
Tel. +(37322) 226160,  
Fax. +(37322) 210807,  
E-mail: info@technotest.md

**Attn:** Mrs. Nicola Harrington-Buhay  
UNDP Resident Representative  
in the Republic of Moldova

**Subject:** Expression of interest for the Project “ESCO Moldova - Transforming the market for Urban Energy Efficiency in Moldova by introducing Energy Service Companies (ESCO)” (ESCO Project)

Dear Madam,

Hereby, on behalf of Techno Test s.r.l., I would like to express my interest and willingness to support the Project “ESCO Moldova - Transforming the market for Urban Energy Efficiency in Moldova by introducing Energy Service Companies (ESCO)” (ESCO Project).

The ESCO business model is well-known in the Republic of Moldova, although not applied due to the existing legal and financial constraints. The proposed ESCO Project will significantly contribute to the removal of the respective barriers, faced by the private sector and to the advancement of the ESCO market development.

In this context, provided that the Techno Test s.r.l. is selected on a competitive-basis to implement energy efficiency sub-projects in line with the ESCO business model and Energy Performance Contracts, we would like to express our readiness to invest 20% in the respective sub-projects subject to satisfactory regulatory framework in place to support ESCOs and to acceptable levels of risk.

Looking forward to a fruitful collaboration within this project.

Sincerely yours,

Gheorghe Burdila  
director





www.escovoltage.md  
TEHNOLOGII PENTRU TOȚI

Nr.7 of 06 february 2014

**Subject:** Expression of interest for the Project "ESCO Moldova - Transforming the market for Urban Energy Efficiency in Moldova by introducing Energy Service Companies (ESCO)" (ESCO Project)

Dear Sir/Madam,

Hereby, on behalf of "Esco-Voltaj" SRL, I would like to express my interest and willingness to support the Project "ESCO Moldova - Transforming the market for Urban Energy Efficiency in Moldova by introducing Energy Service Companies (ESCO)" (ESCO Project).

The ESCO business model is well-known in the Republic of Moldova, although not applied due to the existing legal and financial constraints. The proposed ESCO Project will significantly contribute to the removal of the respective barriers, faced by the private sector and to the advancement of the ESCO market development.

In this context, provided that the "Esco-Voltaj" SRL is selected on a competitive-basis to implement energy efficiency sub-projects in line with the ESCO business model and Energy Performance Contracts, I would like to express my readiness to invest 20% in the respective sub-projects subject to satisfactory regulatory framework in place to support ESCOs and in acceptable levels of risk.

Looking forward to a fruitful collaboration within this project.

Sincerely yours,

Valeriu Galetchi  
Director „Esco-Voltaj” SRL



## Appendix 9 Terms of Reference for selecting the Financial Institution

### Background

The UNDP/GEF “ESCO Moldova - Transforming the market for Urban Energy Efficiency in Moldova by introducing Energy Service Companies (ESCO)”, hereinafter referred to as the Project, is establishing a Loan Guarantee Fund (LGF), which is to be used by local engineering companies, hereinafter understood as Energy Service Company (ESCOs), to finance and implement Energy Efficiency measures (EE) through the energy performance contract (EPC).

The LGF is a payment security mechanism which involves the establishment of a trust account in a financial institution (partner bank) selected by the UNDP and under the UNDP procurement procedures.

The UNDP will make a deposit to share the risk of bad debts or the underperformance of one or several EE projects.

The primary objective of a LGF is to expand the availability of commercial financing for energy efficiency projects to develop a sustainable commercial lending market for energy efficiency investments.

### Selection of the Partner Bank

With regard to selection, the following pre-selection criteria would apply to commercial banks:

- possession of NBM license as a commercial bank;
- compliance with NBM guidelines on financial soundness, management and accounting;
- majority of share capital owned by the private sector;
- average portfolio at risk >30days less than 8% for the last 12 months, with a write-off ratio of no more than 3%;
- satisfactory financial statements for the last 3 years audited to international standards;
- no arrears or default on any loan or refinancing granted by NBM;
- positive return on average equity for the last fiscal year;
- experience working with international organisation in terms of loan provision (financial intermediation) using donor funder financial resources;
- Experience in financing of energy efficiency projects would be considered as an advantage.

Commercial banks intending to participate in the Project, in order to provide management services of the project Loan Guarantee Fund, will be invited to bid on the cost of managing the LGF as well as on the interest rate they intend to apply to the loans aimed for the Project EE financing.

