

Cover Page for CTF Program Approval Request	
1. Country/Region	Ukraine
2. CIF Project ID#	
3. Project/Program Title	Ukraine District Heating Modernisation Program (the Program)
4. Terms and Amount Requested in million USD equivalent	<p><b>Public sector – n/a</b></p> <p><b>Private sector</b></p> <p>1. <u>Loan (for investments):</u> EUR equivalent of USD49.25 million = EUR36.5 million<sup>1</sup></p> <p>2. <u>Grant (advisory services, evaluation, and knowledge management) –</u> USD133,000 for EBRD’s account (See Annex C).</p> <p>3. <u>Fee: Implementation/supervision budget:</u> – USD617,000 (Annex D).</p> <p><b>Total: USD 50 million split into:</b></p> <ul style="list-style-type: none"> <li>• EUR 36.5 million for investment</li> <li>• USD 0.75 million for grants and fees</li> </ul>
5. Implementing MDB(s)	European Bank for Reconstruction and Development (“EBRD”)
6. National Implementing Agency	Private/Municipal Sector
7. MDB Focal Point	Andreas Biermann, CTF Coordinator ( <a href="mailto:biermana@ebrd.com">biermana@ebrd.com</a> )
8. Brief Description of Project/Program (including objectives and expected outcomes)	<p><b>Fit with Ukraine Country Investment Plan:</b> This Program proposal is consistent with Ukraine’s Country Investment Plan (CIP), which was endorsed by the CTF Trust Fund Committee (TFC) on March 16, 2010, as well as with the proposed updated CIP which was endorsed in August 2013. Ukraine’s updated CIP confirms what has been stated in the original 2010 Plan; direct financing for district heating modernisation is a high priority for the country, in order to increase energy efficiency, reduce GHG emissions, and increase energy security. The project is part of the Ukraine’s strategic commitment to reduce energy intensity 50% by 2030.</p> <p><b>Project Summary</b></p> <p>The proposed CTF facility will provide sub-sovereign loans and technical assistance to public and private municipal heating companies of up to USD50 million from CTF, and of up to USD150 million from EBRD, in addition to project sponsor finance. Technical assistance and further grant support will be sought from bilateral and multilateral donors, such as the E5P initiative.</p> <p>The operations to be financed will enable these companies to rehabilitate and modernise the district heating infrastructure in their cities, decrease operating costs, reduce CO<sub>2</sub> emissions and make the district heating system more energy efficient. The operations will be carried out under the <i>Integrated Approach to Reform in the Ukrainian District Heating Sector</i> that will be focused on establishing systemic policy dialogue with the relevant stakeholders in the Ukrainian government focused on urgent reforms with respect to regulatory and institutional framework in the utility sector. The proposed programme is fully compatible with the</p> <p>The proposed programmatic proposal, <i>Ukraine District Heating Modernisation Program</i>, aims to support the <i>Integrated Approach</i> in scaling up and transform the market for district heating modernisation.</p> <p>The funding request for this Program is as follows:</p> <ol style="list-style-type: none"> <li>i. The EUR equivalent of USD 49.25 million of loan volume.</li> <li>ii. USD 0.133 million of grants for policy dialogue, evaluation, and knowledge management</li> <li>iii. USD 0.617 million of fees for EBRD’s supervision and implementation services.</li> </ol>

<sup>1</sup> 1.35 USD/EUR exchange rate used throughout the document

## 9. Consistency with CTF Investment Criteria - For Private Sector Projects/Programs

- (1) Potential GHG Emissions Savings  
350,000tCO<sub>2</sub>/yr over 20 years lifetime, equalling 7.0mtCO<sub>2</sub>
- (2) Potential energy savings  
350 GWh/yr in reduced electricity and natural gas consumption.
- (3) Cost-effectiveness  
CTF: USD7.1/tCO<sub>2</sub> reduced over the lifetime of the programme  
Total project cost: USD39/tCO<sub>2</sub> reduced over the lifetime of the programme.  
The marginal abatement cost will be below USD100/tCO<sub>2</sub>.
- (4) Demonstration Potential at Scale  
The project is scalable, and will help reduce the additional cost of the advanced technologies employed in Ukraine, reducing the investment requirements for similar projects in the future.
- (5) Development Impact  
The project will have a good development impact through i) the creation of employment, and ii) the increased comfort levels in apartments.
- (6) Implementation Potential  
High. Projects with similar scope are being implemented with E5P funding.
- (7) Additional Costs and Risk Premium  
Additional costs are incurred for the use of demand-side technology, and additional cost risk is introduced through the promotion of high-efficiency co-generation. Concessional and grant funds are required to alleviate these.
- (8) Financial Sustainability  
Individual sub-projects will quickly move towards financial sustainability through covenanted tariff increases. The sector overall will be helped to move towards this through policy dialogue.
- (9) Effective Utilization of Concessional Finance  
The low cost to the donor of the CO<sub>2</sub> savings that will be achieved indicates a very effective use of concessional finance.
- (10) Mitigation of Market Distortions  
The market is currently artificially distorted against the operators of district heating systems. The use of concessional finance does therefore not cause any market distortion.
- (11) Risks  
The main risks related to: (1) the general political and reform environment in Ukraine including, inter alia, potential political unwillingness to set tariffs based on consumption and at full cost recovery or lag in setting up the tariffs, (2) failure to implement the Project, and (3) failure to introduce changes in the way the Company operates.
- (12) Risk Mitigation  
The risks outlined above are mitigated by: (1) support by the Mayors and the City Councils of the cities selected for the project, (2) ensuring good competence and motivation of the management team, and providing technical assistance, (3) appropriate covenants in the Loan documentation and structuring of the Project, and (4) the IA which strengthens the EBRD's leverage when pursuing reform components and policy dialogue with the Ukrainian authorities in the district heating sector.

<b>10. Stakeholder Engagement</b>		
<ul style="list-style-type: none"> <li>• Sound Gender assessments will be undertaken at the sub-projects development stage in line with the recent proposal to the TFC to fund gender assessments in district heating in Ukraine.</li> <li>• Project implementation units will be given specific tasks relating to appropriate stakeholder engagements in their tasks.</li> </ul>		
<b>11. Gender Considerations</b>		
<ul style="list-style-type: none"> <li>• Gender considerations will be assessed at the sub-project development stage in line with the recent proposal to the TFC to fund gender assessments in district heating in Ukraine.</li> <li>• Annex F contains an outline of the proposed work on gender.</li> </ul>		
<b>12. Indicators and Targets (consistent with results framework)</b>		
<b>Core Indicators</b>	<b>Targets (by Feb 2019 – 5 years)</b>	
(a) <i>GHG emissions avoided</i>	0.35 MtCO <sub>2</sub> e per annum	
(b) <i>Energy Savings Achieved</i>	350 GWh per annum reduced	
(c) <i>Renewable Heat Capacity Installed</i>	30 MWth installed	
<b>Development Indicator(s):</b> (d) <i>Increased comfort levels for users of district heating systems.</i> (e) <i>Development of guidelines for gender-sensitive development of DH projects</i>	(d) 30,000 apartments addressed user surveys. (e) Guidelines published and lessons disseminated	
<b>13. Co-financing</b>		
	Please specify as appropriate	Amount (in million EUR)
• Government	-	-
• EBRD	Loans	€112 million <sup>2</sup>
• Municipalities (sub-sovereign) and municipal companies (public or private)	Equity	€25 million
• Bilateral co-finance	TBD	TBD
• E5P	Grant	€27 million
<b>Total Co-Financing</b>		<b>€164 million</b>
<b>Total Finance including CTF</b>	<b>CTF share 18%</b>	<b>€200 million</b>
<b>14. Expected Date of MDB Approval</b>		
The project is Board approved – EBRD Board Document Number <b>BDS12-208</b> , with an approval date of 3 September 2012. The CTF contribution would facilitate an expansion of the approved project, thereby ensuring scale up and market transformation.		
<b>15. Document Structure</b>		
Main Sections:		
1: OVERVIEW		
2: PROJECT SPECIFICS		
3: RESULTS MEASUREMENT, ADDITIONALITY, MARKET TRANSFORMATION POTENTIAL, AND RISK		
4: GENDER AND SAFEGUARDS		
5: THE DISTRICT HEATING SECTOR		
Annexes:		
A – Sample Sub Project		
B – Abbreviations and Currency Conversions		
C – Administrative Budget		
D – Technical Assistance Budget		
E – Knowledge Management and Evaluation Activities		
F – Gender		

<sup>2</sup> Remaining EBRD co-financing volume, excluding the three signed projects (see p.7)

