

**PROJECT INFORMATION DOCUMENT (PID)  
APPRAISAL STAGE**

Report No.: PIDA2652

<b>Project Name</b>	District Heating Energy Efficiency (P132741)
<b>Region</b>	EUROPE AND CENTRAL ASIA
<b>Country</b>	Ukraine
<b>Sector(s)</b>	Energy efficiency in Heat and Power (100%)
<b>Theme(s)</b>	City-wide Infrastructure and Service Delivery (80%), Climate change (20%)
<b>Lending Instrument</b>	Specific Investment Loan
<b>Project ID</b>	P132741
<b>Borrower(s)</b>	Ministry of Finance
<b>Implementing Agency</b>	Ministry of Regional Development, Construction, Housing and Communal Services of Ukraine, participating district heating companies
<b>Environmental Category</b>	B-Partial Assessment
<b>Date PID Prepared/Updated</b>	30-Nov-2013
<b>Date PID Approved/Disclosed</b>	12-Dec-2013
<b>Estimated Date of Appraisal Completion</b>	13-Dec-2013
<b>Estimated Date of Board Approval</b>	27-Mar-2014
<b>Decision</b>	

## **I. Project Context**

### **Country Context**

Ukraine is among the most energy intensive economies in the world. Ukraine's energy intensity exceeds that of Germany by a factor of 3.9 (0.47 kg of oil equivalent in Ukraine vs. 0.12 kg in Germany in 2010) and more than double that of the EU-12 countries. The only countries in the Europe and Central Asia (ECA) region with more energy intensive economies are Turkmenistan and Uzbekistan. Such high energy intensity is attributable, in part, to historically low energy prices, especially for natural gas, which biased the incentives in favor of inefficient and energy intensive technologies. As a result, the Ukrainian industrial sector is labor and energy intensive. Similarly, district heating is also labor- and energy-intensive and was designed based on low-cost gas. Because of its high energy intensity, Ukraine is among the worst CO<sub>2</sub> polluters in the world.

The Government of Ukraine calls for more than a 50 per cent reduction in energy intensity by 2030 (compared to 2005), corresponding to energy savings of 223 million ton of oil equivalent (MTOE). About 38 per cent of the savings (85 MTOE) would come from structural changes, as the economy shifts away from heavy industry to more service-oriented sectors, and the rest would primarily

come from technological improvements in industries and buildings. To achieve this target it is estimated that about US\$20 billion needs to be invested in energy efficiency over the next 15 years.

### **Sectoral and institutional Context**

Ukraine is among the most energy intensive economies in the world. Ukraine's energy intensity exceeds that of Germany by a factor of 3.9 (0.47 kg of oil equivalent in Ukraine vs. 0.12 kg in Germany in 2010) and more than double that of the EU-12 countries. The only countries in the Europe and Central Asia (ECA) region with more energy intensive economies are Turkmenistan and Uzbekistan. Such high energy intensity is attributable, in part, to historically low energy prices, especially for natural gas, which biased the incentives in favor of inefficient and energy intensive technologies. As a result, the Ukrainian industrial sector is labor and energy intensive. Similarly, district heating is also labor- and energy-intensive and was designed based on low-cost gas. Because of its high energy intensity, Ukraine is among the worst CO<sub>2</sub> polluters in the world.

The Government of Ukraine calls for more than a 50 per cent reduction in energy intensity by 2030 (compared to 2005), corresponding to energy savings of 223 million ton of oil equivalent (MTOE). About 38 per cent of the savings (85 MTOE) would come from structural changes, as the economy shifts away from heavy industry to more service-oriented sectors, and the rest would primarily come from technological improvements in industries and buildings. To achieve this target it is estimated that about US\$20 billion needs to be invested in energy efficiency over the next 15 years.

#### **Sectoral and institutional Context**

District heating (DH) is a key element of energy consumption in Ukraine. DH companies are the third biggest consumers of natural gas in the country (after households and industry). DH accounts for 20 per cent of the CO<sub>2</sub> emissions and 80 per cent of the methane emissions from fossil fuel combustion in Ukraine. Most of the buildings in cities and towns are connected to DH networks; about 80,000 high-rise buildings consume 44 per cent of the country's heat energy resources. The reason for high energy consumption in Ukrainian DH sector is its poor energy efficiency, which developed as a result of high energy subsidies and poor energy pricing policies.

