PROJECT INFORMATION DOCUMENT (PID)
CONCEPT STAGE

Report No.: PIDC860

Project Name	District Heating Energy Efficiency (P132741)
Region	EUROPE AND CENTRAL ASIA
Country	Ukraine
Sector(s)	Energy efficiency in Heat and Power (100%)
Theme(s)	City-wide Infrastructure and Service Delivery (80%), Climate change (20%)
Lending Instrument	Specific Investment Loan
Project ID	P132741
Borrower(s)	District Heating Utilities
Implementing Agency	District Heating Utilities, District Heating Utilities, Ministry of Regional Development, Building and Communal Services of Ukraine, Ministry of Regional Development, Building and Communal Services of Ukraine
Environmental Category	B-Partial Assessment
Date PID Prepared/ Updated	20-Mar-2013
Date PID Approved/ Disclosed	15-Jul-2013
Estimated Date of Appraisal Completion	01-Nov-2013
Estimated Date of Board Approval	20-Mar-2014
Concept Review Decision	Track II - The review did authorize the preparation to continue

I. Introduction and Context

Country Context

1. 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 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 CO2 polluters in the world.

2. The Government of Ukraine calls for more than a 50% reduction in energy intensity by 2030 (compared to 2005), corresponding to energy savings of 223 million ton of oil equivalent (MTOE). About 38% 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

3. 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% of the CO2 emissions and 80% of the methane emissions from fossil fuel combustion in Ukraine. Most of the buildings in cities and towns are connected to DH networks; 77,400 high-rise buildings consume 44% 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.

4. Historically, DH in Ukraine has been heavily subsidized through the provision of gas to utilities at below market prices and low residential heating tariffs. As a result of low gas prices, the actual average financial cost of residential heat production in Ukraine in 2012 was about US$40 per Gcal, about 50% 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% of the current, already low, heat production cost. DH utilities are to receive a direct subsidy for the difference between their actual costs incurred and revenues received. However, the budget compensation to utilities either comes late or does not come at all.

5. 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. Due to a protracted lack of investment over the past 25 years, the system is in urgent need of rehabilitation. 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.

6. 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 group substations to consumers has led to higher fuel needs, higher losses, lower service quality and higher CO2 emissions than in more modern systems that supply heat to consumers through building-level heat substations (ITPs).

7. DH utilities have neither means nor incentives to improve their efficiency and governance. Most Ukrainian households pay according to normative, estimated consumption. This does not encourage DH companies to invest in building-level heat meters and move to consumption-based billing. Instead, utilities have incentives to overestimate residential heat consumption and overcharge residential consumers for heat in order to reduce their financial losses. Overestimating residential heat consumption also hides true network losses and decreases incentives to improve efficiency of the system.

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8. In July 2010, the Parliament passed a law on the State Regulation in the Area of Communal Services in Ukraine. In July 2011, the President of Ukraine signed a decree creating a utilities regulator - the National Commission on the Regulation of Communal Services (district heating and water supply sectors); and the Law on Heat Supply was amended accordingly. Currently the utilities regulator has over 280 licensees that supply over 90 per cent of the total heat in Ukraine.

9. The utilities regulator has established a priority list of the 75 largest DH companies and aims to have their financial cost-recovery tariffs calculated and approved by the end of the 2012-2013 heating season. So far the utilities regulator has calculated tariffs for the 40 largest DH utilities that cover about 70 per cent of the heat market in Ukraine.

10. The Government has made it a strategic priority to improve energy efficiency as per its Energy Strategy 2030 and reiterated in its ongoing update. It has approved a master plan to improve energy efficiency in the district heating sector based on a combination of cost-recovery tariffs, a large-scale investment program in energy efficiency measures starting but not limited to building-level heat substations, and reforms of the social safety net to protect vulnerable consumers.

11. The World Bank, together with other donors, is assisting to implement this master plan through an ongoing policy dialogue on energy price reforms, DH tariff regulation, and social safety nets. In coordination with the IMF, the Bank has developed a suggested path for energy price reforms in Ukraine, together with its impact assessment. The proposed reforms include increasing DH tariffs to financial cost recovery levels in 2013 and subsequent gradual increases of gas price to DH utilities (with corresponding heating tariff increases) over the following four years. These steps would be implemented together with the reform of social safety nets to improve targeting and aggressive energy efficiency program to reduce residential heat consumption. The new IMF Stand-By Arrangement program, currently under negotiations, is consistent with the Bank's position on energy pricing and social protection reforms.

