Document of
The World Bank

Report No.: PAD1065

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF US$140 MILLION

TO THE

REPUBLIC OF UZBEKISTAN

FOR A

DISTRICT HEATING ENERGY EFFICIENCY PROJECT

January 3, 2018

Energy and Extractives Global Practice
Europe and Central Asia Region

CURRENCY EQUIVALENTS
(Exchange Rate Effective as of December 26, 2017)

Currency Unit = Uzbekistan Som (UZS)
US$1 = UZS 8,120.07

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

BEM	Bukharaenergomarkaz
CBU	Central Bank of Uzbekistan
CQS	Selection based on the Consultants' Qualifications
DA	Designated Account
DC	Direct Contracting
DH	District Heating
DHC	District Heating Company
ECAPDEV	Europe and Central Asia Project Development Trust Fund
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
EMP	Environmental Management Plan
ENPV	Economic Net Present Value
FBS	Selection under a Fixed Budget
FIRR	Financial Internal Rate of Return
FM	Financial Management
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GW	Gigawatt
HOA	Home Owners Association
HCS	Communal and Housing Sector
IC	Individual Consultants
ICB	International Competitive Bidding
IFR	Interim Financial Report
IFRS	International Financial Reporting Standards
IHS	Individual Heat Substation
ISA	International Standards on Auditing
KA	Kommunkhizmat Agency
LCS	Least-Cost Selection
M&E	Monitoring and Evaluation
MAB	Multi-apartment Building
MHCS	Ministry of Housing and Communal Services

NCB	National Competitive Bidding
PDO	Project Development Objective
PCU	Project Coordination Unit
PEFA	Public Expenditure and Financial Accountability
PFS	Project Financial Statement
POM	Project Operational Manual
PP	Procurement Plan
QCBS	Quality- and Cost-Based Selection
QBS	Quality-Based Selection
RPF	Resettlement Policy Framework
SBD	Standard Bidding Document
SIA	Social Impact Assessment
SIC	State Investment Committee
SOE	Statement of Expenditure
SORT	Systematic Operations Risk-Rating Tool
SSS	Single-Source Selection
TA	Technical Assistance
ToR	Terms of Reference
UNDB	United Nations Development Business
VAT	Value Added Tax
WA	Withdrawal Application
WACC	Weighted Average Cost of Capital

Regional Vice President:	Cyril E Muller
Country Director:	Lilia Burunciuc
Senior Global Practice Director:	Riccardo Puliti
Practice Manager:	Sameer Shukla
Task Team Leaders:	Feng Liu
	Mitsunori Motohashi

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District Heating Energy Efficiency Project
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PAD DATA SHEET

Republic of Uzbekistan

District Heating Energy Efficiency Project (P146206)

PROJECT APPRAISAL DOCUMENT

EUROPE AND CENTRAL ASIA REGION

Report No.: PAD1065

Basic Information		
Project ID P146206	EA Category B - Partial Assessment	Team Leader(s) Feng Liu, Mitsunori Motohashi
Financing Instrument Investment Project Financing	Fragile and/or Capacity Constraints [ ] Financial Intermediaries [ ] Series of Projects [ ]	
Project Implementation Start Date 25-Jan-2018	Project Implementation End Date 31-Dec-2024	
Expected Effectiveness Date 25-Apr-2018	Expected Closing Date 31-Dec-2024	
Joint IFC No		

Practice Manager/Manager	Senior Global Practice Director	Country Director	Regional Vice President
Sameer Shukla	Riccardo Puliti	Lilia Burunciuc	Cyril E Muller

Borrower: UZBEKISTAN			
Responsible Agency: Ministry of Housing and Communal Services			
Contact:	Salokhiddin Isaev	Title:	Acting Coordinator
Telephone No.:	998-71-235-82-90	Email:	pcu.tashkent@gmail.com
Responsible Agency: Kommunkhizmat Agency			
Contact:	Tadjbaev Zamzamboy	Title:	Acting Director General
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Project Financing Data(in USD Million)					
[ ]	Loan	[ ]	IDA Grant	[ ]	Guarantee
[X]	Credit	[ ]	Grant	[ ]	Other

Total Project Cost:	140.00	Total Bank Financing:	140.00
Financing Gap:	0.00		

Financing Source	Amount
International Development Association (IDA)	140.00
Total	140.00

Expected Disbursements (in USD Million)

Fiscal Year	2018	2019	2020	2021	2022	2023	2024	2025	0000	0000
Annual	0.50	5.50	24.00	25.00	25.00	25.00	25.00	10.00	0.00	0.00
Cumulative	0.50	6.00	30.00	55.00	80.00	105.00	130.00	140.00	0.00	0.00

Institutional Data

Practice Area (Lead)

Energy & Extractives

Contributing Practice Areas

Social, Urban, Rural and Resilience Global Practice

Proposed Development Objective(s)

The project development objective is to improve the efficiency and quality of heating and hot water services in selected cities within the territory of the Recipient.

Components

Component Name	Cost (USD Millions)
Modernization of District Heating Systems	134.00
Implementation Support and Capacity Building	6.00

Systematic Operations Risk- Rating Tool (SORT)

Risk Category	Rating
1. Political and Governance	Substantial
2. Macroeconomic	Substantial
3. Sector Strategies and Policies	Substantial
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Substantial
7. Environment and Social	Substantial
8. Stakeholders	Moderate

9. Other	
OVERALL	Substantial

Compliance

Policy

Does the project depart from the CAS in content or in other significant respects?	Yes [ ] No [X]
Does the project require any waivers of Bank policies?	Yes [ ] No [X]
Have these been approved by Bank management?	Yes [ ] No [ ]
Is approval for any policy waiver sought from the Board?	Yes [ ] No [X]
Does the project meet the Regional criteria for readiness for implementation?	Yes [X] No [ ]

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**

Legal Covenants

Name	Recurrent	Due Date	Frequency
Accounting system of the Project Coordination Unit		31-May-2018	

Description of Covenant

The Recipient shall cause the Project Coordination Unit (PCU), not later than 30 days from the Effective Date, to update the accounting software of the PCU.

Conditions

Source Of Fund	Name	Type
IDA	Project Operational Manual	Effectiveness

Description of Condition

The Project Operational Manual has been adopted by the Recipient, through the Implementing Agency, in form and substance satisfactory to the Association.

Source Of Fund	Name	Type
IDA	Subsidiary Agreements	Effectiveness

Description of Condition

The Recipient has executed Subsidiary Agreements with each of the Participating District Heating Companies (DHCs).

Source Of Fund	Name	Type
IDA	PCU Staffing	Effectiveness

Description of Condition

The Recipient, through the Implementing Agency, has established a PCU with the composition, resources and terms of references satisfactory to the Association.

Source Of Fund	Name	Type
IDA	In-building heating system rehabilitation in Andijan	Disbursement

Description of Condition

Under Category (2) until the Recipient has adopted an implementation plan for the rehabilitation of the in-building heating system in Selected Project Buildings in the City of Andijan acceptable to the Association.

Team Composition

Bank Staff

Name	Role	Title	Specialization	Unit
Feng Liu	Team Leader (ADM Responsible)	Senior Energy Specialist	Energy Specialist	GEE03
Mitsunori Motohashi	Team Leader	Senior Energy Specialist	Energy Specialist	GEE03
Fasliddin Rakhimov	Procurement Specialist (ADM Responsible)	Procurement Specialist	Procurement	GGO03
Djamshid Iriskulov	Financial Management Specialist	Financial Management Specialist	Financial Management	GGO21
Arcadii Capcelea	Environmental Safeguards Specialist	Senior Environmental Specialist	Environment	GEN03
Dung Kim Le	Team Member	Senior Program Assistant	Senior Program Assistant	GEE03
Elena Klementyeva	Team Member	Program Assistant	Program Assistant	ECCUZ
Hiwote Tadesse	Team Member	Operations Officer	Operations Officer	GEE03

Irina Voitekhovitch	Team Member	Energy Specialist	Energy Specialist	GEE03
Jasna Mestnik	Team Member	Finance Officer	Finance Officer	WFALN
Maksudjon Safarov	Team Member	Energy Specialist	Energy Specialist	GEE03
Pedzisayi Makumbe	Team Member	Senior Energy Specialist	Energy Specialist	GEEES
Pekka Kalevi Salminen	Team Member	Consultant		GEE03
Rebecca Emilie Anne Lacroix	Social Safeguards Specialist	Social Development Specialist	Social Specialist	GSU03
Ruxandra Costache	Counsel	Senior Counsel	Counsel	LEGLE
Yuriy Myroshnychenko	Team Member	Senior Energy Specialist	Energy Specialist	GEE02

Extended Team

Name	Title	Office Phone	Location
Kishore Nadkarni	Consultant - Financial Analysis		
Murat Alehodzhin	Energy Economist		

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments
Uzbekistan	Samarqand	Samarqand Viloyati	**X**		
Uzbekistan	Bukhara	Bukhara Province	**X**		
Uzbekistan	Toshkent	Toshkent Viloyati	**X**		
Uzbekistan	Toshkent Shahri	Toshkent Shahri	**X**		
Uzbekistan	Andijon	Andijan	**X**		

Consultants (Will be disclosed in the Monthly Operational Summary)

Consultants Required ?	Consulting services to be determined

I. STRATEGIC CONTEXT

A. Country Context

1. Uzbekistan is a lower-middle-income, mineral-rich country with a population of 32.3 million as of July 2017, the largest in Central Asia, and an annual population growth of 1.7 percent in recent years. Over the past decade, Uzbekistan has maintained a high and stable economic growth rate and achieved gradual diversification by following a state-driven approach to development. Uzbekistan's economy has not only grown rapidly, but it has also proven highly resilient to external shocks. According to official estimates, the annual gross domestic product (GDP) growth averaged 7.2 percent over 2000-2016 and contributed to a decline in the poverty rate from 27.5 percent in 2001 to 12.5 percent in 2016. This reduction in poverty appears to have been accompanied by equity gains, because the income of the bottom 40 percent of the income distribution is estimated to have grown at a slightly faster rate than that of the top 60 percent over 2008-2013. Meanwhile, per capita gross national income (current international dollar) measured in purchasing-power parity terms[1] rose from US$2,050 in 2001 to US$6,640 in 2016. This is a notable achievement for the most populous country in Central Asia. The external current account and budget have been in small surplus and public debt is low.

2. Starting from 2017, the Government has adopted a new Strategy of Actions for 2017-2021 and started implementing important structural reforms. In January 2017, a ban was lifted on the export of 12 types of products, mostly foodstuffs, for example, meat, grains, sugar, vegetable oils, and antiques. On September 5, 2017, the Central Bank of Uzbekistan (CBU) unified exchange rates by devaluing Uzbekistani Som from UZS 4,210 to UZS 8,100 per dollar, helping to establish a framework to allow it to float thereafter. The authorities also announced that the surrender requirements by which firms were mandated to sell a portion of their export revenues were eliminated, widening the participation in the foreign exchange market by the private sector. This decision helps reduce extreme disparities between exchange rates that were witnessed in Uzbekistan during 2009-2016, and if accompanied by complementary market-oriented reforms, this will be an important step to reduce market distortions and encourage private investment in the economy. Budget policy has stayed prudent in recent years, and the consolidated state budget, including the Fund for Reconstruction and Development (a reserve fund), is projected to maintain a lower surplus of 0.6 percent of GDP in 2017 compared to 1.2 percent of GDP in 2016. High economic growth is expected to continue in the near term: the economy grew by 7.8 percent in 2016 and is projected to grow further at around 6 percent per year on average during 2017-2019[2] as transitional adjustments unravel, given uncertainties, and the fact that remaining rigidities in the economy may not allow for a sufficiently rapid adjustment to take advantage of a more competitive exchange rate.

3. Uzbekistan's long-term development goal is to become an industrialized upper-middle income country through doubling GDP, and increasing the industry-to-GDP ratio to 40 percent by 2030. The Government's approach toward achieving this goal is to continue the transition to a more market-oriented economy, mitigate the potential negative consequences of external shocks,

[1] World Bank's World Development Indicators Central Database, September 14, 2017.
[2] World Bank, 2017. *Macro-Poverty Outlook for Uzbekistan;* IMF, 2017. *World Economic Outlook*, 66.

ensure equitable distribution of growth between regions, and maintain infrastructure and social services at an adequate level. In the medium term, the Government's key development priorities are to (a) further strengthen the macroeconomic stability and maintain high rates of economic growth, including the balance of the state budget and stability of the national currency; (b) increase the efficiency of infrastructure, especially of energy, transport, and irrigation; (c) enhance the competitiveness of targeted strategic industries, such as agro-processing, petrochemicals, construction materials, pharmaceuticals and textiles; (d) diversify the economy, particularly to reduce reliance on raw materials exports; and (e) improve access to and the quality and outcomes of education, health, and other social services so that the benefits of overall growth are shared equitably by the entire population.

4. The energy sector continues to provide large implicit subsidies to the rest of the economy in Uzbekistan though the subsidies have been decreasing since 2010. According to the International Energy Agency, energy subsidies decreased from US$10.3 billion in 2013 to US$6.5 billion in 2015, which was about 10 percent of GDP. The depressed energy and fuel prices for domestic consumers deprive the energy sector of financial resources needed for rehabilitation, modernization, and expansion; undermine incentives for energy efficiency investments; and create pressures to boost gas exports. The Government has been increasing domestic energy prices and tariffs in the past years and intends to pursue this policy in the coming years.

5. Natural gas is the primary fuel in the energy supply mix and a major source of commodity exports. It accounts for 86 percent of the total primary energy supply followed by oil, hydropower, and coal. In the past decade, gas production increased by 13 percent, reaching about 60 billion m^3 per year to meet the growing domestic demand, as well as expand gas exports, which have been growing, mostly driven by sales to China and the Russian Federation. Gas exports generated around US$2 billion in 2016, or about 20 percent of the total revenue stemming from export of goods.

B. Sectoral and Institutional Context

6. Uzbekistan is in a continental climate zone, which is characterized by hot summers and cold winters, where temperatures in December average -8°C (18°F) in the north and 0°C (32 °F) in the south, and fluctuations in weather can drop temperatures as low as -40°C (-40°F) in winter. The district heating (DH) sector in the country has suffered years of neglect, and there are no reliable central heating services. For this reason, according to a social survey conducted in the project areas, many households resort to inadequate (unhealthy, unreliable, unsafe, or expensive) heating alternatives, such as stoves based on coal and other solid fuels or electricity. Kindergartens and pre-schools in the project areas are cold, and do not provide suitable environment for caring for and educating young children.

7. Uzbekistan is the second-most energy-intensive economy in Europe and Central Asia (ECA) as measured by energy intensity per unit of GDP. While Uzbekistan's energy intensity declined by about 45 percent during 1998–2013, the country's energy use per unit of GDP is 3.1 times higher than the average for the ECA region. The high level of energy intensity is common for all parts of the entire energy supply chain, from energy generation to transmission and distribution, as well as all main sectors, including industry and agriculture. The Government has

been making efforts to reduce energy intensity by modernizing industry and energy assets and reducing energy losses. The Bank has been supporting energy efficiency improvements through the Uzbekistan Energy Efficiency Facility for Industrial Enterprises Project and was requested to support modernization of power transmission and distribution systems countrywide within the 2016-2020 Country Partnership Framework.

8. The five-year road maps on energy efficiency and DH system development (Presidential Resolution #3012 'Program on Further Development of Renewable Energy, Improvement of Energy Efficiency in Sectors of Economy and Social Sector in 2017-2021', and Presidential Decree #2912 'the Program on the Development of District Heating System in 2018–2022') set ambitious targets to significantly increase energy efficiency in all sectors of economy through further modernization, technical and technological re-equipment of existing production facilities, establishment of new production facilities exclusively based on modern energy-efficient technologies, and wider utilization of the renewable energy sources. The DH modernization is one of the key pillars of these programs along with power generation and industrial energy efficiency.