The PMU will then evaluate the bids received by taking into consideration the following criteria:

- The fees (%) for managing the LGF, inclusive of bankable document review and decision making; activity reports, and compliance with the LGF regulation
- Loans Terms and conditions: interest rate, period of grace, reimbursement schedule, procedure for recovering bad-debt, etc...
- The multiplier factor on the Trust Account to provide loan guarantees.

The PMU will have the option to reject one of the bids received if such a bid is significantly higher than the average margin to manage a LGF.

The interest rates for financing of loans for EE subprojects shall be positive in real terms as required by current NBM policy, and will be calculated as follows:

- (i) For financing denominated in USD, a variable rate, equal to the reference rate of 6-month LIBOR USD rate, plus the Bank’s margin.
- (ii) Financing denominated in MDL, a variable rate based on the NBM reference rate and the Bank’s margin added up to the NBM reference rate.

## Appendix 10 List of banks

At present, there are 14 licensed banks that operate in the Republic of Moldova, as follows:

1. Commercial Bank „COMERTBANK” JSC
2. Commercial Bank „BANCA SOCIALA” JSC
3. Commercial Bank „VICTORIABANK” JSC
4. Commercial Bank „MOLDOVA - AGROINDBANK” JSC
5. Commercial Bank „Moldindconbank” JSC
6. Joint Stock Company “Banca de Economii”
7. Commercial Bank „EuroCreditBank” JSC
8. Commercial Bank „UNIBANK” JSC
9. „Banca de Finante si Comert” JSC
10. Commercial Bank „ENERGBANK” JSC
11. Commercial Bank „ProCredit Bank” JSC
12. “Banca Comerciala Romana Chisinau” JSC
13. Commercial Bank „EXIMBANK - Gruppo Veneto Banca” JSC
14. Commercial Bank „MOBIASBANCA - Groupe Societe Generale” JSC

Details on their addressees and contact information:

<b>Bank name</b>	<b>Banca Comerciala „COMERTBANK” S.A.</b> (B.C. „COMERTBANK” S.A.)
President	Serghei Cartasov
Vice President	Alexandru RADU
Phone	0 22 839839
Fax	0 22 839840
Telex	163145 TRADE MD
SWIFT	CMTB MD 2X
E-Mail	<a href="mailto:secretary@comertbank.md">secretary@comertbank.md</a>
WWW	<a href="http://www.comertbank.md">http://www.comertbank.md</a>
Address	1/1, Independentei Street, Chisinau, MD-2043, Republic of Moldova
Date of entry in the register of authorized banks	11.09.1991
<b>Bank name</b>	<b>BANCA COMERCIALA „BANCA SOCIALA” S.A.</b> (BC „BANCA SOCIALA” S.A.)
President	Sergiu Albot
Vice President	Aglaia Crivceanschi, Liudmila Matveeva, Svetlana Focsa
Phone	0 22 22-14-94, 0 22 22-14-81
Fax	0 22 22-42-30
Telex	163265 BANSO MD
SWIFT	BSOC MD 2X
E-Mail	<a href="mailto:office@socbank.md">office@socbank.md</a>
WWW	<a href="http://www.socbank.md">http://www.socbank.md</a>
Address	61, Mitropolit G. Banulescu-Bodoni Street, Chisinau, MD-2005, Republic of Moldova
Date of entry in the register of authorized banks	11.09.1991

<b>Bank name</b>	<b>Banca Comerciala „VICTORIABANK” S.A.</b>
	<b>(B.C. „VICTORIABANK” S.A.)</b>
President	Natalia Politov-Cangas
Vice President	Corneliu Ghimpu, Ludmila Vangheli, Elena Gonciar, Victor Domenti
Phone	0 22 57-61-00
Fax	0 22 23-45-33
Telex	163188 BCAVMD
SWIFT	VICB MD 2X
E-Mail	<a href="mailto:office@victoriabank.md">office@victoriabank.md</a>
WWW	<a href="http://www.victoriabank.md">http://www.victoriabank.md</a>
Address	141, 31 August 1989 Street, Chisinau, MD-2004, Republic of Moldova
Date of entry in the register of authorized banks	12.09.1991
<b>Bank name</b>	<b>Banca Comerciala „MOLDOVA - AGROINDBANK” S.A.</b>
	<b>(BC „MOLDOVA - AGROINDBANK” S.A.)</b>
President	Serghei Cebotari
Vice President	Marcel Teleuca, Leonid Bejenari, Victor Iuras, Oleg Paingu
Phone	0 22 22-27-70, 0 22 24-46-49
Fax	0 22 22-80-58
Telex	163263 AGRO MD
SWIFT	AGRN MD 2X
E-Mail	<a href="mailto:aib@maib.md">aib@maib.md</a>
WWW	<a href="http://www.maib.md">http://www.maib.md</a>
Address	9, Cosmonautilor Street, Chisinau, MD-2006, Republic of Moldova
Date of entry in the register of authorized banks	12.09.1991
<b>Bank name</b>	<b>Banca Comerciala „Moldindconbank” S.A.</b>
	<b>(BC „Moldindconbank” S.A.)</b>
President	Svetlana Banari
Vice President	Vitalie Groza, Alexandru Sveriniuc, Igor Stratan
Phone	0 22 57-67-82
Fax	0 22 27-91-95
Telex	163228 Incon MD
SWIFT	MOLD MD 2X
E-Mail	<a href="mailto:info@moldindconbank.com">info@moldindconbank.com</a>
WWW	<a href="http://www.moldindconbank.com/">http://www.moldindconbank.com/</a>
Address	38, Armeneasca Street, Chisinau, MD-2012, Republic of Moldova
Date of entry in the register of authorized banks	15.11.1991
<b>Bank name</b>	<b>Societatea pe Actiuni Banca de Economii</b>
	<b>(Banca de Economii S.A.)</b>
President	Ivan Crivceanschi
Vice President	Corina Burlacu, Viorel Birca
Phone	0 22 21-80-05

