

**DRAFT GEF PROJECT PAPER  
(COUNCIL APPROVAL STAGE)**

ON A  
PROPOSED LOAN  
IN THE AMOUNT OF US\$ 100 MILLION

AND A  
PROPOSED GRANT FROM THE  
GLOBAL ENVIRONMENT FACILITY TRUST FUND  
IN THE AMOUNT OF US\$ 3.653 MILLION

TO THE  
REPUBLIC OF BELARUS

FOR A  
SUSTAINABLE ENERGY SCALE-UP PROJECT

April 4, 2019

World Bank GEF Coordination Program

## CURRENCY EQUIVALENTS

(Exchange Rate Effective {Jul 09, 2018})

Currency Unit = Belarusian Rubles

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BYN 1 = US\$ 0.50

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US\$ 1 = BYN 2.00

## FISCAL YEAR

January 1 - December 31

## ABBREVIATIONS AND ACRONYMS

BDHP	Biomass District Heating Project
BIES	Belinvestenergoberezhnie
CHP	Combined Heat and Power
CPF	Country Partnership Framework
COM	Council of Ministers
DH	District Heating
DHC	District Heating Company
DFIL	Disbursement and Financial Information Letter
ESMAP	Energy Sector Management Assistance Program
EBRD	European Bank of Reconstructing and Development
ERDF	European Regional Development Fund
EE	Energy Efficiency
EIB	European Investment Bank
EED	Energy Efficiency Department
ENPV	Economic Net Present Value
EIRR	Economic Internal Rate of Return
ESMF	Environmental and Social Management Framework
EA	Environment Assessment
ESIA	Environmental and Social Impact Assessment
FM	Financial Management
FSC	Forest Stewardship Council
GHG	Greenhouse Gas
GRM	Grievance Redress Mechanism
GEF	Global Environment Facility
HCA	Heat Cost Allocator
HUS	Housing and Utility Subsidy
ISA	International Standards on Auditing
MAB	Multi Apartment Building
MFD	Maximizing Finance for Development
MOHU	Ministry of Housing & Utility
MCA	Municipality Contracting Authority
OHUD	Oblast Housing and Utility Department
OE	Oblast Expertise
PDO	Project Development Objective
PPP	Purchase Power Parity
PMU	Project Management Unit
PIU	Project Implementation Unit
PPSD	Project Procurement Strategy for Development
POM	Project Operations Manual
PEFC	Program for the Endorsement of Forest Certification
SCS	State Committee for Standardization
TRV	Thermostatic Radiator Valve
USC	Unified Settlement Center
WTP	Willingness to Pay

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## DATASHEET

### BASIC INFORMATION

Country(ies)	Project Name	
Belarus	Sustainable Energy Scale-Up Project	
Project ID	Financing Instrument	Environmental Assessment Category
P165651	Investment Project Financing	B-Partial Assessment
Expected Approval Date	Expected Closing Date	
26-Sep-2019	31-Jan-2025	

### Proposed Development Objective(s)

The Project Development Objective is to scale up efficient energy use in space heating of multi-apartment buildings and renewable wood biomass fuel utilization in selected urban localities in Belarus.

### Components

Component Name	Cost (US\$, millions)
Component 1. Renewable Wood Biomass Heating	138.00
Component 2. Thermal Renovation of Multiapartment Buildings	61.00
Component 3. Technical Assistance, Implementation and Incremental Support for Thermal Renovation	4.65

### Organizations

Borrower:	The Republic of Belarus
Implementing Agency:	Energy Efficiency Department, State Committee for Standardization

### PROJECT FINANCING DATA (US\$, Millions)

#### SUMMARY

Total Project Cost	203.65
Total Financing	203.65

<b>of which IBRD/IDA</b>	100.00
<b>Financing Gap</b>	0.00

## DETAILS

### World Bank Group Financing

International Bank for Reconstruction and Development (IBRD)	100.00
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### Non-World Bank Group Financing

Trust Funds	3.65
Global Environment Facility - IBRD as Implementing Agency	3.65
Other Sources	100.00
EC: European Investment Bank	100.00

## INSTITUTIONAL DATA

### Practice Area (Lead)

Energy & Extractives

### Contributing Practice Areas

### Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

### Gender Tag

#### Does the project plan to undertake any of the following?

a. Analysis to identify Project-relevant gaps between males and females, especially in light of country gaps identified through SCD and CPF	Yes
b. Specific action(s) to address the gender gaps identified in (a) and/or to improve women or men's empowerment	Yes
c. Include Indicators in results framework to monitor outcomes from actions identified in (b)	Yes

## I. STRATEGIC CONTEXT

### A. Country Context

1. Since its independence the Republic of Belarus has pursued a gradual transition path, characterized by limited structural reforms and a modest reorganization of Soviet production networks. Instead of privatization and a reliance on the private sector as the main driver of growth, policies have focused on upgrading large state-owned enterprises (SOEs). Economic growth was rapid from 2001 to 2014 and accompanied by a remarkable fall in the number of households below the poverty line and increase in the incomes of households at the bottom 40 percent. From 2003 to 2014, Belarus had the largest reduction in poverty rates in the Europe and Central Asia (ECA) region. Measured by the internationally comparable Purchase Power Parity (PPP) US\$5/day threshold, Belarus's poverty headcount fell from 32 percent in 2003 to less than 1 percent in 2014, while in the rest of ECA it fell from 38 percent in 2003 to 13 percent in 2013. Inequality fell alongside poverty and is low by regional standards.

2. The economy went into recession in 2015 and 2016 when real GDP contracted 6 percent. Real wages fell and poverty and vulnerability rose, foreign debt obligations and fiscal constraints increased and Government cut public expenditure. The limits of the growth model already had already begun to manifest themselves since 2008 when the global recession started. Less favorable external circumstances exposed previously hidden inefficiencies and deep-seated structural rigidities in the economy. Subsidizing inefficient parts of the SOEs became unsustainable and the economy was increasingly relying on foreign currency borrowing on external and domestic markets. The public debt to GDP ratio increased from 5.9 percent in 2008 to 19.4 percent in 2011, and then to 28.5 percent in 2016.

3. Real GDP grew 2 percent in 2017, ending a two-year recession. The medium-term outlook of economic growth remains weak as Russian demand growth is recovering slowly, the subsidy margin on fuel imports is declining, and foreign debt constraints are tighter. Macro-economic imbalances are recurring and liabilities of SOEs have strained the financial sector. In the absence of structural adjustments, it will be difficult for Belarus to achieve rapid improvements in living standards in the years ahead. A sustainable improvement in living standards will therefore require economic, social, and institutional transformation, with an enhanced role for private enterprises, markets, and strengthened safety nets.

4. Over the last two years, the Government has taken a number of macroeconomic stabilization measures and adopted policies to support private sector development. There is enhanced understanding of the benefits and risks of reforms. In November 2017, the President approved a package of laws aiming at improving the environment for private businesses, with a particular emphasis on reducing inspections, improving the transparency of regulation and supporting self-employment and IT-enabled businesses. The flow of directed government lending on non-market terms is gradually declining, from 7 percent of GDP in 2013 to 4 percent in 2017.

5. *The Program of Activities of the Government of the Republic of Belarus for 2018-20* has the objective of creating conditions that ensure a decent life for the population, sustained income growth, reduction of poverty, high social standards, continuous infrastructure development, provision of comfortable housing, and high-quality medical, educational and other services. The Government will focus on the following economic policies: creating a favorable business environment; improving the efficiency of the public sector; ensuring effective employment, the growth of labor productivity and wages; reducing interregional disparity in the quality of life; supporting the formation of the "IT country"; creating new high-performance organizations and industries and fundamentally new products; accelerating the development of the services sector; and promoting goods and services to new markets.

6. Belarus is a signatory to the Paris Agreement and is committed to its Nationally Determined Contribution (NDC)

to greenhouse gas (GHG) emissions reduction.

## B. Sectoral and Institutional Context

7. Belarus consumed about 25.79 million tons of oil equivalent (toe) of primary energy in 2017. Natural gas and oil accounted for 61 and 29 percent of the total primary consumption, respectively. Biomass is a distant third with less than a 6 percent share. Final energy consumption in 2017 was 18.19 million toe. Industrial, residential, and transport sectors accounted for 32, 28 and 22 percent of final consumption respectively. About 70 percent of residential energy use is for space heating and service water heating, which are provided primarily by district heating (DH) systems.

8. Belarus is highly dependent on Russia for its energy supply. In 2015, close to 80 percent of its primary energy consumption was imported from Russia, and about 95 percent of power and 80 percent of heat were produced from imported Russian natural gas. Reducing the reliance on a single foreign energy supplier is an important driver of national energy policy.

9. Virtually all of the country's energy infrastructure – power plants, transmission and distribution assets, refineries, gas pipelines, DH systems, and etc. – are owned by the government. Modernization and new investments in energy infrastructure primarily rely on public financing. Substantial investments have been made in the past 15 years or so to modernize key energy assets, including those financed by the World Bank. But the needs for continued modernization remain large. The government estimated that US\$2 billion in modernization investments would be needed from 2016 to 2020.

10. Belarus has made significant progress in reducing the energy intensity of its economy. Its primary energy intensity of GDP, measured in toe per thousand USD in 2010 PPP, decreased from 0.33 in 2001 to 0.16 in 2015. Compared with Poland, where the same indicator was 0.10 in 2015, Belarus still has significant potential to reduce energy intensity through adjustments of the mix of economic activities and by improving the efficiency of energy production and consumption.

11. The government has kept energy affordable for the population through universally subsidized residential energy tariffs, especially for heat supplied by DH systems.<sup>1</sup> Households in the bottom income decile on average spend less than 10 percent of their disposable income on energy. But the universal energy tariff subsidies benefit higher-income households disproportionately and discourage energy conservation and energy efficiency (EE) investments in the residential sector. Currently, one general tariff is applied to all residential consumers of district heat nationwide.<sup>2</sup> In the 2017/2018 heating season the residential heat tariff covered about 22 percent of the average operating cost of district heating companies (DHCs). For DHCs relying on heat-only boilers, a direct fiscal subsidy is provided to cover the gaps in operating costs. For oblast energos operating combined heat and power (CHP) plants and distributing heat and electricity, district heat supplied to residential customers is subsidized by charging high electricity prices to industrial and commercial customers. The government has made efforts in recent years to reduce subsidies for residential utility tariffs. Due to the large share of heating bill in the combined utility bills, the government has adopted a gradual increase schedule for residential heat tariff to avoid a rapid rise in heating cost and the associated negative social impact.

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<sup>1</sup> In 2017, the estimated total energy utility subsidies to residential consumers is BYN1,859 million rubles (or about 1.8 percent of 2017 GDP), including BYN722 million cross subsidy from non-residential power consumers to residential DH consumers, BYN559 million fiscal subsidy to heat-only DHCs, and BYN578 million fiscal subsidy to gas utilities.

<sup>2</sup> For those who own multiple apartments, only the primary residencies will be billed according to the general residential heat tariff. The other properties will be billed according to commercial heat tariff (which is at operating cost recovery level).



12. *The Program of Activities of the Government of the Republic of Belarus for 2018-20, which sets priorities for government support and interventions*, also specified goals and the main short to medium term tasks for the energy, utility and housing sectors. *For the energy sector*, the goal is to meet the needs of the economy and the population for energy resources, taking measures to ensure the energy security of the country and improve energy efficiency. *For the housing and utilities sector*, the goals are to provide high-quality housing and communal services while reducing the cost of services provision and to provide effective and safe waste management. The investments supported by the proposed project are aligned with the priorities on ensuring energy security, improving energy efficiency, providing high quality housing and reducing the cost of heating service.

### Key Energy Sector Challenges

13. The government's long-term energy sector development strategy is outlined in the third edition of the Concept of Energy Security of the Republic of Belarus (Resolution No. 1084 of the Council of Ministers, December 23, 2015). According to the Concept, the national energy policy till 2035 will focus on nine areas of support, including energy independence, diversification of energy resources and suppliers, reliability of energy supply, end-use EE, modernization of energy infrastructures, energy affordability, international integration and corporation, reform and development of the power market, and technological innovations<sup>3</sup>. These planned efforts underscore several challenges facing the energy sector:

- **Limited options in the near term to diversify energy supplies and reduce import dependency.** Beside small amounts of oil and gas production, the main domestic energy resource is wood biomass generated by the country's well stocked and growing forest. While wood biomass fuel is readily deployable for displacing imported natural gas in district heating, the economics of wood chips and air pollution control requirements also limit its application as a district heating fuel. Maximizing the potential of wood biomass as a heating fuel will need a well-functioning wood biomass fuel supply chain operated on transparent commercial rules and quality standards, as well as a better understanding of the supply constraints.
- **Critical barriers to unlocking energy savings potential in space heating.** Improving EE across all energy-consuming sectors has been a principal energy security measure of the government and has been a successful one judging by the rate of reduction of the primary energy intensity of the economy. But the achievement has been uneven. As the single largest energy end-use in the country, space heating remains highly inefficient because of two mutually reinforcing factors: the residential heat tariff is heavily

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<sup>3</sup> Specifically, the nine areas are: (i) Energy independence, i.e. increasing the share of national energy demand covered from domestic energy resources including renewable energy resources up to 20% in 2035 (14% in 2015); (ii) Diversification of energy resources (local and renewable energy resources, nuclear energy) and suppliers, decreasing the share of dominating energy supplier in total imports of energy resources from 90% in 2015 to 70% in 2035; (iii) Reliability of energy supply, reservation and processing of fuel and energy resources; (iv) Increasing the EE of end-consumption of fuel and energy resources through the introduction of new technologies and materials in manufacturing and service sectors, construction and housing; reduction of the energy intensity of GDP of approximately 37% by 2035 from the level of 2010; (v) Economic and energy efficiency of energy generation and distribution (creation of favorable economic and legal framework for energy sector development, modernization and reconstruction of energy grids and infrastructure); (vi) Affordability of fuel and energy resources for consumers, elimination of cross-subsidization of electricity and heat tariffs; (vii) Integration into global energy system, development of international cooperation with the Eurasian Economic Union, the EU and leading energy organizations, such as the International Energy Agency and International Uranium Enrichment Center, expansion of energy exports to the EU countries; (viii) Improving the management system in national energy sector, creating the wholesale national electricity market, developing the law "On electric power industry"; and (ix) Providing scientific and technology support for development of the energy system focusing on such areas as EE technologies, nuclear technologies, local fuel and energy resources and RES, environment protection, intelligent management of fuels and energy generation and consumption.

subsidized and the majority of the population live in multiapartment buildings (MABs) which have poor thermal insulation.

