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Songdo, Incheon, Republic of Korea
Provisional agenda item 15

GCF/B.19/22/Add.19

6 February 2018

Consideration of funding proposals – Addendum XIX

Funding proposal package for FP077

Summary

This addendum contains the following three parts:

a) A funding proposal summary titled "Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal Project (AHURP)";
b) No-objection letters issued by the national designated authority(ies) or focal point(s); and
c) Environmental and social report(s) disclosure;

GREEN CLIMATE FUND

Funding Proposal

Version 1.1

The Green Climate Fund (GCF) is seeking high-quality funding proposals.

Accredited entities are expected to develop their funding proposals, in close consultation with the relevant national designated authority, with due consideration of the GCF's Investment Framework and Results Management Framework. The funding proposals should demonstrate how the proposed projects or programmes will perform against the investment criteria and achieve part or all of the strategic impact results.

Project/Programme Title:	Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal Project (AHURP)
Country/Region:	Mongolia
Accredited Entity:	Asian Development Bank
Date of Submission:	_____

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Section F	**APPRAISAL SUMMARY**
Section G	**RISK ASSESSMENT AND MANAGEMENT**
Section H	**RESULTS MONITORING AND REPORTING**
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Note to accredited entities on the use of the funding proposal template

- Sections **A, B, D, E** and **H** of the funding proposal require detailed inputs from the accredited entity. For all other sections, including the Appraisal Summary in section F, accredited entities have discretion in how they wish to present the information. Accredited entities can either directly incorporate information into this proposal, or provide summary information in the proposal with cross-reference to other project documents such as project appraisal document.
- The total number of pages for the funding proposal (excluding annexes) is expected not to exceed 50.

Please submit the completed form to:

fundingproposal@gcfund.org

Please use the following name convention for the file name:
"[FP]-[Agency Short Name]-[Date]-[Serial Number]"

A.1. Brief Project / Programme Information			
A.1.1. Project / programme title		Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal Project (AHURP)	
A.1.2. Project or programme		Project	
A.1.3. Country (ies) / region		Mongolia	
A.1.4. National designated authority (ies)		Ministry of Environment and Tourism	
A.1.5. Accredited entity		Asian Development Bank	
A.1.5.a. Access modality		☐ Direct ☒ International	
A.1.6. Executing entity / beneficiary		Executing Entity: Municipal Government of Ulaanbaatar Implementing Entity: Municipal Government of Ulaanbaatar Beneficiaries: The Municipality of Ulaanbaatar and its population. The direct beneficiaries are expected to reach 100,000 people that will directly benefit from living in low carbon and climate resilient affordable housing units, living and working in improved and better adapted urban environment, and more resilient and healthiest urban areas. The indirect beneficiaries are estimated to reach 900,000 people in Ulaanbaatar. They will benefit in the short term through replication investments triggered by the supportive enabling framework created by the project and improved access to services, urban climate resilience, and decrease in air pollution. The co-beneficiaries from the greenhouse gas mitigation, improved climate resilience of the city, and reduced air pollution, are the residents of Ulaanbaatar, that is 1.4 million people (forecasted to reach 2.7 million by 2050) or 45% of the population of Mongolia.	
A.1.7. Project size category (Total investment, million USD)		☐ Micro (≤10) ☐ Medium (50<x≤250)	☐ Small (10<x≤50) ☑ Large (>250)
A.1.8. Mitigation / adaptation focus		☐ Mitigation ☐ Adaptation ☒ Cross-cutting	
A.1.9. Date of submission		16 October 2016	
A.1.10. Project contact details	Contact person, position	Arnaud Heckmann, Senior Urban Development Specialist East-Asia Urban and Social Sectors Division Mongolia Resident Mission	
	Organization	Asian Development Bank	
	Email address	aheckmann@adb.org	
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	Mailing address	Asian Development Bank Mongolia Resident Mission ICC Tower, 17th and 18th floor Jamyan Gun Street-9 Ulaanbaatar Mongolia	