Historically, DH in Ukraine has been heavily subsidized through the provision of gas to utilities at below market prices and low residential heating tariffs. In 2012, DH companies paid US\$93 per thousand cubic meters (tcm) (excluding VAT and delivery charges) for gas used to produce residential heat, about 20 per cent of the average import gas price Ukraine paid to Russia that year (US\$425/tcm). As a result, the actual average financial cost of residential heat production in Ukraine in 2012 was about US\$40 per Gcal, about 50 per cent below that of Western Europe and many countries in Eastern Europe. On the other hand, the approved district heating tariffs are also subsidized and cover on average about 60 per cent of the current, already low, heat production cost. DH companies are to receive a direct subsidy for the difference between their actual costs incurred and revenues received; the 2012 State Budget included about US\$0.6 billion as compensation to DH companies for low tariffs. However, the budget compensation to utilities either comes late or does not come at all.

As a result of poor energy pricing policies DH companies are financially constrained. They do not have funds to implement necessary investments and maintain the system in decent condition to provide quality service (e.g., maintain comfortable temperature in all apartments they service during a heating season, minimize service disruptions, etc.). Due to a protracted lack of investment over the past 25 years, the system is in urgent need of rehabilitation. About 60 per cent of heat is

lost in production, networks, at heat exchangers and during end-use. Because of their poor financial state, DH companies cannot borrow from local banks for much-needed investments to modernize their assets and improve efficiency and service quality.

Lack of funds for system modernization and deferred maintenance have led to higher-than-necessary operating costs for the utilities. Maintenance and investments are carried out on an ad hoc basis to deal with emergency situations rather than in a planned manner designed to reduce operating costs. The common outdated practices of supplying heat directly from the boiler-house or through central heat substations (CHSs) to consumers has led to higher fuel needs, higher losses, lower service quality and higher CO<sub>2</sub> emissions than in more modern systems that supply heat to consumers through building-level individual heat substations (IHSs).

The sector has been reluctant to switch to building-level heat substations because: (i) CHSs were invented in Ukraine; (ii) many old-style DH professionals still believe in the superiority of supply-driven DH systems; and (iii) the rate of return on this investment is rather low to DH companies because most of efficiency gains are captured by their customers. Moreover, installing IHSs is complicated in a regulatory sense. According to the Law on Heat Supply (No. 2633-IV), DH companies are responsible for generation, transmission and distribution of heat up to a building's wall. Regulation of heat distribution within a building, which includes servicing and maintenance of internal pipes and IHSs, is left to municipalities. Homeowners associations are still rare, and residential buildings' ownership is mostly mixed: apartments are owned by residents, while municipalities own the common spaces. This means that DH companies need to get authorization from the municipality (and in some cases from the residents as well) in order to install IHSs. Without such authorization, which would also grant access for servicing and maintenance, IHSs cannot be included in the utilities' regulated investments plans and thus tariffs. Hence, installation of IHSs requires commitment and determination of both DH companies and municipalities. Some more progressive municipalities in Ukraine started solving this regulatory obstacle to IHS installation. They either outsource servicing and maintenance of the internal building infrastructure to DH companies or lease space inside buildings to DH companies for IHS installation. However, even in these municipalities lack of funds prevents installation of IHSs on a large scale.

DH companies have neither means nor incentives to improve their efficiency and governance. About 70 percent of residential DH consumption remains not metered; most of Ukrainian households pay their heating bills according to estimated consumption based on apartment size. Below-cost recovery residential heating tariffs discourage DH companies to invest in building-level heat meters and move to consumption-based billing. To the contrary, DH companies have an incentive to overestimate residential heat consumption and overcharge residential consumers in order to reduce their financial losses. This also hides true network losses and decreases incentives to improve efficiency of the system.

These challenges culminate in poor quality of heating service. According to public consultations conducted by the World Bank in 2011, many residents are not satisfied with the quality of service offered by their DH companies. Some complained that DH companies are not able to maintain comfortable temperatures in all apartments. Others noted that the utilities start supplying heat later than they are supposed to and stop earlier, but still charge residents for the whole heating season. Many respondents mentioned disruptions of service and a lack of routine maintenance of DH infrastructure.