<b>CTF Private Sector Proposal</b>	
<i>Name of Project or Program</i>	Ukraine District Heating Modernisation Program (the Program)
<i>CTF amount requested</i>	Total: USD 50 million or up to EUR 36.5 million and up to USD0.75 million comprising: <ol style="list-style-type: none"> <li>1. <u>Investment</u> – up to EUR 36.5 million (equivalent to USD49.25 million)</li> <li>2. <u>Grant (advisory services, evaluation, and knowledge management)</u> – up to USD133,000 for EBRD’s account.</li> <li>3. <u>Implementation and supervision budget</u> – USD617,000 for EBRD’s account (see Annex D)</li> </ol>
<i>Country targeted</i>	Ukraine
<i>Indicate if proposal is a Project or Program</i>	Program
<p><b>OVERVIEW</b></p> <p><b>Fit with the Investment Plan</b>  The updated investment plan approved in August 2013 allocated USD50 million to EBRD’s district heating facility. This proposal is for the full amount of this allocation. More than 1/3rd of the investment volume under this proposal is in advanced stage of project preparation and internal review.</p> <p><b>Rationale for Use of CTF in Ukraine’s DH Sector</b>  In 2005, Ukraine’s GHG emissions ranked 18th in the world, after Australia and France. Estimated total emissions in 2005 were nearly 495 million metric tons of carbon dioxide equivalent (MtCO<sub>2</sub>e) and per capita emissions were over 10 tons per person. Due to the inefficient use of gas and dependency on coal, Ukraine is the most energy intensive economy in Eastern Europe, consuming more than twice the amount of energy per US\$ of GDP as Poland and almost 40% more than Russia. The only countries with more energy intensive economies are the oil producers of the Middle East. While the carbon intensity of the economy has been decreasing due to a drop in economic growth, the energy sector alone was responsible for 69% of GHG emissions in 2006. According to the Ukrainian “Energy Strategy through 2030,” fossil fuel-fired generation is expected to increase over the next 20 years, primarily driven by a 30% increase in the use of coal for energy use.</p>	
<p><b>PROJECT SPECIFICS</b></p> <p><b>Overview</b>  This document sets out the EBRD’s Integrated Approach (“IA”) to the Ukraine District Heating (“DH”) sector over the period 2012-2017 and outlines the specific market transformation objectives in the Ukraine district heating sector and the benefits of a multi-project approach that is fully integrated with policy dialogue and technical advisory services at various levels of the sector.</p> <p><b>Project Objectives and Design</b>  The project strategy for the DH sector in Ukraine is targeted towards improved energy efficiency and a significant reduction of consumption of natural gas, leading to a significant reduction in CO<sub>2</sub> emissions from direct reductions of gas consumptions and indirect effects of reducing methane losses further up the network, mainly through:</p> <ul style="list-style-type: none"> <li>● Investment into demand side measures (individual heating substations, metering);</li> <li>● Conversion to local, domestic and where possible renewable fuels as biomass, sludge gas, and municipal solid waste;</li> <li>● Introduction of mini CHPs to increase overall system efficiency; and</li> <li>● Other energy efficiency investments across DH systems.</li> </ul>	

This project will use a combination of investment, technical assistance, and policy dialogue, to support the transition of the DH sector towards energy- and cost efficiency, and financial self-sustainability in a competitive environment without price distortions. As one of the most inefficient sectors in Ukraine the DH sector is in need of major restructuring and long-term investments and the multi-project and strategic approach will both target key investment needs and the main transition challenges in the sector. Multilateral donor support is required to ensure affordability of the investment, to develop capacity for project implementation, and to support engagement with regulatory authorities on tariff reform.

As part of the targeted investments, the EBRD will pursue project-specific market transformation objectives at the level of the participating utilities and the regulator. At the level of the project, these will consist of:

- Moving the city utility company towards a position of financial sustainability and increased competitiveness through the provision of improved services and loss reductions;
- Increasing the technical capacity within the company to undertake complex, long-term capital investment programmes; and
- Improve the business model to include the demand side and broaden the range of clean energy technology to fully reflect best practice in advanced economies.

Alongside the project-by-project approach, the project aims to address several key challenges at sector-level by combining standardised requirements for participating municipalities/utilities for a very close cooperation with the Regulator and national authorities. More specifically there are three key aspects that have a reach beyond each individual project that will be targeted through this project:

- The reform of the tariff methodology and measures to ensure its consistent application by the Regulator to ensure that:
  - tariffs are fully cost reflective and allow sustainable DH operations; and
  - DH competes on an equal footing with other forms of heat supply;
- The introduction of a model public service contract (“PSC”) to be rolled out by all participating cities and beyond. The PSC is expected to turn DH operators into companies that seek to cover their costs and generate a profit, focus and deliver cost effective services that compete with other forms of heat supply on an equal footing without the privilege of continuous and potentially unlimited public support; and
- The introduction of a sector wide benchmarking exercise based on standardised performance reporting template that will enable utility managers, municipalities, and regulator to assess their performance over time and against market standards.

These objectives are expected to be addressed most effectively through the project by combining several sub-projects, systematic policy dialogue, and specific advisory services. The project will strengthen the EBRD’s leverage when pursuing reform components associated to specific investments in the DH sector in Ukraine. Policy dialogue component by providing leverage in the form of a critical mass of investment projects which will help achieve a deeper long term impact during its policy dialogue. Leverage furthermore also derives from the continuing strategic engagement of the EBRD with the Ukrainian authorities through which commitment and deliverables by regulator and other stakeholders can be assessed and rewarded during the implementation of investment pipelines. For instance, the failure to implement the agreed tariff methodology could put further investment projects in the pipeline at risk both from a sustainable banking and from a market transformation perspective.

This project design will also enable the EBRD to tailor and adjust the technical assistance and policy dialogue in a more flexible way during an ongoing and challenging reform process.

The three sector wide objectives outlined above will be backed by a systematic approach to all operations within the IA that will pursue a set of utility specific reforms with the main objective of making DH operators more competitive and energy efficient, such as:

- Commercialisation and cost restructuring of operators;
- Increased adoption of metering and demand side measures to provide incentives for rational resource use and savings.

Besides the sector wide and project specific objectives the IA also facilitates – as a risk mitigant – the introduction of rules for the allocation of grants and concessional finance to signal that:

- DH is not a preferred sector; and
- Energy savings (emissions reductions) have a value and need to be encouraged in a way that is consistent with market principles in order to be sustainable.

### **Project Activities and Policy dialogue**

Consistent with the EBRD's project-focused approach, the objectives outlined above will primarily be driven by an investment component consisting of 5-10 sub-projects. All investments under this IA will promote energy efficiency and sustainable development of the DH sector in the relevant municipalities and regions. In addition, the EBRD will also leverage these investments with focused technical cooperation and policy dialogue to maximise the transition value of the IA. These components are outlined below.

### **Investment Component**

The overall project envelope is expected to consist of up to 15 sub-projects covering up to 15% of Ukraine's population, with a total volume of up to EUR 200 million of EBRD investment co-financed by CTF Concessional Loans and E5P grants. Implementation is foreseen up to 2017. Pricing and terms are in line with the principles laid down in EBRD document *Multilateral Climate Investment Funds (CIF) – Rules of the Special Fund (BDS09-201)*, which established CIF operations at the EBRD.

The Program will seek to retain flexibility (in terms of approach, project selection, and application of CTF funds) to achieve optimal structure and effectively accelerate the implementation of wind investments with minimum concession on a project-by-project basis. Products will be chosen based on what can most effectively address the barriers to accelerate investment and most efficiently use CTF funds to leverage investment in line with the project objectives.

Note that final agreement to provide CTF financing will for all sub-projects be subject to full due diligence and approval by the Board and management of the EBRD. All projects financed under the Program will be required to meet EBRD's environmental, social, governance and other compliance requirements, as well as all relevant national requirements of Ukraine.

As part of the development of project, the EBRD is endeavouring to mobilise an IFI partner with appetite for sub-sovereign risk in Ukraine with a view to co-financing some or all future projects undertaken under the IA. Discussions are on-going with two institutions. NEFCO, one of the identified institutions, is considering co-financing energy efficiency investments in the municipalities of Donetsk and Luhansk. In addition to this IFI partner, CTF co-financing will be crucial in addressing capital gaps and affordability constraints.

### *Terms of the CTF Investment*

Proposed CTF Investment:	EUR 36.6 million
<i>Instrument:</i>	<b>Senior loans on concessional terms</b>
<i>Tenor:</i>	15-20 years dependent on project needs and final negotiations with each city; grace period to be determined based on project need, up to 10 years on the principal.
<i>Seniority / security:</i>	Senior, as EBRD.
<i>Pricing:</i>	The concept of <u>least concessionality</u> will be applied. Actual pricing will be determined based on project need, with the aim to provide a material concession and to tangibly improve returns so that they compensate appropriately for additional risk and address affordability concerns.