- **Maintaining energy affordability while removing tariff subsidies.** The state investments in upgrading DH systems and direct subsidies to keep DHCs financially stable have helped maintain an adequate level of DH service in Belarus. The universal heat tariff subsidy has shielded the population from facing the actual cost of space heating. The latest World Bank analysis indicates that removing subsidies will require the current residential heat tariff to increase by five times for heating companies to recover operating costs. Ensuring adequate social protection for the needy will be crucial to mitigate the negative financial impact of subsidy removal on low-income households.
- **Mobilizing financing for investments.** Large amounts of capital are needed for the continued modernization of energy infrastructures, increasing utilization of clean and sustainable domestic energy resources, and improvement of end-use EE, particularly in residential and public buildings. Thermal renovation of MABs encompasses a challenging set of issues and complexities. While such investments in general have viable economic rates of return, they pose significant financial and implementation challenges because of the long financial payback period normally associated with energy cost savings (even if heat tariffs are at full cost recovery levels) and the collective investment decision required for the homeowners in an MAB. Currently there is no demonstrated viable financing and delivery scheme to address the large investment needs for thermal renovation of MABs in Belarus.

## **Government Energy Sector Priorities Supported by the Proposed Project**

### ***Scaling up Sustainable Wood Biomass-Based Space Heating***

14. Forests are one of Belarus's richest natural resources, covering about 39 percent of the country's land area. They are well stocked and growing (in both standing volume and coverage area). The estimated renewable energy potential of wood biomass in Belarus is about 192.6 TJ/year. Total wood biomass fuel consumption in 2017 was about 60.2 TJ, mainly in the form of commercial fuelwood. According to a recent World Bank estimate, fuelwood supply could reach 82.5 TJ by 2020, sufficient to meet the government's target to increase the share of local fuels (mainly biomass) in heat generation by heat-only boilers from 26 percent in 2015 to 32 percent in 2020. Generally speaking there still is significant room for scaling up wood biomass fuel consumption. But the current mapping of wood biomass resources for energy purposes is not detailed enough to estimate the economically viable potential.

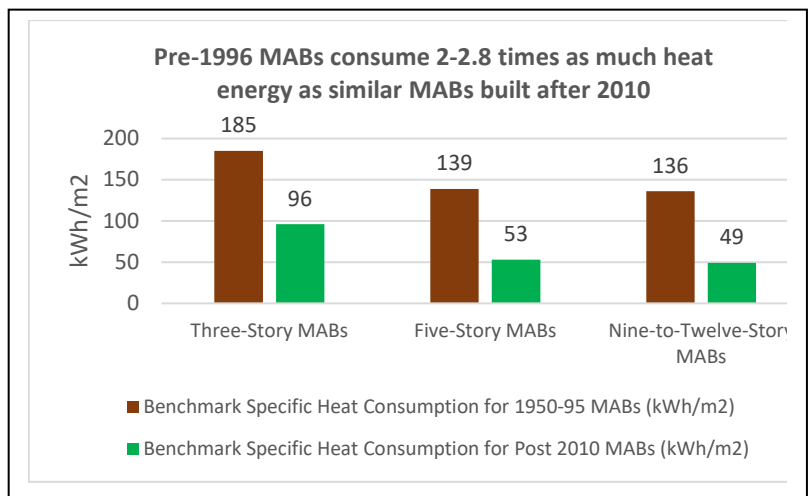
15. The current prices of local wood biomass fuel on an energy-equivalent basis, averaging about US\$3.99/GJ, is significantly lower than the price of imported natural gas at US\$6.35/GJ. The economic price of natural gas, using international market prices of neighboring countries as a proxy, is about US\$6.71/GJ. Improving the EE of heat generation and scaling up the use of wood biomass fuel would therefore help address two of the aforementioned challenges in the energy sector by reducing energy production costs (enhancing affordability) and maximizing the energy potential of wood biomass fuel in district heating. Using non-commercial grade wood, mostly forestry byproduct, for heat and power generation could promote the development of the wood processing industry, encourage sustainable forest management, and create new job opportunities.

16. The main challenges to the further development of wood biomass fuel use in space heating, especially in district heating, are: (i) diminishing economic returns due to depletion of sites with large heat load and close to sources of wood chip supply; and (ii) the inefficient pricing mechanism and underdeveloped supply infrastructure for wood biomass fuels.

17. The proposed project will build on the Biomass District Heating Project (BDHP, \$90 million IBRD loan under implementation since 2014, project completion by the end of 2019) to help address these challenges. The development of the remaining biomass district heating sites under a coordinated national investment program would enable better planning and design and implementation support, which could reduce overall development cost, increase the quality of delivery, and improve environmental safeguards. Broader competition through international competitive bidding in the on-going BDHP was one of the main factors for the nearly 30 percent lower investment cost than that estimated at appraisal, enabling the project to invest in seven additional sites. This continued national investment program would also facilitate further development of the wood biomass fuel market both through predictable demand and greater pressure from customers on developing and enforcing transparent wood biomass pricing based on energy content. The proposed project will also forge closer collaboration with the Bank’s forest management operations in Belarus, especially on the efforts to develop a sustainable and transparent wood biomass fuel market.

***Scaling up Thermal Retrofit of Multiapartment Buildings***

18. The large energy savings potential of residential space heating in Belarus is untapped. Based on a World Bank study completed in 2015, the overall investment needs for thermal renovation of MABs were US\$14 billion in 2015 prices and could result in annual energy savings equivalent to 5.5 percent of the total final energy consumption of the country in 2015. MABs constructed from 1950 to 1995, which typically have extremely poor thermal insulation, account for half of the 254 million m<sup>2</sup> total residential floor area in Belarus (2016 figure). These MABs have substantial potential for reducing specific heat consumption through deep/comprehensive thermal renovation (refer to the chart on the right). Almost all of the pre-1996 MABs are connected to DH systems. The majority of these MABs have building-level heat metering and heat control. But thermostatic radiator valves (TRVs) for controlling heat consumption and room temperature at the apartment level are virtually non-existent. Heat is typically billed based on heat consumption at the building level and the building heat bill is distributed among households proportional to the floor areas of their apartments.



19. Deep thermal renovation of the pre-1996 MABs would generally include installation of TRVs, upgrade of building level heat control, and improvement of the thermal insulation of the building envelope (windows, exterior doors, roof, exterior walls, and basement), and would on average result in 40 percent or more energy savings, assuming homeowner behavior changes. The economic justification of such investments is generally sound with an economic internal rate of return greater than 6 percent, including the benefits of reduced heating cost, increased property value and reduced CO<sub>2</sub> emissions (see the section on Economic Analysis). But the significant upfront investment and long financial payback period (through energy cost savings) make it challenging for homeowners to invest in thermal renovation.

20. To overcome these challenges the government is initiating a national program for thermal renovation of MABs, which will be defined in a Presidential Decree and a Council of Ministers’ Resolution. The proposed program envisions (i) a significant capital grant by the government to reduce the financial burden of participating

homeowners<sup>4</sup>; and (ii) the establishment of a repayment mechanism through which homeowners will be able to repay their share of the investment cost by installments over multiple years. Both elements will be combined in a partially repayable grant financing scheme through which the thermal renovation projects approved by homeowners will be fully financed by government funds while the homeowners' capital contribution (which is the difference of the investment costs and eligible government capital grant) will be recovered through the installment repayment mechanism (Annex 2). This is a model which has been successfully applied in multiple countries, such as Lithuania, Estonia, and Poland, with variations in specific designs and implementation arrangements depending on country-specific market conditions.<sup>5</sup> For Belarus, the partially repayable grant scheme would demonstrate the viability of homeowner debt financing for thermal renovation investment, paving the way for the involvement of commercial banks in the long term. The proposed project will support the roll-out of the proposed national thermal renovation program by piloting at scale the partially repayable grant scheme in two selected oblasts.

21. For the government, supporting the investment in thermal renovation, including capital grants, is also considered a means to ease the impact of heat tariff subsidy removal. For example, for an MAB which has undergone deep thermal renovation, the overall heat bill could be reduced by 40 percent or more, creating a significant buffer for tariff adjustment. The fiscal impact of such fiscal expenditure swapping is analyzed in Section IV. But in the long run, cost-reflective heat tariffs are necessary for sustaining the demand for thermal renovation investments.

### C. Relevance to Higher Level Objectives

22. The proposed project is fully aligned with the Belarus Country Partnership Framework (CPF) for the Period FY18-22 (Report No. 123321-BY). Specifically, the proposed project will contribute to achieving the development outcomes of Focal Area 3 of the CPF – Improving Contribution of Infrastructure to Climate Change Management, Economic Growth and Human Development, in particular, enhanced climate change management and improved efficiency, security, and quality of energy service provision.

23. The proposed project also contributes to the Maximizing Finance for Development (MFD) objectives by crowding in financing from other development partners, and by laying the foundation for potential commercial bank financing in thermal renovation of MABs. The European Investment Bank (EIB) has confirmed its commitment to partner with the World Bank on the proposed investments with US\$100 million co-financing. The European Bank of Reconstruction and Development (EBRD), following a similar approach proposed by the World Bank, is working with Minsk City on thermal renovation of MABs with €20 million financing. Over the long-term, the business model demonstrated through the proposed project could unlock a US\$14 billion market for thermal renovation of MABs in Belarus.

24. The proposed project supports Belarus' NDC to the global efforts in mitigating GHG emissions, as well as the World Bank Group Climate Change Action Plan. Energy production and consumption account for about 62 percent of total GHG emissions in Belarus excluding land use, land use change and forestry, which are a net sink of GHG emissions. The proposed investments and technical assistance for scaling up renewable wood biomass heating and the thermal renovation of MABs will generate direct GHG emissions reduction, as well as long-term and leveraged GHG emissions reduction through removing market and institutional barriers.

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<sup>4</sup> Two levels of government capital grant have been proposed: for projects applying limited thermal renovation measures (limited renovation) the government capital subsidy would cover 30 percent of the eligible investment costs; and for projects applying comprehensive thermal renovation measures (comprehensive renovation) the government capital subsidy would cover 50 percent of the eligible investment cost.

<sup>5</sup> Scaling up thermal retrofit of residential and public buildings in Eastern Europe, World Bank, 2018

## II. PROJECT DESCRIPTION

### A. Project Development Objective

#### PDO Statement

25. The Project Development Objective (PDO) is to scale up efficient energy use in space heating of multi-apartment buildings and renewable wood biomass fuel utilization in selected urban localities in Belarus.

26. The higher level Global Environmental Objective (GEO) is to support national efforts in reducing fossil fuel consumption in space heating.

#### PDO Level Indicators

27. The PDO level indicators are:

- a. Projected lifetime fossil fuel savings due to investments financed by the project (mega joules [MJ])
- b. Projected lifetime avoided CO<sub>2</sub> emissions due to investments financed by the project (metric tons of CO<sub>2</sub>)
- c. Rate of households' participation in the thermal renovation investment

### B. Project Components

28. The proposed project will support investments in scaling up wood biomass-based district/central heating and thermal renovation of MABs, as well as associated technical assistance for the development of relevant sector policies, for institutional capacity and for supporting project implementation. The main outcomes sought are increased economical utilization of renewable wood biomass for centralized space heating and increased households' participation in thermal renovation investments in MABs. The European Investment Bank (EIB) has proposed to jointly finance the investment components of the project through a US\$100 million loan. The EIB co-financing loan will be appraised and approved by EIB in parallel. The proposed project will also be supported by a Global Environment Facility (GEF) grant for removing key barriers to sustaining wood biomass fueled district heating and scaling up thermal renovation of MABs, as well as for supporting the early adoption of apartment-level consumption-based heat billing. It will also support the development of a robust MRV system for GHG emission reduction in space heating. The GEF Focal Point of Belarus endorsed the allocation of US\$3.653 million (exclusive of Agency fees) GEF 7 resources for the proposed GEF activity on November 27, 2018.

29. **Component 1: Renewable wood biomass heating** (estimated cost US\$138 million, proposed IBRD financing US\$69 million, proposed EIB co-financing US\$69 million). This component will support fuel-switching and efficiency improvement of district/central heating systems in selected urban localities through:

1.1. *Biomass district heating investments:* including, inter alia, conversion of inefficient gas-fired boilers to wood-chip-fired boilers, installation of new peak gas-fired boilers, modernization of heat networks, installation of individual heat substations and operational monitoring and control systems, and development of local sites for wood fuel preparation;

1.2. *Application of distributed biomass heating:* at locations where the decentralized biomass heating option is more economical than simple fuel switching of the existing gas-fired district heating systems, distributed heating using wood pellet-fired boilers close to the buildings would be considered; and

1.3 *Biomass heating for public institutions* (e.g., schools, hospitals) with isolated heating systems: where wood biomass fuel supply is secure, installation of modern wood pellet-fired boilers and rehabilitation of dilapidated heating systems.

30. Component 1 will invest in all six oblasts of Belarus, targeting inefficient DH systems in small- and medium-sized towns, as well as inefficient central heating systems in public institutions not connected to DH systems. In both cases, reliable and sustainably sourced wood biomass supplies are a pre-condition for investment.

31. **Component 2: Thermal renovation of multiapartment buildings** (estimated cost US\$61 million, proposed IBRD financing US\$30 million, proposed EIB financing US\$30 million, proposed GEF grant financing US\$1 million). This component will support the implementation of the government's national program for thermal renovation of MABs by piloting a partially repayable grant scheme in two oblasts selected by the government and the Bank. For the pilot of the proposed partially repayable grant scheme IBRD and EIB loan proceeds will be used to pre-finance the full cost of thermal renovation projects. Homeowners of participating MABs (determined by more than two-thirds of the homeowners in an MAB voting in favor of the investment) are obliged to repay a pre-determined portion of the full cost of thermal renovation through installments for up to 10 years.

32. To simplify the technical design and facilitate communications with homeowners regarding thermal renovation, two thermal renovation packages will be offered to target the lower and higher ends of the potential energy savings corresponding to the proposed government capital grant levels, respectively, prioritizing measures with higher cost-effectiveness. Package A would include measures that would be eligible for a 30 percent government capital grant. This would cover limited thermal renovation, including building-level substations or mixing loops, TRVs and necessary piping retrofit in individual apartments, upgrading of entrance doors and staircase windows, and other associated low-cost measures, including necessary capital repairs<sup>6</sup>. Package B would include measures that would be eligible for a 50 percent government capital grant. This would, in addition to Package A measures, generally include thermal insulation of the roof, exterior walls, and basement, as well as upgrading of individual apartment windows (for which the homeowners themselves need to cover the full cost)<sup>7</sup>. The installation of heat cost allocators (HCAs) and implementation of apartment-level consumption-based billing will be included in both packages as an option for homeowners since individual apartment heat billing is not a mandatory (regulatory) requirement.