9. The DH sector used to be one of the largest gas consumers, after industry and the power sector. During the Soviet times, most of the urban settlements in Uzbekistan were provided with space heating and hot water services. DH has traditionally been supplied by public sector companies under municipal ownership. The municipal governments have been closely involved in approving key aspects of the operations of district heating companies (DHCs). There are 33 DHCs in the country and most of them were transferred to the Ministry of Housing and Communal Services (MHCS) established in April 2017. The largest DH system in the country is in Tashkent, with a share of about 70 percent of the country's overall DH services.

10. The quality and availability of DH services have been on a steady decline. Most of the DH sector assets were put in operation during the 1950s to the 1970s. Because of the expected growth in heat demand and industry practice at that time, they were often oversized and still remain so. Also, the DH systems were predominantly designed as open systems[3] for hot water supply, which caused accelerated wear and tear of heat transportation and distribution networks and inefficient use of energy. These legacy deficiencies were further compounded by significant under-investment in maintenance, rehabilitation, and modernization of the DH assets over the past two decades, which resulted in significant deterioration of DH services. Except Tashkent, all other cities lost the practice of investments in operation and maintenance of the DH infrastructure.

11. DH services have degraded in all the cities of Uzbekistan, and in several of them, the services have ceased to exist altogether for the entire city or a part of it. In these circumstances, electricity and gas have been extensively used for producing heat and hot water in multi-apartment buildings (MABs) and public buildings, causing the following problems:

i. Inefficient use of electricity and natural gas due to wide usage of crude devices;

[3] In an open system, water from DH network is transferred directly without heat exchangers to both the domestic hot water system and radiators network.

ii. Overloaded power sector assets, which caused accelerated wear and tear and as a result frequent power outages, especially in winter;

iii. Safety and health risks that stem from the use of poor quality or polluting heaters and stoves. These risks disproportionately affect household members who are primarily responsible for carrying out energy-related tasks, such as women carrying out household tasks, men and women using faulty or poor quality electric, gas, and coal heaters and stoves, and elderly family members spending a large amount of time at home.

12. Unviable operation of the DHCs is stemming from: (a) heat tariffs which are below cost-recovery levels; (b) low heat bill collection rates; (c) high network heat and water losses; (d) poor operational management; and (e) under-investments in rehabilitation of main assets. To revive the DH sector for the provision of affordable quality urban heating services and position it on a financially sustainable pathway, the following challenges will be tackled under the project:

13. **Challenge No. 1: Low efficiency of the DHCs operation.** At present, the efficiency of heat generation equipment is in the range of 65–70 percent (compared to the industry's international benchmark of above 90 percent), while heat network losses reach 40-50 percent in some extreme instances (compared to the industry's international benchmark of below 15 percent). The DHCs need large investments to upgrade and renovate the main assets. The envisaged switching to the closed system under the project, and installation of pre-insulated pipes and efficient gas boilers will help reduce heat and water losses significantly.

14. **Challenge No. 2: Financial viability of DHCs.** Today's operational performance of Uzbekistan's DHCs is inadequate, due to several regulatory and operational deficiencies, such as: (a) heat billing mainly based on consumption norms instead of meter readings at the building level; (b) inefficient bill collection; and (c) tariffs set at levels insufficient to cover investments in rehabilitation of main assets required for their efficient operation. At the same time, increasing heat tariffs could be socially acceptable only if improvements in the quality of services can be demonstrated or credibly promised to customers. The project will help improve the quality of DH service in the selected cities, and support an assessment of the profitability of the participating DHCs, development of recommendations to improve their financial performance, and strengthen their capacity, together with other stakeholders, including through workshops.

15. **Challenge No. 3: Lack of consumers' trust in good quality services provision,** both in heat supply and commercial aspects. Gas shortages in the past years disrupted the functioning of DHCs. As a result, the quality and availability of DH services have been on a steep decline across the board. Due to the lack or absence of the DH services in some DH systems, existing in-building pipelines and radiators were not used for a long period and became obsolete. In many MABs the apartment owners totally dismantled them. To regain their customer base, the DHCs need to make every effort to encourage the apartment owners to restore the piping and radiator systems in their apartments to benefit from the forthcoming latest DH system. The project envisages to conduct social surveys of customer satisfaction in the five participating cities at midterm and before the project closing, with disaggregation by gender.

16. To improve energy efficiency, quality, and availability of heating services, the Government established the MHCS in 2017, transferring the DH system from municipalities to

the ministry. Moreover, the Government approved 'the Program on the Development of District Heating System in 2018–2022'. According to the Program, the main priorities in the DH sector, inter alia, are to ensure: (a) performance of a unified policy; (b) effective implementation of programs on development, modernization, and upgrade of service infrastructure; (c) introduction of energy-efficient technologies; (d) organization of modern automated metering systems; (e) replacement of heat-boiler equipment, trunk distribution networks, and in-house heating systems; (f) transition from open to closed systems with installation of building-level individual heat substations (IHS); and (g) introduction of decentralized heating options to make space heating more cost-effective.

17. The World Bank has been working with Uzbekistan on energy and energy-saving issues since 2009. Given the World Bank's comparative advantages associated with its significant experience in rehabilitating and upgrading large urban DH systems, the Government requested the World Bank to support implementation of the "Concept for Reforming District Heating in Uzbekistan for 2010–2020" and "the Program on the Development of District Heating System in 2018–2022". The Europe and Central Asia Capacity Development Trust Fund (ECAPDEV) Grant helped prepare the project feasibility study. The proposed project will address the sector development challenges outlined above through pilots in five cities and thereby set a model of DH system modernization for replication and scaling-up in other parts of the country, with a possibility to catalyze private financing. This is a first major effort to modernize the DH sector, which has suffered from years of neglect. These five pilot DH systems will be practical examples demonstrating to other DHCs how modern technical solutions operate. They entail a new design concept, including the envisaged switchover to the closed system under the project with higher energy efficiency, and a new strategy for meeting the heating needs of the urban population with modern standards and least cost (briefly described in para 16). With a significant sum of investments needed to modernize the DH systems across the country, the proposed project would open co-financing opportunities for a scaled-up deployment of modern DH systems in other parts of the country in the future. Moreover, the proposed project will help Uzbekistan overcome the challenges of institutional development, strategic planning, and financing of DH upgrade and rehabilitation so that it ensures stable operation of the systems in the future.

C. Higher Level Objectives to which the Project Contributes

18. The proposed project supports the Government's medium-term growth and development strategy as reflected in the Uzbekistan Strategy of Actions for 2017-2021. For the urban heating system, the Action Plan aims to improve the quality and reliability of hot water and heating services, and improve the energy efficiency of the system through introduction of new and modern technologies.

19. **Twin goals.** By promoting higher quality and efficient DH in Uzbekistan, the project also supports the World Bank's twin goals of reducing poverty and increasing shared prosperity. Providing reliable, efficient, and environmentally friendly heating services will have a larger impact on the most vulnerable households in the project areas than on other segments of the urban population because they are often dependent on inadequate or expensive sources of heating (such as coal and firewood stoves) during cold months. The impact on the most vulnerable will be especially noticeable in Andijan, where DH services have been stopped, and heating solutions used by the urban poor are not reliable throughout the heating season and have

negative health impacts caused by indoor air pollution. The project will benefit women, who work or stay at home more often than men, and children and other people who use facilities including kindergartens, schools and other educational institutions, and medical institutions.

20. The District Heating Energy Efficiency Project was included in the World Bank Group's Country Partnership Strategy for the Republic of Uzbekistan for the period FY12–FY15 and is also included in the newly approved Country Partnership Framework FY16-FY20, agreed between the Government and the World Bank and endorsed by the World Bank's Board of Directors. The project will support Focus Area 3 – improvement of public service delivery, by modernizing the DH infrastructure under the project.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

21. The Project Development Objective (PDO) is to improve the efficiency and quality of heating and hot water services in selected cities within the territory of the Recipient.

22. The project will introduce a modern DH model to Uzbekistan, which will change the DH systems from open to closed customer connection for hot water and space heating. This is a major technological modernization and it has not been introduced in Central Asian countries before. The Government's DH Program approved in 2017, calls for introduction of modern heating systems as a key element to improve the efficiency and quality of DH services and increase the technical lifetime of the DH infrastructure.

B. Project Beneficiaries

23. The ultimate project beneficiaries are the population of the five participating cities (Andijan, Bukhara, Chirchik, Samarkand, Sergeli District of Tashkent City), who reside in MABs connected or to be connected to DH and/or use public and administrative buildings, including kindergartens, schools, hospitals, and municipality offices. They will benefit from improved reliability of heat supply, better quality of heating services, and higher level of comfort. The number of project beneficiaries is estimated to be approximately 241,000. Improved heating services would particularly be beneficial to: (a) poorer households, who otherwise cannot afford the adequate level of heating services; (b) women, who work or stay at home more often than men; and (c) children and other people who use facilities including kindergartens, schools and other educational institutions, and medical institutions.

24. The second group of direct project beneficiaries are the DHCs of the five participating cities. The project supports investments in DH infrastructure, enhancement of staff capacity in DHCs, and improvements in the regulatory framework that would help make the companies viable, efficient, and sustainable.

25. Other beneficiaries include the power distribution subsidiaries of Uzbekenergo, which supply electricity in the cities. Switching from electricity to DH for heating and hot water will help address the issue of overloading of power networks and subsequently reduce the technical losses, number of breakdowns, and power outages in the participating cities.

C. PDO Level Results Indicators

26. The PDO level indicators include: (a) projected lifetime energy savings; (b) associated project lifetime CO_2 emissions reduction; (c) people served by energy-efficient heating facilities; and (d) percentage of people who perceive improvements in heating services. These indicators will track project impacts in the project areas.

27. The intermediate indicators are for each of the participating cities and include: (a) number of individual heat substations (IHSs) installed; (b) heat capacity of gas-fired boilers installed/rehabilitated; (c) length of DH channel installed/replaced; (d) beneficiaries who feel project investments reflected their needs; (e) grievances registered related to DH service that are actually addressed; and (f) number of public information events concerning the project and its benefits. These indicators will track project implementation progress in the project areas.

III. PROJECT DESCRIPTION

A. Project Components

28. The project will have two components, as described in the following paragraphs.

29. **Component 1: Modernization of District Heating Systems (Estimated cost US$134million, US$134 million IDA financing).** The component will finance energy efficiency investments in modernization of heat production and transportation and distribution systems, including installation of building-level IHS and heat meters for billing purpose, renovation of obsolete boilers and pipes for heat transportation. The project entails a shift to metering and consumption-based billing in the project areas. In addition, gas, electricity, and water supply systems will be upgraded, wherever it is needed for DH purposes. The component will also finance procurement of specialized maintenance equipment for the participating DHCs. A brief description of the project subcomponents is provided below, and a more detailed description is given in Annex 2.

30. **Subcomponent 1.1. Andijan City (Estimated cost US$22.6 million, US$22.6million IDA financing).**[4] Andijan is located in the Fergana Valley in the southeastern part of the country, with a total population of about 416,300, of which about 54,000 live in project area buildings. In Andijan, the DH system stopped operating more than eight years ago. Since then, tenants in MABs have mainly used electric heaters, gas heaters, and coal-fired stoves to heat their apartments. The old DH system in Andijan has become dilapidated beyond rehabilitation and will need to be completely replaced.

31. The project investments will include: (a) installation of three new boilers at boiler house RK-2 with a total capacity of about 110 MW; (b) replacement of about 24 km of the DH network (trench length) with pre-insulated pipes; (c) installation of 306 IHSs in selected MABs and public buildings; (d) reconstruction of the electricity distribution network; (e) reconstruction of the water supply network; and (f) maintenance tools, equipment, and vehicles for the DHC.

[4] Implementation of this component will start after the first phase in Bukhara and Chirchick City, to give time for reconstruction of the in-building infrastructure in Andijan, Samarkand, and Sergeli District of Tashkent City.

32. Subcomponent 1.2. Bukhara City (Estimated cost US$14.6 million, US$14.6 million IDA financing). Bukhara City is located in the southern part of Uzbekistan. The population of Bukhara is about 270,000 and about 37,000 live in the project area. The project investments will deal with the DH system of Bukharaenergomarkaz (BEM), one of the two main DHCs of the city. Overall, the total heat demand to be met by BEM is currently about 70 MW.

33. The project investments will include the following: (a) installation of one new gas-fired boiler with capacity of 40 MW, and modernization of two existing boilers of 30 MW total capacity; (b) replacement of about 5.6 km (trench length) of the DH network with pre-insulated pipes; (c) installation of 264 IHSs in selected MABs and public buildings; (d) reconstruction of the electricity distribution network; and (e) maintenance equipment, tools, and vehicles for BEM.

34. **Subcomponent 1.3. Chirchik City (Estimated cost US$16.2 million, US$16.2million IDA financing).** Chirchik is located about 30 km northeast from Tashkent, with a total population of about 150,000. There are about 20,000 people living in the project area buildings. The DH system of the city is currently operational, though it shrank in size by about one-third in the past years because of lack of funds to rehabilitate the outdated equipment. The project will aim to restore and improve heat and hot water supply to about 195 residential and public buildings.

35. The project investments will include: (a) installation of three new gas-fired boilers in Yubileynaya boiler house with 75 MW total capacity; (b) replacement of about 21 km of the DH network (trench length) with pre-insulated pipes; (c) installation of 199 IHSs in selected MABs and public buildings; (d) reconstruction of the electricity distribution network; and (e) maintenance tools, equipment, and vehicles for the DHC.

36. **Subcomponent 1.4. Samarkand City (Estimated cost US$28.9 million, 28.9 million IDA financing)**. Samarkand is a city located in the southern part of Uzbekistan. The population of Samarkand is about 500,000, with about 54,000 people living in the project area. In Samarkand City, boiler house RK-2 area will be modernized under the project. The existing installed capacity of the boiler house is 232 MW, but the current level of heat demand is about 80 MW.

37. The project investments will include the following: (a) installation of three new gas-fired boilers with total capacity of 100 MW; (b) replacement of about 39 km (trench length) of the DH network with pre-insulated pipes; (c) installation of 418 IHSs in selected MABs and public buildings; (e) reconstruction of the electricity distribution network; and (d) maintenance equipment, tools, and vehicles for the DHC.

38. **Subcomponent 1.5. Sergeli District (Estimated cost US$51.7 million, US$51.7 million IDA financing).** Sergeli is a district of Tashkent located in the southern part of the city, with a population of about 75,000 inhabitants in the project area. Currently the heat is generated in Sergeli boiler house (350 MW). The DH system of Sergeli District is isolated from the rest of the Tashkent DH systems. It is fully functional, but significant opportunities exist to improve energy efficiency and thereby reduce the cost of heat and hot water supply. The project will cover all 993 buildings that are currently connected to the DH system.

39. The project investments will include: (a) modernization of two existing gas-fired boilers with a total capacity of 175 MW; (b) installation of a new gas-fired boiler (30 MW) for hot water service in the summer; (c) replacement of about 46.5 km of the DH network (trench length) with pre-insulated pipes; (d) installation of 649 IHSs in selected MABs and public buildings; (e) reconstruction of the electricity distribution network; (f) reconstruction of the water supply network; and (g) maintenance tools, equipment, and vehicles for the DHC.

40. The number and capacity of boilers, and IHSs, and the length of the DH network to be replaced in the participating cities are based on the results of the project draft feasibility study supported by the ECAPDEV Grant.