#### *Use of Grants and Concessional Co-Finance – Impact and Eligibility Criteria*

The EBRD's leverage in pushing the reform agenda as part of the IA is further aided by the EBRD's role as an administrator of the E5P that was ratified by the Ukrainian Parliament in July 2011 – the EBRD (and other implementing agencies under E5P) can use this fund as an opportunity to demonstrate the market-compatible use of grants and kick-start the investment process in the DH sector.

E5P and CTF will be able to be combined, when eligibility criteria are met, and each donor funds specific project components. The use of grants will be guided by the following principles:

- Grants/ concessional co-finance needs to be justified on the basis of compensation for externalities (emission reductions);
- Grants/ concessional co-finance will be sized in proportion to the project effect in terms of reducing emissions (Grant = estimated annual emission reduction × # of years × price of carbon as per rules set out in the E5P manual);
- Grants/concessional co-finance will leverage reforms:
  - As grants/concessional co-finance are expected to largely finance IHSs (a small proportion of each city's network), the clients should commit to continue the roll-out of IHSs for their networks based on their own resource availability and without any further grants;
  - Metering and meter based billing needs to be rolled out.

#### *Implementation Progress and Pipeline*

The comprehensive list of projects (including the exploratory ones) currently in preparation (for approval in 2014) under the framework is given below:

#### *Project and Pipeline List – EBRD Integrated Approach to DH in Ukraine 2012 – 2017*

<b>Project name</b>	<b>EBRD Investment EUR</b>	<b>E5P grant financing EUR<sup>3</sup></b>	<b>CTF Concessional Loan<sup>4</sup></b>
<b>Projects signed</b>			
Ternopil District Heating	10,000,000	5,000,000	0
Lviv District Heating	20,000,000	10,000,000	0
Luhansk District Heating <sup>5</sup>	20,000,000	5,000,000	0
<b>Projects under preparation</b>			
Zaporizhzhya Energy Efficiency <sup>6</sup>	7,000,000	2,000,000	0
Donetsk Oblast District Heating	15,900,000	According to the rules	5,185,000
Donetsk City District Heating	11,500,000	According to the rules	3,750,000
Lutsk District Heating	7,500,000	According to the rules	2,440,000
Cherkassy Energy Efficiency II	9,000,000	According to the rules	2,930,000
Poltava District Heating	11,500,000	According to the rules	3,750,000
Gorlovka District Heating	6,000,000	According to the rules	1,955,000
Kryvyi Rih District Heating	15,100,000	According to the rules	4,920,000
Other Projects TBC	35,500,000	According to the rules	11,570,000
<b>Total Ukraine DH Projects</b>	<b>162,000,000<sup>7</sup></b>	<b>Not less than 49,000,000</b>	<b>36,500,000</b>

<sup>3</sup> Approved by E5P Donor Assembly, EUR22 million, foreseen not less than EUR27 million

<sup>4</sup> Information is indicative only.

<sup>5</sup> The E5P grant/CTF concessional co-finance sizing is provisional (apart from the already approved by the E5P Donor Assembly projects), subject to the CO<sub>2</sub> reduction to be confirmed by the Feasibility Study to be developed and subsequent review/approval by the E5P Steering Group and Donor Assembly. See item (iii) below.

<sup>6</sup> EBRD Board Approved

<sup>7</sup> Including EUR 50m already approved.

The implementation of this project is broadly on track, although some delays have been incurred. The first loan agreement (Ternopil District Heating) was signed in September 2012, the second (Lviv District Heating) was signed in June 2013, the third (Luhansk District Heating) was signed in December 2013 and a further six projects (Poltava, Zaporizhzhya, Donetsk, Lutsk, Cherkassy, Donetsk Oblast) with a loan financing volume of EUR 90 million are in active preparation (mandate letters signed and the due diligence on-going). The TC component roll-out has been delayed due to continuing discussions on the funding rules and procurement procedures for the planned joint EBRD-WB regulatory support TC, but is now on track. Additionally USAID, in consultation with the WB and EBRD, is considering joint technical assistance supporting the Regulator.

The first projects have been approved under the framework already, these being the Ternopil and Lviv District Heating Projects, which have already been signed and where the implementation has started in 2013. Luhansk was EBRD Board approved in 2013 and signed in December 2013. It is expected to commence implementation in 2014. It is not proposed that CTF funding will be added to these project structures. Further projects with five Ukrainian municipalities, namely Zaporizhzhya, Donetsk, Poltava, Lutsk, Cherkassy and one region (Donetsk Oblast) are in active preparation, with mandate letters signed and the due diligence and feasibility studies under way or, in case of regional project, due to commence shortly. The total EBRD loan financing volume for these six projects reaches up to EUR 100 million alongside expected EUR 20 million investment grant co-financing from the E5P Fund, and up to EUR 36 million CTF and a further EUR 78.5 million for projects in 2015.

#### *Technical Cooperation and Policy Dialogue Component*

There are project specific technical assistance activities linked to each transaction under this IA. There will also be additional technical cooperation provided to the Regulator to assist with the regulatory reform and a broader TC for developing a PSC with the endorsement of the Ministry and the Regulator:

- assistance with developing and introducing the model PSC to be deployed to all utilities participating in the IA (necessary condition for the projects);
- twinning programme for the regulator to develop benchmarking of operations to facilitate the regulatory process;
- assistance with developing the regulatory asset base assessment.

The EBRD has maintained an active policy dialogue with senior Ukrainian Government officials, the Regulator, other IFIs and stakeholders to ensure the proposed reform package is comprehensive and addresses the urgent reform needs, in particular, with respect to tariff regulation. The Regulatory Reform TC has been jointly submitted by the EBRD and the World Bank to the Assembly of Donors of E5P Fund. Following approval by the Donor Assembly in December 2012, the Regulatory Reform TC is in active preparation for roll-out during 2013 once the consultants are selected on competitive tender basis.

#### *Co-Operation with other IFIs*

EBRD is working closely with the World Bank on the assistance to the regulator, and with IFC on the design of residential energy efficiency finance facilities, and provision of technical assistance to the government on housing legislation. EBRD is fully involved in donor co-ordination to ensure that activities are complementary and do not overlap.

## **RESULTS MEASUREMENT, ADDITIONALITY, MARKET TRANSFORMATION POTENTIAL, AND RISK**

### **Results Measurement Framework**

Monitoring will be fully in line with the most recent version of the CTF Results Measurement Framework<sup>8</sup>. Market transformation objectives at the sub-project level will be monitored through the normal EBRD process for each transaction under the framework. In addition, there are aggregated targets that are expected to be

<sup>8</sup> 6 December 2012

achieved under this framework. The benchmarks below aim to capture these aggregated objectives and will partly be monitored through the EBRD's close engagement with the Ukrainian central and municipal authorities and periodic reporting from the clients. Also, each new project document submitted under this IA will include a brief progress report on the benchmarks below and update on remaining challenges.

<b>Impact Objectives</b>	<b>Monitoring Benchmarks</b>	<b>Timing</b>
<i>Institutions, laws and policies that promote market functioning and efficiency</i>	Adoption of the tariff setting methodology and procedures by the Regulator ensuring full cost recovery	End 2014
	Adoption of the investment programme assessment methodology by the Regulator	End 2014
	All participating utilities achieve operating cost recovery	Within a year after sub-project start
	All participating utilities achieve full cost recovery (opex and capex)	Within three years after sub-project start
	Adoption of the PSC format by the Regulator	End 2014
	Signing of PSCs under each individual transaction	2013 onwards for each project as it becomes operational
	Adoption of Regulatory Asset Based tariff setting methodology by the Regulator	2014 onwards
<i>Environmental Improvements</i>	Environmental improvements will come from reducing energy use, and reducing CO2 reductions, with the following targets: <ul style="list-style-type: none"> <li>- CO2 reductions of 350,000tCO2/yr</li> <li>- Energy savings of 350 GWh/yr equivalent in reduced electricity and natural gas consumption.</li> </ul>	By the end of the investment period
<i>Demonstration of ways of successfully restructuring companies and institutions</i>	Improvements in operating, technical and financial performance of the utility companies to achieve: <ul style="list-style-type: none"> <li>- targeted amount of energy savings (to be determined during due diligence for each project);</li> <li>- reduced losses in the network (to be determined during due diligence);</li> <li>- targeted operating cost reductions (to be determined during due diligence)</li> </ul>	2014 onwards
	Achievement of full cost-recovery tariffs (including coverage of the investment costs) for each utility	Within three years after project start
<i>Successful demonstration of new products and processes</i>	Installation of pilot demand side measures (IHS, metering)	2014 onwards for each project in accordance with the PIP
	Deployment of demand side measures across all the utilities	3-5 years after project start
	Installation of bio-fuel boilers and other energy – efficiency investments	2014 onwards for each project in accordance with the PIP

#### **Market Transformation Potential**

A key benefit of the IA to the DH sector in Ukraine is the synergies between the different types of projects presented herein where investments and regulatory improvements pursued in one transition impact area in the DH sector have a positive impact on the functioning and operations of all other areas. In particular achieving the improved tariff setting and regulation (to allow full operating and investment cost recovery) would facilitate

commercialisation of utilities as well as spur private sector participation.