33. In order to support future government scale-up efforts in apartment-level consumption-based heat billing GEF grant co-financing of US\$1 million for a demonstrate of HCA-based heat billing is proposed for inclusion in Component 2. The GEF grant, which will not be repaid by the beneficiary households, will be used as a financial incentive for households to participate in the demonstration. For the purpose of demonstration at scale, efficient implementation, monitoring and evaluation, it was determined that the GEF grant will be used in one selected residential settlement supplied by the same district heating system.<sup>8</sup> The GEF grant will be disbursed per participating building, covering a portion of the costs required for HCA-based billing.<sup>9</sup> The eligible costs would include installed

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<sup>6</sup> The capital repairs are those eligible for the government's capital repair program (see footnote 8).

<sup>7</sup> Survey indicates that over 80 percent of the windows in MABs are already upgraded by homeowners using their own funds.

<sup>8</sup> A residential settlement in the town of Slonim in Grodno Oblast has been identified. The settlement has a total of 135 multiapartment buildings totaling 460,500 m<sup>2</sup>. All buildings are supplied by the same district heating system which will receive new woodchip-fired boilers and other upgrades to be financed under Component 1. This overlapping investment of Components 1 and 2 would constitute a good example for achieving low-carbon space heating through both supply- and demand-side interventions.

<sup>9</sup> The exact portion, or GEF grant amount per square meter, was determined based on a balance between the needs for maximizing participation and sufficient financial contribution by households. Based on analysis done during project preparation, when the US\$1 million grant is evenly distributed for the total floor area of 460,500 m<sup>2</sup> (at about US\$2.17/m<sup>2</sup>), the grant incentive would cover about 40 percent of the estimated cost for implementing HCA-based heat billing. Such amount of grant support is deemed reasonable based on focus group discussions conducted in Belarus, as well as experiences in Croatia and Hungary where similar level of financial incentives were provided in government programs for apartment-level consumption-based billing.

costs of TRVs, by-pass pipes, HCAs, other necessary changes and adjustments of the building internal heating system (such as replacement of corroded pipes, hydraulic balancing, etc.), as well as billing data collection and relay equipment and bill processing.

34. Component 2 will primarily target MABs which have been identified by the participating oblast governments for capital repairs. Each oblast government has a rolling 5-year pipeline of MABs eligible for capital repairs<sup>10</sup>. This will facilitate the selection of buildings, increase the impact of the capital repair program and the thermal renovation pilot by upgrading the targeted buildings to an “as new” condition, and take advantage of synergies and cost savings by implementing both capital repairs and thermal renovation at the same time. MABs not included in the capital renovation pipeline may also participate in the proposed project if they meet the eligibility criteria based on specific heat consumption of the building. All eligibility criteria will be clearly described in the Project Operations Manual (POM).

35. **Component 3: Technical assistance and implementation support** (estimated cost US\$4.653 million, proposed IBRD financing US\$1 million, proposed EIB financing US\$1 million, proposed GEF grant financing US\$2.653 million). This component will provide technical assistance to the thermal renovation pilot and the national thermal renovation program, as well as for overall project implementation support, including:

3.1. *Biomass fuel market development (estimated cost US\$ 0.15 million, proposed GEF grant financing US\$ 0.15 million):* analytical work and technical assistance for developing national regulation on energy-content-based biomass pricing;

3.2. *Thermal renovation market development and implementation support (estimate cost US\$ 1.9 million, proposed GEF grant financing US\$ 1.9 million):* development and implementation of communications and outreach programs to homeowners, capacity building for government agencies, market participants and stakeholders (e.g., administrators of thermal renovation projects, homeowners’ associations/organizations, contractors and commercial banks);

3.3. *Development and introduction of a monitoring, reporting and verification (MRV) system for GHG emissions reduction in space heating as a result of thermal renovation, switching from fossil fuels to sustainable wood biomass, and other energy efficiency measures (estimated cost US\$ 0.456 million, proposed GEF financing US\$ 0.456 million);* and

3.4. *Project management, monitoring and reporting (estimated cost US\$2.147 million, proposed IBRD financing US\$1 million, proposed EIB financing US\$1 million, and proposed GEF grant financing US\$0.143 million) :* (i) training for the national Project Management Unit (PMU), Project Implementation Units (PIUs) in the two selected pilot oblasts; (ii) consultant services to support the PMU, PIUs and the DHCs in the implementation and supervision of the project, including annual multi-stakeholder dialogues which share information and opinions between end-users from public institutions and MAB homeowners which benefited from the project and discuss how end-users’ recommendations are considered; and (iii) consultant services for annual financial audits of the project accounts and other consultant services. The monitoring and reporting will include a well promoted and easily accessible grievance redress mechanism building upon the BDHP’s recently-upgraded grievance redress mechanism and further

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<sup>10</sup> The government has an on-going capital renovation program targeting basic repairs of buildings based on a 30-yr capital repair cycle, as well as actual issues reported by homeowners. In general it covers the most dilapidated buildings in the MAB stock, which also tend to be among the least energy efficient. The purpose of the capital renovation program is to restore the buildings to their original design standards, for examples, repair or replace a leaky roof, reseal the joints between panels (of panel buildings), replacing malfunctioning equipment, etc.. It does not explicitly address heat losses of buildings, although certain measures (e.g., repair of a freezing wall or replacing a roof) will reduce heat losses. More details about the capital renovation program are provided in Annex 2.

supporting and improving the efficient management of inquiries and complaints – in particular related to the thermal renovations and the repayable grant scheme.

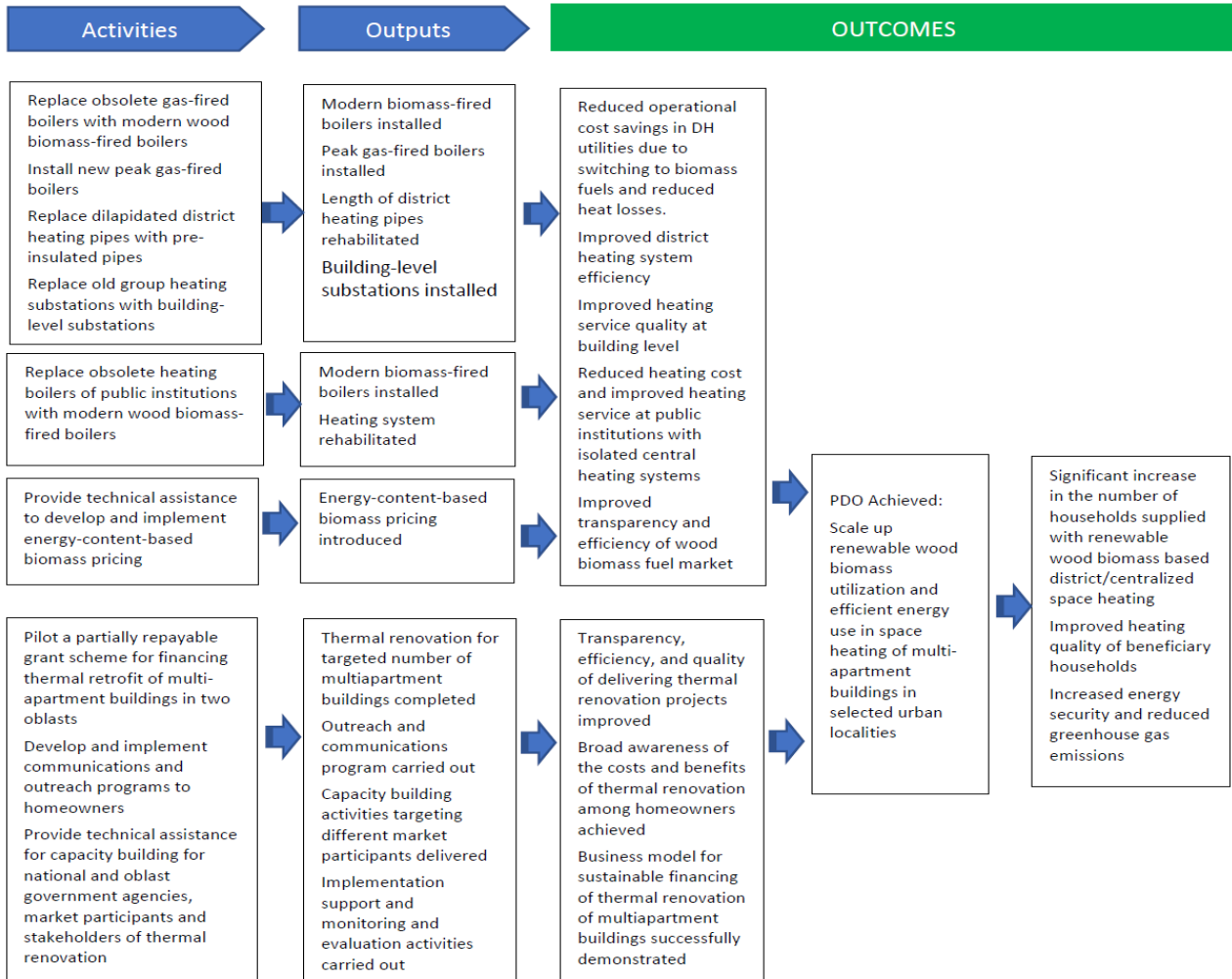
### C. Project Beneficiaries

36. The direct beneficiaries will include (i) participating district heating companies which will modernize their heat production facilities and improve operational efficiency; (ii) households living in MABs which are served by upgraded heating systems and/or undergone thermal renovation; and (iii) public institutions which will install modern wood pellet-fired boilers. The government will also benefit from reduced fiscal subsidies to DHCs because of reduced heat production cost from switching to wood biomass fuel and reduced heat consumption in MABs which have undergone thermal renovation, as well as from fulfilling its national contribution to climate change mitigation.

### D. Results Chain

37. The proposed project responds and contributes to addressing the key energy sector challenges and government priorities discussed above, through supply- and demand-side complementary components. The replacement of obsolete gas-fired boilers with modern wood biomass-fired boilers, together with the rehabilitation of network and modernization of building level control, will increase local DH service resilience and reduce reliance on imported natural gas, as well as reduce heat production costs and losses and enhance DH affordability. The proposed thermal renovation pilot will help catalyze critical changes needed to scale up thermal renovation, particularly in demonstrating a viable business model for long-term debt financing and efficient delivery of thermal renovation projects, as well as reducing the social impact of tariff increases. The proposed project as a whole would foster two strategically important changes in the energy sector of Belarus: maximizing the use of renewable wood biomass fuel for heating and large scale thermal renovation of MABs, which will generate significant energy security dividends and global environment benefits. The theory of change is depicted in the diagram below.





38. The key assumptions of the theory of change included: (i) government commitment to supporting a national thermal renovation program for MABs through deliberate policy actions, including issuance of relevant Presidential Decree and Council of Ministers’ Resolution, as well as introduction of supplementary measures to support program implementation, including enhanced housing and utility subsidy (HUS) for low-income households; (ii) government commitment to gradual removal of residential heat tariff subsidies; (iii) effective outreach and consultation efforts which help convince sufficient number of homeowners to participate in the thermal renovation investment; and (iv) well executed thermal renovation projects with results which clearly demonstrate significant tangible benefits to homeowners.

#### E. Rationale for Bank Involvement and Role of Partners

39. The Bank is well positioned to assist the government in addressing the main challenges to the energy sector. Over the last 10 years or so, the Bank has partnered with the government in promoting sustainable energy solutions through investment financing, policy advisory, and technical assistance. These efforts have included two demand-side EE projects—the Social Infrastructure Retrofitting Project and the Post-Chernobyl Recovery Project; a supply-side EE project in heat and power generation—the Energy Efficiency Project; and most recently, the BDHP. Over the last four years or so with support from the Energy Sector Management Assistance Program (ESMAP), the Bank has carried out four pieces of analytical work highly relevant to the heat tariff reform and the efforts in

establishing a sustainable financing and delivery scheme for thermal renovation of MABs. These operational projects and analytical activities have enabled the Bank to develop a trusted partnership with the government in the energy sector, bringing in not only financial resources but also global knowledge to help address energy sector challenges.

40. The Bank has also been deeply involved in assisting Belarus in sustainable forest management. There is significant synergy between the proposed project and the on-going Forestry Development Project, which seeks to enhance silvicultural management and reforestation and afforestation, increase the use of felling residues and improve the public good contribution from forests in targeted forest areas.

41. The proposed project aims to scale up environmentally sustainable energy solutions for space heating in Belarus by supporting important government investment programs in renewable wood biomass fueled district/central heating and thermal renovation of MABs. The proposed investment activities will primarily target at inefficient DH systems serving small and medium-sized towns and the most energy-inefficient MABs. Such communities or buildings also tend to have a higher share of low income households than those in oblast capitals, or in post-1996 MABs. Thus the proposed project is expected to contribute directly to improving heating services and affordability of district heating for the bottom 40 percent of the population.

42. The Bank has had policy dialogues with the government on heat tariff reforms since 2014. The ESMAP financed two phases of the analytical work, which provided critical insights on potential pathways to operating cost-recovery for power and DH utilities, associated social impacts, and appropriate social protection measures, and helped structure policy dialogues with the government and communications with the public. The heat tariff reform engagement will continue with the support of a recently established trust fund from the European Commission. The proposed project will facilitate the government's policy of gradual increase of residential heat tariff by supporting lower-cost heating solutions through demand-side EE measures and increased utilization of lower-cost wood biomass fuel, compared with traditional gas-fired heating. Such proactive interventions by the government to address affordability of heat and DH service quality would help soften the financial impact of subsidy removal on homeowners, making heat tariff reform more palatable to the affected population. In addition, by supporting the development and implementation of a long-term program on thermal renovation of MABs and the establishment of a sustainable wood biomass energy market, the proposed project would help promote economic growth, sustain or create jobs in urban centers and rural areas.<sup>11</sup> The project will also contribute to the reduction of GHG emissions by reducing overall heat demand and the amount of fossil fuel used for heat production.

43. The proposed project is fully aligned with GEF climate change focal area strategy Objective 1.3 – Accelerating energy efficiency adoption by focusing on scaling up energy efficiency and renewable biomass use in residential buildings and heating system. The GEF grant financing will enable the government to (i) implement sustained and large-scale communications and out-reach programs to support thermal renovation; (ii) support development of homeowners' associations and their capacity to decide and manage thermal renovation investments; (iii) pilot and demonstrate innovative business model for financing and delivery; (iv) demonstrate at scale integrated approach to low-emission space heating and the merits of apartment-level consumption-based heat billing; (v) support capacity building for the thermal renovation supply chain participants in all oblasts, including energy auditors, designers, contractors, inspectors, banks and concerned government entities; (vi) introduce a energy-content-based wood biomass pricing regime; and (vii) develop a MRV system for GHG emission reductions in space heating.