41. **Component 2: Implementation Support and Capacity Building (Estimated cost US$6 million, US$6 million IDA financing).** This component will finance capacity-building and implementation support for the MHCS, the Project Coordination Unit (PCU) in the Kommunkhizmat Agency (KA), participating DHCs and their technical support teams. The component will include the following activities: (a) providing technical assistance for Project management, monitoring and supervision, Project financial audit, including Training and Operating Costs; (b) assessment of the profitability of the participating DHCs, develop recommendations to improve their financial performance, and strengthen their capacity, including through workshops for the participating DHCs and other shareholders; (c) development of institutional model for DH sector regulation and management; (d) designing and conducting social surveys of customer satisfaction in the participating cities at midterm and after the project completion with disaggregation by gender; (e) developing and providing support for the implementation of a communication strategy and a public information campaign for the Participating DHCs; (f) preparation of feasibility studies for future investment projects in the DH sector; and (g) other technical assistance (TA) activities identified during project implementation.

B. Project Financing

42. The proposed project will be implemented over seven years, through an Investment Project Financing operation from IDA to the Republic of Uzbekistan in the amount of US$140 million.

Table 1. Project Cost and Financing

Project Components	Project Cost US$, million	IDA Financing	
		US$, million	As % of Total
Component 1. Modernization of District Heating Systems	134	134	100
Component2. Implementation Support and Capacity Building	6	6	100
Total Project Cost[a] and Financing Requirement	**140**	**140.0**	**100**

C. Lessons Learned and Reflected in the Project Design

43. Misalignment of Bank's and Government's project preparation cycles are considered to be the major reason for delays in effectiveness, and hence, implementation of WB-funded projects, leading to significant delays in project effectiveness and disbursement, price increases

for procurement packages and longer time needed to achieve PDOs. Early start of preparatory work including project feasibility studies, preparation of bidding documents and advancing procurement processes during project preparation, enhance the readiness for project implementation.

44. Project procurement arrangements are critically important for timely implementation of investment projects that are co-financed by the World Bank. There are two main options for organizing procurement in World Bank-supported municipal projects with participation of several cities: (a) centralized, by a line ministry/agency; or (b) decentralized, by participating cities. Each of them has inherent advantages and disadvantages that are magnified or diminished by local circumstances. Given that the DHCs have no experience in handling World Bank-funded projects, the project adopted a centralized project management concept where project coordination responsibilities, including procurement and financial management (FM), are handled centrally by the PCU in the KA.

45. Upfront training in procurement, contract management, FM, monitoring and evaluation (M&E) and safeguard issues strengthens implementation capacity of implementing agency staff. This will be continued under the Project, as necessary.

46. Early establishment and engagement of a competent project team are essential for successful implementation. Implementation of the project will be coordinated by the same PCU that is experienced in implementing other World Bank-financed projects and acquainted with the relevant World Bank guidelines and procedures.

47. To ensure sustainability of project-supported investments in utility infrastructure, utilities' revenues should be sufficient to cover operating and financing costs and attract or retain professional staff. At the same time, given the monopolistic nature of several utility businesses, including DH, a proper oversight and governance mechanism should be established to achieve effectiveness and efficiency of utilities' operations. The project will help improve the quality of DH service in the selected cities, and support an assessment of the profitability of the participating DHCs, development of recommendations to improve their financial performance, and strengthen their capacity, including through workshops.

48. Another critical element for success of projects in the housing and communal sector (HCS) is public outreach and awareness campaigns to measure the level of satisfaction with HCS services by the households. This is especially important in the former Soviet Union countries where HCS services were heavily subsidized by the state, thus, households used to enjoy reliable and sufficient supply of heating, water, and other services at a fraction of the economic cost. The ongoing energy tariff adjustments toward cost-recovery levels in Uzbekistan will result in a substantial increase of HCS tariffs. Therefore, there is a need to increase the level of households' awareness and understanding of costs associated with DH supply and efforts made by utilities to optimize them and ensure reliable supply. To this end, the project-supported TA will help utilities and municipalities develop and conduct regular public communications, including during the project preparation. This is particularly important for this project given that households are expected to directly participate in project financing through replacing piping and radiators in their apartments.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

49. The proposed project will be implemented over a period of seven years by the Implementing Agency (the KA), with participation by six DHCs in Andijan, Bukhara, Chirchik, Samarkand, and Tashkent (Sergeli).[5] The project implementation shall initially start in Bukhara and Chirchik, to give time for preparation of investments, such as development of an implementation plan for reconstruction of the in-building infrastructure and design works, which will be undertaken in parallel.

50. The KA under the MHCS will be responsible for the overall project coordination. The PCU will be located in the KA. The MHCS will provide ministerial oversight for the project activities including project preparation, supervision, and M&E. The PCU will be responsible for the procurement of the goods, works, and services; undertaking of FM including disbursement processing and project audit; public relations; consolidation of environmental and social safeguards measures in compliance with the World Bank's requirements; and preparation of periodical reports and their submission to the World Bank. The PCU will assign coordinators who will liaise with DHCs, and make sure that DHCs participate in the project preparation and implementation stages. Establishment of a PCU with the composition, resources and terms of references satisfactory to the Association is a condition of effectiveness.

51. Under the PCU's oversight, the DHCs will participate, among others, in the definition of technical specifications, tender evaluations, and construction supervision. Once the contractors are selected, the DHCs together with the PCU on behalf of the KA will be the contracting parties for supply and installation and other contracts. The DHCs will assign, and if necessary hire, a technical support team that will ensure implementation of the investment activities in their respective service areas. Both the PCU and the technical support teams under the DHCs will communicate directly with the World Bank on project-related issues.

B. Results Monitoring and Evaluation

52. Overall monitoring of the project implementation, achievement of PDO results indicators, and reporting to the World Bank will be the responsibility of the PCU. The technical support teams at the Andijan, Bukhara, Chirchik, Samarkand, and Tashkent DHCs will monitor and report to the PCU with regard to progress on their respective contributions to the PDO results indicators and intermediate results indicators. The PCU will report to the World Bank on the progress achievedon a quarterly basis. This will be carried out in conjunction with World Bank team implementation support missions.

C. Sustainability

53. The financial viability of DHCs and reliable supply of gas to the utilities are the two main conditions for project sustainability. The first condition will be supported by project TA under Component 2 through a tariff structure and cost recovery in the DH sector, technical capacity

[5] There are two DHCs covering heat generation and distribution, respectively, in Tashkent.

building at the utility level, and public communication campaigns by the participating DHCs and municipalities. The second condition will rely on the commitments taken by the Government to ensure sufficient and reliable gas supply to the participating DHCs.

V. KEY RISKS AND MITIGATION MEASURES

A. Overall Risk Rating and Explanation of Key Risks

Table 2. Risk Ratings Summary

Risk Categories	Rating
1. Political and Governance	S
2. Macroeconomic	S
3. Sector strategies and policies	S
4. Technical design of project	S
5. Institutional capacity for implementation and sustainability	S
6. Fiduciary	S
7. Environmental and social	S
8. Stakeholders	M
9. Others	–
Overall	**S**

Note: S=Substantial; M=Moderate

54. The proposed project will be the first large-scale DH rehabilitation project in the country. The overall risk for project implementation is rated **Substantial**. Key risks are mostly related to the decentralized nature of the project, which involves multiple DHCs covering different parts of the country that would manage several project sites with no experience in implementing World Bank-financed projects. For this reason, the PCU will centrally manage project procurement and FM to mitigate the risks. A consulting firm was hired, with finance from the ECAPDEV grant, to build the capacity of the DHCs and support them to prepare the feasibility study and technical specifications for the first year of project implementation.

55. **Political and governance risks.** Political and governance risks are rated "substantial," reflecting the ongoing political and structural transition. The Bank will be monitoring the transition process closely and adapt its program, if necessary and when requested, to changing priorities of the new Government.

56. **Macroeconomic risks.** The Macroeconomic risks were rated "substantial" given the recent and ongoing monetary and fiscal reforms in the country. The Presidential Decree allowed the official exchange rate to adjust from UZS 4,210 to UZS 8,100 per US dollar starting in September 2017, helping converge the official rate with the curb market rate, and establishing a framework to allow it to float thereafter. Budget policy has remained prudent in recent years. The World Bank Group will continue to monitor the country's economic developments.

57. **Sector strategies and policies.** The absence of a strategy for the DH sector and deficient sector policies until recently, including regulation and tariffs, have resulted in loss-making operation of the DHCs, and deterioration of DH infrastructure and services across the country, except for Tashkent. The Government began to address the sector issues with the approval of the state program 'Concept for Reforming District Heating in Uzbekistan for 2010–2020'. The establishment of the MHCS and the Presidential Resolution on the 'Program on the Development of District Heating System in 2018–2022' affirmed the Government's role and responsibilities in the sector. Additional TA grant will be mobilized to support the Government in conducting urban heating master planning for selected cities and in strengthening institutional capacity for the DH sector.

58. **Technical Design of Project.** The achievement of the PDO requires coordinated implementation of Component 1 with in-building heating system rehabilitation to be undertaken by the Government. Component 1 will be funded from the IDA credit and its implementation faces moderate risks. The in-building heating system rehabilitation will be fully financed by counterparts through the HOAs of MABs and local administration. If its implementation were to be delayed, it would adversely affect the entire project because Component 1 will not achieve its intended objectives without the necessary rehabilitation of in-building heating system. This risk is high in Andijan and moderate in Samarkand, Chirchik and Tashkent (Sergeli District), and low in Bukhara. The risk will be mitigated by provisions for ensuring the financing and implementation arrangements for in-building heating system rehabilitation through subsidiary agreements between the Ministry of Finance and KA, DHCs, and the Khokimiyats (municipal governments) of the pilot cities. The risk will be further mitigated through provisions in the Project Operational Manual to ensure that in-building heating system rehabilitation is completed before IHSs are installed in individual buildings and that selection/approval criteria for MABs and public buildings are stipulated. Preparation of an implementation plan for in-building heating system rehabilitation in Andijan will be a disbursement condition. Such plan would describe, among others, the basic profile of Selected Project Buildings, estimated cost of rehabilitation of in-building heating systems in the Selected Project Buildings, responsible entities for such rehabilitation works, financing sources, rehabilitation process and timeline, and possible support mechanisms for households that cannot afford the cost of rehabilitation.

59. **Institutional capacity for implementation and sustainability.** Some of the participating DHCs have little experience in managing new investment activities and their core capacity has been weakened due to diminished DH services over the past years. Moreover, all the participating DHCs will need to adjust to the new design and operation of modern DH systems. Therefore, they will need to be substantially strengthened to perform the core utility functions.

60. **Fiduciary.** Based on the capacity assessment of the existing PCU under the KA to handle procurement and FM for the ongoing World Bank-financed water sector projects, the fiduciary risks for the project is rated Substantial. As described in the respective fiduciary assessment sections, the PCU will hire dedicated procurement and FM specialists to strengthen their capacity to handle fiduciary aspects. The World Bank will provide necessary training before commencing project implementation.

61. **Environmental and social.** While the project will generate mostly positive social, economic, and environmental benefits, it might also cause some environmental risks related to soil removal and destruction, air pollution, construction and solid wastes, dust, noise, occupational hazards, and traffic disruptions. Furthermore, the DHCs do not have experience in implementing safeguards requirements. The PCU will hire an environmental specialist for ensuring safeguards compliance during project implementation. The participating DHCs are also required to have personnel covering the safeguards aspects of the project implementation in pilot areas. The World Bank will provide necessary training before commencing project implementation.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis

62. ***Economic analysis*** of the investment in modernization of DH systems was conducted for all five subprojects proposed under the credit and for the project as a whole. Detailed reports and analytical files with regard to the analysis are available in the project files.

63. The economic costs of the DH system modernization include: (a) the total investment costs of the energy-generating equipment, pipelines, and IHSs, including design and construction costs; and (b) operating costs, including fuel costs; electricity and water consumption for auxiliaries; and operation, repair, and maintenance costs. The analysis excludes taxes, including import duties (if any) and value added tax (VAT). The economic analysis was conducted exclusive of the impact of any subsidies.

64. The net economic benefits of the individual investments are estimated on an incremental basis, that is, as the difference between costs and benefits under the 'with project' and 'without project' scenarios. Benefits and costs are valued at economic prices. The indicators used are the economic net present value (ENPV) and the economic internal rate of return (EIRR). The principal quantifiable benefits under the selected investments come from: (a) fuel savings and other operating cost savings through improvements in facilities' operating efficiency and reduced heat consumption in buildings due to the use of IHSs; and (b) reductions in CO_2 emissions. Other economic benefits, including increased comfort and improved health and wellbeing due to enhanced reliability of supply, restarting of DH services in Andijan, and decreased risk of collapse of key facilities and other improvements in the quality of service, reduced congestion of the electricity distribution network due to the fuel switchovers, and improved local air quality due to switch in fuels, are important but not quantified because of the lack of proper metrics.

65. An economic price for natural gas is estimated on the basis of the Uzbek gas export prices to China in 2016, which averaged US$130 per thousand m^3. The gas price development for the following years is estimated on the basis of the World Bank's Commodity Price Forecast. Evaluation of the social value of carbon is carried out following the World Bank's Guidance Note on the social value of carbon during project appraisal.

66. The estimates of the ENPV and EIRR (at a discount rate of 6 percent and assuming a 20-year operating horizon) of the DH system modernization investment in each city and of the overall project are summarized in Table 3. The table presents the results of the analysis,

considering the social value of carbon reduction by the project. It also summarizes the results of a sensitivity analysis assuming: (a) a natural gas price decrease of 20 percent to US$104 per thousand m^3; and (b) a natural gas price decrease of 40 percent to US$78 per thousand m^3.

Table 3. Estimated EIRR and ENPV of the Project

Subproject/City	Base Case		EIRR Sensitivity Analysis (%)	
	ENPV (US$, millions)	EIRR (%)	Natural Gas Price -20%	Natural Gas Price -40%
Andijan	6.15	10.4	7.6	6.2
Bukhara	16.50	18.6	15.1	11.2
Chirchik	2.26	8.1	5.3	2.2
Samarkand	8.22	10.2	7.4	4.3
Tashkent (Sergeli)	1.32	6.4	4.0	1.3
Overall Project	**34.45**	**9.7**	**6.9**	**3.9**

67. Table 4 compares the results for the 'with' and 'without' social value of carbon cases.

Table 4. Estimated EIRR and ENPV With and Without Social Value of Carbon

	With Social Value of Carbon		Without Social Value of Carbon	
Subproject/City	ENPV (US$, millions)	EIRR (%)	ENPV (US$, millions)	EIRR (%)
Andijan	6.15	10.4	5.86	10.2
Bukhara	16.50	18.6	15.98	18.3
Chirchik	2.26	8.1	1.97	7.8
Samarkand	8.22	10.2	5.52	8.9
Tashkent (Sergeli)	1.32	6.4	-3.00	5.2
Overall Project	**34.45**	**9.7**	**31.86**	**9.4**

68. The economic analysis confirms that the proposed project is economically justified based on information available and assumptions at appraisal. Even with a 20 percent drop in the economic price of natural gas, the overall EIRR remains favorable. Previous World Bank DH projects in other countries demonstrated that capital cost savings were achieved through International Competitive Bidding (ICB). This tends to enhance project economics. Once actual energy savings data become available after project commissioning, the economic analysis will be revisited at the project implementation completion stage.

69. ***Financial analysis*** was carried out for three participating DHCs: (a) at the project level, to estimate the financial internal rate of return (FIRR) for each investment subproject; and (b) at the entity level, to assess each DHC's financial situation and ability to meet its financial obligations with regard to operating expenses and debt service during project implementation and operation periods. The results of two other DHCs (Bukhara and Samarkand) are expected to be within the range of the three analyzed DHCs based on the baseline assessment for all participating DHCs.