Market transformation will be demonstrated in the context of specific priority investments being discussed with Ukrainian decision-makers (on central and municipal levels) and where the EBRD can successfully achieve a deeper commitment from the Ukrainian officials to promote reforms that will achieve specific transformation impact related to each of the individual projects.

Finally, bringing CTF co-finance into this project will enable the EBRD to engage in policy dialogue and to provide advisory services in a systematic manner. This is necessary to develop the regulatory structure that the sustainable development of the sector requires.

### **Additionality**

There are hardly any sources of commercial long-term finance for municipal utilities in Ukraine. As part of pipeline development under the IA, the EBRD is currently endeavouring to mobilise an IFI partner with potential appetite for municipal risk so as to co-finance future projects in the E5P context. Discussions are on-going with two institutions, including NEFCO which is considering co-financing energy efficiency investments in the municipalities of Donetsk and Luhansk. The EBRD is also uniquely placed to add significant value to the Project in terms of institutional development, skill transfer and tariff reform, complementing other donor initiatives.

<b>Additionality Dimension</b>	<b>Verification and/or counter factual results</b>	<b>Timing</b>
Conditionalities in the project documents	EBRD conditionalities go far beyond what commercial sources of funding would require, i.e. procurement procedures, transparency of accounting, sector reform, environmental and social procedures, stakeholder engagement and so forth.	Before signing/ during implementation
Terms	The market for long-term municipal borrowing for municipal utilities in Ukraine is practically non-existent. The Ukrainian local bond and loan markets offer maturities, which do not correspond to the economic life of infrastructure assets.	Already achieved as result of project preparation
EBRD attributes	The EBRD has accumulated substantial experience in Ukraine with municipal operations in Kyiv, Lviv, Cherkassy, Zaporizhzhya, Ivano-Frankivsk, Zhytomyr, Ternopil etc. The EBRD is uniquely positioned for the dialogue with the government and the Regulator on sector issues through the IA (including, inter alia, the tariff reform). The EBRD's role as administrator of E5P is also key for policy dialogue in the sector.	Before signing/ during implementation

### **Risks**

#### *Risks to market transformation impact*

The main risks to the transformation impact are related to: (1) the general political and reform environment in Ukraine including, inter alia, potential political unwillingness to set tariffs based on consumption and at full cost recovery or lag in setting up the tariffs, (2) failure to implement the Project, and (3) failure to introduce changes in the way the Company operates. These risks are mitigated by: (1) support by the Mayor and the City Council of the project, (2) good competence and motivation of the management team, (3) appropriate covenants in the Loan documentation and structuring of the Project, and (4) the IA which strengthens the EBRD's leverage when pursuing reform components and policy dialogue with the Ukrainian authorities in the district heating sector.

There are increasing concerns regarding Ukraine's macro-financial stability (exacerbated by a lack of structural reforms and corresponding lack of progress with the IMF negotiations), growing fiscal deficits at central level and the associated potential effects on the financial performance of the cities carrying out the sub-projects in the context of Ukraine's volatile and underfunded system of inter-budgetary relations. Cities chosen will have to have modest debt levels and demonstrate the resilience by the Company and the City to various negative

revenue and /or expenditure shocks, through stress tests.

*Sensitivity analysis / risks*

<b>Risk</b>	<b>Effect/ Probabili ty</b>	<b>Mitigation/Comments</b>
Demand risk	Medium/ Medium	<ul style="list-style-type: none"> <li>- If operated effectively, district heating is a competitive way to heat apartment buildings in the densely populated areas. The district heating infrastructure already exists but is in need of investments and upgrading.</li> <li>- Feasibility Study to confirm the sustainability of the district heating demand.</li> <li>- Stress-testing against decrease in volumes (coupled with pessimistic macroeconomic scenario and higher cost of funds) to be prepared as part of due diligence for each individual investment project.</li> </ul>
Credit risk of the Company and the City	High/ High	<ul style="list-style-type: none"> <li>- The PIP implementation is expected to result in considerable improvements in operational efficiency resulting in improved credit standing of the Company.</li> <li>- Projections for the City and the Company are to be stress-tested for each individual operation against the pessimistic macroeconomic scenario, higher cost of funds, lower volumes, for the Company and the City in order to assess vulnerability to various negative revenue and /or expenditure shocks and confirm their good credit standing.</li> <li>- The loan and the guarantee agreements will covenant the level of debt and the financial performance for both the Company and the City.</li> </ul>
Foreign exchange and interest rate risks	High/ High	<ul style="list-style-type: none"> <li>- The Company' sensitivity to an increase in interest rates and local currency devaluation is limited as it passes over the increased costs to consumers in tariffs. The Company is exposed mostly through a lag in tariff increase and indirect effects of increased tariffs on collection and affordability.</li> <li>- The City's financial forecasts are to be stress-tested against negative shocks in interest rates and currency movements.</li> <li>- The City is exposed to CTF foreign exchange risk on repayments. This will be mitigated by concessional pricing and loan terms.</li> </ul>
Implementation/ Operating risk	Medium/ Medium	<ul style="list-style-type: none"> <li>- Project Implementation Unit will be established within the Company supported by international consultants financed by TC funds.</li> <li>- The City treats the investment in the district heating sector as a priority, particularly, in the context of increasing prices of gas.</li> <li>- Procurement risk will be mitigated through appointment of international procurement and implementation consultants. Procurement risk is further mitigated by the inclusion into the PIP of the proven technological and technical solutions and equipment.</li> </ul>
Regulatory /legal risk	High/ High	<ul style="list-style-type: none"> <li>- As part of the IA the EBRD will work with the Regulator to ensure that a formalised tariff methodology based on principles of cost recovery and cost efficiency (including investment costs recovery) is developed and approved by the Regulator and adequately implemented for the Company.</li> </ul>
Political risk	Medium/ Medium	<ul style="list-style-type: none"> <li>- The project will significantly improve sustainability of operations of the district heating system in the cities and, therefore, the political consensus around the project, once approved, can be expected to continue. Experience from other cities shows that the tariff increases could be acceptable politically if linked with implementation of large investment programmes aimed at energy efficiency and better service.</li> </ul>

## **GENDER AND SAFEGUARDS**

### **Gender Impact**

The IA is part of the pilot gender work proposed by EBRD to the CTF, and approved in October 2013. See Annex F for details.

### **Safeguards**

#### *Environmental*

The sub-projects are normally Categorised B in line with the EBRD's Environmental and Social Policy. This means an independent environmental and social due diligence ("ESDD") of the Company and the projects will be carried out, consisting of an E&S audit of the Company's management systems and practices, the existing facilities and operations, and an E&S analysis of the impacts and benefits of the proposed PIP. These will normally lead to an Environmental and Social Action Plan, ESAP.

An ESAP contains required measures for identified impacts and could include the following: enhancing corporate EHS management; improving waste management; regular emissions monitoring; developing implementing and revising risk assessment procedures and providing relevant training to personnel; monitoring contractors; developing procedures for public safety during construction; management of asbestos removal; provision of information to public during the construction phase; minimising heat supply disruptions; providing required protection measures for noise and dust impacts; conducting weekly environmental and safety inspections during construction phase; regular maintenance during operation phase; optimisation and monitoring of efficient fuel use; and monitoring the use of resources and raw materials during operation phase. ESAPs will be agreed with the companies implementing sub-projects prior to project implementation commencing.

The companies implementing sub-projects will be required to provide the EBRD with annual environmental and social reports, including updates on the implementation of the project and the ESAP in compliance with EBRD PRs.

#### *Integrity*

All actions required by applicable EBRD procedures relevant to the prevention of money laundering, terrorist financing and other integrity issues have been taken with respect to the project, and the project files contain the integrity checklists and other required documentation which have been properly and accurately completed to proceed with the project.

All parties to the proposed transaction are public entities. The EBRD has checked publicly available information for integrity issues. Based on the information available to the EBRD there is no specific evidence of integrity issues that could prevent the EBRD from continuing a relationship with the Company or the City. OCCO was not involved in this Project.

## **DISTRICT HEATING SECTOR BACKGROUND**

### *Market Structure*

District heating (DH) services in Ukraine are decentralised both in terms of ownership and decision making, which now rests at the municipal level. DH utilities are mostly organised as municipal enterprises (semi-corporatised) with de jure management independence, but de facto heavily dependent on the local administration for decision-making and financial support. There is generally a lack of good contractual arrangements between DH companies and relevant city administration. Thus, the norm is limited predictability in procedures, revenues, and implementation of investment programmes as well as the lack of accountability and clear incentives for the companies' management.