44. The GEF grant, while relatively small compared to the total cost of the project, will enable the broad-based

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<sup>11</sup> Based on Lithuanian experience, €1 million investment in thermal renovation of MABs creates about 15 construction jobs, encourages the development of construction and construction materials production sectors, and generates additional revenue to the budget.

outreach and capacity building efforts necessary for the success of the national thermal renovation program. A GEF grant amount of US\$1 million is earmarked for demonstrating apartment-level consumption-based heat billing which is crucial for building confidence for future government scale-up efforts. The GEF grant will be used as a financial incentive for households to participate in the demonstration. For the purpose of demonstration at scale, efficient implementation, monitoring and evaluation, it was determined that the GEF grant will be used in one selected residential settlement supplied by the same district heating system. The settlement has 135 multiapartment buildings totaling 460,000 square meters of heated floor area. The GEF grant will be disbursed per participating building, covering a portion of the costs required for consumption-based billing, which would include installed costs of TRVs, by-pass pipes, HCAs, necessary changes and adjustments of the building internal heating system (such as replacement of corroded pipes, hydraulic balancing, etc.), as well as billing data collection and relay equipment and bill processing. The GEF grant is expected to cover up to 40 percent of the eligible cost while the rest will be covered by the local co-financing.

45. The proposed project will also explore potential collaboration with the Finance, Competition and Innovation (FCI) GP in technical assistance in development of the capacity of the Belarus financial sector for housing renovation financing through a parallel GEF-funded Global Green Housing Finance Program implemented by the FCI GP. The proposed project will also forge closer collaboration with the Bank's forest management operations in Belarus, including the GEF-supported Forestry Development Project, particularly on efforts to develop a sustainable and transparent wood biomass fuel market. The project will also seek to explore synergies where relevant the GEF-financed Green Urban Development in Small and Medium Sized Cities project implemented by UNDP.

46. The Bank is partnering with EIB in the investment financing of the proposed project and is coordinating closely with EBRD on its separate investment project in thermal renovation of MABs in the City of Minsk. EBRD is expected to adopt a homeowner repayment scheme similar to the partially repayable grant scheme to be piloted by the proposed project.

## F. Lessons Learned and Reflected in the Project Design

47. The design of the Renewable Wood Biomass Heating component and associated technical assistance in development of wood biomass fuel market have drawn lessons learned from the on-going BDHP, as well as international experience in scaling up renewable wood biomass heating. The key lessons and their influence on the project design include:

- The combination of base-load biomass-fired and peak-load gas-fired boilers produces the best economic rates of return. This design principle will be adopted for all potential sites of biomass heating investment. In some sites, selected old gas boilers may be retained as peak boilers.
- Energy efficiency investments, including critical network rehabilitation/modernization investments, improve the sustainability and affordability of district heating projects, and result in long-term savings for the utilities. One particular area of network modernization which will be incorporated in all potential sites is improved demand response through improved data acquisition and operational control.
- Establishment of a transparent commodity market for wood biomass fuels requires the development and implementation of an energy-content-based pricing system. Following up on the gap analysis conducted in the on-going BDHP, the proposed project will support the formulation of the national regulation on energy-content-based wood biomass pricing. Support for pilot implementation will be included in the GEF additional financing. The GEF additional financing may also support wood biomass energy resources mapping to help understand and manage potential supply constraints when expanding wood biomass energy use.

48. The design of the Thermal Renovation of MABs component and associated technical assistance in development of the market for thermal renovation have drawn from international experiences, especially those from Lithuania and Poland, as well as from findings of a national survey on willingness to pay (WTP) conducted as part of the project preparation. The main lessons learned and their influence on project design include:

- Government interventions are needed to address the critical barriers to thermal renovation financing, namely, large upfront capital requirements, long financial payback period, and the lack of ability to pay by low income households. These issues are particularly difficult to deal with in MABs where investment decisions are made by the homeowners collectively. In well-established thermal renovation markets such as Poland and Lithuania, where government programs started 20 years ago and commercial banks have become the main sources of financing for thermal renovation, the government capital subsidy still remains vital for leveraging homeowners' investment. The partially repayable grant scheme to be piloted by the proposed project is designed based on these international experiences to incentivize homeowners' participation in thermal renovation through (i) a transparent system for efficient use of the government capital subsidy, including proper monitoring and verification; and (ii) a credible debt financing scheme for homeowners to borrow for thermal renovation investment. Both are essential for the long-term goal of involving commercial banks in thermal renovation financing.
- Affordability of additional cost due to thermal renovation by low-income households is a critical concern, and targeted financial assistance beyond the general capital grant is needed to ensure participation by such households without undue financial burdens. Belarus has a means-tested energy assistance program for targeted support to low-income households struggling with affordability of housing utilities (Housing and Utility Subsidy (HUS), see Annex 3). In principle, it could provide means-tested support for households that might struggle with the cost of utilities plus the cost of thermal renovation. Nonetheless, the current income related eligibility conditions result in low coverage and adequacy of support because the benefit formula has an eligibility threshold that is too high and resulting in exclusion of a significant proportion of low-income households. The second problem of the current HUS design is that the formula calculates the benefit amount based on total household income without consideration of households' size. Such an approach overestimates the potential for household economies of scale in energy consumption; it also sets a very high threshold for households with two low-income earning members resulting in situations where total income is above the eligibility threshold even though such households are among the working poor. The lack of coverage of working poor occurs due to a very high share of out of pocket expenditures relative to household income needed to qualify for HUS. Therefore, while groups such as single pensioner households and sole-earner households (with low enough earnings) tend to be eligible, the dual income earning households tend to be excluded regardless of the number of dependents in the household. The World Bank has advised that the HUS eligibility and benefit formula is enhanced so that the program can provide the needed level of support to families which may struggle with both the utility costs and the thermal renovation payments. This will be an important area for implementation support. The enhanced benefit formula should be designed to take into account the number of dependents in the household and set a lower threshold for the share of utility expenditures above which households are energy poor (energy poverty). The Bank team is currently in discussions with the Government to amend the HUS eligibility formula for improved support to low-income households.
- Credible, evidenced-based information is critical for mitigating skepticism towards thermal renovation and improving consensus among homeowners on investment decisions. Intensive outreach efforts and consultations with homeowners will be a focal area of implementation support. An ESMAP-supported national survey on WTP for thermal renovation among homeowners of the targeted MAB stock conducted during the project preparation indicates that the affordability (the monthly repayment amount) of thermal renovation investment is the primary concern of homeowners. This could be partially mitigated by well-elaborated

explanation of the government support program and clear demonstration of the costs and benefits of participation. A detailed homeowner engagement approach will be developed as part of the operations manual preparation by the counterpart. An ESMAP-funded support for implementation readiness is being mobilized as a bridging activity for engaging homeowners in the pilot oblasts between project appraisal and effectiveness.

- *In the long term cost-reflective heat tariffs are needed for sending the market signal for thermal renovation investment.* The national WTP survey also reveals that the cost of heating does not register strongly with most homeowners although most of them are aware that the government has a plan to gradually increase heat tariff. This lack of understanding of the impact of heat tariff increases on heating bills and potential cost savings through thermal renovation will be another area of the communications efforts. While the pilot per se could achieve its Development Objective without significant tariff increases, moving the residential heat tariff towards the cost-recovery level is important for replicability and sustainability of the pilot scheme. In parallel to the pilot, the Bank team will continue to engage the government on the heat tariff reform agenda so as to help establish a sensible pathway toward operating-cost-recovery heat tariff, as well as sensible expectation by homeowners of the future tariff adjustments.
- *Reducing transaction costs and development of an efficient and trustworthy delivery system also is critical to scaling up thermal renovation investments.* The proposed national thermal renovation program will be the first time in which homeowners' will have to pay a significant amount of out-of-pocket expense for something that generates benefits which cannot be clearly allocated to individual households.<sup>12</sup> The newly bestowed ownership of the renovation projects by homeowners also comes with their scrutiny on costs and expectation for results and quality. Thus, one of the main objectives of the pilot is to set benchmarks on quality and efficiency of project delivery by standardizing and streamlining the preparation and implementation of thermal renovation projects, including a transparent procurement platform for efficient and competitive contracting of services and works.

49. Finally, the proposed project also aims to demonstrate the augmented benefits of the full heating chain EE improvement and optimization. Efforts will be made to identify and support integrated projects where thermal renovation of MABs, investments in modern wood biomass boilers and network efficiency are combined.

### III. IMPLEMENTATION ARRANGEMENTS

#### A. Institutional and Implementation Arrangements

50. The proposed project will be implemented by the Energy Efficiency Department (EED) of the State Committee for Standardization (SCS) through its project management unit (PMU) and in close collaboration with participating oblast and rayon (municipal) governments and local DHCs. The EED is the designated national agency responsible for the implementation of national EE and renewable energy programs. The Ministry of Housing and Utility (MOHU), the sector line ministry, is a government partner of the proposed project and will be closely working with the EED to support project implementation.

51. The proposed project will continue to use the centralized national project management model proven effective in previous and on-going Bank-financed operations. The PMU will be accountable for all fiduciary responsibilities, including procurement, financial management, safeguards, monitoring and reporting. The PMU has

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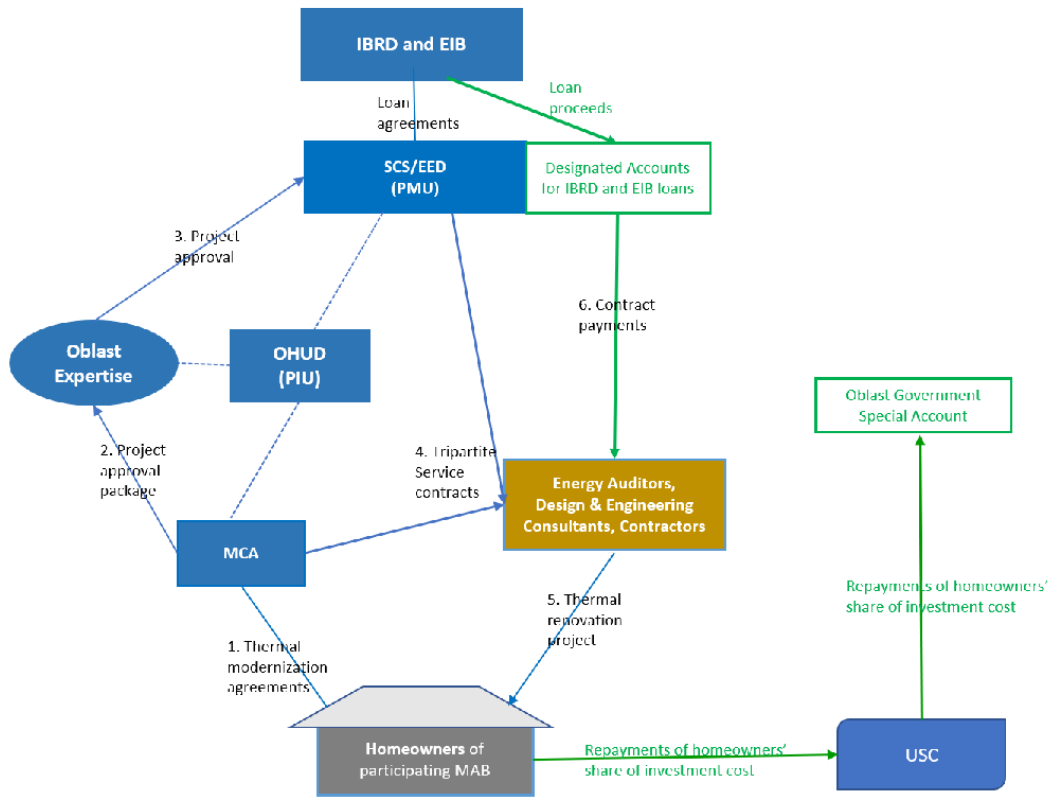
<sup>12</sup> The 80 percent window upgrade rate in MABs indicates that households are willing to invest a significant amount of money if the benefits are clearly associated with their own benefits. The main reason cited for window upgrades is thermal comfort.

successfully implemented the Bank-financed Social Infrastructure Retrofitting Project, the Post-Chernobyl Recovery Project, and the Energy Efficiency Project, and is currently implementing the BDHP. The PMU will operate in accordance with the POM. The POM will outline the implementation arrangements, including procurement, contract management, payment authorization, environmental management, social safeguards, periodic reporting, and relationships between the implementing and beneficiary agencies. The PMU's staffing will be augmented accordingly for the implementation of Components 2 and 3. More details on institutional and implementation arrangements are described in Annex 1.

52. **Specific implementation arrangements for Component 1.** All participating DHCs are subordinate to the MOHU and the oblast and rayon executive committees. Each beneficiary DHC will assign a coordinator (project manager) responsible for project implementation to work with the PMU. The DHCs are responsible for providing terms of reference for design documents (or approving design documents when they are available), ensuring appropriate technical supervision of the contracts, accepting payment orders, and submitting adequate documentation to the PMU so that it can prepare and sign disbursement applications. The bidding documents will be prepared by the PMU's procurement staff in close collaboration with the technical staff of participating DHCs. The PMU's Tender Committee will evaluate bids or proposals. The Review Committee, which includes ministry representatives and technical staff of the participating DHCs, will clear evaluation reports before sending them to the Bank on a "no objection" basis.

53. **Specific implementation arrangements for Component 2.** The key parties involved in the implementation of thermal renovation projects include (i) the PMU, which has the overall fiduciary responsibility for project implementation; (ii) the respective PIUs of the two selected oblasts, which will coordinate the thermal renovation component activities at the oblast level. The PIU will be hosted by the Oblast Housing and Utility Department (OHUD) with support of locally-based specialists hired by the PMU; (iii) the municipal contracting authority (MCA), which can be a housing maintenance company or a separate entity directly responsible for implementing the thermal renovation projects in its home municipality. The Oblast Expertise (OE) is the government agency authorized to review and approve the technical aspects of thermal renovation projects.

54. The implementation of a thermal renovation project under the pilot scheme will involve the following steps: (i) *project initiation* by the MCA and/or home-owners association (HOA) through consultation with the homeowners of an eligible MAB. This consultation will be based on a standard information package for homeowners. At this stage the homeowners need to decide whether they want to proceed with a detailed energy assessment or energy audit to determine the scope of thermal renovation, investment cost, and potential repayment obligations of homeowners. A simple majority approval is needed; (ii) *project approval* by homeowners based on recommendations of the detailed energy assessment or energy audit. Approval by two thirds of homeowners is required. A binding agreement with the homeowners will be signed regarding mutual obligations, including homeowners' repayment arrangements; (iii) *project preparation* by the MCA. The technical design requires OE approval; (iv) *contractor selection* following World Bank procurement regulation and managed by the PMU, which will result in a tripartite contract involving the PMU, the MCA and the contractor; (v) *construction and commissioning*, including obtaining all necessary certifications; and (vi) *repayment collection*. Homeowners' repayments will be collected by the government's Unified Settlement Center (USC) which is responsible for collecting utility bills and is located in each municipality. The homeowners' repayments will be accumulated in a special account of the oblast government and will be used together with oblast budget allocation for additional thermal renovation projects following the business model of the pilot scheme. The overall implementation arrangements of the thermal renovation pilot are depicted in the diagram below.