70. The financial analysis of each investment program for the participating DHCs was based on the draft feasibility study and the companies' historical financial statements for 2012-2014. The project FIRRs were calculated at constant 2015 prices and compared to the estimated weighted average cost of capital (WACC). The FIRRs for all investment subprojects were negative, lower than the WACC for each subproject, due to the inadequate cost recovery of

tariffs and high prevailing losses. The financial net present values vary from US$19.8 million to US$84.1 million totaling to US$103.8 million. Further details are provided below and in the project files.

71. The financial position of the participating DHCs is strongly influenced by the regulated heat tariffs, which are set below the full cost-recovery levels. Present Uzbek heat tariff setting system underestimates the network heat losses and heat consumption within the buildings, which are both estimated on a normative basis. Average cost recovery of DH tariff in Uzbekistan is estimated to be 63 percent. The average cost recovery of heat tariffs in the participating utilities varies from 42-70 percent. Moreover, the billing is not based on consumption of heating services. The DHCs have been incurring losses in recent years. The annual loss caused by the existing heat pricing policies is split between the DHCs and the Government. Presently there is no formal system of production subsidies to DH production. However, at the end of each fiscal year the Ministry of Finance compensates a part of the losses to the DHCs as direct budgetary support. The remaining loss accumulates in the company's balance sheet.

72. Assuming that the tariffs would be gradually increased to the cost-recovery levels, and the collection performance improve with the transition to consumption-based metering and billing, the companies are expected to achieve financial cost recovery during project implementation and continue to break even after commencement of the project. Introduction of cost-recovery tariffs together with the achieved savings due to the project will help participating DHCs to achieve a sound financial condition. The TA component under the project will further assess and develop recommendations to improve the financial performance of the participating DHCs.

B. Technical

73. The project's technical design is sound. The proposed technical solutions are based on best international practices. The pre-feasibility and draft feasibility studies were reviewed by the relevant government agencies, as well as the World Bank. The individual subprojects meet accepted international standards. The proposed solutions also comply with the DH concept discussed and approved in Uzbekistan.

74. The major change in the DH concept under the project compared to the current DH systems in Uzbekistan is the 'closed' DH connection to buildings. This will be implemented by installation of modern and fully automated building-level heating substations, which will include heat exchangers to separate in-building heat distribution networks and hot water distribution networks from the heat transportation networks. All substations will be equipped with heat meters, which will be used for heat billing at the building level. In the current situation, the DH connection is 'open', where heating and hot water connections are done without heat exchangers; DH water circulates directly through the radiators and is connected to hot water taps. In the closed DH system, the DH circulating water can be chemically treated at the heat source, which will remarkably increase the lifetime of pipes and other equipment that are in contact with the DH water.

75. The fully automated substations will regulate the heat supply to the building based on the outside weather conditions and thus the water flow in the DH network varies depending on the

heat load. This will lead to a variable operation mode of the DH system, which requires equipping the heat sources with variable flow pumps.

76. Currently, Uzbekistan is not using pre-insulated pipes, but the project will introduce this pipe technology to the country. Pre-insulated pipes manufactured in the factory have lower heat losses and longer life than pipes with thermal insulation applied at the construction site. They will be used for rehabilitation and construction of the DH network in the project cities.

C. Financial Management

77. The PCU will be responsible for FM of all project components including submission of quarterly unaudited interim financial reports (IFRs) and audited annual project financial statements (PFSs) to the World Bank. PCU staff changed frequently in the preceding years for several reasons. The current FM staff include a project accountant and an FM specialist. The existing staff have some knowledge and experience in accounting, but they still need to build their skills in the areas of internal controls, international financial reporting, and FM requirements in World Bank-financed operations through attending World Bank-organized trainings and workshops. Considering the heavy work-load of the current FM specialist and project accountant, the PCU will hire a dedicated FM specialist for the proposed project. While the PCU has some procedures in place with regard to planning, budgeting and accounting, the Project Operational Manual (POM) should be updated to reflect the proposed project-related project description, PDOs, internal control weaknesses noted during the supervision of on-going World Bank projects, budgeting, external auditing, financial reporting, and accounting policies and procedures. The PCU will manage project payments and maintain project accounting records, which would be segregated for this project. The existing accounting software, 1-C, needs to be customized for accounting and financial reporting purposes of the proposed project. The annual audited financial statements, together with the auditor's opinion and the Management Letter, will be provided to the World Bank within six months after the end of each fiscal year and at the closing of the project. The PCU will be responsible for selection and appointment of the project auditor, according to terms of reference (ToR) acceptable to the Bank, and the financial audit will be financed from the credit proceeds.

78. The overall FM residual risk for the project is *Substantial after mitigating measures*, considering the country risk and unsatisfactory performance of the PCU in currently implementing on-going World Bank-financed projects.

D. Procurement

79. A country procurement assessment was conducted in 2003 (by the World Bank and the Asian Development Bank) and most recently the partial assessment was done during the Public Expenditure and Financial Accountability (PEFA) exercise in 2012. The procurement environment is considered as having *substantial* risk. The PCU will be responsible for overall project coordination. The procurement capacity assessment identified procurement risks and they are described in Annex 3. Procurement for the project will be carried out in accordance with the World Bank's 'Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers', dated January 2011 and revised July 2014 (Procurement Guidelines); 'Guidelines: Selection and Employment of

Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers', dated January 2011 and revised July 2014 (Consultant Guidelines); and the provisions stipulated in the Financing Agreement. Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants, dated October 2006 and revised in January 2011, shall apply to this project. If there is a conflict between government decrees, rules, and regulations and the World Bank's Procurement and Consultant Guidelines, then the World Bank's Procurement and Consultant Guidelines shall prevail. Further detailed information concerning procurement under the project is given in Annex 3.

E. Social (including Safeguards)

80. **Overall, the project is expected to have positive social impacts.** Improved heating services would be particularly beneficial for: (a) poorer households, who otherwise cannot afford the adequate level of heating services; and (b) women, children, and the elderly, who work from and stay at home more often than adult men. To better understand the financial and social impacts, especially on vulnerable households, a Social Impact Assessment (SIA) was carried out during the preparation phase.

81. The study confirmed that DH is likely to be the most affordable, safe, and convenient heating option available to households. Overall, the SIA indicated broad support for the project, with 76 percent of households willing and able to pay for the investments inside their apartments, provided they can pay in installments. The hesitancy of the remaining group, largely the result of the costly investments made on alternative sources of heating, the cost of replacing piping inside the apartments, and the low trust in utility companies, will be mitigated through robust communication efforts emphasizing the economic advantages of DH over the long term. Government-subsidized consumer loans through local banks will be available to help households defray the investment cost of in-building heating system rehabilitation.

82. **Gender**. The project will have particularly beneficial impacts on women who often carry the primary responsibility of heating provision inside the home and perform numerous household chores requiring hot water while also spending a large amount of time inside the home. Women also perform key functions in terms of problem solving, paying utility bills (non-automated), and as apartment caretakers. Men are more likely to make household decisions regarding purchasing heating equipment. The study also found different preferred information avenues for women (radio) and men (television). The project will address these gender roles and needs related to heating and communications by designing gender-sensitive communication campaigns and ensuring equal access to customer feedback channels (for example, information is disseminated and feedback can be submitted through multiple and different channels to ensure wide access). Although, as a group, women, pensioners, or the elderly were not found to be worse-off in terms of household income in the surveyed population, female-headed households reported a lower capacity to pay for a DH connection, both up front and in installments. As noted above, subsidized loans are available through local banks for households having difficulties in meeting the investment cost. The qualitative data collection also pointed to informal arrangements within the HOAs, whereby similar maintenance or investment costs for the most vulnerable households were often reduced or borne by the other apartment owners.

83. **Citizen engagement and social accountability**. The SIA pointed to a need for greater accountability of DHCs, particularly in communication and transparency in customer billing and service, as well as education of customers in their roles and responsibilities as users of a communal system. Some information and complaints channels exist in the participating cities, either in the utility company or municipality (people can visit in person, call, or write in). Although responses are given to most queries received, this is not systematic and customer services and information handling systems should be significantly strengthened. The concept of enabling and analyzing feedback from customers and creating channels for customer participation is rather new to the DHCs. None of the participating DHCs have an ongoing partnership with a civil society organization and none conduct regular customer satisfaction surveys.

84. These key findings are reflected in project design. The TA and capacity-building component of the project will include developing a communications strategy and training to build DHCs' capacity to understand and react to customers' concerns through more systematic customer feedback collection, analysis, and response to such feedback. Progress will be verified through regular customer feedback at the level of municipalities and utility companies, as well as customer satisfaction surveys. The project includes a core indicator to measure progress on customer satisfaction. This is also disaggregated by gender to account for, and take action on, any potential differential impacts upon female and male customers.

85. **Social safeguards.** OP 4.12 – Involuntary Resettlement - is triggered by the project; however, the proposed investments are not anticipated to cause any permanent physical displacement. The rehabilitation and upgrading work planned under Component 1 is expected to take place on existing infrastructure and on land, which is owned by the state and managed by the oblast administration. However, the exact locations and the scale of physical works have yet to be determined and minor land acquisition might be required. A draft Resettlement Policy Framework (RPF) was prepared by the Recipient and disclosed in-country on October 13, 2017. This follows in-person and virtual consultations in the five participating cities between September 2016 and March 2017, with separate disclosure of the draft RPF in the five different cities. The final version was disclosed in-country on October 16, 2017, as well as by the World Bank through InfoShop on October 16, 2017. As the technical designs are finalized, the Recipient will conduct screening of the investment sites in the five cities to identify any impacts covered under OP 4.12, and if necessary, prepare abbreviated Resettlement Action Plans. The designated safeguards specialist in the PCU will be responsible for screening of project investments for social impacts covered under OP 4.12 and will closely monitor the subprojects for any social impacts.

F. Environment (including Safeguards)

86. The project will result in socioeconomic benefits stemming from investments in modern and efficient heating systems that will improve the reliability, safety, and quality of heating services for the concerned population in the participating cities. Furthermore, energy savings from DH modernization and switching from electricity- and solid-fuel-based heating modes to gas-fired DH will reduce the level of air pollution and greenhouse gas emissions. At the same time, rehabilitation/construction works during project implementation may cause negative temporary impacts, including noise, air pollution, disturbance of traffic, and water runoffs from

the construction. These impacts will be site-specific and can be effectively mitigated by implementing adequate avoidance and/or mitigation measures. Thus, the project triggers OP 4.01 - Environmental Assessment. The project Environmental Impact Assessment (EIA) concluded that no sensitive or protected areas will be affected during the proposed civil works nor will physical cultural resources be involved or affected.

87. The project was assigned Category B for the purposes of the Environmental Assessment (EA). According to the World Bank's safeguards requirements, the participating cities commissioned project EIAs and Environmental Management Plans (EMPs), which will be used during the project implementation. The EA report includes the World Bank's safeguards policies applied to the project, and a description of the policies, and legal and administrative framework regarding environmental management and the centralized heating sector in place in Uzbekistan, as well as five site-specific EMPs. The EMPs contain the following: (a) baseline analysis; (b) potential environmental impacts and necessary measures targeted at mitigating any impacts; (c) monitoring plan for EMPs' implementation; (d) EMPs' implementing arrangements, as well as a short analysis of the project beneficiaries' (Andijan, Bukhara, Chirchik, Samarkand, and Tashkent [Sergeli] DHCs) EA capacity. The EA report stipulates that the EMP provisions will form part of the tendering requirements and will be included in construction contracts for proposed activities, both in the specifications and bills of quantities. Furthermore, all contractors will be required to include these costs in their financial bids and comply with the EMP provisions while implementing the project activities. According to the World Bank and the national EA regulations, the site-specific EMPs have been disclosed on September 13, 2017 and consulted with all interested stakeholders and local population in the participating cities. The EMPs were disclosed on the World Bank website on September 19, 2017.

G. World Bank Grievance Redress

88. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit http://www.worldbank.org/GRS. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org

Annex 1: Results Framework and Monitoring

Project Development Objectives

PDO Statement

The project development objective is to improve the efficiency and quality of heating and hot water services in selected cities within the territory of the Recipient of Uzbekistan.

These results are at | Project Level

Project Development Objective Indicators

Indicator Name	Baseline	Cumulative Target Values							
		YR1	YR2	YR3	YR4	YR5	YR6	YR7	End Target
Projected lifetime energy savings (Megawatt hour (MWh))	0	0	0	0	0	0	2400000	7500000	7500000
Associated project lifetime CO_2 emissions reduction (Metric ton)	0	0	0	0	0	0	280000	765000	765000
People served by energy-efficient heating facilities (Number)	0	0	0	0	0	0	57506	240937	240937
Percentage of people who perceive improvements in heating services (Percentage)	0.00	0.00	0.00	0.00	0.00	0.00	17.00	73.00	73.00

Intermediate Results Indicators

Indicator Name	Baseline	Cumulative Target Values							
		YR1	YR2	YR3	YR4	YR5	YR6	YR7	End Target
Number of individual heat substations installed (Number)	0	0	0	512	811	1239	1629	1836	1836
Tashkent - Installed individual heat substations (Number - Sub-Type: Breakdown)	0	0	0	125	250	375	525	649	649
Chirchik - Installed individual heat substations (Number - Sub-Type: Breakdown)	0	0	0	15	32	109	199	199	199
Andijan - Installed individual heat substations (Number - Sub-Type: Breakdown)	0	0	0	65	149	220	273	306	306
Bukhara - Installed individual heat substations (Number - Sub-Type: Breakdown)	0	0	0	264	264	264	264	264	264
Samarkand - Installed individual heat substations (Number - Sub-Type: Breakdown)	0	0	0	43	116	271	368	418	418

Heat capacity of gas-fired boilers installed or rehabilitated (MW)	0	0	0	145	145	560	560	560	560
Andijan - Capacity of gas-fired boilers installed or rehabilitated (MW - Sub-Type: Breakdown)	0	0	0	50	50	110	110	110	110
Chirchik - Capacity of gas-fired boilers installed or rehabilitated (MW - Sub-Type: Breakdown)	0	0	0	25	25	75	75	75	75
Tashkent - Capacity of gas-fired boilers installed or rehabilitated (MW - Sub-Type: Breakdown)	0	0	0	30	30	205	205	205	205
Bukhara - Capacity of gas-fired boilers installed or rehabilitated (MW - Sub-Type: Breakdown)	0	0	0	0	0	70	70	70	70
Samarkand - Capacity of gas-fired boilers installed or rehabilitated (MW - Sub-Type: Breakdown)	0	0	0	40	40	100	100	100	100

Length (trench) of pre-insulated DH channel installed/replaced (Kilometers)	0.0	0.0	0.0	20.7	58.7	95.8	126.7	134.7	134.7
Tashkent - Length of pre-insulated DH channel installed/replaced (Kilometers - Sub-Type: Breakdown)	0.0	0.0	0.0	9.7	21.3	32.9	46.6	46.6	46.6
Chirchik - Length of pre-insulated DH channel installed/replaced (Kilometers - Sub-Type: Breakdown)	0.0	0.0	0.0	2.0	9.4	15.2	19.7	19.7	19.7
Andijan - Length of pre-insulated DH channel installed/replaced (Kilometers - Sub-Type: Breakdown)	0.0	0.0	0.0	4.8	10.9	16.8	21.0	24.0	24.0
Bukhara - Length of pre-insulated DH channel installed/replaced (Kilometers - Sub-Type: Breakdown)	0.0	0.0	0.0	0.0	5.6	5.6	5.6	5.6	5.6
Samarkand - Length of pre-insulated DH channel installed/replaced (Kilometers - Sub-	0.0	0.0	0.0	4.2	11.6	25.3	33.9	38.8	38.8