### *Size of the Market*

District heating supplied about 65% of heat requirements in 2006, although it is likely to have declined since then. In 2010, 82% of Ukraine's heat production came from natural gas. In turn, heat and CHP plants accounted for 27% of natural gas use, just ahead of the 26% of natural gas directly supplied to residential and commercial/public service use. These two sectors, which would be addressed by this project, account for about 60% of total centrally produced heat use.

### *Sector Regulation*

Tariff setting responsibilities, which were until recently within the purview of the municipalities, have been transferred to the single national regulator, initially within the energy regulator (National Energy Regulation Commission – "NERC"), but since mid-2011 to a new sector regulator (National Utility Regulatory Commission – the "Regulator") formed on the basis of NERC. The Regulator is now staffed and is in the process of building capacity, but requires support. A new methodology for tariffs has been developed but it has not been adhered to in tariff-setting and lacks a clear design and procedures relating to approval of tariff increases for investment programmes. To become a well-functioning sector the DH sector in Ukraine would therefore also need a clear, predictable, and consistent regulatory framework. The reform process of the heat supply sector in Ukraine should aim to achieve a competitive level playing field in which the most cost competitive supply sources deliver heat to end users.

### *Climate Impact of the District Heating Sector*

Due largely to insufficient maintenance and capital repairs over the past two decades, DH systems in Ukraine are plagued by inefficiency and excessive distribution losses and are therefore a significant source of the greenhouse gas emissions accounting for 20 per cent of the CO<sub>2</sub> (equivalent to 54 mtCO<sub>2</sub>/yr<sup>9</sup>) and 81 per cent of the methane emissions produced by fossil fuel combustion in Ukraine (equivalent to 55 mtCO<sub>2</sub>/yr<sup>10</sup>). Problems also persist at the demand side. Ukraine's 77,400 high-rise residential buildings (five or more stories) alone consume approximately 44 per cent of all of the country's heat energy resources. An efficient heating sector would also require efficiency on the demand side backed by end users that can control their final consumption and heating bills.

### *Barriers to Market Transformation*

#### Operational Performance

In consequence of the sector structure, financial and operational performance in the DH sector is weak, as the vast majority of local utilities continue to be loss making and utility systems remain supply driven, both cost- and resource-inefficient. This prevents the companies from making urgently needed investments to increase efficiency, drive down cost, and improve customer service. The high and increasing costs, inflexible structures on the supply- and demand side have led to increasingly weak services to end users and DH networks have been losing customers to alternative sources of heat supply, most commonly gas fired individual boilers. The gas price for the population remains at an exceedingly low level (the gas price for the DH companies for generation of heat for residential customers is 64 per cent above the gas price for the population) resulting in further disconnections from the centralised DH. Increasing the efficiency of gas use is therefore not just an environmental, but also an economic must for the utilities. Decreasing rates of connected users further limit the opportunity for environmental improvements, by reducing the potential for renewable and high-efficiency CHP solutions to achieve substantial reductions in CO<sub>2</sub> emissions in Ukraine.

#### Tariffs

Tariffs were substantially below cost recovery and do not include investment costs, leading to further deterioration of the infrastructure. Additionally, tariffs are often based on outdated norms rather than actual

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<sup>9</sup> IEA, data for 2010

<sup>10</sup> World Bank, data for 2010

use. Metering and then billing based on actual use remain uncommon, providing little incentives for efficient use. Cross-subsidies are widespread. While the tariffs for the budgetary and commercial sector have now been increased to cost-recovery levels, the residential tariffs remain subsidised by the Government citing concerns about potential affordability effects, particularly for the vulnerable part of the population. This issue is one of the main stumbling blocks in the renewal of the Ukraine's cooperation with IMF with the recent IMF press-release stating that "large subsidies on gas and heating for households continue to undermine Ukraine's budget and its balance of payments."

**Annex A**

<b>SAMPLE SUB-PROJECT UKRAINE DISTRICT HEATING MODERNISATION PROGRAMME</b>	
<b>Transaction:</b>	A senior loan of up to EUR 20 million, under a municipal guarantee, to be complemented by up to EUR 5 million grant co-financing (the “ <b>Grant</b> ”) from the Eastern Europe Energy Efficiency and Environment Partnership (the “ <b>ESP</b> ”) and up to EUR 5 million of concessional loan-finance from the Clean Technology Fund (the “ <b>CTF</b> ”).
<b>Project Description/ Business Purpose:</b>	<p>The proceeds of the loan and the grant will be used to finance a priority investment programme (the “<b>PIP</b>”) aimed at significantly improving the energy efficiency, reducing energy losses, gas and electricity consumption and improving the quality of heat and hot water supply services in the City (the “<b>Project</b>”). The PIP includes, inter alia:</p> <ul style="list-style-type: none"> <li>• Introduction of individual heating substations (“<b>IHSs</b>”) and associated rehabilitation and modernisation of the heat distribution networks (~EUR 12.2 million, EUR 5 million of which is to be financed through the Grant and EUR 5 million of which is to be financed through the CTF);</li> <li>• Installation of natural gas fired mini-combined heat and power plants (“<b>CHPs</b>”), with an electricity generation capacity of 12 MW and heat generation capacity of 15 MW (~EUR 12.0 million);</li> <li>• Replacement of obsolete main transmission pipelines (~EUR 3.2 million);</li> <li>• Replacement of 4-pipe distribution networks into two-pipe system due to conversion from central heating substations (“<b>CHSs</b>”) to IHSs (~EUR 4.3 million);</li> <li>• Installation of a dispatching and monitoring system (~EUR 1.3 million).</li> </ul> <p>The PIP is expected to result in significant efficiency improvements with positive environmental impact associated with a reduction of resource usage and corresponding reduction in CO<sub>2</sub> emissions.</p>
<b>Associated TC:</b>	<p><b>Pre-signing:</b></p> <ul style="list-style-type: none"> <li>• Feasibility Study (EUR 300,950), financed by a bilateral donor;</li> <li>• IFRS audit (EUR 25,000), funded by the EBRD’s own resources.</li> </ul> <p><b>Post-signing:</b></p> <ul style="list-style-type: none"> <li>• Project Implementation Support (EUR 600,000) including procurement and contract supervision, assistance to the Company to strengthen the implementation capacity, to be financed by the Government of Sweden. TC Com approved on 20 March 2013;</li> <li>• Corporate Development Support Programme (“<b>CDSP</b>”) to support development of a financial and operational performance improvement programme; Corporate Development Plan; Public Service Contract; policies which promote equal opportunities and non-discrimination; and a Stakeholder Participation Programme. (EUR 275,000), to be financed by the Government of Sweden. TC Com approved on 20 March 2013.</li> </ul> <p>All TCs are proposed to be non-reimbursable.</p> <p><b>Cost Sharing:</b></p> <p>Since this project is in support of a municipal client, there is no presumption of cost sharing, however the Company will make in kind contributions through the provision of office space, photocopying equipment and supplies, telephone connections, transportation to sites relevant to the preparation and implementation of the Project.</p>
<b>Key Parties Involved:</b>	<ul style="list-style-type: none"> <li>• The Company as the borrower and operator.</li> <li>• The City as the guarantor of the Loan.</li> </ul>

<b>Maturity:</b>	EBRD: Up to 13 years including up to 3 years of grace. CTF: Up to 20 years including up to 10 years of grace
<b>Security / Guarantees:</b>	<ul style="list-style-type: none"> <li>• Financial Guarantee of the City;</li> <li>• Project Support Agreement between the EBRD and the City covering <i>inter alia</i> timely payment for heat by municipal entities, non-discriminatory treatment by the City and compliance by the City with its undertakings under the PSC.</li> </ul>

### Investment Programme

The PIP will focus on increasing energy efficiency, reducing fuel, electricity and water consumption and other maintenance and operating costs, improving the reliability and quality of district heating services. The PIP will be implemented over a period of three years. It is expected that the PIP, as structured, will reduce the operating costs for the Company and will save up to 30 per cent per cent of energy (gas) at the project area, and a significant amount of treated water, as well as increase the quality of heat and hot water services to the consumers. The PIP will benefit the entire population of the City. The IHSs component of the project covers one complete district or about 40 per cent of the connected residents in Lviv. The IHSs district will serve as an example of complete district heating system loop operated with modern technology such as pre-insulated pipes, frequency converters and automatic heating substations as well as dispatching centre for remote control and monitoring of the heat supply which ultimately increases quality of provided services to the end-consumers.