## B. Results Monitoring and Evaluation Arrangements

55. The monitoring and evaluation of outcomes and results during implementation will follow standard Bank practices. Project monitoring and evaluation will include (i) project results indicators as specified in Section VI, (ii) semi-annual progress reports on project implementation, and (iii) a midterm review of implementation progress. Project results indicators would be collected semiannually by the PMU. The PMU will be responsible for the overall monitoring and evaluation of implementation results and for the preparation of semiannual and midterm review progress reports.

56. The intermediate results indicators include one for the gender aspect of the project outcome and one for the citizen engagement during project implementation, especially for the consultations with homeowners for the thermal renovation investments.

57. The Bank implementation support team will monitor implementation progress and evaluate the outcomes semi-annually, using information from reports prepared by the PMU. Discussions during implementation support related to institutional capacity building, financial viability, along with technical reviews, and site visits will provide additional support for the project monitoring.

## C. Sustainability

58. The borrower's ownership of and commitment to the project are high. The government considers improving EE and increasing the use of wood biomass fuels as priorities for enhancing energy security and the sustainability of economic growth. It has adopted relevant national strategies and programs. Such strong

commitment is among the main reasons for the impressive reduction in energy intensity in Belarus. The government is in the process of launching a national thermal renovation program and is prepared to commit significant budgetary resources to support the long-term financing needed for such a program (see Annex 2). The proposed project will provide strong implementation support for the national program, contributing to its future success, which in turn, would reinforce the sustainability of the project's development outcome for thermal renovation. Similarly, the proposed project also supports the government's national program to increase the share of wood biomass fuels in heat supply. These high-level alignments with planned and on-going national priority programs in the relevant sectors portend strong ownership, a key factor for the project's sustainability.

59. The potential for scaling up thermal renovation of MABs is huge in the Republic of Belarus. The estimated investment needs are US\$14 billion, and potential energy savings are estimated at 12,000 GWh per year.<sup>13</sup>

## IV. PROJECT APPRAISAL SUMMARY

### A. Technical, Economic and Financial Analysis (if applicable)

#### Technical Aspects

60. **Renewable biomass heating component:** The technical design of the component is based on international best practices for district heating EE improvements and biomass use for heat generation. The district heating rehabilitation and EE improvements follow the same principles successfully applied in DH projects financed by the Bank and other international financial institutions in Central and Eastern Europe during the past two decades. The biomass boilers for heat generation will be based on conventional and well-proven technologies already used in Belarus and in neighboring countries. The typical wood-chip-fired boiler capacities would be between 2 and 5 MW with movable grate combustion arrangements. The boiler houses will be equipped with automated mechanical fuel handling and feeding systems for wood chips. The feasibility studies conducted for each of the potential sites demonstrate that the biomass boilers selected would operate as base-load boilers with long annual operating times, providing favorable conditions for biomass use.

61. **Thermal renovation component:** Thermal renovation of MABs supported by the project will cover a range of measures aimed at (1) improving heating control at both building and apartment levels through installation of building-level heat substations or mixing loops, TRVs and HCAs in apartments and necessary hydraulic balancing for the building; and (2) reducing heat losses of buildings through thermal upgrading of windows and exterior doors, and thermal insulation of exterior walls, roofs and basement. These measures involve proven technologies, building materials and components or construction techniques which have been widely used in Belarus. MABs which have structural problems that breach building structural safety code will not be considered for thermal renovation under the proposed project. Belarus is in a seismically stable region and seismic risk of buildings is low.

#### Economic Analysis

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<sup>13</sup> In the absence of the proposed project, it is expected that over the next 5 to 10 years, the government would (i) gradually increase the residential heat tariff to cost-recovery level; and (ii) continue to implement its capital renovation program for MABs which focuses on basic repairs without addressing thermal energy efficiency issues. The government is unlikely to implement apartment-level consumption-based heat billing for pre-1996 MABs. Thermal renovation of MABs will continue to be hindered by the market barriers identified above. The government will continue to invest in wood biomass-based district heating as part of the fuel-switching and modernization investments in the district heating systems of smaller cities. But energy-content-based wood fuel pricing is unlikely to be implemented. The infrastructure for transparent pricing and improved wood fuel quality would remain underdeveloped.



62. Due to the different nature and market conditions of the biomass district heating investment (Component 1) and thermal renovation investment (Component 2), the economic analysis is carried out separately for each component. The main results of the economic analysis are summarized in the table below.

### Main Results of Economic Analysis

		Base EIRR (%)		Sensitivity Analysis			
		With carbon benefit	Without carbon benefit	Biofuel cost +10% / Heat saving -10%	Biofuel cost +20% / Heat saving -20%	Investment cost +10%	Investment cost +20%
Biomass investments		15.6%	6.6%	13.6%	11.5%	14.0%	12.6%
Thermal renovation investments	Package A	26.9 - 33.9%	24.7 - 30.8%	25.1 – 31.6%	23.3 – 29.2%	25.1 – 31.5%	23.5 – 29.5%
	Package B	8.0 - 9.1%	7.3 – 8.4%	7.2 – 8.3%	6.4 – 7.4%	7.1 – 8.2%	6.3 – 7.4%

#### ***Component 1: Renewable wood biomass heating***

63. The proposed project includes subprojects in six oblasts, including Brest, Gomel, Grodno, Minsk, Mogilev, and Vitebsk (Minsk City, the Capital, is an oblast level jurisdiction and is not part of the project). The economic analysis of the investment in biomass DH systems is conducted for the 34 subprojects included in the current pipeline for investment financing individually and as a whole. The analysis takes into account the circumstances of each town and is used to determine whether the potential subprojects would yield acceptable levels of net benefits as measured by the economic net present value (ENPV) and economic internal rate of return (EIRR).

64. Project costs. The economic costs of the DH system modernization include: (i) the total investment costs of the energy-generating equipment (including pollution control), pipelines, and individual heat substations, and wood fuel preparation equipment, including design and construction costs; and (ii) operating costs, including fuel costs, electricity consumption for auxiliaries, and operation and repairs and maintenance costs. The economic analysis of the projects was calculated exclusive of taxes and subsidies.

65. Project benefits. The analysis takes into account three major benefits that would result from investments under the project: (i) reduced heat production cost due to switching from imported natural gas to domestic wood biomass fuel; (ii) a reduction in heat consumption and the corresponding heat production costs through the installation of individual building-level heat substations; and (iii) the economic benefits of reductions in CO<sub>2</sub> emissions through EE and renewable energy investment. This project will also generate other economic benefits (improved comfort, quality of service, potential net job gains in biomass fuel supply and the trades which support thermal renovation projects such as energy auditors and construction contractors that were not quantified in this analysis).

66. Results of economic analyses. The economic analysis of the project, exclusive of avoided CO<sub>2</sub> emission benefits, yielded an economic NPV of US\$ 4.1 million and EIRR of 6.8 percent. The economic analysis of the project, inclusive of avoided CO<sub>2</sub> emission benefits, yielded an economic NPV of US\$ 73 million and EIRR of 17.1 percent.

67. Sensitivity analysis. Sensitivity analysis (inclusive of avoided CO<sub>2</sub> emission benefits) was conducted to assess the robustness of the estimated project economic returns to changes in the main evaluation variables. The sensitivity analysis covers the following cases that in turn stress test the economic returns to the project; (i) natural gas price decrease to the import price of Russian gas (US\$150 per thousand m<sup>3</sup> border price); (ii) natural gas price increase of the import price of European gas (US\$250 per thousand m<sup>3</sup>); (iii) woodchip-price increase of 20 percent;

(iv) a capital cost overrun of 20 percent; and (v) a combination of the (iii) and (iv). For the worst-case scenario of a woodchip-price increase of 20 percent and a capital cost overrun of 20 percent, the project becomes economically viable and robust enough to the changes, yielding EIRR of 9.5 percent.

### ***Component 2: Thermal renovation of multiapartment buildings***

68. The program for thermal renovation of MABs will finance both Package A and Package B type of investments. The relative share of the two different investment types cannot be determined up front since it will depend upon the investment choice that will be made by the apartment owners. The economic analysis for Component 2 therefore is based on estimation of the costs and benefits for representative cases for both types of packages drawn from the available data and analysis carried out in the preparation of the project. (3-storey, 5-storey, and 9-storey MABs, information for which was more readily available in selected oblasts, are selected and analyzed for the economic analysis as representative cases.)

69. Project costs. Economic costs of the renovation works include (i) capital costs of the renovation works depending upon the investment choice made by the owners from building level substations, TRVs and HVAs in apartments, and upgrading of building entrance doors and staircase windows to upgrading of apartment windows, exterior doors of the apartment, and thermal insulation of the roof, exterior walls and basement, and (ii) incremental maintenance expenses arising from the renovation. The economic analysis was calculated exclusive of taxes and subsidies.

70. Project benefits. Quantifiable economic benefits consist of (i) the economic value of energy savings, valued at the full cost-recovery level of heat supplied, (ii) the economic value of CO<sub>2</sub> emission reductions from reduced energy consumption in renovated buildings, and (iii) the property value increased due to building improvements.<sup>14</sup> The program has a number of additional benefits, which are not quantified for the purposes of the economic analysis; these include national benefits (enhanced energy security, reduced fiscal burden from energy subsidies, job creation), municipal benefits (urban renewal, improved social cohesion), and owner benefits (increased comfort, health and safety levels, enhanced HOAs).

71. Results of the economic analyses. Based on the potential pipelines of MABs identified during preparation, the economic cost-benefit estimates have been prepared for representative cases for three types of MABs. For Package A, which involves limited thermal retrofits, the energy savings resulting from the combined impact of all retrofits is 12% on average and the EIRRs of the project vary from 27 to 34% with payback period of 4-5 years. For Package B, the energy savings from the installation of comprehensive thermal renovation measures are estimated at about 40% on average and the EIRRs vary from 8 to 9% with the dynamic payback period of 13-14 years.

72. Sensitivity analysis. The sensitivity analysis covers the following cases that in turn stress test the economic returns to the project: (i) Investment cost increase by 10 percent; (ii) Investment cost increase by 20 percent; (iii) Heat savings decrease by 10 percent; (iv) Heat savings decrease by 20 percent; and (v) A combination of (ii) and (iv). Only in the worst-case scenario (investment cost +20% & heat saving -20%), the EIRRs falls below the discount rate of 6% prescribed under current Bank guidelines to about 5%.

73. A homeowner's financial perspective of thermal renovation investment. While the economic analysis indicates that thermal renovation is a sound investment for society and justifies government support, a homeowner's

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<sup>14</sup> Increased property value may be attributed to multiple factors such as improved building appearance, thermal comfort, energy efficiency, as well as extended building lifespan. There is potential double counting since reduced energy cost could be priced into the increased property value. There is insufficient empirical data to help determine the significance of the potential double counting.

financial perspective is more narrowly focused on financial returns. This is illustrated in the table below which summarizes the key financial indicators based on the direct and tangible impact of such an investment on the heating cost of a 48 m<sup>2</sup> standard apartment. Potential financial gains of a more salable apartment is not considered here.

**Illustration of the financial implications of comprehensive thermal renovation of a standard apartment in 2018**

		At current heat tariff	At operating cost-recovery tariff
Investment cost of comprehensive thermal renovation	BYN 10080 *		
Potential heating cost savings post thermal renovation	50 percent	BYN91/yr	BYN412/yr
Simple payback period based on heating cost savings without capital subsidy		110 years	24 years
Simple payback period based on heating cost savings with 50 percent capital subsidy		55 years	12 years
Simple monthly payment over 10 years without capital subsidy	BYN84/month	BYN76/month (after considering heating cost savings)	BYN50/month (after considering heating cost savings)
Simple monthly payment over 10 years with 50 percent capital subsidy	BYN42/month	BYN34/month (after considering heating cost savings)	BYN8/month (after considering heating cost savings)
Average monthly pension of pensioners (2018)	BYN364/month		

\* Assume that the average cost of thermal renovation is BYN210 per m<sup>2</sup>.

74. The numbers in the table above clearly indicate why the thermal renovation investment without additional financial support could be a significant financial burden for low-income households. In addition, the rationale of the investment in thermal renovation might not be clear to households until they are made aware of the implications of a long-term cost-recovery tariff being adopted. Thus, illustrating this aspect will be important in the outreach and consultation activities.

75. In order to make the thermal renovation affordable to low-income households, the draft Presidential Decree included provisions to provide additional financial support through the existing HUS program. This is further analyzed below.

***Affordability of thermal renovation repayments and the Housing and Utilities Subsidy Program***

76. The current draft provisions envisage introducing an additional subsidy to be delivered with the HUS. However, for the HUS Program delivery mechanism to provide effective support to low income households engaged in thermal renovation, modifications to the current eligibility criteria and benefit calculations are required. In particular, the current benefit formula used to target the HUS provides limited coverage of the poor because: (a) it is directed to “energy poor” households identified as low-income households who spend an extremely high percentage of their resources on heating costs (20 percent in urban areas, 15 percent in rural ones).<sup>15</sup> Such a high threshold results in significant under-coverage of the poor; (b) it is based on total income rather than per capita

<sup>15</sup> The formula is actually based on the costs of the expected consumption of services given housing characteristics rather than the actual costs incurred.

income, thereby biasing the coverage against large households (especially households with children). In addition, budget data suggest that the HUS program consistently underspends its allocations, suggesting that there is a need to lower the entry eligibility condition to increase coverage and generosity of support.

77. The Bank recommendation is that the current HUS formula should be adjusted to:

- a. Replace the current benefit calculation with a formula anchored to the calculations for the minimum subsistence consumption adopted by the Government in the design of other social programs. This would result in less exclusionary (lower) energy share at which household become eligible and therefore expand eligibility for the program; and
- b. Introduce a new feature in the formula so that benefits for eligible households would depend on per capita income levels and therefore increasing the progressive nature of the transfer and to reverse the bias against larger households.

78. The budget implications of the proposed changes to the HUS are well under control. With the proposed changes the HUS spending would have to increase to around BYR 9-10 million from the current BYR 1 million, that is, it would result in spending of around 0.01% of GDP.

### ***Fiscal Impact of the Proposed Investment***

79. The net fiscal impact of the investment components is estimated on an incremental basis as the difference in net fiscal expenditures between the with-project and without-project cases. This incremental difference is the NPV of the net fiscal expenditure of with-project case minus the NPV of the net fiscal expenditure of the without-project case ( $\Delta$ NPV). A negative  $\Delta$ NPV means the proposed project will generate net fiscal savings compared with the without-project case. The overlapping effects of the biomass heating and thermal renovation investments are not considered in this analysis. Due to the relatively small scale of the thermal renovation investments and their wide geographic distribution the effect of reduced demand on the heat production of a specific DH system is likely to be negligible.