Type: Breakdown)									
Number of public information events concerning project and its benefits (Number)	0.00	0.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Tashkent - Number of public information events (Number - Sub-Type: Breakdown)	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Chirchik - Number of public information events (Number - Sub-Type: Breakdown)	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Andijan - Number of public information events (Number - Sub-Type: Breakdown)	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bukhara - Number of public information events (Number - Sub-Type: Breakdown)	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Samarkand - Number of public information events (Number - Sub-Type: Breakdown)	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Grievances registered related to DH service	0.00	0.00	0.00	0.00	0.00	0.00	75%	80%	80%

that are actually addressed (Percentage)									
Tashkent - Grievances registered related to DH service that are actually addressed (Percentage - Sub-Type: Breakdown)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	80%	80%
Chirchik - Grievances registered related to DH service that are actually addressed (Percentage - Sub-Type: Breakdown)	0.00	0.00	0.00	0.00	0.00	0.00	70%	80%	80%
Andijan - Grievances registered related to DH service that are actually addressed (Percentage - Sub-Type: Breakdown)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	80%	80%
Bukhara - Grievances registered related to DH service that are actually addressed (Percentage - Sub-Type: Breakdown)	0.00	0.00	0.00	0.00	0.00	0.00	80%	80%	80%
Samarkand - Grievances registered related to DH service that are actually addressed (Percentage - Sub-Type: Breakdown)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	80%	80%

Beneficiaries who feel project investments reflected their needs (Percentage)	0.00	0.00	0.00	0.00	0.00	0.00	17.00	73.00	73.00
Tashkent - Beneficiaries who feel project investments reflected their needs (Percentage - Sub-Type: Breakdown)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	75.00	75.00
Chirchik - Beneficiaries who feel project investments reflected their needs (Percentage - Sub-Type: Breakdown)	0.00	0.00	0.00	0.00	0.00	0.00	70.00	70.00	70.00
Andijan - Beneficiaries who feel project investments reflected their needs (Percentage - Sub-Type: Breakdown)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	75.00	75.00
Bukhara - Beneficiaries who feel project investments reflected their needs (Percentage - Sub-Type: Breakdown)	0.00	0.00	0.00	0.00	0.00	0.00	70.00	70.00	70.00
Samarkand - Beneficiaries who feel project investments reflected their needs (Percentage - Sub-Type: Breakdown)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70.00	70.00

Indicator Description

Project Development Objective Indicators

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Projected lifetime energy savings	This indicator projects lifetime energy savings directly attributable to the project, converted to MWh. The baseline value is expected to be zero.	Annual	Project progress reports	PCU
Associated project lifetime CO_2 emissions reduction	The associated CO_2 emissions reduction is estimated based on predetermined emissions factor per MWh energy savings.	Annual	Project progress report	PCU
People served by more energy-efficient heating facilities	This indicator measures the number of people living in households that switched to more energy-efficient space heating	Annual	Project progress reports	PCU
Percentage of people who perceive improvements in heating services	This indicator reflects the proportion of people living in the project area who recognize improvements in the heating services to all people living in the project area (subject to project related measures already implemented). The indicator will be defines based on the household survey done in YR4 and YR7. This indicator will be disaggregated by gender.	Two surveys: one during the implementation period, the second one after the project completion	Project progress reports	PCU

Intermediate Results Indicators

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Number of individual heat substations installed	This indicator measures construction progress with installation of individual heat substations.	Annual	Project progress reports	PCU
Tashkent - Installed	Tashkent: Number of installed individual	Annual	Project progress reports	PCU

individual heat substations	heat substations.			
Chirchik - Installed individual heat substations	Chirchik: Number of installed individual heat substations.	Annual	Project progress reports	PCU
Andijan - Installed individual heat substations	Andijan: Number of installed individual heat substations.	Annual	Project progress reports	PCU
Bukhara - Installed individual heat substations	Bukhara: Number of installed individual heat substations.	Annual	Project progress reports	PCU
Samarkand - Installed individual heat substations	Samarkand: Number of installed individual heat substations.	Annual	Project progress reports	PCU
Heat capacity of gas-fired boilers installed or rehabilitated	This indicator measures progress with capital overhaul or replacement of existing boilers in participating DHCs.	Annual	Project progress reports	PCU
Andijan - Capacity of gas boilers installed or rehabilitated	Andijan: Capacity of gas-fired boilers replaced or modernized.	Annual	Project progress reports	PCU
Chirchik - Capacity of gas boilers installed or rehabilitated	Chirchik: Capacity of gas boilers installed or rehabilitated.	Annual	Project progress reports	PCU
Tashkent - Capacity of gas boilers installed or rehabilitated	Tashkent: Capacity of gas boilers installed or rehabilitated.	Annual	Project progress reports	PCU
Bukhara - Capacity of gas boilers installed or rehabilitated	Bukhara: Capacity of gas boilers installed or rehabilitated.	Annual	Project progress reports	PCU
Samarkand - Capacity of gas boilers installed or rehabilitated	Samarkand: Capacity of gas boilers installed or rehabilitated.	Annual	Project progress reports	PCU
Length (trench) of DH channel installed	This indicator measures construction progress with district heating network installation.	Annual	Project progress reports	PCU
Tashkent - Length of pre-	Tashkent: Trench length (2 pipes) of	Annual	Project progress reports	PCU

insulated DH channel installed	installed district heating network (pre-insulated pipes).			
Chirchik - Length of pre-insulated DH channel installed	Chirchik: Trench length (2 pipes) of installed district heating network (pre-insulated pipes).	Annual	Project progress reports	PCU
Andijan - Length of pre-insulated DH channel installed	Andijan: Trench length (2 pipes) of installed district heating network (pre-insulated pipes).	Annual	Project progress reports	PCU
Bukhara - Length of pre-insulated DH channel installed	Bukhara: Trench length (2 pipes) of installed district heating network (pre-insulated pipes).	Annual	Project progress reports	PCU
Samarkand - Length of pre-insulated DH channel installed	Samarkand: Trench length (2 pipes) of installed district heating network (pre-insulated pipes).	Annual	Project progress report	PCU
Number of public information events concerning project and its benefits	This indicator measures the number of information events reflecting the project implementation and its benefits.	Annual	Project progress reports	PCU
Tashkent - Number of public information events	Tashkent: Number of public information events held	Annual	Project progress reports	PCU
Chirchik - Number of public information events	Chirchik: Number of public information events	Annual	Project progress reports	PCU
Andijan - Number of public information events	Andijan: Number of public information events	Annual	Project progress reports	PCU
Bukhara - Number of public information events	Bukhara: Number of public information events	Annual	Project progress reports	PCU
Samarkand - Number of public information events	Samarkand: Number of public information events	Annual	Project progress reports	PCU
Grievances registered related to DH service that are actually addressed	This indicator measures the number of grievances actually addressed to the number received by the district heating	Annual	Project progress reports	PCU

	company from the consumers unsatisfied with the quality of heating services.			
Beneficiaries who feel project investments reflected their needs	The indicator measures satisfaction to improvements among people who live in the buildings connected to the rehabilitated DH system. This indicator will be disaggregated by gender.	Midterm and upon project completion	Project progress reports	PCU

Annex 2: Detailed Project Description

1. The project consists of two components: (a) Modernization of District Heating Systems, and (b) Implementation Support and Capacity Building. The total estimated project costs are US$140 million. The project is supported by an IDA Credit of US$140 million. The cities included in the project are Andijan, Chirchik, Bukhara, Samarkand, and Sergeli District of Tashkent City.

2. Component 1: Modernization of District Heating Systems (Estimated cost US$134million, US$134 million IDA financing). The component will finance energy efficiency investments in renovation of heat production and transportation, and distribution systems, including installation of building-level IHS and heat meters for billing purposes. In addition, gas, electricity, and water supply systems will be upgraded or constructed, wherever it is needed for DH purposes. In addition to DH infrastructure, the component will finance procurement of specialized maintenance equipment and vehicles for the participating DHCs. Table 2.1 provides a summary of investments in each of the five cities.

Table 2.1. Component 1. Modernization of DH Systems (Estimated Costs, in US$ million)

Item	Andijan	Bukhara	Chirchik	Samarkand	Sergeli	Total	IDA Financing
Boilers rehabilitation and/or replacement in the existing boiler houses	9.28	6.10	6.11	8.31	15.81	45.61	45.61
DH network rehabilitation, new network construction	7.51	3.73	6.14	12.78	23.38	53.54	53.54
Individual substations and building-level heat meters	5.32	4.26	3.46	7.22	11.01	31.27	31.27
Electricity network reconstruction	0.2	0.2	0.2	0.2	0.51	1.31	1.31
Water supply reconstruction	0.18	0.18	0.18	0.18	0.51	1.23	1.23
Maintenance equipment for boiler houses	0.15	0.15	0.15	0.15	0.44	1.04	1.04
Total Component 1	**22.64**	**14.62**	**16.246**	**28.84**	**51.66**	**134.0**	**134.0**

3. Subcomponent 1.1. Andijan City (Estimated cost US$22.6 million, US$22.6 million IDA financing). Andijan City is located in the Fergana Valley in the southeastern part of the country with a total population of about 416,300, of which about 54,000 live in project area buildings. In Andijan, the centralized DH system stopped operating more than eight years ago. Since then, tenants in the MABs have heated their apartments with different types of temporary measures, such as electric heaters, gas heaters, and coal-fired stoves. Therefore, the DH system in Andijan pilot area will need to be completely replaced and modernized. The project investments will include the following:

(a) Installation of three new boilers at boiler house RK-2 with a total capacity of about 110 MW. This boiler house currently has old PTVM-30 and PTVM-50 boilers, which would require full renovation or replacement. The heat demand in the future will be smaller than during the time when the boiler plants provided heat to the whole DH system.

(b) Replacement of about 24 km (trench length) of DH network. The DH system has not been in operation for several years and most of the existing network requires full replacement with pre-insulated pipes. Some parts of the old network may be used.

(c) Installation of 306 IHS in selected MABs and public buildings. Each building shall be equipped with an indirect HIS for heating and hot water generation. The substations will be modern, fully automated, and equipped with heat meters for billing purposes.

(d) Electricity network reconstruction. This will include laying cable lines (6 kV and 0.4 kV), installation of transformers in existing transformer substations, and construction of new substations.

(e) Water supply reconstruction will include replacement of existing water networks and construction of new ones.

(f) Maintenance equipment for boiler houses of the Andijan DHC. This will include special maintenance vehicles and typical mechanical and electric maintenance equipment for keeping the DH system in good technical condition.

4. Subcomponent 1.2. Bukhara City (Estimated cost US$14.6 million, US$14.6 million IDA financing). Bukhara City is located in the southern part of Uzbekistan. The population of Bukhara is about 270,000, and about 37,000 people live in the project area. The project investments will deal with the DH system of BEM, one of the two main DHCs of the city. The existing installed capacity of the boiler house at BEM is 284 MW. Part of the capacity was used to supply steam to a textile plant. With the plant no longer in operation, steam boilers have been switched to producing hot water. Overall, the total heat demand to be met by BEM is currently about 70 MW. The project investments will include the following:

(a) Installation of one new gas-fired boiler of 30 MW, and modernization of two existing boilers with total capacity of 40 MW, which is sufficient to meet the current heat demand.

(b) Replacement of about 5.6 km (trench length) of the DH network.

(c) Installation of 264 IHS in selected MABs and public buildings. The substations will be modern, fully automated, and equipped with heat meters for billing purposes.

(d) Electricity network reconstruction. This will include laying cable lines (6 kV and 0.4 kV), installation of transformers in existing transformer substations, and construction of new substations.

(e) Maintenance tools and vehicles for BEM. This will include special maintenance vehicles and typical mechanical and electric maintenance equipment.

5. Subcomponent 1.3. Chirchik City (Estimated cost US$16.2 million, US$16.2 million IDA financing). Chirchik is located about 30 km to the northeast of Tashkent, with a total population of about 150,000. There are about 20,000 people living in the buildings of the DH area. The DH system of the city is currently operational, though it shrank in size by about one-third in the past years because of lack of funds to rehabilitate the outdated equipment. The project will aim to restore and improve heat and hot water supply to about 194 residential and public buildings. Project investments will include the following:

(a) Installation of three new boilers (75 MW in total) at the Yubileynaya boiler house.

(b) Replacement and construction of 19.7 km (trench length) of the DH network with pre-insulated pipe. The main part of the DH network requires replacement and dimensioning considering that the buildings will be equipped with automated indirect substation resulting in larger temperature difference and smaller flow rate of the DH circulating water.

(c) Installation of 199 IHS in selected MABs and public buildings. The DH system in Chirchik has been the only DH system with indirect building substations. However, after being in operation for more than two decades, it requires replacement. Each building will be equipped with an indirect IHS for heating and hot water generation. The substations will be modern, fully automated, and equipped with heat meters for billing purposes.

(d) Electricity network reconstruction. This will include laying cable lines (6 kV and 0.4 kV), installation of transformers in existing transformer substations, and construction of new substations.

(e) Maintenance tools and vehicles for the Chirchik DHC. This will include special maintenance vehicles and typical mechanical and electric maintenance equipment for the DH system.

6. Subcomponent 1.4. Samarkand City (Estimated cost US$28.9 million, US$28.9 million IDA financing). Samarkand is a city located in the southern part of Uzbekistan. The population of Samarkand is about 500,000 and about 54,000 people live in the project area. In Samarkand city, boiler house RK-2 area will be modernized under the project. The existing installed capacity of the boiler house is 232 MW, but the current level of heat demand is about 80 MW. The project investments will include the following:

(a) Installation of three new gas-fired boilers with total capacity of 100 MW, which is sufficient to meet the current heat demand.

(b) Replacement of about 39 km (trench length) of the DH network.

(c) Installation of 418 IHS in selected MABs and public buildings. The substations will be modern, fully automated, and equipped with heat meters for billing purposes.

(d) Electricity network reconstruction. This will include laying cable lines (6 kV and 0.4 kV), installation of transformers in existing transformer substations, and construction of new substations.

(e) Maintenance tools and vehicles for the Samarkand DHC. This will include special maintenance vehicles and typical mechanical and electric maintenance equipment.

7. Subcomponent 1.5. Sergeli District (Estimated cost US$51.7 million, US$51.7 million IDA financing). Sergeli is a district of Tashkent located in the southern part of the city. The population of the Sergeli project area is about 75,000. Currently the DH is generated in the Sergeli heat-only boiler house No.8 (capacity of about 350 MW). The DH system of the Sergeli District is isolated from the rest of the DH system of Tashkent. It is fully functional, but significant opportunities exist to improve energy efficiency and hence reduce the cost of heat and hot water supply. The project will cover 993 buildings currently connected to the DH system, including 826 MABs and 167 public buildings. The project investments will include the following:

(a) Modernization of two existing boilers (175 MW in total) of the district boiler house No.8. Both boilers will be rehabilitated and modernized with new heat surfaces, modern automation and control systems, and variable flow pumps.

(b) Installation of a new hot water boiler of 30 MW in the same boiler house No.8.

(c) Rehabilitation of 46.6 km (trench length) of DH network. In Sergeli, the DH network is in reasonable condition and only a part of the network will be replaced with pre-insulated DH pipes.

(d) Installation of 649 IHS in selected MABs and public buildings. The substations will be modern, fully automated, and equipped with heat meters for billing purposes.

(e) Electricity network reconstruction. This will include laying cable lines (30 km of 6 kV and about 100 km of 0.4 kV line), installation of one transformer in the existing transformer substation, and construction of 15 new transformer substations. These investments will be financed by Uzbekenergo and the assets will belong to them.