12. In consultation with EC, EIB, EBRD and USAID, the Bank submitted to the Eastern Europe Energy Efficiency and Environment Partnership (E5P) grant fund a request for technical assistance to the utilities regulator. In December 2012, the second Assembly of Contributors approved the World Bank-executed capacity building grant to assist the utilities market regulator with updating tariff methodology and estimation of cost recovery tariffs for its licensees. The Bank has also started preparation of a Second Social Assistance Modernization project to support implementation of the social safety nets reform.

13. The proposed project is a part of the Bank's comprehensive sector strategy and would support implementation of the Government's district heating energy efficiency program. The vast experience from Central and Eastern Europe demonstrates high economic impacts of modernizing DH systems. The main investment components of DH systems modernization are rehabilitation of the networks (replacement of old pipes with pre-insulated pipes) and installation of individual building-level heat substations, with automatic temperature controls and heat metering facilities. The proposed project would finance these investments, which are expected to reduce network losses, decrease building-level heat consumption and facilitate consumption-based billing. Building-level heat metering and consumption-based billing would provide incentives to both DH utilities and households to implement energy efficiency measures, as well as improve transparency, and hence governance, in the sector. The project is fully aligned with the Government's strategic

objective to reduce energy intensity by 50% by 2030 and the Government's master plan to reduce energy intensity in the DH sector.

Relationship to CAS

14. The proposed District Heating Energy Efficiency Project is included in the Country Partnership Strategy (CPS) for Ukraine for fiscal years 2012-2016 under Pillar 2 (Improving Policy Effectiveness and Economic Competitiveness: Support to Building Relations with Businesses). The proposed project supports the Pillar's results area "Improving Infrastructure for Business Activities" by improving efficiency in the public sector (expected outcome 14).

II. Proposed Development Objective(s)

Proposed Development Objective(s) (From PCN)

15. The project development objective is to improve the energy efficiency and quality of service of selected Ukrainian district heating utilities and decrease their CO2 emissions.

Key Results (From PCN)

16. The key project development indicators for tracking progress toward the project development objective are:

- Decrease in residential heat consumption of participating utilities (10-15% compared to baseline);
- Decrease of heat and water network losses (8-10% decrease compared to baseline);
- Decrease of gas needs to produce residential heat of participating utilities (10% decrease compared to baseline);
- Consumption-based billing of heating services (100% by the proposed project's closing date);
- Decrease of CO2 emissions (10% compared to baseline);
- Improved quality of services, as measured (by surveys before, during and after the project) by the following indicators:
  - frequency and duration of service disruptions;
  - comfort level in apartments (average room temperature during a heating season; whether rooms are too hot or too cold during a heating season); and
  - quality of hot water supply (for DH utilities that also supply hot water).

17. The baseline and expected savings will be established after completing the feasibility studies for selected DH utilities and their first quality service survey.

III. Preliminary Description

Concept Description

18. The proposed project would be implemented over six years, through a Specific Investment Loan (SIL) from IBRD directly to DH utilities, guaranteed by the Government of Ukraine, in the total amount of US$250 million, blended with Clean Technology Fund (CTF) loan in the amount of US$50 million; the utilities are expected to contribute funds of approximately US$50 million.

19. The CTF funds would allow increasing the scale of the proposed investments in building-level heat substations (ITPs) that have surprisingly low market penetration in Ukraine. Most of the countries in Western and Eastern Europe have switched to supplying heat through ITPs due to their economic and efficiency gains. However, in Ukraine this switch has not happened, partly because of

historical reasons (group substations were invented in Ukraine) and partly because of prevalence of the old Soviet mentality among Ukrainian DH professionals who still believe in superiority of supply-driven DH systems. Using CTF funds would buy down the investment costs of the participating utilities, allowing them to install more ITPs, thus speeding up the process of introduction of a more efficiency technology to the market, increasing its demonstration effect and reaching the tipping point when other DH companies start investing in ITP installation. Using CTF funds would also lead to lower CO2 emissions that could not be achieved otherwise.