Fax	0 22 21-80-06
Telex	163275 BECO MD
SWIFT	BECO MD 2X
E-Mail	<a href="mailto:bem@bem.md">bem@bem.md</a>
WWW	<a href="http://www.bem.md/">http://www.bem.md/</a>
Address	115, Columna Street, Chisinau, MD-2012, Republic of Moldova
Date of entry in the register of authorized banks	08.04.1992
<b>Bank name</b>	<b>Banca Comerciala „EuroCreditBank” S.A.</b> <b>(BC „EuroCreditBank” S.A.)</b>
President	
Vice President	Oleg Holban, Dumitru Lupan
Phone	0 22 50-01-01, 0 22 50-02-22
Fax	0 22 54-88-27
Telex	163278 ECBMD MD
SWIFT	ECBMMD2X
E-Mail	<a href="mailto:info@ecb.md">info@ecb.md</a>
WWW	<a href="http://www.ecb.md">http://www.ecb.md</a>
Address	33, Ismail Street, Chisinau, MD-2001, Republic of Moldova
Date of entry in the register of authorized banks	30.09.1992
<b>Bank name</b>	<b>Banca Comerciala „UNIBANK” S.A.</b> <b>(B.C. „UNIBANK” S.A.)</b>
President	Dumitru Tugulschi
Vice President	Ghenadie Cernei, Victoria Hvorostovscaia
Phone	0 22 25-38-01
Fax	0 22 22-05-30
Telex	163260 UNIP MD
SWIFT	JSCUMD2X
E-Mail	<a href="mailto:welcome@UNIBANK.MD">welcome@UNIBANK.MD</a>
WWW	<a href="http://www.unibank.md">http://www.unibank.md</a>
Address	45, Banulescu Bodoni Street, Chisinau, MD-2012, Republic of Moldova
Date of entry in the register of authorized banks	19.01.1993
<b>Bank name</b>	<b>„Banca de Finante si Comert” S.A.</b> <b>(„FinComBank” S.A.)</b>
President	Victor Hvorostovschii
Vice President	Iurie Salamaha, Larisa Rudenco
Phone	0 22 26-99-00
Fax	0 22 23-73-08
Telex	163294BFCMD
SWIFT	FTMD MD 2X
E-Mail	<a href="mailto:fincom@fincombank.com">fincom@fincombank.com</a>
WWW	<a href="http://www.fincombank.com/">http://www.fincombank.com/</a>
Address	26, Puskin A. Street, Chisinau, MD-2012, Republic of Moldova