The proposed project addresses the urgent investments targeted towards improving the energy efficiency as well as the quality of district heating service provision and reduced losses incurred in the distribution networks. The introduction of IHSs represents the first step investments at the customer demand side that will transfer control of heating from the supplier to the end-users.

The PIP composition is as follows:

#### Installation of IHSs

As a result of the increased focus on energy efficiency and on reduction of gas import from Russia, the Company received funds for UAH 35.6 million (EUR 3.56 million) in 2009 from a national funding programme aiming at modernisation of the district heating system in Ukraine. However, the amount of funds and the short permissible implementation were not sufficient for a conversion from all CHSs into IHSs at building level. In addition, the introduction of the IHSs will save energy and increase the comfort of the end-consumers by accurate regulation of heat which is expected to match the actual, fluctuating needs of the buildings and individual needs of the consumers. The domestic hot water will be generated inside the buildings' envelope resulting in huge savings of water use and increased quality. Generally, the conversion will also decrease the heat demand and consequently lower the costs of required upgrading of the heat generation facilities. The substations will include new heat and hot water meters allowing an implementation of the tariff reform, to be based on actual consumption at the building level.

The main focus from the consumers' perspective is on the investments which create incentives to control and save energy through increased energy efficiency measures and through behavioural changes of the consumers allowing them to significantly reduce the heat demand in the buildings. Investment into new, compact substations is crucial for the modernisation strategy of the entire district heating system, a first necessary step forward to switching from a production-controlled to consumer-controlled heat provision. It will significantly influence the progress of tariff reforms by creating incentives for customers to save energy and control their consumption of heat, and also will speed up the modernisation of buildings, improve heating comfort for the consumers and increase their willingness to pay for the provided services. To ensure this, meters and substations giving the possibilities to regulate energy usage at building level must exist, and consumer information and engagement, as well as policy dialogues and an adequate legislative framework to allow further investments (other energy efficiency measures) must be in place.

The largest district has been selected for the installation of IHSs under this project. The district is very suitable as it consists of multi-storey buildings primarily supplied from the CHP plant TEC-1, but also from other boiler plants that may be part of the rehabilitation programme. As such this district will be a very good showcase with a complete conversion to customer controlled operations, supplied by more than one boiler plant under the variable flow regime. The area supplies 618 residential connections, 290 commercial connections and 93 budgetary connections. The term 'connection' is used here as one building or one customer may have more than one connection to the district heating network.

The average benefits of this component can be summarised as:

- Water losses reduced by circa 15 per cent in the project area, corresponding to more than 5,000 m<sup>3</sup> annually;
- Power consumption for pumping reduced by approximately 30 per cent in the project area, corresponding to more than 1,200 MWh annually;
- Network temperatures can be lowered by 12°C to 15°C leading to inter alia lower heat losses and improved operating conditions for CHP plants, corresponding to savings of more than 0.11 million m<sup>3</sup> gas annually in the project area;
- Lower energy supply to the connected building in the district, corresponding to reduced use of gas corresponding to 4.6 million m<sup>3</sup> gas annually;
- Opex reduction resulting from lower labour costs (the number of personnel could be reduced by 135 after project implementation);
- Avoided reinvestment in domestic hot water pipelines of approximately EUR 0.25 million annually;
- CO<sub>2</sub> savings of 10,100 tonnes per year.

#### Introduction of mini CHPs

Mini CHPs are gas engines connected to generators and condensing units supplying the district heating network. The gas engine is an efficient means of producing electricity and heat from low pressure gas supply. Two of the boiler plants, Pivnichna and CHP1, have large enough summer load for the gas engines capable of producing 12 MWel to operate 8,000 hours per year. The equipment will be installed in the existing building at Pivnichna, and using the existing distribution systems. The estimated total investment is EUR 12.0 million. The gas engines will, in addition to producing electricity for use by the district heating company, thereby reducing imports of low-efficiency electricity from the grid, replace 15 MWth of heat load from the existing gas boilers (basically covering the summer load).

The average benefits of installing two mini CHPs will be:

- Electricity production will increase by 85,200 MWh after project implementation (resulting in savings of natural gas equivalent of 26 million m<sup>3</sup> per year);
- CO<sub>2</sub> savings of 63,700 tonnes per year.

#### Monitoring and Optimisation Programme

The Company operates approximately 120 boiler plants around the city and most of the production is concentrated at the larger production units (CHP1 and CHP2). Around one third of the production is generated from de-centralised boiler houses. The Company has started to convert the monitoring programme to more modern systems with temperature, flow and pressure measuring equipment, thus enabling monitoring and optimisation of the production, as well as allowing better synchronisation of the heat output with other networks and the demand. They have started to implement the system at four de-centralised boiler plants with good results in energy savings thanks to optimisation etc. The Company also has a large labour force with the main task to manually monitor the process. This labour force can be reduced thanks to the expansion of this system to other boiler plants.

An investment programme including measuring equipment for temperature, flow and pressure in the production units and network for collecting and processing data will enable an efficient use of energy and personnel. This part of the investment programme is estimated at EUR 1.3 million, and will enable the company to connect the decentralised boiler to the existing monitoring system.

The benefits of installing measuring devices in the boiler houses and pipe network will be:

- A reduction of the natural gas consumption of 1,7 million Nm<sup>3</sup> gas per annum;
- A reduction of CO<sub>2</sub> emissions of 3,200 tonnes per year;
- A reduction in opex resulting from decrease in labour (personnel could be reduced by circa 100 once the system is up and running) and repair and maintenance costs.

### **Replacement of main transmission pipelines**

The project includes replacement of three larger transmission pipelines vital for the supply of district heating to the project area where the IHSs will be installed, in total 1.3 km DN800 and 0.3 km DN400. Seen as a separate measure, and without considering the cost of reduced customer satisfaction, pipe replacements do not rank among those measures which have the shortest pay-back time. However, if the district heating network is allowed to deteriorate, a situation would arise where eventually system operation is no longer sustainable on a safe basis. If no replacement of pipes is performed during the coming five year period, the failure rate would be expected to increase, as would the cost of unplanned repairs. The main benefits of the replacement of distribution pipelines relate to lower heat and water losses, less costs for repair and maintenance and a higher reliability for the system.

The benefits during a 10-year loan period of replacement of distribution pipelines will be:

- Reduction of heat losses by 4,000 MWh corresponding to saving of 0.4 million m<sup>3</sup> gas;
- Reduction of electricity consumption of 1,700 MWh;
- Reduction of water losses of 8,700 m<sup>3</sup>;
- CO<sub>2</sub> savings of 2,500 tonnes per year.

### **Replacement of distribution pipelines between the CHSs and the buildings**

Due to the conversion from CHSs to IHSs, the 4-pipes distribution network will be replaced by a 2-pipes system and the pipeline supplying energy for space heating will also supply the energy for preparation of domestic hot water. Consequently this investment package is well in line with the long term strategy to replace smaller diameter pipes which often are in worse condition than the larger diameter pipes. The project includes replacement of 15 per cent of the 56 km distribution pipeline network in the Sykhiv district with an average pipe dimension of DN100.

The benefits during a 10-year loan period of the replacement of pipelines between the CHS and the connected buildings will be:

- Reduction of heat losses by 900 MWh corresponding to saving of 0.1 million m<sup>3</sup> gas;
- Reduction of water losses of 2,200 m<sup>3</sup>;
- CO<sub>2</sub> savings of 200 tonnes per year.

The objectives of the priority investments are in line with the long-term strategy for the Company and focus on the reduction of fuel, electricity and water consumption, as well as reduction of maintenance and operating costs, in order to achieve positive short-term results. Reduction of energy consumption will also lead to a decrease of greenhouse gas emissions (CO<sub>2</sub> and NO<sub>x</sub>).

### **Total project**

The total investment of EUR 33 million is to be financed by an EBRD loan of EUR 20 million, a EUR 5 million grant from the E5P, a EUR 5 million concessional loan from the CTF, and a local contribution from the Company of EUR 3 million. Local taxes (VAT) are also expected to be covered from a local contribution.

The following investment components have been proposed and agreed with the Company as the final priority investment programme:

- Modernisation of district heating assets and optimisation of operations, mainly by introduction of IHSs (~EUR 12.2 million). EUR 5 million financed through the E5P grant, and EUR 5 million financed by the CTF, and EUR 1.6 million through the EBRD loan;

- Introduction of natural gas fired mini-CHPs (12 MWel), with a heat generation capacity of 15 MWth (~EUR 12.0 million);
- Pipeline replacement – main transmission lines (~EUR 3.2 million);
- Pipeline replacement – distribution network (~EUR 4.3 million);
- Monitoring and Optimisation Programme (~EUR 1.3 million).