80. **For the renewable biomass heating investment**, the fiscal cost for the government is the cost of debt service (principal plus interest) of IBRD and EIB loans, and the fiscal benefit is the reduction in heat production cost which translates into reduction in fiscal subsidies to the beneficiary DHCs. The government has not yet defined a schedule for progressive reduction of the residential heat tariff subsidy. Two scenarios have been considered for the purpose of this analysis: (i) *business as usual* – the subsidy will be continued at the present level; and (ii) *subsidy phasing-out* – the subsidy will be progressively phased out over a period of 10 years. The net fiscal impact of the biomass heating investment has been estimated to be a negative  $\Delta$ NPV of US\$33.8 million under the business as usual scenario and a positive  $\Delta$ NPV of US\$26.7 million under the subsidy phasing-out scenario, both at a discount rate of 6 percent over a period of 20 years. This would mean that, under the business as usual scenario, the biomass heating investment would generate net fiscal savings. Under the subsidy phasing-out scenario, the government would incur a net increase in fiscal spending (positive  $\Delta$ NPV) because the fiscal benefit of reduced heat tariff subsidy is reduced to zero in 10 years. But keep in mind that in the subsidy phase out scenario, the government would also avoid paying US\$60.5 million subsidies in NPV to the DHCs. So overall economics of the proposed biomass heating investment would be positive.

81. **For the thermal renovation investment**, the fiscal cost for the government is its contribution to the investment cost of the program. Based on the cost sharing arrangements in the proposed scheme, the government would contribute either 30 percent or 50 percent of the investment cost depending upon the package of the EE measures. Since the relative shares of total investment cost for these two investment packages cannot be

determined up front, two simple scenarios have been considered: one in which all thermal renovation investments receive 30 percent capital grant and the other in which all thermal renovation investments receives 50 percent capital grant. The government contribution will be financed entirely from the loans, the resulting fiscal expenditures will be the annual debt service of the loans.

82. The fiscal benefits of the project arise from the reduction in annual government fiscal subsidy for residential heat tariff that would result from the savings in heat consumption enabled by the thermal renovation.<sup>16</sup> As in the case for biomass heating investment the same two subsidy removal scenarios have been considered for the purpose of this analysis. Based on the above considerations, the net fiscal impact of the thermal renovation investment has been estimated over a period of 25 years at a discount rate of 6%. The results are summarized in the table below.

**Estimated net fiscal impact of thermal renovation investment**

	$\Delta$ NPV (Business as usual)	$\Delta$ NPV (Subsidy phasing-out)
Governmental contribution of 30% cost	Negative US\$3.2 million	US\$8.2 million
Governmental contribution of 50% cost	US\$4.8 million	US\$16.2 million

83. Under the business as usual scenario, the government would incur a relatively small amount of increased fiscal spending if the capital grant level is at 50% for all thermal renovation investments. Under the subsidy phasing-out scenario, the government would incur net fiscal expenditures at either levels of capital grant for thermal renovation investments. Again, the overall economics of the thermal renovation would be positive due to avoided tariff subsidies under the subsidy phasing out scenario.

**B. Fiduciary**

***Financial Management***

84. Financial Management and disbursement arrangements for the implementation of the project have been confirmed as Satisfactory. The project’s overall financial management risk is rated as moderate.

85. Financial management and disbursement functions for the project will be carried out by the EED, specifically by its subordinate entity the PMU. The PMU has extensive experience in supporting Bank-financed projects. It has an accountant and a financial management specialist, who would perform the financial management and disbursements functions in this project. Both have practical experience from implementing the ongoing Bank financed projects and also have attended a number of fiduciary training events organized by the Bank. Existing staff of PMU was assessed to be able to carry out functions under this project, in addition to their tasks under the ongoing BDHP.

86. The flow of funds arrangements will follow the standard Bank procedures, including direct payment/special commitment and reimbursement/advance mechanisms, and separate designated account will be opened for this project, one for IBRD and one for EIB funds. The project funds would not need to be included in the state budget prior to the project disbursements, and no government co-financing is envisaged.

87. Accounting and reporting for the project will be carried out in the existing automated accounting and

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<sup>16</sup> The impact on quasi-fiscal subsidies, cross subsidies from non-residential heat and power consumers, are not analyzed.

reporting systems used by the PMU for other projects. A separate set of accounts will be used to record project transactions, to keep the accounting records segregated from those for other ongoing projects, in both the currency of payment and the U.S. dollar equivalents. Quarterly reports (IFRs) will be submitted using the acceptable sample format agreed at negotiations. The project audit will be conducted by independent private auditors acceptable to the Bank, in accordance with International Standards on Auditing (ISA) under the terms of reference acceptable to the Bank. Both the PMU and the Bank would make the audited financial statements publicly available on their websites, as required by the World Bank Group Policy on Access to Information. Both the IFRs and audited financial statements will cover the activities financed from both IBRD and EIB funds.

88. The project standard full-scope FM monitoring visits will be carried out on the basis of the risk profile of the project, normally once a year. Monitoring visits may be made more frequently if it is determined that this is necessary or if changes occur in the FM and disbursement arrangements and assessed risk.

### ***Procurement***

89. **Applicable Procurement Arrangements:** Procurement under the project will be carried out in accordance with the World Bank Procurement Regulations for IPF Borrowers – Procurement in Investment Project Financing – Goods, Works, Non-Consulting and Consulting Services (July 2016, revised November 2017 and August 2018) (hereinafter referred to as “Procurement Regulations”) and with the latest Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits. EIB agreed to follow IBRD procurement procedures.

90. **Capacity Assessment:** An assessment of the capacity of the PMU to implement procurement was carried out by the Bank team in July 2018 and recorded in the Procurement Risk Assessment and Management System. Given the risks identified and the results of the assessment, overall procurement risk is considered Moderate.

91. **Project Procurement Strategy for Development (PPSD):** Based on the project requirements, operational context, economic aspects, technical solutions and market analysis, a PPSD has been developed for the project by BIES with the support from the Bank team. The Bank reviewed the document and provided comments.

## C. Safeguards

92. The draft project Environmental and Social Management Framework (ESMF) was disclosed on the implementation agency’s (Energy Efficiency Department of the State Committee for Standardization) website on September 18, 2018. Public consultation of the ESMF was conducted on October 5. The final draft ESMF was cleared by the Bank on October 30, 2018 and disclosed on the Bank’s website on November 6, 2018. The appraisal stage PID/ISDS was disclosed on November 16, 2018. For EIB, the appraisal and implementation of the proposed project will be based on the EIB Environmental and Social Standards, which are generally consistent with the World Bank’s safeguards requirements.

### ***Environmental Safeguards***

93. ***Project potential environmental impacts and triggered World Bank Operational Polices (OPs).*** The types of activities to be implemented will have either minor or no adverse environmental impacts and provide significant environmental and social benefits (reductions in local pollution such as dust and sulfur dioxide emissions and reductions in emissions of greenhouse gases such as carbon dioxide; improving livelihoods by securing heat supply; etc.). Negative environmental impacts are primarily associated with civil works (e.g. dust, noise, disposal of non-hazardous wastes and/or older equipment; degradation of vegetation, traffic disruption (depending upon specific

location), worker safety (e.g. welding operations). In most cases these impacts will be minor, short-lived, and primarily limited to the project sites (except for movement of equipment and materials to/from the construction sites), and they can be addressed with good engineering and construction practices as well as by preparing and implementing adequate mitigation measures and applying best construction and/or energy supply or energy conservation practices and relevant mitigation measures. The project triggers only one World Bank Environmental OP 4.01 as it will generate some adverse environmental and social impacts. The OP 4.04 on Natural Habitats as well as OP 7.36 on Forests, are not triggered as the project is focused on existing infrastructure in urban areas no natural habitats and/or forests will be impacted. The draft Environmental and Social Management Framework (ESMF) has been disclosed and consulted in the country and in selected participating cities prior to appraisal.

94. *Project category and Environmental Assessment instruments to be applied by the project.* In accordance with the Bank's safeguard policies and procedures, the project is classified as Category B for which an Environmental Assessment (EA) with Environmental and Social Management Plan (ESMP) is required. A subproject pipeline has been prepared during project preparation. Specific subprojects to be financed by the proposed project will be confirmed during implementation. The appropriate EA instrument at appraisal is an ESMF, which would specify all rules and procedures for the Environmental and Social Impact Assessment (ESIA) of specific subprojects (e.g., a biomass DH investment or the thermal renovation of an MAB) and preparing ESMPs. The proposed project will not finance any subprojects which may cause significant environmental impacts and may fall under the Category A projects. The subprojects to be financed under the proposed project would fall under the Category B projects, for which the Bank requires a simple and/or a partial ESIA and/or preparing an ESMP.

95. *Purpose and contents of the Environmental and Social Management Framework.* The ESMF will guide the Environmental and Social Impact Assessment process, relevant to the proposed project activities. Overall its main goal is to avoid, minimize or mitigate, potential negative environmental and related social impacts caused by the project implementation. The ESMF prepared by the client provides the following: (a) the national and WB safeguards ESIA rules and procedures; (b) environmental and social impacts associated with the proposed investments and generic mitigation measures; (c) guidelines on conducting sub projects environmental screening, as well as ESIA, including defining mitigation measures and monitoring activities for different types of activities; (d) roles and responsibilities in ESIA process and in supervision and reporting; (e) ESMP and ESMP Checklist to be applied within the ESIA process; and (f) capacity building activities to ensure an efficient ESMF implementation. A special section of the ESMF provides safeguards capacity building activities for the selected pilot oblasts. To ensure that the biomass comes from sustainable sources, the ESMF requires for each new Biomass boiler that: (i) wood chips or wood for production of wood chips by district heating utilities are supplied by certified forestry enterprises in Belarus (as opposed to uncertified enterprises or through self-collection of local wood resources); (ii) confirmation that there is adequate excess material available from existing forest enterprise activities so that the increased demand for them will not lead to changes in forest management or utilization practices (if project-related increased demand could lead to such changes). Also, the proposed capacity building activities to be provided under the Component 3 includes in its curricular a section on identifying subprojects environmental impacts and rules and procedures for preparing ESIA&ESMP.

### ***Social Safeguards***

96. No Project activities will require or cause physical or economic displacement. The selection process for thermo-renovation as it relates to homeowners will need to ensure that it does not involve temporary or permanent relocation of homeowners/tenants. The ESMF requires that site-specific ESMPs have a checklist to monitor this. Under Component 2, in cases where thermal renovation activities might lead to minor temporary impacts on small retail businesses located on the first floor of the buildings, site-specific ESMPs (which will be included into construction contracts) will require appropriate mitigation measures such as providing street signs or other measures

for clientele to easily access during construction. Robust Grievance Redress Mechanism (GRM) with active outreach campaign will be supported by the Project (building on the experience of the EED in other Bank-financed projects), and will ensure active participation of project beneficiaries/affected people. Detailed GRM procedures will be laid out in the Project Operations Manual, and the PMU under EED will be responsible for maintaining a functional GRM throughout the project life.

### ***Citizen Engagement and Grievance Redress Mechanisms***

97. The project will ensure the implementation of regular gender-sensitive homeowner consultations and gender-sensitive MAB homeowner monitoring committees (bridging the gender gap in voice and participation at the project-level). Engagement of citizens in providing feedback as well as monitoring the project will be ensured through: (i) gender-sensitive consultation with MAB homeowners before starting EE investments in any MAB (presenting information on thermal retrofit options and its benefits, capturing female and male home-owners' views and questions, discussing concerns, needs, and recommendations regarding MAB renovations, particularly including vulnerable homeowners, and forming homeowner committees through the election of committee members). Specific outreach efforts to female homeowners and homeowners from other vulnerable groups (e.g. elderly) shall contribute to representative attendance of female and other vulnerable homeowners. Consultation efforts and outcomes are summarized for semi-annual project reports.; (ii) participatory monitoring through MAB homeowner monitoring committees. The committees will closely cooperate with local PIUs which support them to get organized and regularly exchange between different MABs supported under the project. In addition, the committees will monitor the progress of works, contribute and to and influence planning processes and decisions during renovations, disseminate results of consultation and how female and male homeowners' recommendations have been considered, and collect female and male homeowners' opinions before and after thermal retrofit works (committees will consider a gender composition representative of homeowners' gender composition). Efforts and activities of homeowner committees are summarized for semi-annual project reports; (iii) two beneficiary satisfaction surveys (at the mid-term and end of the project) analyzing perceptions of female and male beneficiaries on project investments and the project's responsiveness to their needs and concerns; and (iv) a well promoted and easily accessible grievance redress mechanism relying on the national grievance system, which will be well promoted and easily accessible through the project. Results are reported in semi-annual project reports.

### ***Gender***

98. According to the World Bank Belarus Country Gender Profile (2016), 70% of households in Belarus are headed by women and on average, female headed households show lower income per capita than male headed-households. This indicates, that a large proportion of households required to make investments in thermal renovations, are headed by women. Because of their greater vulnerability to poverty, female headed-households are more likely to live in less energy-efficient dwellings because they cannot afford improvements. A regional qualitative research in ECA, covering Belarus, found that insufficient access to heating services and the length of the heating season affects women more than men, as women often spend more time at home doing housework and looking after children, elderly people and people with disability<sup>17</sup>. Other findings show that information about energy efficiency is often technical, available to a narrow, specialized audience and thus more frequently spread among men's social circles. According to the aforementioned willingness to pay survey, female headed-household show greater willingness to pay for a thermal retrofit package that is more limited than alternative packages. In order to incentivize female-headed household to make EE investment in their dwellings, the proposed project would include the following measures: (i) targeted financial support through HUS to low income homeowners, including female

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<sup>17</sup> World Bank. 2015. Toward Gender-Informed Energy Subsidy Reforms: Findings from Qualitative Studies in Europe and Central Asia. World Bank: Washington, DC. <https://openknowledge.worldbank.org/handle/10986/22100>



headed households for EE investment, and (ii) gender sensitive outreach programs to homeowners on the benefits of energy saving measures, thermal heating upgrades and financing options (also helping to close the gender gap in knowledge about EE investments and benefits to homeowners and to increase female-headed households' uptake of thermal renovation investments). The outreach programs will include easily understandable brochures informing on thermal retrofit options (including contact information for the relevant MAB homeowner committees) and will take into account appropriate communication channels and language to better reach women. Increasing female-headed households investments in thermal renovation will not only improve female-headed households' living conditions, but will also lead to savings in energy expenditures in the long run, as the government of Belarus plans to reduce energy subsidies.

## V. KEY RISKS

99. The overall risk of the proposed project is rated High at appraisal. The areas of high risks include Sector Strategies and Policy and Stakeholders. The areas of substantial risks include Macroeconomic and Technical Design of Project.