The Government of Ukraine (GoU) has taken several steps to address the issues in the DH sector. Firstly, in July 2010, the Parliament passed the Law on State Regulation in the Area of Communal Services in Ukraine which states that tariffs for communal services need to cover economically justifiable costs and planned profit and that investment costs can be recouped through tariffs. Secondly, in July 2011, the President of Ukraine signed a decree creating a Utilities Regulator: the National Commission on the Regulation of Communal Services. The Utilities Regulator issues licenses, regulates the licensees and approves tariffs for DH companies that operate large boiler houses and/ or supply large volumes of heat. The Utilities Regulator now has over 290 licensees that supply over 90 per cent of the heat in Ukraine. The creation of the Utilities Regulator removed the process of setting district heating prices from the control of the municipal governments. So far the Utilities Regulator has calculated tariffs for the 57 largest DH utilities representing 80 per cent of the heat market. On average heating tariffs need to increase by 40 percent to bring them to financial cost recovery. However, this is a politically sensitive matter, especially given the upcoming 2015 Presidential elections. Hence, GoU has not yet increased DH tariffs.

The Bank has actively supported reforms in the Ukrainian DH sector. In 2012, the Bank published a report entitled “Modernization of the District Heating Systems in Ukraine: Heat Metering and Consumption-Based Billing”, which outlined a multi-step reform program. It recommended (i) making consumption-based billing for heat obligatory; (ii) installing building-level heat meters in all buildings that use district heat together with temperature controls at IHSs; and (iii) improving targeted social assistance for low income households. This would reduce heat consumption by about 20 per cent and reduce DH utilities’ gas consumption by 10 per cent. The study also emphasized that DH tariffs should cover the full cost of gas and of investments necessary to modernize the system, while reducing heat consumption by about 50 per cent through investments in energy efficiency. In 2012, the GoU approved a master plan to improve energy efficiency in the DH sector based on this report. However, its implementation remains slow.

In coordination with the IMF, the Bank developed a suggested path for energy price reforms in Ukraine, along with impact mitigation. The proposed reforms include a short-term increase of DH tariffs to financial cost recovery levels and gradual increases in gas prices to DH utilities (with corresponding heating tariff increases) over the subsequent four years. These steps would be implemented together with the reform of social safety nets to improve targeting and an aggressive energy efficiency program to reduce residential heat consumption. The new IMF Stand-By program, currently under negotiation, is consistent with the above. Also, as requested by GoU, the Bank’s proposed Second Social Assistance Modernization project could assist with expanding the Guaranteed Minimum Income (GMI) program coverage to protect the poorest households from the negative impacts of the tariff increases.

In consultation with the EC, EIB, EBRD, USAID and SIDA, the Bank designed technical assistance to the Utilities Regulator to support its long-term sector reform strategy. The proposed technical assistance, expected to commence in January 2014, will support (i) development of incentive-based methodologies and auditing principles in order to improve the Utilities Regulator’s capacity for setting cost recovery tariffs; and (ii) introduction of a sector-wide benchmarking exercise that will enable the Utilities Regulator to assess DH companies’ performance over time and incentivize them to improve their efficiency. The proposed technical assistance would be implemented over two years, through a recipient-executed trust fund, financed by the Swedish International Development Cooperation Agency (SIDA). Successful implementation of this activity would stimulate improving efficiency and quality of service of DH companies and move them toward financial viability. The

proposed activity has been closely coordinated with USAID and EBRD. This activity would become a part of the Integrated Approach to Reform in the Ukrainian District Heating Sector of the development partners.

The Project is an important part of the Bank's comprehensive sector strategy to address the major challenges in the DH sector and as a vehicle to continue the policy dialogue, including on DH tariffs. The Project will finance investments to modernize DH systems that will have a significant economic impact and that will improve efficiency of heat production and delivery, reduce network losses and decrease building-level heat consumption. In medium term, these investments are expected to decrease DH production costs, hence making district heating services affordable to the population. By also promoting consumption-based billing at the building level it will provide incentives to both utilities and households to implement energy efficiency measures, and improve transparency and governance in the sector.

## II. Proposed Development Objectives

The project development objective is to improve the energy efficiency and quality of service of selected Ukrainian DH companies, improve their financial viability and decrease their CO2 emissions

## III. Project Description

### Component Name

Energy Efficiency Investments

### Comments (optional)

This component will cover rehabilitation of boiler houses; closure of redundant boiler houses; installation of mini-CHPs; replacement of network pipes; installation of IHSs, heat meters and SCADA

### Component Name

Technical Assistance and Capacity Building

### Comments (optional)

This component will finance technical assistance to Minregion which will oversee the implementation of the Project

## IV. Financing (in USD Million)

Total Project Cost:	382.00	Total Bank Financing:	332.00
Financing Gap:	0.00		
<b>For Loans/Credits/Others</b>			<b>Amount</b>
Borrower			0.00
International Bank for Reconstruction and Development			332.00
Clean Technology Fund			50.00
Total			382.00