The benefits of the total investments will be:

- Reduced utilisation of natural gas by improved energy efficiency and reduced losses totalling 6.9million m<sup>3</sup> per year;
- Reduced utilisation of water with 15,900 m<sup>3</sup> annually;
- Reduced power consumption for pumping with 2,900 MWh annually;
- CO<sub>2</sub> savings with 79,700 tonnes per year;
- Additional generation of electricity totalling 85,200 MWh per year<sup>11</sup>.

The IRR for the project has been estimated by the Feasibility Study Consultant at 13.9 per cent in real terms.

### **Affordability analysis of residential tariffs in the Sample Project**

This Annex presents projections on the affordability of district heating and hot water in the City according to an affordability model developed by the EBRD.

The key variables and assumptions are summarised below:

- **The household income** figures are based on the statistical data for the Region and the City for 2011 from the State Committee of Statistics of Ukraine and the City Department of Economics.
- **Current residential two-tier tariff (2013)** for heat in the City stands at UAH 180 per Gcal and the fixed part of the tariff at UAH 1.3 per square meter per month (including VAT). The financial model forecasts, with the increases in gas price for population (somewhat offset in 2014-2015 by revenues from sale of electricity generated at CHPs), the real heating and hot water tariff increases for variable part of the two-tier tariff as follows:
  - 2013: 32.7 per cent for heat;
  - 2014-2015: decreases for heat and hot water in real terms by 2.2 and 13.6 per cent respectively;
  - 2016: 38.2 per cent for heat and hot water;
  - 2017: 45.4 per cent for heat and hot water;
  - 2018: 30.9 per cent for heat and hot water.
- The fixed part of the two-tier tariff is expected to increase on average at 20.1 per cent in real terms over 2013-2018. Afterwards the tariffs are expected to be adjusted substantially in line with inflation (i.e. no real tariff increases).
- **Utility consumption:** currently majority of the customers have meter based billing for hot water and heating. It is expected that by the end of 2014, as the result of the project implementation, all customers will have meters for heat and will be billed according to actual heat consumption. Therefore, the heat consumption is modelled as a function of income and tariffs. The average household heat consumption currently amounts to around 0.51 Gcal per month for heat and around 0.17 Gcal per month for hot water.
- An **affordability limit** of 10 per cent of household expenditure for heating and hot water is considered.

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<sup>11</sup> Generation of electricity at the Company's mini CHP plants will result in own generation of electricity to replace purchased electricity produced through the grid. Under the assumption that the marginal power production is performed in coal fired condensing plants with an average efficiency of 35 per cent, the electricity generation in mini CHP plants within the project will reduce the coal consumption equivalent of 26 million m<sup>3</sup> natural gas, more than offsetting any increase in local gas use. Grid losses are being ignored in this assessment. The proposed mini-CHP plant are the highest efficiency models currently available, ensuring that combined heat and power is produced as efficiently as is possible.

**Results:**

**Table 1: Affordability of heating and hot water (in UAH/Gcal), in per cent of household income**

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
average household	6.1%	8.0%	7.8%	8.8%	9.3%	10.0%	9.6%	9.3%	8.9%	8.6%	8.3%
1st decile (lowest)	9.9%	13.1%	12.8%	14.4%	15.2%	16.4%	15.7%	15.1%	14.6%	14.1%	13.6%
2nd decile	7.8%	10.3%	10.1%	11.3%	12.0%	12.9%	12.4%	11.9%	11.5%	11.1%	10.7%
3rd decile	6.7%	8.8%	8.6%	9.7%	10.3%	11.0%	10.6%	10.2%	9.9%	9.5%	9.2%
<b>Affordability threshold 10%</b>											

- In the presence of meter-based billing, the tariff increases are not expected to generate affordability challenges for average income households. An average income household is expected to allocate less than 10 per cent of its disposable income on heating and hot water services.
- Nevertheless, the tariff increases may generate affordability challenges for the households belonging to the lower income deciles. For the lowest income decile affordability threshold is expected to be in breach until throughout the period considered peaking at 16.4 per cent in 2018 and decreasing to 13.6 per cent in 2023.
- For the second lowest income decile affordability threshold is expected to be in breach until 2023 peaking at 12.9 per cent in 2018 and decreasing to 10.7 per cent in 2023. For the third income decile affordability threshold is expected to be in breach from 2017 until 2020 peaking at 11.0 per cent in 2018.

Summing up, the analysis shows that there are no affordability concerns for average income households throughout the entire period based on the tariff structure projected by the financial model. Nevertheless, tariff increases are expected to impose a significant affordability burden on households belonging to the lower income deciles. This issue will be mitigated by the fact that the Ukrainian government provides income support to all low-income households to cover spending on utility services in excess of 15 per cent of the household income.

## Annex B

### ABBREVIATIONS / CURRENCY CONVERSIONS

CDSP	Corporate Development Support Programme
CHP	Combined Heat and Power Plant
CHS	Central Heating Substation
Consultant	AF Consult, the feasibility study consulting company
DH	District Heating
DSCR	Debt service coverage ratio
ESP	Eastern Europe Energy Efficiency and Environment Partnership
ESAP	Environmental and Social Action Plan
ESDD	Environmental and Social Due Diligence
EUR	Euro
Gcal	Giga calorie – unit of heat
GDP	Gross Domestic Product
GHG	Green House Gases
IFRS	International Financial Reporting Standards
IHS	Individual Heating Substation
IRR	Internal Rate of Return
m <sup>3</sup>	cubic metre – unit of volume
MW	megawatt – unit of power
MWh	megawatt hour – unit of energy
NEFCO	Nordic Environment Finance Corporation
NERC	National Energy Regulatory Commission
O&M	Operations and Maintenance
PIP	Priority Investment Programme
PIU	Project Implementation Unit
PP&R	EBRD's Procurement Policies and Rules
PR	Performance Requirements
SIDA	Swedish International Development Cooperation Agency
SSF	EBRD Shareholder Special Fund
TC	Technical Cooperation
UAH	Ukrainian Hryvnia

### CURRENCY CONVERSIONS

EUR 1 = UAH 10.5

EUR 1 = USD 1.35

**Annex C**

**Indicative Budget for Technical Assistance Program**

**CTF Advisory Services Component**

<b>Activity Overview</b>	<b>Year 2014-2017</b>	<b>CTF Contribution</b>	<b>EBRD/Donor/Sponsor Contribution</b>
	Thousand USD		
<b>Project Preparation, Feasibility Studies and Technical Assistance work and Capacity Building</b>	9,000	0	9,000
<b>Policy Dialogue</b>	1,000		1,000
<b>CTF/CIF Knowledge Management and Evaluation</b>	0	133	133
<b>Total</b>	<b>10,000</b>	<b>133</b>	<b>10,133</b>

**Annex D**

**Administrative Budget**

<b>1. Project Implementation (pre-signing)</b>	<b>Full Management Cost (USD)</b>	<b>CTF Management Cost Share (32.4% - USD)</b>
(Due diligence; legal review; contractual and site visits)	280,000	90,500
(Staff costs - fund management; overall project preparation; project and programme management)	280,000	90,500
<b>Subtotal</b>	<b>560,000</b>	<b>181,000</b>
<b>2. Project Supervision (post signing)</b>		0
(Contractual and site visits)	504,000	163,500
(Fund's and Financial Controls; monitoring & reporting; site visits; restructuring; evaluation)	840,000	272,500
<b>Subtotal</b>	<b>1,344,000</b>	436,000
<b>3. Total</b>	<b>1,904,000</b>	<b>617,000</b>

## Annex E

### Knowledge Management Activities

- 1) Production of a publishable case study aimed at the climate finance community covering the climate and social benefits of investing in district heating projects
  - Overview of the project
    - Outcomes
    - Barriers and challenges
  - Impact of key actors
    - Public Authorities
      - Central Government
      - Regulator
      - Municipalities
    - IFIs
      - EBRD
      - World Bank
    - Donors
      - CTF
      - Other donors
  - Specific development outputs and social impact
    - Climate impact
    - Approach to tariff reform
    - Market transformation impact
  - Lessons learnt
- 2) Production of a handbook on establishing PIUs and PSCs in municipal energy efficiency projects

## Annex F

### Gender

#### I. BACKGROUND

Within the CTF's policy orientations, there has been a growing interest in assessing the co-benefits of financing climate operations, where co-benefits could arise in areas such as employment, health, poverty, and gender equality. In particular, gender concerns have risen in climate finance since the initial approval of investment plans under the CTF in 2008 - 2010. EBRD is currently in the process of progressing through a pipeline of sub-projects under CTF approved frameworks for which under EBRD policies no separate gender assessment is required for every project, but rather a targeted approach is taken based on a gender gap analysis<sup>12</sup>.