100. Sector strategies and policies risks are rated High. One of the main global lessons learned in thermal renovation of MABs is that robust government support in policy and facilitating financing is critical to the creation and growth of the thermal renovation market. This lesson has been fully embraced by the counterparts of the proposed project. The proposed national program for thermal renovation of MABs is ambitious both in scale and in timing. It also has gained broad support from both the oblast governments and the key line ministries in the past few months. The draft Presidential Decree which would endorse the national program was posted for public comments in September 2018. During a COM review meeting in October, all six oblast and Minsk City and all concerned ministries have agreed on a final set of revisions of the draft Presidential Decree. The revised draft Presidential Decree was submitted to the President's Office for final approval in November. The approval of the Presidential Decree will provide a timely policy support for the proposed project going forward and will ensure its sustainability. If the approval is delayed, which is a potential risk, the proposed project and the thermal renovation pilot can still move forward so as to use the pilot to test the proposed measures and procedures before they are broadly adopted in a national program. The size of the thermal renovation component has been kept relatively small to keep this a pilot, and the project would help test out the key elements of the program – demonstrate efficiency gains, homeowners' ability to pay for retrofits, the financing mechanism etc. Thus, the commitment of the government to implementing the pilot itself would be a strong indication of its commitment to the national program, which would substantially reduce the policy risk.

101. Stakeholders risk is rated High because of the significant risk of slow uptake of the thermal renovation investments. The national households survey conducted during project preparation indicated that less than 30 percent of the households are willing to pay for the comprehensive renovation. The proposed project and the proposed GEF additional financing will support large-scale, intensive outreach efforts to inform and consult with homeowners. This could potentially persuade significantly more households to participate in the thermal renovation investments.

102. Macroeconomic risks are rated substantial. Belarus is vulnerable to macroeconomic risks and these risks will affect the implementation of the project, especially the thermal renovation component. Macroeconomic vulnerabilities relate largely to debt sustainability, balance of payments pressures, and reduced fiscal space in a lower growth context. The quality of social services and infrastructure may be impaired by constraints upon recurrent financing, specifically for consumables and maintenance. Slow economic growth would suppress household income growth and dampen homeowners' interest in long-term investments such thermal renovation. It would also make heat tariff subsidy removal more difficult to implement, further diminish potential demand for thermal renovation.

While the project cannot address macroeconomic risks, it could limit the negative impact of the risks if they materialize by maintaining flexibility. The scope of the thermal renovation component could be adjusted at the mid-term review junction.

103. *The technical design risk of the project is rated substantial* due to the novelty and homeowners' financial responsibility for the partially repayable grant scheme for thermal renovation financing. This would be the first time in Belarus when homeowners have to pay a significant amount of money (as high as BYN5000, or US\$2500 for a 48m<sup>2</sup> apartment) out-of-pocket for thermal renovation, for which most still do not have a clear idea what they would get in return. The national survey on homeowners' willingness to pay for thermal renovation indicates that a great deal of outreach and consultation will be needed to help homeowners understand and become interested in thermal renovation (the key findings are summarized in Annex 4). Resources are being mobilized to help strengthen the implementation readiness, especially in supporting preparation for and early engagement of homeowners through well conducted consultation meetings, both in terms of credible information and delivery method.

104. Potential lapses in quality control and poorer than expected energy-saving and thermal comfort results of the thermal renovation projects also pose a reputational risk for the thermal renovation program and affect the sustainability of the pilot scheme as well. In addition to strengthening the construction supervision and inspection process, these risks could be mitigated by strengthening the ownership of the thermal renovation project by beneficiary homeowners, so they are closely involved in the process and take interest in monitoring and reporting potential issues.

105. Protracted heat tariff reform is a significant risk for the sustainability of the proposed project, especially for the thermal renovation component. The risk could be mitigated by continued constructive engagement with the government in addressing the critical concerns of social impact mitigation. In addition to the current Bank/ESMAP TA in this area, the new EU trust fund activity will further support needed analytics and dialogues. The pace of heat tariff adjustments will need to be accelerated and clearly communicated to the households to change expectations and encourage behavioral change. The risk is partially mitigated by designing the project to target the buildings with worst physical conditions (but structurally sound), thus increasing the other attributes of the thermal renovation, such as improved comfort and asset value.

106. The proposed project has been screened for climate and disaster risks. The main climate risk is the potential long-term impact on forest productivity due to increased frequency and severity of insect invasion. The main disaster risk includes flooding in urban areas which could damage renovated buildings. Buildings using polystyrene foam-based panels for thermal insulation tend to have a higher fire risk than those without. But the risk can be mitigated through fire safety design features and awareness raising, or by using more fire-retardant insulation materials. Belarus is not known for seismic activities. Thermal renovation in general does not interfere with a building's seismic design features.

## VI. RESULTS FRAMEWORK AND MONITORING

### Results Framework COUNTRY: Belarus Sustainable Energy Scale-Up Project

#### Project Development Objectives(s)

The Project Development Objective is to scale up efficient energy use in space heating of multi-apartment buildings and renewable wood biomass fuel utilization in selected urban localities in Belarus.

#### Project Development Objective Indicators

Indicator Name	DLI	Baseline	End Target
<b>Reduced fossil fuel consumption in space heating in selected urban localities</b>			
Projected lifetime fossil fuel savings due to investments financed by the project (Mega Joules (MJ))		0.00	61,000,000,000.00
<b>Reduced greenhouse gas emissions</b>			
Projected lifetime avoided CO2 emissions due to investments financed by the project (Metric ton)		0.00	3,800,000.00
<b>Increased rate of participation in thermal renovation investments</b>			
Rate of households participation in thermal renovation investments (Percentage)		0.00	50.00

#### Intermediate Results Indicators by Components

Indicator Name	DLI	Baseline	End Target
<b>Renewable wood biomass heating</b>			
Generation capacity of renewable wood biomass energy constructed (Megawatt)		0.00	225.00
<b>Thermal renovation of multiapartment buildings</b>			
Total floor area of renovated buildings (Square Meter(m2))		0.00	550,000.00
Number of households participating in thermal renovation projects (Number)		0.00	10,000.00
Percentage of female-headed households which receive capital grant for investment in thermal renovation (Percentage)		0.00	50.00
<b>Technical assistance and implementation support</b>			
Number of homeowners participated in consultations (Number)		0.00	60,000.00
Number of female participants in the consultations (Number)		0.00	40,000.00
Percent of benefiting households who feel heating service or thermal comfort has improved (Percentage)		0.00	70.00
Percent of benefiting households who are satisfied with the process in which they have been consulted with (Percentage)		0.00	70.00

#### Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Projected lifetime fossil fuel savings due to investments financed by the project	Estimated lifetime fossil fuel savings directly resulted from the project investments. The lifetime of biomass heating assets is	Annually	Signed contracts, commission reports, completion	Documentation of investment and key technical parameters based on signed contracts, commission	PMU, PIUs, and DHCs

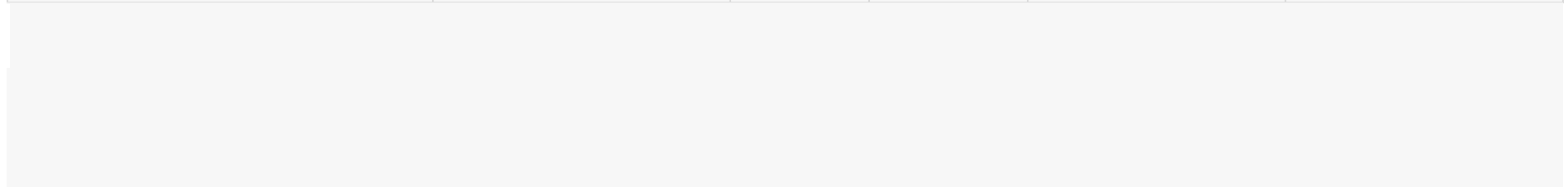
	assumed to be 15 years. The lifetime of thermal renovation assets is assumed to be 25 years.		certificates, operational records, and energy audit/assessment reports.	reports, completion certificates, operation records, and energy audit/assessment reports.	
Projected lifetime avoided CO2 emissions due to investments financed by the project	Estimated lifetime avoided CO2 emissions based on estimated lifetime fossil fuel savings.	Annually	Same as for fossil fuel savings estimate	Same as for fossil fuel savings estimate	PMU, PIUs and DHCs
Rate of households participation in thermal renovation investments	The rate of participation is the ratio between the number of buildings whose homeowners decided to invest in thermal renovation and the number of buildings whose homeowners agreed to conduct detailed energy assessment.	Annually	Based on actual results of homeowners' consultation and project monitoring reports	Documentation of both numbers as indicated in the definition as they become available and aggregate on a quarterly basis.	PMU and PIUs

#### Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Generation capacity of renewable wood biomass energy constructed	Thermal energy capacity of biomass boilers financed by the project	Annually	Signed contracts and commissioning reports	Documentation of commissioned biomass boiler capacity	PMU and DHCs

Total floor area of renovated buildings	Floor areas of MABs with completed thermal renovation	Annually	Signed contracts and renovation completion certificates	Documentation of floor area data based on completion certificates	PMU and PIUs
Number of households participating in thermal renovation projects	Number of households participating in thermal renovation investments	Annually	Project monitoring reports	Documentation of head of household for each participating MAB disaggregated by gender	PMU and PIUs
Percentage of female-headed households which receive capital grant for investment in thermal renovation	Percent of female-headed households in all households which received capital grant for thermal renovation investment. Note that every household which participate in thermal renovation receives capital grant.	Annually	Project implementation monitoring reports.	Documentation of head of household status for all households of participating MABs.	PMU and PIUs with assistance of MCAs.
Number of homeowners participated in consultations	Number of homeowners participated in consultations	Annually	Project monitoring reports	Documentation of participants of consultation meetings and interviews disaggregated by gender	PMU and PIUs
Number of female participants in the consultations	Number of female participants in the consultations	Annually	Project monitoring reports	Documentation of participants of consultation meetings and interviews disaggregated by gender	PMU and PIUs

Percent of benefiting households who feel heating service or thermal comfort has improved	Percent of benefiting households who feel heating service or thermal comfort has improved	At mid-term review (year 3) and project completion (year 5)	Survey reports	Surveys of the beneficiary households with gender disaggregation	PMU and PIUs
Percent of benefiting households who are satisfied with the process in which they have been consulted with	Percent of benefiting households who are satisfied with the process in which they have been consulted with	At mid-term review and project completion	Household survey reports	Surveys of beneficiary households with gender disaggregation	PMU and PIUs



## Annex 1: Implementation Arrangements and Support Plan

### Project institutional and implementation arrangements

1. The project will be implemented by the Energy Efficiency Department (EED) of the State Committee for Standardization (SCS), the existing Project Management Unit (PMU), also known as BellInvestEnergoSberezhenije (BIES), district heating companies (DHCs) in the selected project areas, the Project Implementation Units (PIUs) of two selected oblasts for the thermal renovation pilot, and Municipal Contracting Authorities (MCAs) of participating municipalities of the thermal renovation pilot. In particular, the implementation of the thermal renovation pilot will be supported by the Ministry of Housing and Utilities (MOHU), the Oblast Housing and Utility Departments (OHUD) of the selected oblasts.
2. The EED is the agency responsible for the implementation of the State Energy Saving Program, the National Program on the Development of Local and Renewable Energy Sources, and the State Program on the Construction of Local-Fuel-Fired Energy Sources, as well as the proposed national program for thermal renovation of MABs. The PMU is subordinate to the Energy Efficiency Department. It will be responsible for daily project implementation and for the monitoring of and adherence to World Bank requirements. The PMU has successfully implemented multiple Bank-financed investment projects and has adequate and practical knowledge of Bank procedures. It also has both the technical capacity and the necessary links to ministries and oblasts to prepare and implement the proposed project. The PMU has skilled managerial, technical, procurement, and financial management staff, and these staff would receive further training for the specific needs of the project. To handle the increased responsibility in implementing the thermal renovation pilot, the PMU will hire additional technical staff both based in its Minsk office and in the PIUs of the pilot oblasts. The PIUs of the pilot oblasts will be led by managers appointed by the hosting OHUDs and supported by locally based technical staff hired by the PMU.
3. The PMU will operate in accordance with the Project Operations Manual (POM), which will be finalized prior to effectiveness. The POM will outline the implementation arrangements, including procurement, contract management, payment authorization, environmental and social management, GRM, periodic reporting, and relationships between the implementing and beneficiary agencies.
4. *For the implementation of the Renewable Biomass Heating Component* all the participating DHCs (which are subordinated to the MOHU) will assign their respective project managers responsible for project implementation to work with the PMU. The DHCs would be responsible for providing terms of reference for design documents (or approving design documents when they are available), ensuring appropriate technical supervision of the contracts, accepting payment orders, and submitting adequate documentation to the PMU so that it can prepare and sign disbursement applications. The subprojects will be implemented through a Plant Design, Supply, and Installation contract at each selected site. This contract method has been tested and applied in on-going BDHP, and the PMU is well acquainted with it. The bidding documents would be prepared by the PMU's procurement staff in close collaboration with the technical staff of all participating DHCs. The technical staff of the utilities would be responsible for preparing the technical documents required to develop the bidding documents and for evaluating the technical aspects of the bidding documents. The PMU's Tender Committee would evaluate bids or proposals. The Review Committee, which includes ministry representatives and technical staff of the participating district heating utilities, would clear evaluation reports before sending them to the Bank on a "no objection" basis.
5. Forests are owned by the state and managed by state forestry enterprises subordinate to the Ministry of



Forestry. Biomass fuel would be supplied by state forestry enterprises in close proximity to participating district heating utilities (within a distance of 0–60 kilometers) under long-term fuelwood delivery agreements. The forestry enterprises would supply wood logs, wood chips, or both. If only wood logs are delivered, the district heating companies would produce wood chips themselves. All participating state forestry enterprises have been recognized for sustainable forest governance subject to requirements of international conventions and were certified to be compliant with Program for the Endorsement of Forest Certification (PEFC) standards, Forest Stewardship Council (FSC) standards, or both.

6. *For the implementation of the Thermal Renovation Component* the key parties involved include (i) the PMU, which has the overall fiduciary responsibility for project implementation; (ii) the PIUs of the selected pilot oblasts, which will coordinate the thermal renovation component activities at the oblast level; (iii) the MCAs, which is directly responsible for implementing the thermal renovation projects in its home municipality. (iv) The oblast expertise is the government agency authorized to review and approve the technical aspects of thermal renovation projects. It applies technical due diligence for construction projects on behalf of the government. Other independent government due diligence involved include all necessary inspections and certifications required for commissioning the thermal renovation projects.