## V. Implementation

The Project will be implemented by 10 participating DH companies, namely Chernihivteploelectrocentral (Chernigiv), Dniproteploenerho (Dnipropetrovsk),

Donetskmiskteplomerezha (Donetsk), Ivano-Frankivskteplokcomunenergo (Ivano-Frankivsk), Miskteplovodenerhiya (Kamyans-Podilsky), Kharkivski Teplovi Merezhi (Kharkiv), Khersonteploenergo (Kherson), Kirovohradteplo (Kirovograd), Mykolayiboblteploenergo (Mykolaiv) and Vinnytsiamiskteploenergo (Vinnytsia). The participating DH companies and municipalities were selected competitively. Selection was based on governance indicators and financial indicators. Governance indicators included: availability of boiler-level gas and heat meters; prevalence of residential consumption-based billing; availability of IHSs and /or readiness to install IHSs. Financial indicators included: cost recovery level of heating tariffs; collection rate. All the participating DH companies have 100 per cent gas meters in their boiler houses; almost all boiler houses operated by participating companies have boiler-level heat meters. The average cost recovery of the participating DH companies is 70 per cent (compared to 60 per cent average in Ukraine).

Each participating DH company has established, using their existing staff, a Project Implementation Unit (PIU), which consists of: general manager, procurement specialist, financial management (FM) specialist, technical supervisor (engineer) and safeguards specialist. The responsibilities of the local PIUs will include: preparation of the tender documents, preparation of technical specifications, leading procurement process according to the World Bank guidelines, leading FM according to the World Bank guidelines, supervision of physical works, environmental and social assessment, monitoring and evaluation, preparation of the progress reports, etc.

The Project implementation by each participating DH company will be supervised by the Ministry of Regional Development, Construction, Housing and Communal Services (Minregion). The Central Project Management Unit (CPMU) has been created around an existing PIU in the Ministry that has been implementing the Clean Technology Fund (CTF) Project Preparation Grant. The responsibilities of the CPMU will include: reporting to the World Bank, providing procurement and FM support to the local PIUs, aggregating data and reports, checking invoices and delivering them to the Ministry of Finance, supervising quality of service survey, monitoring and evaluation, etc. The existing CTF PIU capacity will be increased by adding procurement, FM, engineering, safeguards and accounting specialists. The Project CPMU will benefit from the lessons learned and experience of the Urban Infrastructure Project (UIP) CPMU in Minregion, which has been supervising the implementation of the UIP since 2007.

Additionally, each participating DH company will present its annual investment programs, financed by the Project, to the Utilities Regulator for its review, approval and inclusion in the investment component of their heating tariffs.

Since most of the participating DH companies have no experience in implementation of the World Bank projects, the local PIUs as well as new members of the CPMU participated in the training on Bank procedures conducted by the Bank staff and Minregion. The Bank and Minregion will continue providing regular in-depth trainings on procurement, FM and safeguards issues to the PIUs and CPMU during Project implementation.

## VI. Safeguard Policies (including public consultation)

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	x	
Natural Habitats OP/BP 4.04		x
Forests OP/BP 4.36		x

Pest Management OP 4.09		x
Physical Cultural Resources OP/BP 4.11		x
Indigenous Peoples OP/BP 4.10		x
Involuntary Resettlement OP/BP 4.12	x	
Safety of Dams OP/BP 4.37		x
Projects on International Waterways OP/BP 7.50		x
Projects in Disputed Areas OP/BP 7.60		x

**Comments (optional)**

**VII. Contact point**

**World Bank**

Contact: Yadviga Viktorivna Semiko  
 Title: Senior Energy Economist  
 Tel: 473-7631  
 Email: ysemikolenova@worldbank.org

**Borrower/Client/Recipient**

Name: Ministry of Finance  
 Contact: Viktoria Kolosova  
 Title: Head, Division for Cooperation with International Finance Or  
 Tel: 38044 2775333  
 Email: kolosova@minfin.gov.ua

**Implementing Agencies**

Name: Ministry of Regional Development, Construction, Housing and Communal Services of Ukraine

Contact:  
 Title:  
 Tel:  
 Email:

Name: participating district heating companies  
 Contact:  
 Title:  
 Tel:  
 Email:

**VIII. For more information contact:**

The InfoShop  
 The World Bank  
 1818 H Street, NW  
 Washington, D.C. 20433  
 Telephone: (202) 458-4500  
 Fax: (202) 522-1500  
 Web: <http://www.worldbank.org/infoshop>