(f) Upgrade of the water infrastructure to ensure water supply to the IHS is required. It is estimated that about 40 km of water pipes will be replaced and about 2.5 km of new water pipe constructed to supply adequate amount of cold water to the new substations.

(g) Maintenance tools and vehicles for the Tashkent DHC. This will include special maintenance vehicles and typical mechanical and electric maintenance equipment.

Table 2.2. Component 1, Detailed Contents

Item	Andijan	Bukhara	Chirchik	Samarkand	Sergeli	Total
Boilers replacement in the existing boiler houses	RK-2 (1, 2 and part of 3 region) Installation of three new boilers of 110 MW total capacity	Modernization of two boilers of 40 MW total capacity and installation of one new boiler of 30 MW	Installation of three new boilers 75 MW total capacity	Installation of three new boilers of 100 MW total capacity	Modernization of two boilers of 175 MW total capacity and installation of a new hot water boiler 30 MW	15 boilers of 560 MW total capacity
DH network rehabilitation with pre-insulated pipes	24 km of DH network (trench length)	5.6 km of DH network (trench length)	19.7 km of DH network (trench length)	38.8 km of DH network (trench length)	46.6 km of DH network (trench length)	134.7 km of DH network (trench length)
Individual substations with building level heat meters	306 IHS with heat meters	264 IHS with heat meters	199 IHS with heat meters	418 IHS with heat meters	649 IHS with heat meters	1,836 IHS with heat meters
Electricity network reconstruction	Cable lines (6 kV and 0.4 kV); installation of transformers.	Cable lines (6 kV and 0.4 kV); installation of transformers.	Cable lines (6 kV and 0.4 kV); installation of transformers.	Cable lines (6 kV and 0.4 kV); installation of transformers.	30 km of cable line (6 kV); 100.85 km (0.4 kV) cable lines; installation of transformers.	At least 130.85 km; 16 transformer substations
Water supply reconstruction	Replacement/const-ruction of water networks	Replacement/const -ruction of water networks	Replacement/const-ruction of water networks	Replacement/const-ruction of water networks	Replacement of 41 km of water networks; new 2.4 km network	About 50 km of water network to be replaced/ constructed
Equipment for DHCs	Maintenance equipment for boiler houses	Maintenance equipment for boiler houses	Maintenance equipment for boiler houses	Maintenance equipment for boiler houses	Maintenance equipment for boiler houses	Maintenance equipment for boiler houses

8. The number and capacity of boilers, the number of IHS, and the length of the DH network to be replaced in the participating cities are based on the results of the project draft feasibility study supported by the ECAPDEV grant.

9. Component 2: Implementation Support and Capacity Building (Estimated cost US$6 million, US$6 million IDA financing). The component will finance capacity building and implementation support for the MHCS, the PCU in the KA, and participating DHCs. TA areas comprise the following:

(a) providing technical assistance for Project management, monitoring and supervision, Project financial audit, including Training and Operating Costs. The first year's bidding documents and technical specifications will be prepared under the ECAPDEV grant.

(b) Training and capacity building, including study tours for the MHCS, KA, and participating DHCs, as well as knowledge-sharing workshops for the participating DHCs and sector-wide knowledge-sharing and project results dissemination workshops.

(c) assessment of the profitability of the participating DHCs, develop recommendations to improve their financial performance, and strengthen their capacity, including through workshops for the participating DHCs and other shareholders.

(d) Development of institutional model for DH sector regulation and management

(e) Social surveys of customer satisfaction in the participating cities at midterm and after the project completion with disaggregation by gender.

(f) Annual financial audit of the project accounts over the project lifetime.

(g) Development of a communication strategy and action plan for public information campaigns for the six DHCs and support their implementation.

(h) preparation of feasibility studies for future investment projects in the DH sector.

(i) Other TA activities identified during the project implementation.

Annex 3: Implementation Arrangements

Project Institutional and Implementation Arrangements

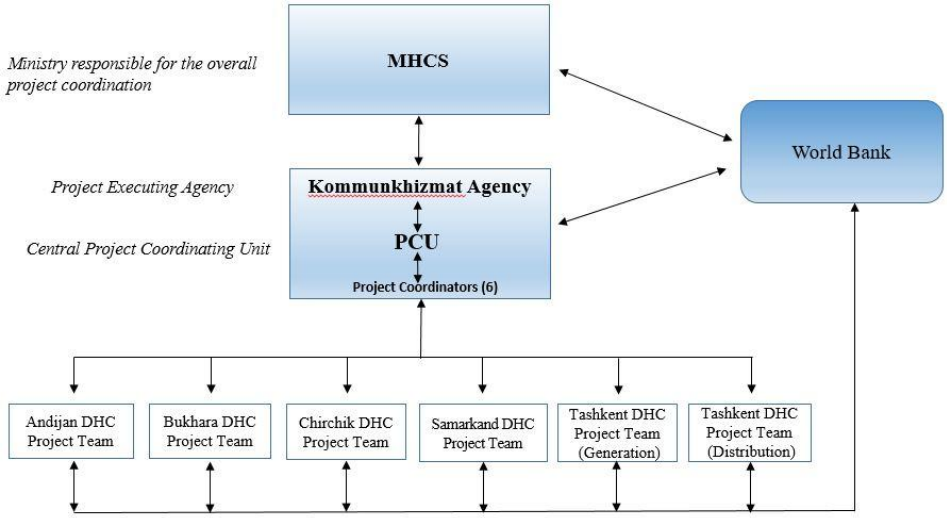
1. The proposed project will be implemented over a period of seven years by the Project Executing Agency, with the participation by six DHCs in Andijan, Bukhara, Chirchik, Samarkand, and Sergeli (Tashkent)[6]. The project implementation shall initially start in Bukhara and Chirchik, while preparation for investments, such as preparation of an implementation plan for in-building improvements and design works for investments will be undertaken in parallel.

2. The KA under the MHCS will be responsible for the overall project coordination. The PCU will be located in the KA. Under the Presidential Decree on Measures of Further Improvement of Housing and Public Utilities (No. UP-5017 dated April 18, 2017), the responsibilities related to DH services, among others, were consolidated under the MHCS. Under the Decree, the ownership of DHCs were transferred from Khokimiyats to the MHCS. Therefore, the MHCS will provide ministerial oversight for the project activities including project preparation, supervision, and M&E. The PCU will be responsible for the procurement of the goods, works, and services; undertaking FM including disbursement processing and project audit; public relations; consolidation of environmental and social safeguards measures in compliance with the World Bank's requirements, and preparation of periodical reports and their submission to the World Bank. The PCU will assign coordinators who will liaise with DHCs, and make sure that DHCs participate in the project preparation and implementation stages. Establishment of a PCU with the composition, resources and terms of references satisfactory to the Association is a condition of effectiveness.

3. Under the PCU's oversight, the DHCs will participate, among others, in the definition of technical specifications, tender evaluations, and construction supervision. Once the contractors are selected, the DHCs together with the PCU on behalf of KA will be the contracting parties for supply and installation and other contracts. The DHCs will assign, and if necessary hire, a technical support team that will ensure implementation of the investment activities in their respective service areas. Both the PCU and the technical support teams under the DHCs will communicate directly with the World Bank on project-related issues.

[6] There are two DHCs covering heat generation and distribution, respectively, in Tashkent.

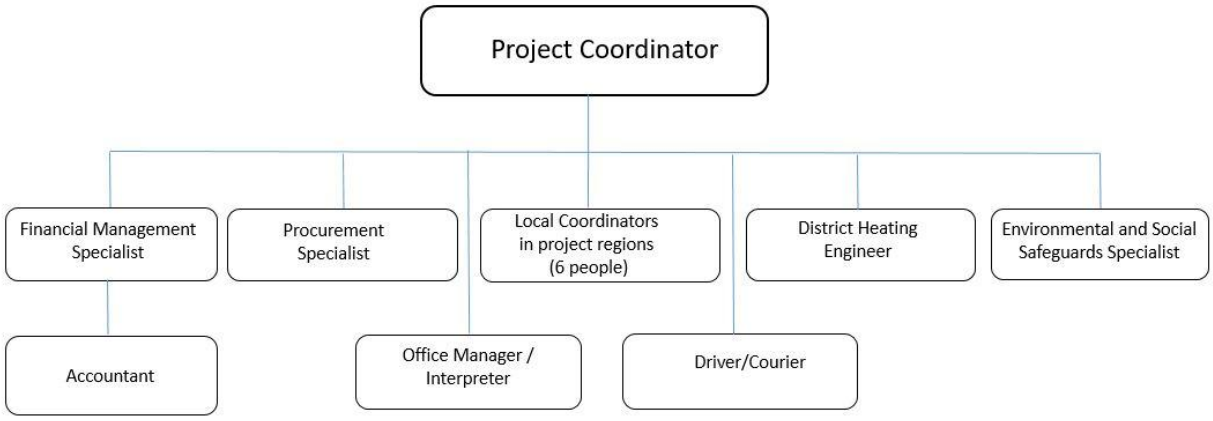
Figure 3.1. Project Implementation and Communication Structure



4. This arrangement was chosen to mitigate the risk of delays in implementation caused by weak capacity of the DHCs to manage World Bank requirements on fiduciary responsibilities. Moreover, this would mitigate the possible delays in contract review and registration.

5. **Structure of the PCU.** The head of the PCU will be a project coordinator. The PCU also will be staffed with technical specialists, a procurement specialist, an FM specialist, and an environmental and social safeguards specialist. The PCU, with the participation of technical experts from relevant DHCs on technical specifications and implementation arrangements, will take the lead in the preparation of tender documents and in execution of the procurement process in accordance with the World Bank guidelines. The PCU will also handle FM and environmental and social safeguards measures in accordance with the POM.

Figure 3.2. Organogram of the PCU



6. **Structure of the technical support teams in DHCs.** The participating DHCs will designate and, if necessary, hire dedicated technical support team staff to their investment departments, namely: the head of the team, an engineering expert, a procurement specialist, an

environmental and social safeguards specialist, and FM specialist. The technical support teams will coordinate and monitor implementation of the project. The PCU under the KA will summarize the project data from all the DHCs and is in charge of interaction with the World Bank and other stakeholders.

Proposed Legal Framework

7. The proposed legal arrangements for the project will be as follows: Financing Agreement between IDA and the Ministry of Finance; and Subsidiary Agreements between quadruple contracting parties, consisting of the Ministry of Finance, KA, the six DHCs, and Khokimiyats in the respective service areas.

Financial Management, Disbursements, and Procurement

Financial Management

8. The PCU under the KA will be responsible for all FM and disbursement aspects during project implementation including planning, budgeting, accounting, financial reporting, funds flow, internal controls and auditing. The technical support team within the DHCs will assist the PCU; however, it will not be responsible for any aspect of FM. The role of technical support teams within DHCs will be limited to preparing supporting documents for payments under procurement contracts and submitting them together with payment requests to the PCU. The PCU under the KA has experience in the implementation of World Bank-financed projects.

9. The PCU will be responsible for FM of all project components including submission of quarterly unaudited IFRs and audited annual PFSs to the World Bank. While the PCU has some procedures in place with regard to planning, budgeting and accounting, the POM should be updated to reflect the proposed project-related project description. The PCU will manage project payments and maintain project accounting records, which would be segregated for this project. The existing accounting software, 1-C, is functional; however, due to system glitches IFRs, Statement of Expenditures (SOEs), and Withdrawal Applications (WAs) are prepared manually. The accounting system needs to be customized for accounting and financial reporting purposes of the project and system glitches addressed by engaging an accounting system developer. The annual audited financial statements together with the auditor's opinion and the Management Letter will be provided to the World Bank within six months after the end of each fiscal year and at the closing of the project. The PCU will be responsible for selection and appointment of the project auditor, according to ToR acceptable to the World Bank, and the financial audit will be financed from the credit funds.

10. *Staffing*. The current FM staff include a project accountant and an FM specialist. The existing staff have some knowledge and experience in accounting, but they still need to build their skills in the areas of internal controls, international financial reporting and FM requirements in World Bank-financed operations through attending World Bank-organized trainings and workshops. Further, hiring an additional FM specialist fully dedicated to the implementation of project is highly recommended.

11. *Budgeting and planning*. The annual budget of the project will be based on the final Procurement Plan (PP) that has been discussed and agreed between the PCU and the World Bank. The PCU coordinator, the FM specialist, and the procurement specialists and other specialists, if necessary, will be involved in the preparation of the annual budget. These budgets will form the basis for allocating funds to project activities and requesting counterpart funds from the Government, if appropriate. The budgets will be prepared according to the IFR format (disbursement categories, components and activities, and broken down by quarter).

12. *Accounting*. The PCU has experience maintaining the accounting system. The project accounting will be maintained on the accrual basis of accounting in accordance with National Accounting Standards of Uzbekistan. For reporting purposes, cash basis of accounting with the disclosure of commitment will be used under the proposed Project. The POM, under on-going projects, reflects accounting policies and procedures and will be used under the project. However, it should be updated to reflect the proposed project-related internal control, budgeting, external auditing, financial reporting, and accounting policies and procedures. All supporting documents will be maintained in files for ready access by auditors and World Bank staff. The project's chart of accounts will track all transactions and report them according to the source of financing for project components, and type and category of expenditure. The PCU has fully adopted the 1-C accounting system that suits the needs of the projects, and the accounting system is multi-user and has dual currency (U.S. dollar and Uzbekistan som) functionality, and is fully capable of generating IFRs, SOEs and WA automatically, however due to system glitches IFRs, SOEs and WA are prepared manually. It is highly recommended to engage an accounting system developer and update the accounting system, which will be undertaken not later than 30 days after the project effectiveness.

13. *Internal controls*. There are implemented internal control procedures in the PCU. However, it is not always capable of providing reliable and timely information and reporting on the projects. Internal controls procedures are documented in the POM. The PCU has adequate internal control procedures in place over operational expenses. However, internal control weaknesses noted need to be implemented and duly reflected in the updated POM. Particularly in the POM, the following internal controls procedures should be documented: (a) verification of eligibility of expenditures by the project accountant and FM specialist; (b) description of financial documents flow/circulation, formal reconciliation procedures of project records with Client Connection, XDR/U.S. dollar reconciliations procedures and mechanisms; (c) introduction of invoice verification check-list within contract management, and proper enforcement mechanisms; (d) FM specialist role in contract management and FM specialist involvement into the contract management since the early stages; and (e) maximum allowed daily cash operations. Updating the POM for the above recommendations is a condition of effectiveness. The FM section of the POM for the project should clearly capture the above-mentioned recommendations.

14. *Co-financing*. Government co-financing will be in the form of tax exemptions. The PCU will be exempted from paying VAT, import VAT, excise tax, customs duties, and Road Fund charges on vehicles, in relation to goods, works, non-consulting services, and consultants' services, and incremental operating costs, which are procured under the project.

15. *Financial reporting*. For the project, project management-oriented unaudited IFRs will be prepared as well. The PCU will produce a full set of IFRs every calendar quarter throughout the life of the project. The format of IFRs has been agreed during the assessment and includes (a) Project Sources and Uses of Funds, (b) Uses of Funds by Project Activities, (c) Designated Account (DA) Statement, (d) Disbursement Summary, and (e) an SoE Withdrawal Schedule. These financial reports will be submitted to the World Bank within 45 days of the end of each calendar quarter.

16. *External audit*. The project audit will be conducted (a) by an independent private auditor acceptable to the World Bank, on ToRs acceptable to the World Bank, and selected by the PCU; and (b) according to the International Standards on Auditing (ISA) issued by the International Auditing and Assurance Standards Board of the International Federation of Accountants. The ToR will include (a) audits of PFSs, (b) assessments of the accounting system, and (c) a review of the internal control mechanisms. No entity audit is required. Table 3.1 identifies the required audit reports that will be submitted by the PCU and the due date of submission.