20. The proposed project aims to engage with utilities of different sizes (small, medium and large) to enhance its demonstration and transformation effects. The participating utilities were selected though a screening process managed by the Ministry of Regional Development, Building and Communal Services of Ukraine (Minregion). Minregion developed an application form for the district heating utilities, based on the criteria, suggested in the World Bank "Ukraine: Creditworthiness of District Heating Companies" report. These criteria, among others, included: cost recovery level of heating tariffs; collection rate; availability of boiler-level heat meters; prevalence of residential consumption-based billing (i.e., share of residential heat consumption which is billed according to readings of building-level meters); availability and readiness to install ITPs. Minregion, the executor of the CTF Project Preparation Grant received by Ukraine as a part of the CTF investment plan, decided to use the project preparation grant to prepare feasibility studies for 6 of the selected utilities.

21. Applications, received from over 60 Ukrainian utilities, were independently evaluated. Based on the recommendations of the independent report, the Government recommended the following 6 DH utilities for participation in the proposed project and preparation of the feasibility studies:

- Miskteplovodenerhiya (Kamyanets-Podilskyi),
- Ivano-Frankivskteplokomunenerho (Ivano-Frankivsk);
- Kharkivski teplovi merezhi (Kharkiv);
- Vinnytsiamiskteploenerho (Vinnytsia);
- Mykolaivoblteploenerho (Mykolaiv); and
- Khersonteploenerho (Kherson).

22. The two other companies were suggested as potential candidates for the project if financing becomes available for additional feasibility studies:

- Donetskmiskteplomerezha (Donetsk) and
- Southwest teplovi merezhi (Khmelnytsky).

23. The proposed project would consist of two components: (i) investment component; and (ii) technical assistance and capacity building component.

24. The investment component (US$294 million) would improve companies' efficiency, reduce costs and improve their quality of supply. This component is expected to finance:

- installation of ITPs in residential buildings and possibly municipal buildings (schools, hospitals, etc) serviced by participating utilities; and
- replacement of networks with pre-insulated pipes.

25. The scope of the investment component will be determined by feasibility studies conducted for each participating utility.

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26. No land acquisition is expected. All sites will be located on municipal land which is not used in any way. There are no illegal occupiers or squatters on expected project sites. The proposed project would use existing district heating pipeline routes that are owned by municipalities. No old or historic buildings/facilities will be included in the proposed project. No gender-specific impacts are expected. If potential gender effects are identified during subprojects' preparation, a separate analysis will be done.

27. The technical assistance and capacity building component (US$6 million) would finance operational strengthening of participating utilities. It would include:

- software and necessary training support to implement 100% consumption-based billing;
- regular service quality surveys;
- capacity building of participating utilities to install and maintain ITPs; and
- project implementation support.

28. This component is expected to be co-financed with other donors.

29. The preparation of the proposed project would be combined with policy dialogue on tariff reforms with the main objective of improving the regulatory practices focused on achieving financial sustainability. The preparation of the proposed project would also be supported by a public awareness campaign, financed by the CTF Project Preparation Grant.

IV. Safeguard Policies that might apply

Safeguard Policies Triggered by the Project	Yes	No	TBD
Environmental Assessment OP/BP 4.01	×		
Natural Habitats OP/BP 4.04		×	
Forests OP/BP 4.36		×	
Pest Management OP 4.09		×	
Physical Cultural Resources OP/BP 4.11		×	
Indigenous Peoples OP/BP 4.10		×	
Involuntary Resettlement OP/BP 4.12		×	
Safety of Dams OP/BP 4.37		×	
Projects on International Waterways OP/BP 7.50		×	
Projects in Disputed Areas OP/BP 7.60		×	

V. Financing (in USD Million)

Total Project Cost:	350.00	Total Bank Financing:	250.00
Total Cofinancing:		Financing Gap:	0.00

Financing Source	Amount
Borrower	50.00
International Bank for Reconstruction and Development	250.00
Clean Technology Fund	50.00
Total	350.00

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