Date of entry in the register of authorized banks	01.07.1993
<b>Bank name</b>	<b>Banca Comerciala „ENERGBANK” S.A.</b> <b>(B.C. „ENERGBANK” S.A.)</b>
President	Iurii Vasilachi
Vice President	Pavel Cusnir
Phone	0 22 54-43-77
Fax	0 22 85-80-80
Telex	163247 ENBNK MD
SWIFT	ENEG MD 22
E-Mail	<a href="mailto:office@energbank.com">office@energbank.com</a>
WWW	<a href="http://www.energbank.com">http://www.energbank.com</a>
Address	23/3, Tighina Street, Chisinau, MD-2001, Republic of Moldova
Date of entry in the register of authorized banks	16.01.1997
<b>Bank name</b>	<b>Banca Comerciala „ProCredit Bank” S.A.</b> <b>(B.C. „ProCredit Bank” S.A.)</b>
President	Vladislav Garbu
Vice President	Evgenia Gashikulina, Natalia Osadci, Serghei Ilin, Andrei Zainulin
Phone	0 22 836401, 0 22 836404
Fax	0 22 273488
Telex	
SWIFT	PRCB MD 22
E-Mail	<a href="mailto:office@procreditbank.md">office@procreditbank.md</a>
WWW	<a href="http://www.procreditbank.md">http://www.procreditbank.md</a>
Address	65, Stefan cel Mare si Sfint Ave.,office 901, MD-2012, Republic of Moldova
Date of entry in the register of authorized banks	17.12.2007
<b>Bank name</b>	<b>Banca Comerciala Romana Chisinau S.A.</b> <b>(BCR Chisinau S.A)</b>
President	Juan Luis Martin Ortigosa
Vice President	
Phone	0 22 265000
Fax	0 22 265002
Telex	163160 BCRMD MD
SWIFT	RNCB MD 2X
E-Mail	<a href="mailto:office@bcr.md">office@bcr.md</a>
WWW	<a href="http://www.bcr.md">http://www.bcr.md</a>
Address	60/2, Puskin A. Street, MD-2005, Chisinau
Date of entry in the register of authorized banks	22.10.1998
<b>Bank name</b>	<b>Joint Stock Commercial Bank „EXIMBANK - Gruppo Veneto Banca”</b> <b>(JSCB „EXIMBANK - Gruppo Veneto Banca”)</b>
President	Lucio Luigi Gaita

Vice President	Beniamino Contessotto, Veaceslav Burcovschii, Vitalie Bucataru
Phone	0 22 301102
Fax	0 22 601611
Telex	163111 EXIM MD
SWIFT	EXMM MD22
E-Mail	<a href="mailto:info@eximbank.com">info@eximbank.com</a>
WWW	<a href="http://www.eximbank.com/">http://www.eximbank.com/</a>
Address	171/1, Stefan cel Mare si Sfint Ave, Chisinau, MD-2004, Republic of Moldova
Date of entry in the register of authorized banks	29.04.1994
<b>Bank name</b>	<b>Commercial Bank „MOBIASBANCA - Groupe Societe Generale” S.A.</b> <b>(CB „MOBIASBANCA - Groupe Societe Generale” S.A.)</b>
President	Ridha Tekai
Vice President	Nicolae Dorin, Mylene Nicolas de March
Phone	0 22 25 64 56
Fax	0 22 54-19-74
Telex	163152 GRANT MD
SWIFT	MOBB MD 22
E-Mail	<a href="mailto:office@mobiasbanca.md">office@mobiasbanca.md</a>
WWW	<a href="http://www.mobiasbanca.md">http://www.mobiasbanca.md</a>
Address	81a, Stefan cel Mare si Sfint Ave, Chisinau, MD-2012, Republic of Moldova
Date of entry in the register of authorized banks	12.09.1991

Among 14 existing banks, some of them already provide loans and financing for energy efficiency sub-projects, similar to our project, within two donor financed international projects: **MoREEFF and MoSEFF**.

**Moldovan Residential Energy Efficiency Financing Facility (MoREEFF)** provides loans for energy efficiency home improvements.

To help Moldovan households reduce their energy bills and consumption the European Bank for Reconstruction and Development have developed the Residential Energy Efficiency Financing Facility (MoREEFF) to provide credit lines to reputable Moldovan banks to make loans to householders, Condominiums/Associations of Apartment Owners, Housing Management Companies, Energy Service Companies or any other eligible service companies providing maintenance, operation, construction and refurbishment services for the purpose of implementation of eligible energy efficiency projects in the residential sector in Moldova.

**The partner banks of this project are:** Mobiasbanca – Groupe Société Générale, Moldova Agroindbank, Moldindconbank, ProCredit Bank.

#### **Moldovan Sustainable Energy Financing Facility (MoSEFF)**

A credit line of 42 million Euro combined with a 5-20% grant component was provided for on-lending to Moldovan companies through EBRD's partner banks. MoSEFF provides also technical assistance to the projects through Fichtner - a leading German engineering and consulting company.

MoSEFF loans are provided by local partner banks to Moldovan companies applying for financing. MoSEFF loans start from 10 thousand to a maximum of 2 million Euro.

The financing is bound to investments fostering sustainable energy saving and production of renewable energy. The Moldovan partner banks are responsible for the financial due diligence and the final decision on the loan disbursement.

**The partner banks of this project are: Moldova Agroindbank, Moldindconbank, Banca Comerciala Romana Chisinau , ProCredit Bank, Mobiasbanca - Groupe Société Générale.**

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