Table 3.1. Audit Reports to Be Submitted by the PCU

Audit Report	**Due date**
The PFSs include Project Sources and Uses of Funds, Uses of Funds by Project Activities, SOE Withdrawal Schedule, DA Statement, Notes to the Financial Statements, and Reconciliation Statement.	Within 6 months of the end of each fiscal year and also at the closing of the Project.

17. The audited PFSs will be disclosed to the public in a manner acceptable to the World Bank. Following the World Bank's formal receipt of these statements from the Recipient, the World Bank will make them available to the public in accordance with the World Bank Policy on access to information.

18. *Flow of funds and disbursements*. The proceeds of the IDA credit will be disbursed in accordance with the relevant disbursement procedures of the World Bank. The proceeds will be used to finance project activities through (a) advances to and documentation of the DA, (b) direct payments to third parties, (c) special commitments, and (d) reimbursements, all accompanied by appropriate supporting documentation (SoE and records) in accordance with the World Bank's Disbursement Guidelines. The minimum application size for direct payments, reimbursements and special commitments, and the DA ceiling, will be specified in the Disbursement and Financial Information Letter. WAs will be signed by two designated officials of the PCU. The project will be required to adopt e-disbursements.

19. *Documentation for the SOEs*. For all expenditures disbursed on the basis of the SoEs, full documentation in support of the SoEs will be retained in the PCU for at least two years after the project closing date. This information will be available for review by World Bank missions during project implementation support and by the project's auditors.

20. *Financing parameters*. Table 3.2 specifies the categories of eligible expenditures that may be financed out of the proceeds of the credit ('category'), allocations of the credit to each

category, and the percentage of expenditures to be financed for eligible expenditures in each category.

Table 3.2. Eligible Expenditures

Expenditure Category	Amount of the Credit Allocated (US$, millions)	Financing Percentage
(1) Goods, works, non-consulting services, consultants' services, Training and Incremental Operating Costs for the Project (except for Part A.1 for Andijan)	117.36	100
(2) Goods, works, non-consulting services and consultants' services for Part A.1 of the Project (for Andijan)	22.64	100
Total Amount	**140**	

21. *Financial reporting*. The six technical support teams in the DHCs will prepare separate six-monthly IFRs, and the PCU in the KA will be responsible for consolidating and submitting the IFRs for the project, which will be due within 45 days of the end of the biannual period. The format and contents of the IFRs have already been discussed, and will include (a) Project Sources and Uses of Funds, (b) Uses of Funds by Project Components, (c) DA Statements, (d) Disbursement Summary, and (e) an SoE Withdrawal Schedule.

22. *Annual PFSs*. The annual PFS will be prepared by the PCU under the KA.

23. *External audits*. External audits should be carried out by an eligible auditor, according to the ToR acceptable to the World Bank, and consistent with the ISA. The PCU will be responsible for selection and appointment of a project auditor. The audit report and the Management Letter should be provided to the World Bank within six months after the end of each fiscal year and at the closing of the project. The project audit report will include an opinion on (a) the PFS, (b) reliability of the SoE procedure for disbursements, (c) operation of the Designated Special Accounts, and (d) confirmation that project funds have been used for the purposes intended. The cost of external audit will be paid from the credit proceeds.

Procurement

Procurement Implementation Arrangements

24. *Guidelines.* Procurement for the proposed project will be carried out in accordance with the World Bank's 'Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers' dated January 2011 and revised July 2014 (Procurement Guidelines); and 'Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers' dated January 2011 and revised July 2014 (Consultant Guidelines); and provisions stipulated in the Financing Agreement. If there is a conflict between the Government decrees, rules and regulations, and the World Bank Procurement and Consultant Guidelines, then the World Bank

guidelines shall prevail. In addition, the project will also follow 'Guidelines On Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants' dated October 15, 2006 and revised in January 2011. For each contract to be financed by the World Bank, procurement methods or consultant selection methods, the need for pre-qualification, estimated costs, prior review requirements, and time frame will be agreed between the Recipient and the World Bank project team in the PP. The PP will be updated at least annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

25. The items to be procured would include the following:

(a) Goods to be procured under this project include the following: (a) maintenance vehicles and maintenance tools and equipment; (b) supply and installation of new gas fired boilers; and (c) supply and installation of building-level IHS, and so on. These are mainly subject to the ICB procedure.

(b) Works to be procured under this project include: (a) supply and construction of DH pipelines; (b) construction of water pipelines; (c) works for strengthening research institutes, and so on. These works shall be procured through ICB or National Competitive Bidding (NCB).

(c) Consulting services and training: Consulting services required under the project would include the following: (a) project implementation consultancy and TA; (b) financial audit, and so on.

26. Procurement will be carried out by the PCU under the KA of the MHCS of Uzbekistan. The World Bank's ICB Standard Bidding Documents, Standard Request for Proposal, sample NCB or Shopping documents will be used. Domestic preference according to Clause 2.55 and Appendix 2 of the Procurement Guidelines will apply to goods contracts.

Record Keeping

27. The procurement specialist of the PCU is responsible for maintaining procurement records. Separate files should be maintained for each contract (including both hard and electronic copies). All the procurement documents (including bids and technical and financial proposals of consulting services) should be kept until the end of the project and then transferred to the government archives. The original documents (such as bid security, performance guarantee, and advance guarantee) should be kept in the safe by the PCU's accountant.

Risk Analysis and Mitigation Measures

28. *Procurement Risk Assessment and Mitigation*. As part of project preparation, an assessment of the procurement capacity of the KA was carried out during July-August 2017 and the Procurement Risk Assessment Management System has been completed.

29. The country procurement assessment (Report No. 25653 UZ) conducted in 2003 (by the World Bank and ADB) and PEFA in 2012 identified the following weaknesses in the public procurement system in Uzbekistan: (a) absence of a unified legislative framework; (b)

inefficient and non-transparent procurement practices; (c) absence of a single institution with oversight or regulatory authority on public procurement practices; (d) inadequate capacity to deal with bidders' complaints; (e) lack of independent scrutiny of contracts; (f) lack of comprehensive anti-corruption measures; and (g) low skills/capacity of the staff handling public procurement at every administrative level.

30. The Government is reforming the public procurement regulations. For example, price verification, which was causing considerable delays in project procurement and implementation, was removed. However, considerable delays in evaluation of bids remain a key challenge.

31. The risks identified and mitigation measures are summarized in the Table 3.3.

Table 3.3 Procurement Risk Assessment and Mitigation

Description of Risk	**Rating of Risk**	**Mitigation Measures**	**Residual Risk**
Local companies may not participate effectively in the biddings because of the difficulties of obtaining the bank guarantees from local banks for bid security purpose.	S	To encourage competition, the bid security could be replaced by bid security declaration for NCB	M
Staff of DHCs do not have experience with the World Bank procedures and guidelines.	S	Representatives of the DHC shall be trained by the World Bank during the project implementation. Moreover, the procurement team will support and provide guidance to the PCU on procurement. Procurement will be centrally handled by the PCU that is already in place under the MHCS activities. Procurement supervision will be carried out on a regular basis. An experienced procurement specialist to support the PCU will be required by project effectiveness. A POM including a detailed chapter on procurement will be prepared.	M

The process of evaluation of large procurement is cumbersome and may take too long. It may take more than three months to sign the minutes, and approve bid evaluation reports.	S	The World Bank's procedures shall be adhered to strictly and the Portfolio Review Meetings with the Government will be held to follow up closely and address the issues.	M
Delays in project implementation and integrity issues in the sector	H	Prepare a detailed PP for the first 18 months of the implementation of the project. Start the preparation of all first-year bidding documents by project effectiveness to avoid delays in the project implementation. Follow up on the earlier agreed with the KA's Action Plan, earlier agreed upon, to improve the procurement performance and integrity.	S
Total/Average	S		M

Note: H: High; S: Substantial; M: Moderate and L: Low.

Procurement Methods

32. Goods, works, and non-consulting services will be procured using the following methods as to be agreed in the PP: ICB, NCB, Shopping, and Direct Contracting (DC). Works will include supply and installation packages for building-level IHSs; construction of DH pipelines; rehabilitation of existing gas boilers; and new local boiler houses, and small autonomous boiler houses.

33. Consultants will be selected using the following methods: Quality- and Cost-Based Selection (QCBS), Least-Cost Selection (LCS), Selection under a Fixed Budget (FBS), Selection based on the Consultants' Qualifications (CQS), IC Selection, and Single-Source Selection (SSS). Consultant services will include services for project implementation and financial audit. The World Bank's Standard Request for Proposals will be used. All ToRs, irrespective of prior/post review status, are subject to the World Bank's review and no objection.

34. *Training*. The institutions providing standard training, conducting seminars and organizing study tours will be selected on the basis of analysis of the most suitable program of training offered by the institutions, availability of services, the period of training, and the reasonableness of cost. However, consultants hired to deliver training under the project shall be selected in accordance with the selection methods as stipulated in the Consultant Guidelines applicable to the project.

35. *Operating costs*. Activities to be financed by the project (as defined in the Legal Agreement) will be procured using the implementing agency's administrative procedures, which

will be reviewed and found to be acceptable to the World Bank. Operating cost will not include salaries of civil servants.

36. *Procurement Supervision and Procurement Post Review*. Regular procurement reviews and supervision support will be provided by the procurement specialist based in the region/country office. In addition, two supervision missions are expected to take place per year during which ex-post reviews will be conducted for the contracts that are not subject to World Bank prior review on a sample basis (for example, 15 percent in terms of number of contracts). One ex-post review report will be prepared per fiscal year, including findings of physical inspections for not less than 10 percent of the contracts awarded during the review period.

37. *Disclosure*. The following documents shall be disclosed on the KA's website: (a) PP with estimated cost and updates, (b) invitation for bids for goods and works for all ICB and NCB contracts, (c) request for expression of interest for selection/hiring of consulting services, (d) contract awards of goods and works procured following ICB/NCB procedures, (e) list of contracts/purchase orders placed following shopping procedure on quarterly basis, (f) short list of consultants, (g) contract award of all consultancy services, (h) list of contracts following DC or CQS or SSS on a quarterly basis, (i) monthly physical and financial progress of all contracts and (j) action taken report on the complaints received on a quarterly basis. The works bidding documents shall include a clause to put up a notice board in the construction site disclosing the contract details (description, contractor name and contract amount, starting date, completion date, physical progress and financial progress).

38. The following details shall be sent to the World Bank for publishing in the World Bank's external website and United Nations Development Business (UNDB): (a) invitation for bids for procurement of goods and works using ICB procedures, (b) request for expression of interest for consulting services with estimated cost more than US$300,000, (c) contract award details of all procurement of goods and works using ICB procedure, (d) contract award details of all consultancy services with estimated cost more than US$300,000, and (e) list of contracts/purchase orders placed following SSS, CQS, or DC procedures on a quarterly basis.

Procurement Plan

39. The PP for the first 18 months of the project has been prepared. The PP will provide information on procurement packages, methods, and World Bank review requirements, the thresholds for procurement and selection methods, and prior review by the World Bank. The different procurement or consultant selection methods, estimated costs, prior review requirements, and time frame will be agreed in the PP. The PP will be available at the KA's website and on the World Bank's external website after Board approval. The PP will be updated at least annually, or as required, in agreement with the World Bank to reflect actual project implementation needs and improvements in institutional capacity. The World Bank standard bidding documents, including evaluation for procurement of works and goods will be used, as well as the World Bank's standard request for proposal for selection of consultants, including the standard evaluation report.

40. A General Procurement Notice will be published online in UNDB and in its printed version. Specific Procurement Notices will be published for all ICB procurement and consulting

contracts, according to guidelines, after the corresponding bidding documents and request for proposals become ready and available.

Summary of Procurement Plan

Table 3.4 Procurement Arrangements and Schedule for Works and Goods

Package	Description	Procurement Method	Prior/Post	Expected Proposal Opening Date
ICB-01-CHIE	Modernization of boiler plant, rehabilitation of distribution network, and installation of IHS and heat meters	ICB	Prior	March 2018
ICB-02-BEM	BEM-3.01/Pilot: Installation of IHS and heat meters	ICB	Prior	March 2018
ICB-03-CHIE	Pilot -Distribution network Rehabilitation: Sub-projects: CHIE-1.02;CHIE-1.03; CHIE-1.04; CHIE-1.05	ICB	Prior	July 2018
ICB-04-3 cities	Lot 1: Installation of IHS and Heat Meters: Sub-projects: CHIE-3.02;CHIE-3.03; CHIE-3.04; CHIE-3.05 Lot 2: Installation of IHS and Heat Meters: Sub-projects: SIM-3.02;SIM-3.03; SIM-3.04; SIM-3.05 Lot 3: Installation of IHS and Heat Meters: Sub-projects: TIQ-3.01;TIQ-3.02; TIQ-3.03; TIQ-3.04; TIQ-3.05	ICB	Prior	July 2018
ICB-05-BEM	BEM-1.01/Pilot -Distribution network Rehabilitation	ICB	Post	December 2018
ICB-06-BEM	Modernization of boiler plant	ICB	Prior	October 2019
ICB-07-AVIM	Modernization of boiler plant; Pilot -Distribution network Rehabilitation; Pilot: IHS and	ICB	Prior	June 2018

	Heat Meters			
ICB-08-AVIM	Pilot -Distribution network Rehabilitation: Sub-projects: AVIM-1.02;AVIM-1.03; AVIM-1.04; Electrical distribution network, partial reconstruction	ICB	Prior	February 2019
ICB-09-AVIM	Pilot: IHS and Heat Meters: Sub-projects: AVIM-3.02;AVIM-3.03; AVIM-3.04; AVIM-3.05	ICB	Prior	June 2018
ICB-10-SIM	Modernization of boiler plant; Pilot -Distribution network Rehabilitation; Pilot: IHS and Heat Meters	ICB	Prior	December 2018
ICB-11-SIM	Pilot -Distribution network Rehabilitation: Sub-projects: SIM-1.02;SIM-1.03; SIM-1.04; SIM-1.05	ICB	Prior	July 2018
ICB-12-TIM	Modernization of boiler plant	ICB	Prior	September 2019
ICB-13-TIQ	Pilot -Distribution network Rehabilitation: Sub-projects: TIQ-1.01;TIQ-1.02; TIQ-1.03; TIQ-1.04	ICB	Prior	September 2018
ICB-14-all	Maintenance tools, equipment, vehicles	ICB	Post	July 2018
NCB-1-all	Electrical distribution network, and Water supply network, partial reconstruction	NCB	Post	March 2019

41. The procurement packages with similar equipment in different DHCs will be issued in one package with a separate lot for each DHC provided that the technical parts of the bidding document are ready from all sites at the same time. If the designs are not ready, the bidding will proceed for those DHCs that have ready documents.

Table 3.5. Consultancy Assignments Selection Methods and Schedule

Package	Description	Selection method	Prior/Post	Expected Proposal Opening Date
UZB-DH-CONS-01	Design and supervision consultancy for the PMU Support	QCBS	Prior	April 2018
UZB-DH-CONS-02	Sector Development Consultancy	QCBS	Prior	August 2018
UZB-DH-CONS-03	Project financial audit	LCS	Post	August 2018

42. *Thresholds for procurement methods and World Bank prior review*. The following methods of procurement shall be used for procurement under the project (to be included in the PP).