7. The implementation of a thermal renovation project under the pilot scheme will involve the following steps: (i) *project initiation* by the MCA through consultation with the homeowners of an eligible MAB. This consultation will be based on a standard information package for homeowners. At this stage the homeowners need to decide whether they want to proceed with a detailed energy assessment or energy audit to determine the scope of thermal renovation, investment cost, and potential repayment obligations of homeowners. A simple majority approval is needed; (ii) *project approval* by homeowners based on recommendations of detailed energy assessment or energy audit. Approval by two thirds of homeowners is required. A binding agreement with the homeowners will be signed regarding mutual obligations, including homeowners' repayment arrangements; (iii) *project preparation* by the MCA. The technical design requires OE approval; (iv) *contractor selection* following World Bank procurement regulation and managed by the PMU, which will result in a tripartite contract involving the PMU, the MCA and the contractor; (v) *construction and commissioning*, including obtaining all necessary certifications; and (vi) *repayment collection*. Homeowners' repayments will be collected by the government's Unified Settlement Center (USC) which is responsible for collecting utility bills and is located in each municipality. The homeowners' repayments will be accumulated in a special account of the oblast government and will be used together with oblast budget allocation for additional thermal renovation projects following the business model of the pilot scheme.

## **Annex 2: Proposed Pilot for Thermal Renovation of Multiapartment Buildings**

1. The proposed partly repayable grant scheme to be piloted under the proposed project (Components 2 and 3) is designed to support the implementation of the proposed national program for thermal renovation of MABs. The proposed national program is expected to be authorized by a Presidential Decree and detailed by a Resolution of the Council of Ministers (COM). Both official documents have been drafted and are under a government review process. The expected approval date of the Presidential Decree, which proceeds the COM Resolution, is in the spring of 2019. The pilot scheme will be consistent with the principles of the proposed national program.

### ***The National Program for Major Capital Repair of Multiapartment Buildings***

2. The National Program for Major Capital Repair of MABs is a closely associated with the proposed National Program for Thermal Renovation of MABs in large part because there is a large overlap of the targeted buildings by both program. It is also expected that if the thermal renovation program becomes successful and popular, the program for major capital repair could be phased out (or absorbed into the thermal renovation program). The basic features of the National Program for Major Capital Repair of MABs are summarized below.

3. The on-going national Comfortable Housing Program (2016-2020), approved by the Council of Ministers, has been supporting “major capital repair” of MABs nationwide since 2016. This capital repair program is fully funded by oblasts’ budget allocations and homeowners’ paid-in capital repair fees. The capital repair program targets primarily MABs which have not undergone any significant repair in the past 30 years (the current major repair cycle) and aims to improve the major repair cycle to 25 years for all MABs by 2020. The program aims to restore selected buildings to their intended technical quality and operational conditions as originally designed, usually cover a range of repairs from electrical to heating and building structural (non-safety related) repairs. It does not cover measures for reducing building heat losses or improve energy efficiency. But in certain situations minimum thermal insulation is included as part of the capital repair, for example, if a building has a freezing wall.

4. The main reason to skip the EE measures, which could have been done more cheaply together with the major capital repairs, is due the lack of funding. For an average capital repair project, the cost is usually below US\$50 per square meter of floor area and 50-70 percent of the cost is paid by oblast budget allocation while the remaining portion paid by the accumulated capital repair fees. There is no out-of-pocket contribution from homeowners. In comparison, deep thermal renovation would cost about US\$100 or more per square meter floor area. Nonetheless, the on-going capital repair program is large in scale and renovates more than 2 million m<sup>2</sup> of MABs per year. It is thus considered a large missed opportunity for simultaneously implementing EE measures, which could bring significant financial savings.

### ***Proposed Pilot Scheme to be Implemented under Component 2***

5. The above described provisions from the draft COM Resolution have being reviewed and commented by the Bank team. In general, the proposed procedures in the current draft COM Resolution have reflected the good practices in countries where successful thermal renovation programs with partial government capital grant support have been implemented.

6. Objective of the Pilot. The pilot is designed to support the implementation of the proposed national program for thermal renovation of MABs by

- a) Demonstrating the viability of the partially repayable grant financing scheme;

- b) Establishing standardized and systematic procedures for efficient delivery of quality thermal renovation projects;
- c) Supporting broad-based outreach to and consultation with homeowners and the development of homeowners' associations; and
- d) Supporting capacity building for the scaling up and the long-term sustainability of thermal renovation, including key supply chain participants and commercial banks.

7. Scope of the Pilot. The pilot will include an investment component and a technical assistance component. The investment component is supported by Component 2 of the proposed project with proposed IBRD financing of US\$30 million and EIB financing of US\$30 million. Based on preliminary cost estimate, the combined IBRD and EIB financing would cover the full cost of comprehensive/deep thermal renovation of up to 550,000 m<sup>2</sup> total floor area of buildings, or about 275 MABs, assuming 2000m<sup>2</sup> per MAB.

8. Pilot Eligibility Criteria and Procedures. The pilot eligibility criteria and procedures will in general be consistent with the COM Resolution. But specific requirements for Bank financed project will take precedence in cases where potential conflicts may occur. The following aspects will be covered in detail in the POM.

- ✓ Eligible energy efficiency measures and eligible costs
- ✓ Review and approval of applications
- ✓ Technical (structural) audit and energy audit/survey
- ✓ Detailed designs
- ✓ Procurement of renovation works and construction supervision
- ✓ Monitoring during construction
- ✓ Commission certificate/Acceptance of works
- ✓ Commissioning protocol
- ✓ Ex-post energy performance certificate

9. The proposed Belarus national thermal renovation program has taken the Lithuania thermal renovation program as a good practice example (see text box below).

## Multi-Apartment Thermo-Modernization Model in Lithuania

Lithuania launched its “Multi-apartment Buildings Renovation Program” in 2009 with the support of the JESSICA Holding Fund. Its financing model involves a government subsidy of up to 30 percent (provided after a building’s thermo-modernization has been completed and the building has attained energy performance class “C”) and financial instruments (i.e., soft loans) with a fixed 3 percent interest rate for the first five years from a Fund of Funds financial instrument. The loans are offered not only to the apartment owners, but also to municipal program administrators who act on behalf of and for the benefit of the apartment owners.

This program implements Lithuania’s housing strategy, whose objective is to ensure effective use, maintenance, and modernization of housing and rational consumption of energy. The program’s achievements from January 2013 until May 2018 were as follows:

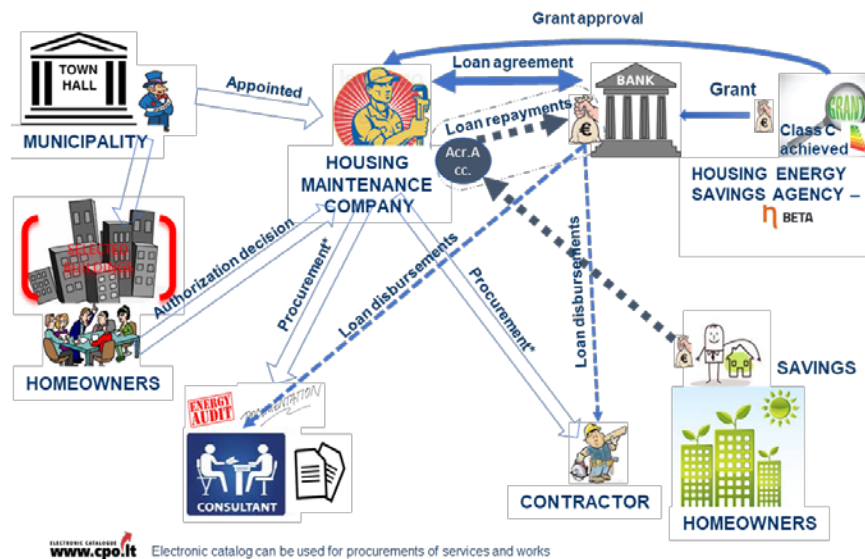
- 3,214 buildings applications submitted to the Housing Energy Saving Agency (HESA);
- 510 buildings in which thermo-modernization works are ongoing; and
- 1,947 buildings that have already implemented thermo-modernization works.

The total budget amounts more than €900 million. The sources of funding loans are:

- EU Structural Funds from the European Regional Development Fund (ERDF), one of the EU Structural Funds under the Cohesion policy allocated to fund local infrastructure projects;
- State budget resources;
- Government securities—that is, green bonds issued by the stated and invested in the Fund of Funds;
- Loans from IFIs; and
- Contributions from commercial banks and other investors.

As shown in the Figure, the project administrator (a company appointed by the municipality) has a role as implementing intermediary acting on behalf and for the benefit of the apartment owners.

Figure: Implementation Scheme for Lithuania Program



Source: Bulgaria National Program for Energy Efficiency in Residential Buildings, Program Design Report for the Second Phase, World Bank, 2018

### Annex 3. Summary of the Results of the National Survey on Willingness to Pay for Thermal Renovation of Multiapartment Buildings

- The willingness to pay (WTP) for thermal renovations in multi-apartment buildings, was assessed through a national survey conducted from June to August 2018, with face-to-face interviews in urban localities with population over 10,000 people in all six oblasts and capital cities, with the exception of the city of Minsk. The sample was taken from residential buildings on the waiting list of the Capital Renovation program. A total of 1,965 effective interviews were made, yielding a sampling error of  $\pm 2.2\%$ .
- Respondents expressed their willingness to pay for Packages A and B, considering different payment periods, heating tariffs, and with or without a 30% subsidy. Interviewees were told that Package A has a cost of 518.4 BYN with an estimated benefit of a 15% reduction in the heating bill, while Package B costs 4,800 BYN and has an estimated 40% reduction in the heating bill.
- The table below summarizes the results. Detailed results by region, income group, and type of respondent -including vulnerable groups.

Table X: Willingness to pay for thermal renovations of multi-apartment buildings

	Heating tariff (BYN/Gcal)			Payment period (months)					30% subsidy
	16.90 (current)	40.70	81.40	36	60	120	180	240	
<b>Package A</b>									
WTP (%)	36	38	41	46	43				52
WTP (BYN)				7.9	5.9				
<b>Package B</b>									
WTP (%)	16	17	18			22	21	23	27
WTP (BYN)						11.7	9.6	8.3	

- Results show that, at current heating tariff levels, the percentage of respondents willing to pay for thermal renovations is highest for Package A at 46% in 36 monthly installments. The amount they are willing to pay is approximately 56% of the monthly installment (7.9 BYN of a total of 14 BYN for the 36 months option). Providing a 30% subsidy raises the willingness to pay to 52%. Willingness to pay for Package B is less than that for Package A, being relatively stable at 21-23% for 120, 180 and 240-monthly installments. The amount that respondents are willing to pay varies from 29% to 41.5% of the total monthly installment (11.7 BYN out of 40 BYN for 120 months, to 8.3 BYN out of 20 BYN for 240 months). Providing a 30% subsidy raises the willingness to pay slightly, to 27%.
- In terms of type of respondent, willingness to pay for both packages is highest for younger, higher income, families with children. Both the surveys and the site visits done by the team, show that willingness to pay is low among pensioners (20% and 9% for Packages A and B, respectively). The survey found that for 56% to 92% of retired and elderly people of low and middle income, monthly payments (utility bills, mortgage, and installment for the thermal renovation), represent over 20% of their total income, which is the cap determined by the GoB to be eligible for subsidies. Given that pensioners account for 33% of the respondents and head of households, and that a majority of two-thirds will be required to decide on the renovation of the building, it is important to address the needs and concerns of this group when implementing the program. In terms of gender, 73% of the respondents were female, and no statistically significant differences were detected between females

and males.

6. Most of the respondents are comfortable with temperature levels inside their apartments and in common areas of their buildings during the heating season, and are satisfied with the service. 63% of respondents feel that their apartments are not cold and 66% felt that they are not hot. Comfort levels are higher among dwellers of buildings older than 30 years. It is interesting to note that 84% of the respondents said that they had replaced windows. Other repairs include putting glass frames in balconies, sealing windows and doors, replacing radiators, and insulating interior and exterior walls. The average investment in these energy efficiency measures is 1,847 BYN, which falls in between the investment of Packages A and B.

7. The main reasons to invest in Package A are: (a) control the amount of heating used (65%), (b) improve comfort in the apartment (60%), (c) reduce heating bill (50%), (d) fair billing for everyone (49%), and (e) the value of the apartment will increase (14%). For Package B, the reasons are similar, including: (a) improve comfort in the apartment (74%), (b) reduce heating bill (61%), (c) apartment and building will look nicer, like new (55%), (d) the value of the apartment will increase (34%), and (e) they will not repay the full cost due to inflation and currency devaluation (21%).

8. On the other hand, the main reasons for not investing in both packages is that they are too expensive (41% and 61% for Packages A and B, respectively), cannot afford to pay back (29% and 21%), and that they do not want any long term financial obligations (26% and 29%). Nearly 20% of respondents say that the savings are too low for the level of investment, while others do not believe that the measures will result in savings. Though 64% of respondents expressed that it is fair that the heating bill is based on floor area, 76% said that they would prefer that the bill be based on the energy used in their apartment.

#### Annex 4: Incremental Cost Reasoning by Component

Component	Baseline project/ BAU scenario	GEF intervention/ GEF scenario	Global environmental benefits	Incremental cost
1. Renewable Wood Biomass Heating		GEF resources will not be used for this component.		
2. Thermal Renovation of Multi- apartment Buildings	Thermal renovation of MABs will proceed, but as apartment-level consumption-based billing is not a mandatory government regulation and is considered expensive by homeowners, demonstration is unlikely to occur without additional financial support, and the development of a national policy for implementing apartment-level consumption-based billing would be delayed	Demonstration of apartment-level consumption-based heat billing at scale, which is crucial to build confidence among homeowners and policy-makers for future government scale-up efforts leading to policy decisions to introduce mandatory requirements for apartment-level consumption-based heat billing.	Additional energy savings and direct avoided GHG emissions through increased efficiency and reduced energy consumption	\$1 million
3. Technical Assistance and Implemen- tation Support	Government efforts to develop thermal renovation market will be significantly limited due to lack of resources. The government will continue to pursue the existing capital repairs program which does not address energy efficiency issues, does not require homeowners to make out-of-pocket payments, and does not involve homeowners in the	<p>Transparency, efficiency and quality of delivering thermal renovation projects improved</p> <p>Broad awareness of the costs and benefits of thermal renovation among homeowners achieved</p> <p>Business model for sustainable financing of thermal renovation of MABs (including homeowner contributions) successfully</p>	Additional energy savings and direct avoided GHG emissions through increased efficiency and reduced energy consumption	\$2.506 million

	<p>decision-making process.</p> <p>Wood biomass fuel will continue to have large price and quality variability.</p>	<p>demonstrated</p> <p>Improved transparency and efficiency of wood biomass fuel market</p>		
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