The EBRD recognizes equality of economic opportunity, where economic opportunities should be made available to people regardless of their gender, as well as other conditions like social background, ethnic origin etc., as a fundamental aspect of a modern, well-functioning market to be promoted in its countries of operation. A particular difficulty with involving women effectively in household energy projects has been that, since the benefits for women have appeared self-evident, it has often been believed that no special analyses were needed and that any project seeking to be effective would automatically take the necessary measures to ensure benefits for male and female equally. In EBRD we believe that further assessment is needed to fully understand the potential for the district heating projects in terms to both promote gender equality and to ensure that both men and women are enabled to benefit from the opportunities and impact of the project and that the specific needs and constraints of women in any aspect will be taken into account.

#### II. EBRD STRATEGIC GENDER INITIATIVE AND FUNDING REQUEST

The Strategic Gender Initiative (SGI) approved by the EBRD Board on the 16th April 2013 (BDS13-057) mandates the EBRD to work predominantly within a pre-defined group of regions where the gender gaps have been identified as greatest, at least over the short term (3 years). The SGI specifically sets out the need for "initial efforts to develop projects that will primarily target the countries where the preliminary gap analysis has shown that gender challenges are greatest: these are judged to be Central Asia, Turkey and the SEMED<sup>13</sup> countries."

The sectors and countries covered by the CTF do not fall within the priority regions or sectors identified by the EBRD as the key focus areas for this new Initiative. Furthermore the SGI provides three clear channels for engagement:

- Access to Finance;
- Access to Services; and
- Access to Skills and Employment.

As such, whilst the EBRD can provide the staffing to manage the consultants under the proposed assignments, the EBRD is currently limited in its ability to finance from its own funds, gender assessments within the CTF projects identified below and as such will need to rely on donor funding for external consultancy and travel cost. Given that the CTF co-finances these projects, it is the most appropriate source of funding for the proposed gender assessments.

#### III. OBJECTIVES

The main objective of the assignment is to implement up to 2 project-level gender assessments and gender components which will help shape the actual projects/programmes to be implemented by EBRD, within the Municipal and environmental infrastructure (MEI) sector and for which CTF funding is to be sought. These projects/programmes will promote the equality of access to the benefits of these Projects (such as

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<sup>12</sup> The relevant EBRD policy, the Strategic Gender Initiative (SGI) is outlined here: <http://www.ebrd.com/pages/about/principles/gender/plan.shtml>

<sup>13</sup> Southern and Eastern Mediterranean Region, i.e. Jordan, Egypt, Tunisia, Morocco

employment, finance and heating) as well as to contribute to achieving the long term and sustainable goals. As part of this, the impact the CTF financing had and can have on ensuring that gender equality and equal opportunities are fully taken into account in the design and implementation of these projects will be assessed.

A second objective will be to prepare a synthesis report analysing the project-level studies in the sector and drawing wider lessons and recommendations. This report will then be disseminated to a wide audience including recipient and donor countries of the CTF; the wider climate related financing and CSO community; other stakeholders, research and development partners and the wider public.

#### **IV. AUDIENCE**

The target audience will be wide-ranging. It includes the recipient and donor countries of the CTF; wider climate related financing and CSO community; and other member states that have submitted the investment plan, as well as other stakeholders, research and development partners and the wider public. The analysis will be used to contribute to provide guidance on a more efficient and effective targeting of financing and policy actions for gender impact and also to provide lessons for other countries.

#### **V. SCOPE OF WORK**

Based on the requirements of the EBRD's SGI and Municipal and Environmental Infrastructure Sector Strategy (MEISS) and the CTF policy orientation and priorities, the tasks would comprise the following:

##### **1) Gender Assessments Project Design**

As part of the implementation of the EBRD's new MEISS, to be further built upon in the approved Strategic Gender Initiative of EBRD, the EBRD will seek to address gender inequalities as regards access to certain services, including urban transport, provision of heating, water and management of solid waste. In this context, the EBRD is looking to develop a pilot project approved under CTF frameworks in Ukraine or Kazakhstan with a gender component in the district heating (DH) sector. Issues which could be addressed through the EBRD's engagement with its clients might include:

- *Gender Differences in Heat Use*

Assessment on the different use by women and men, within the household, of heating, as well as the differentiated practical and strategic needs, constraints, attitudes and opinions about the sustainable use of heating, energy conservation and cost efficiency, in order to better identify access to services and employment related to district heating.

- *Access to Employment*

Traditionally employment within the district heating sector has been male-dominated, much of which has arisen from the fact that historically the sector has not been attractive to the female population given the nature of the work involved. The introduction of more sophisticated automatic heating systems jointly with some specific trainings and adequate communication allow for there to be a targeted approach towards expanding employment opportunities to ensure women will access and benefit equally from job opportunities in the sector. As such, for those projects where the EBRD is engaged in financing such systems the EBRD will seek to work with its clients to assess their Human Resource approach and to more effectively market employment opportunities for both men and women so as to ensure equality of opportunity by implementing adequate measures or revising their policies.

- *Customer Engagement and Service Delivery*

In addition to this, the EBRD will seek to work with its clients with regards the customer orientation of their service delivery. There is data to show that weak customer orientation by heating companies can lead to lower tariff collection rates. Bill collection is the primary interface between service providers and customers. Given that, generally, in much of the EBRD's region women are responsible for

settling the heating bills, the promotion of adequately trained female bill collectors could enhance customer engagement and provide for tangible improvements in service delivery. Because of the role of women in the family, any information dissemination and/or awareness raising campaign will also have a multiplier effect at the household level and this will be relevant for the next generation of users.

- *Access and more efficient use of Services*

In the EBRD's region a lack of awareness in the energy conservation of district heating can be an issue among heat users. Ultimately the provision of training or the production of related user-friendly and family-friendly communication and marketing material, on energy conservation and sustainable use of energy to women - the primary users of heat - could lead to quantifiable benefits both in terms of conservation and cost efficiency. A better understanding of energy conservation and cost efficiency by women can be linked with more empowerment and more voice and agency at the household level, as women will have more access to the information, (including technology) and will be able to make informed decisions related to energy use. The assessment will facilitate recommendations in terms of how to enhance the voice of women related to energy conservation and cost efficiency, participation of women in local energy existing committees or associations or creation of structure at the local level of such committees in order to exchange information, raising awareness and multiplication effect among families.

## **2) Preparation of a report**

This will capture knowledge emerging from the individual project-level gender assessments in the sector (district heating) which will include lessons learned and best practice. This will be made accessible to a wide audience including, but not limited to, donors, policy makers, the private sector, research, civil society and international financial institutions.

The report will:

- Describe the experiences and lessons learned emerging from the implementation of CTF programs and projects
- Propose concrete recommendations of three types; a) generic for the sector, b) country specific and c) project specific

## **VI. DISSEMINATION**

Lessons learned from the implementation of the gender assessments may inform other similar operations globally for dissemination. The preliminary results/findings of this study could be disseminated at the CIF Partnership Forum to be held in Jamaica in 2014. The report would also be published in digital format on EBRD's website to reach out other relevant stakeholders globally, including the MDB working groups on gender and environment.

## **VII. BUDGET<sup>14</sup>**

The cost of this work is covered by the prior approval of funds.

## **VIII. EXPECTED OUTPUT AND TIMETABLE**

Concrete deliverables:

- Up to 2 project-level Gender Assessments in CTF sub-projects

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<sup>14</sup> **Eligible Expenditures:** The grant will finance expenditures for: (i) consultants' services, local training, workshops and seminars, and (ii) operating costs and office equipment for the implementation management of grant activities not to exceed 10% of the grant amount.

**Ineligible Expenditures:** The following expenditures will be ineligible: (i) salaries for civil servants in recipient countries hired as consultants or otherwise; (ii) purchase of vehicles; (iii) foreign training and study tours; and (iv) salaries and travel of World Bank Group staff and consultants.

- Report on gender and District Heating Dissemination (printed material)

The work is expected to progress according to the below schedule:

<b>Expected Output</b>	<b>Date</b>	<b>Notes/Contents</b>
Gender Assessments	Throughout FY13/14	Individual project gender assessments
Preliminary findings	April 31, 2014	Overview of experience with gender assessments, lessons learnt, drawing together of preliminary results and analysis could be submitted for information to the CTF TFC in June 2014.
Final KM Report	June 30 2014	The draft report will be disseminated by EBRD.
Dissemination/Presentation	FY2014/15	The final report will be disseminated by EBRD and the CIFAdministrative Unit

#### **I. IMPLEMENTATION ARRANGEMENTS**

The gender assessment grant will be managed by European Bank for Reconstruction and Development, in collaboration with CTF Focal Points as the counterparts on the Government side. The consultants' selection, grant accounting and disbursements will be made under EBRD procedures. All institutions will provide inputs at all stages of the assignment; provide access to information to the consultants as required; and will be given the opportunity to review the draft documents and provide feedback as necessary. This includes consultation with the CIF Gender Specialist, once recruited.