THRESHOLDS FOR PROCUREMENT METHODS AND BANK PRIOR REVIEW

Expenditure Category	Contract Value Threshold (US$)	Procurement Method	Contracts Subjects to Prior Review (US$)
Goods	>=1,000,000	ICB	ICB contracts >= 1,500,000
	<=1,000,000	NCB	First NCB contract
	<100,000	Shopping	None
	NA	DC	All DC contracts
Works	>=5,000,000	ICB	ICB contracts >=5,000,000
	<=5,000,000	NCB	First NCB contract
	<100,000	Shopping	None
	NA	DC	All DC contracts
Consultant Services (including training)	>=200,000	QCBS/QBS/LCS/FBS a/ b/	>=500,000 for firms; all SSS contracts;
	<200,000	CQS	
	NA	SSS	
	NA	IC	>=200,000 for individuals; all SSS contracts;

Notes:

a/ Shortlist may compose entirely of national consultants for assignments of less than US$100,000 equivalent per contract.

b/ As appropriate, these methods may be adopted for assignments costing less than $200,000.

ICB – International Competitive Bidding

NCB – National Competitive Bidding

DC – Direct Contracting

QCBS – Quality and Cost Based Selection
QBS – Quality Based Selection
LCS – Least Cost Selection
FBS – Fixed Budget Selection
CQS – Selection Based on Consultants' Qualifications
SSS – Single Source Selection
IC – Individual Consultants

Anti-Corruption Measures

43. The World Bank's 'Guidelines: On Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants' dated October 15, 2006 and revised in January, 2011 and the transparency and disclosure provisions of the World Bank's Procurement and Consultants Guidelines (published in May 2011 and revised in July 2014) referred above will apply.

Environmental and Social (including safeguards)

44. *Scope of the project EA*. The objective of the project EIA and EMPs was to analyze the potential environmental and social issues related to the proposed activities and to ensure that these aspects would be adequately addressed and mitigated during the project implementation in full compliance with World Bank requirements and national legislation.

45. *Potential environmental impacts and project environmental category*. The project EIA concluded that it would generate mostly positive socioeconomic benefits due to the improvement of hot water supply and heating services for the population along with the improved environmental conditions in the participating cities. Replacement and modernization of old inefficient boilers or installation of new ones as well as replacement of old heating pipelines and construction of IHS will significantly reduce fuel consumption and the level of pollutant emissions, which will have significant effects on the health of the population. At the same time, these activities might also generate a series of adverse impacts: noise, air pollution, impact on water quality and resources, impact on water by the construction run-offs, disturbance of traffic during construction and rehabilitation works, construction dust, and workers safety, and so on. However, these impacts will be temporary, site-specific, and could be easily mitigated through implementing adequate avoidance and/or mitigation measures. It has been also concluded that no impacts are expected on sensitive or protected areas. Furthermore, no physical cultural resources will be involved/or affected. Considering the character of potential impacts, the project was assigned Category B for which it is necessary to conduct an EIA and prepare a separate EMP for each project city.

46. *EA report provisions*. The EA report includes five site-specific EMPs for participating cities (Andijan, Bukhara, Chirchik, Samarkand, and Sergeli District of Tashkent), along with the World Bank's safeguards policies applied to the current project and description of the policies, and the legal and administrative framework regarding environmental management and the

centralized heating sector in Uzbekistan. The EMPs contain the following: (a) baseline analysis, (b) potential environmental impacts and necessary activities targeted at mitigating them, (c) monitoring plan for EMP implementation, and (d) EMP implementing arrangements as well as a short analysis of DHCs' EA capacity and training needed.

47. *Environmental mitigation measures*. The EMPs stipulate that all adverse environmental impacts associated with the project will be prevented, eliminated, or minimized to an acceptable level. This will be achieved through the implementation of the EMPs' environmental mitigation measures, including careful replacing of old boilers' equipment and pipes; construction of IHSs; conducting civil works in a way that would prevent, as much as possible, cutting of trees, destroying of landscape in parks, and polluting the air and soil; preventing noise pollution; and ensuring labor safety and health impacts during boilers' replacement or modernizing and welding operations.

48. Environmental supervision and monitoring. Environmental supervision and monitoring during project implementation will provide information about the project environmental and social impacts and the effectiveness of applied mitigation measures. Such information enables the Project Executing Agency and the World Bank to evaluate the success of mitigation as part of project supervision, and allows corrective actions to be taken when needed. The monitoring section of the EMPs provides: (a) details of monitoring measures, including the parameters to be measured, methods to be used, sampling locations, and frequency of measurements; (b) monitoring and reporting procedures to (i) ensure early detection of conditions that necessitate particular mitigation measures, (ii) furnish information on the progress and results of mitigation; and (c) execute institutional responsibilities.

49. *Reporting*. Supervision of the EMP implementation will be the responsibility of the DHCs, which periodically (as per monitoring schedule) will prepare short reports on EMP implementation to be submitted to the PCU. The PCU will compile these reports and present short updates about the EMP implementation as part of the progress reports to the World Bank semiannually.

50. *Integration of the EMPs into project documents*. The EMP provisions will form part of the design documents for the project and will be included in the construction contracts for the proposed activities, both in specifications and bills of quantities. The contractors will be required to include the cost of EMP requirements in their financial bids and to comply with them while implementing the project activities. The bidding documents for selecting the contractors will include specifications that would ensure effective implementation of environmental, health, and safety performance criteria by the winning bidder, and in particular (a) preventing/limiting disturbance of soils and vegetation removal to the minimum; preventing soil compaction as well as other potential impacts; (b) ensuring that all ground disturbing activities are conducted in adherence to the construction requirements; (c) developing a traffic management plan that includes measures to ensure work zone safety for construction workers and the travelling public; (d) conducting all activities on installing new boilers with due care, and ensuring labor safety; and (e) ensuring approval of the traffic management plan by the traffic police before commencing any construction/repair works. The contract of the winning bidder will necessarily

include an obligation to inform the DHCs of any significant health, safety, and environmental accidents and events among subcontracted project workers.

51. *Implementing arrangements*. The PCU will ensure that the participating DHCs will comply with all the project safeguards requirements. The technical support teams to be created in Andijan, Bukhara, Chirchik, Samarkand, and Tashkent DHCs would include safeguards personnel, who would be the existing staff of each utility responsible for environment, health, and safety. Their responsibility will include the following tasks: (a) ensure that the contractor complies with all safeguard and statutory requirements during construction, specifically the EMPs; (b) coordinate all environmental and EA-related issues; (c) conduct EMP supervision and monitoring and assess the environmental impacts and efficiency of mitigation measures, as well as identify non-compliance issues or adverse trends in results, and put in place programs to correct any problems identified; (d) when needed, provide advice and consultation to contractors on EMP implementation; and (e) report to the PCU with regard to EMP implementation. As the DHCs lack experience in implementing environmental safeguards in accordance with the World Bank's requirements, the project will provide capacity building in this area. The PCU will have a safeguards specialist who will coordinate the implementation of individual EMPs, report to the KA and to the World Bank regarding safeguards issues, and integrate safeguards requirements into bidding and contracting documents. The PCU safeguards specialist will also be responsible for interacting with the environmental authorities for efficient implementation of safeguards documents; undertaking field visits for environmental supervision and monitoring; analyzing contracts in terms of environmental management and mitigation issues; advising project participants and DHCs on environmental issues; and identifying EA training needs for the participating DHCs.

52. *Contractors' responsibilities*. The contractors, selected through a public tender process, have the responsibility to operate in full compliance with national environmental legislation and with the EMP requirements and are obliged to follow regulative requirements of the national law and the World Bank related to: occupational health and safety, fire safety, environmental protection, community health and safety, and to traffic safety. All EMP associated activities should be financed by the contractors. The contractors will also be requested to designate a person in charge of environmental, health, and safety issues and for implementing the EMP and for reporting on EA issues.

53. *Public consultation and information disclosure*. The draft EIA and EMPs report was prepared after consultation with the key stakeholders and local population in all participating cities. The final version of the document (in English and Russian) was posted on the KA website (http://www.uzkommunhizmat.uz/ru/news/otsenka-vozdejstvija-na-okruzhajuschuju-sredu-i-plan-ekologicheskogo-upravlenija) on September 18, 2017 and was disclosed on the World Bank external website on September 19, 2017. The EMP documents will be used by the PCU and the DHCs during the project implementation.

54. *M&E*. The PDO level and intermediate indicators will be monitored by the DHCs' staff once the new DH system is commissioned. At project launch and during implementation, implementing agencies will receive training on different M&E methodologies and approaches.

The PCU will be responsible for collecting the data associated with the overall project and reporting the results to the World Bank.

55. The Government will be conducting the impact evaluation of the project. The study will aim at capturing the project impact on welfare, human development, and labor market outcomes on the poor, the bottom 40 percent, unemployed youth, and female-headed household among other vulnerable groups both before and after the DH system is operational. The first baseline survey was financed out of the Poverty and Social Impact Assessment undertaken during project preparation. The second survey will be conducted following the same methodology during midterm, and once the DH system is operational by the end of the project. It will be financed out of the TA component.

Annex 4: Implementation Support Plan

Strategy and Approach for Implementation Support

1. The strategy for implementation support has been developed based on the nature of the project and its risk profile. The plan will aim at making implementation support to the MHCS, KA, and the participating DHCs more hands-on and intensive, because this is the first major effort to modernize Uzbekistan's DH sector. The focus of the implementation support will be to mitigate the risks described in the Systematic Operations Risk-Rating Tool (SORT), namely the sector strategies and policies, technical design, institutional capacity, and fiduciary risks, which are rated as either High or Substantial. It will also focus on the traditional implementation support areas, including environmental and social safeguards and other fiduciary aspects.

2. Formal supervision and field visits will be carried out at least semiannually and will focus on the following:

(a) **Sector strategies and policies**. The absence of a strategy for the DH sector and deficient sector policies, including regulation and tariffs, have resulted in loss-making operation of DHCs, and deterioration of DH infrastructure and, subsequently, DH services across the country, except for Tashkent. While the Government approved the state program 'Concept for Reforming District Heating in Uzbekistan for 2010–2020', its implementation has been slow and not supported thus far by development of sector policies and measures. For this reason, an additional TA grant has been mobilized to support the Government in conducting urban heating master planning for selected cities and in strengthening institutional capacity for the DH sector.

(b) **Technical inputs.** Technical inputs are required to review bid documents to ensure fair competition through proper specifications and fair assessment of the technical aspects of bids. Technical specialists will review the implementation of civil works related to the boilers, IHS installation, and civil works. Close environmental and social supervision will be undertaken throughout the life of the project, especially during the implementation phase. During commissioning, close technical supervision will be provided to ensure that the various components of the project as well as the launching of related services come together as smoothly as possible. The team's engineering/ technical specialists will conduct site visits on a semiannual basis throughout project implementation.

(c) **Fiduciary requirements and inputs.** FM support will be provided during project preparation and implementation and will consist of joint risk-based FM implementation support visits will be conducted within six months from the project effectiveness date, and at intervals determined on the basis of risks, covering the following: (a) project accounting and internal control systems; (b) budgeting and planning arrangements; (c) disbursement arrangements and funds flows; and (d) review of supporting documentation for selected project transactions. The World Bank will also review the project's quarterly IFRs as well as the annual audited PFSs and accompanying Management Letters. Procurement support will be provided during the preparation and procurement stages of project implementation. Regular

procurement missions will provide timely support and necessary capacity development to meet the client's needs in conducting procurement proficiently.

(d) **Safeguards.** The environment and social specialist will support relevant counterpart staff and provide any necessary training. On the social side, supervision will focus on the implementation of the RPF, and the social (including gender) and poverty-related impacts associated with the project. The environmental specialist will supervise the implementation of the EIA/Environmental Management Framework and site-specific EIAs and EMPs. Field visits will be made on a semiannual basis.

(e) **Communication campaign.** Special attention will be paid to establish proper forms and channels of communication for the population as a whole and for the beneficiaries of the project, including the tenants of MABs. The communications specialist of the World Bank will support the DHCs' efforts in transforming the client relations units of the DHCs to the full-fledged client support centers.

(f) **Impact assessment.** The Government will conduct an impact evaluation of the project comprising a baseline survey at project launch and a follow-up survey at the end of the project. This evaluation will use the findings of the Poverty and Social Impact Assessment undertaken during project preparation. The evaluation will assess project-related outcomes as well as the extent to which the new DH system improves the situation with power and heat supply, and the quality of life and conserves the energy resources.

(g) **Client relations.** The task team leader will coordinate with the World Bank teams to ensure the project implementation is consistent with World Bank requirements and as specified in the legal documents. The team leader will meet with senior officials on a regular basis to keep them apprised of project progress and issues requiring resolution at their level. The task team leader will also oversee communication and information dissemination of the project and liaise with other development agencies and stakeholders. Moreover, the energy team will work closely with the urban and water teams, as needed, to ensure timely and integrated support to the MHCS's capacity development needs.

Implementation Support Plan

3. The main focus in terms of support to implementation is described in Table 4.1.

Table 4.1. Implementation Support Plan

Time	Focus	Skills Needed	Resource Estimate (Staff Weeks/Year)	
First 12months	Team leadership	Management, supervision, coordination, dialogue with the Government and other stakeholders	Task Team Leaders	8
	Project support	Supervision and coordination	Energy Specialist in-country	8
	Technical	DH and civil engineering, design,	DH Engineer	6

Time	Focus	Skills Needed	Resource Estimate (Staff Weeks/Year)	
		and technical supervision	Energy Specialist/Economist Energy Specialist	4 6
	Social	Social safeguards, land acquisition and resettlement, gender and poverty	Social Specialist	6
	Environment	Knowledge on World Bank norms, and environmental safeguards	Environmental Specialist	6
	Procurement	Procurement experience, knowledge and on the World Bank's procurement norms and training	Procurement Specialist	4
	FM	FM experience, knowledge of World Bank's FM norms and training	FM Specialist	4
	M&E	Support training for M&E and impact assessment baseline survey	M&E Specialist	4
12–48 months	Team leadership	Management, supervision, coordination, dialogue with potential country members of program	Task Team Leaders	8
	Project support	Supervision and coordination	Energy Specialist in-country	10
	Technical	DH engineering and supervision	DH Engineer Energy Specialist/Economist	5 4
	Social	Social safeguards, land acquisition and resettlement, gender and poverty	Social Specialist	4
	Environment	Environmental safeguards, supervision and monitoring, and training as needed	Environmental Specialist	4
	Procurement	Procurement reviews and supervision and training as needed	Procurement Specialist	3
	FM	FM reviews and supervision and training and monitoring	FM Specialist	3
48–60 months	Team leadership	Project management, supervision, and coordination	Task Team Leaders	8
	Project support	Supervision and coordination	Energy Specialist in-country	10
	Technical	DH engineering and supervision	DH Engineer Energy Specialist/Economist	8 4
	Social	Social safeguards, land acquisition and resettlement, and gender and poverty	Social Specialist	3
	Environment	Environmental safeguards, supervision and monitoring, and training as needed	Environmental Specialist	3
	Procurement	Procurement reviews and training as needed	Procurement Specialist	4
	FM	FM reviews, and training and monitoring	FM Specialist	4
	M&E	Support impact assessment	M&E Specialist	4

4. The skills mix required for implementation support is detailed in Table 4.2.

Table 4.2. Skills Required

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Task Team Leaders	8 per year	2 per year	HQ/Country based
Energy Specialist	8–10 per year	2 per year	Country based
DH Engineer	5–8 per year	2 per year	HQ based
Social Specialist	3–6 per year	2 per year	HQ based
Environmental Specialist	3–6 per year	2 per year	HQ based
Communication Specialist	4 per year	2 per year	Country based
Procurement Specialist	4 per year	2 per year	Country based
FM Specialist	4 per year	2 per year	Country based
M&E Specialist	4 for first and last year	1 per year	HQ based
Disbursement officer	4 per year	as needed	Country based