A.1.11. Results areas *(mark all that apply)*	
Reduced emissions from:	
☐	Energy access and power generation (E.g. on-grid, micro-grid or off-grid solar, wind, geothermal, etc.)
☒	Low emission transport (E.g. high-speed rail, rapid bus system, etc.)
☒	Buildings, cities and industries and appliances (E.g. new and retrofitted energy-efficient buildings, energy-efficient equipment for companies and supply chain management, etc.)
☐	Forestry and land use (E.g. forest conservation and management, agroforestry, agricultural irrigation, water treatment and management, etc.)
Increased resilience of:	
☒	Most vulnerable people and communities (E.g. mitigation of operational risk associated with climate change – diversification of supply sources and supply chain management, relocation of manufacturing facilities and warehouses, etc.)
☐	Health and well-being, and food and water security (E.g. climate-resilient crops, efficient irrigation systems, etc.)
☒	Infrastructure and built environment (E.g. sea walls, resilient road networks, etc.)
☐	Ecosystem and ecosystem services (E.g. ecosystem conservation and management, ecotourism, etc.)

A.2. Project / Programme Executive Summary (max 300 words)

Ulaanbaatar, the capital city of Mongolia, has been experiencing exponential rates of population growth in recent decades since its transition from communism in the early 1990s. Most of the rapid growth has occurred in the ger areas of UB causing unplanned, low density areas in the city which are poorly connected to urban infrastructure (drinking water, waste management, wastewater treatment, heating) and vulnerable to climate change. Dwellings are mostly in the form of traditional Mongolian tents (gers) and wooden houses, with poor insulation and inefficient heating through coal and biomass fired stoves. *Ger* areas represent about 60% of the population of the capital city, estimated to be about 800,000 people, and 27% of the country's population.

As developed in more detail in Section C of this proposal, the *ger* areas are, to a significant extent, the result of rural-urban migration caused by climate change. Climate change in Mongolia periodically leads to sizable losses of livestock, the result of droughts and severe winter conditions called dzuds, and general loss of livestock productivity resulting from reduced grasslands biomass production caused by increased temperatures and reduced precipitation. These climate change impacts are projected to continue and accelerate in the near future. The rural-urban migrants who settle into the *ger* areas are less skilled, and have low income levels and limited employment opportunities.

The *ger* areas of Ulaanbaatar are highly vulnerable to climate change and hotspots of greenhouse emissions and air pollution. The Ulaanbaatar Green Affordable Housing[1] and Resilient Urban Renewal Project (AHURP) addresses this by providing the population in selected *ger* areas a low-carbon and climate resilient alternative—affordable housing in apartments that are connected to the main urban infrastructure service networks. The project will launch a large-scale demonstration initiative; providing comprehensive, integrated, and affordable solution for vulnerable communities and

[1] Green housing maximizes climate adaptation and climate mitigation (especially on energy efficiency and renewable energy) through resource efficiency and building materials during design and construction as well as operation and maintenance to insure building performance and occupant health. Green housing here also considers surrounding areas, community participation, public monitoring, land use, efficient use of all types of natural environment – trees, water, soil, and air- and sustainable development as key parameters. Affordable housing is housing whose cost (in rent or mortgage payments) does not exceed 30% of the gross monthly income of a low-income household.

leveraging private sector investments. The aim is to deliver 10,000 green housing units that are energy efficient, affordable, and designed to maximize the use of renewable energy. 100 hectares of *ger* areas will be redeveloped into eco-districts that are both low-carbon and climate resilient as part of the project.

The project will drive the improvement of the regulatory and enforcement framework for climate responsive urban planning, green building, and affordable housing. It will lead transformational impacts on policies, institutions, and sector capacity for energy efficient construction material and techniques, effective community participation, renewable energy systems, efficient supply chains for renewable energy systems and energy efficiency, and comprehensive urban planning that combine climate resilience, social cohesion, and economic opportunities. AHURP will serve as an important demonstration initiative that can be replicated both within Ulaanbaatar and in other Mongolian cities. It will also help to develop the sectoral and institutional capacities to address climate change vulnerabilities and provide low carbon housing. AHURP will do this so in synergy with other ADB-funded and otherwise funded projects. See Section B for Financing/Cost Information.

The following table summarizes the AHURP climate change interventions.

Objective	• The objectives of the project are to (i) improve the climate resilience of Ulaanbaatar city and the adaptability of Mongolia to climate change; and (ii) reduce greenhouse gas emission and pollution, and improve the livability in Ulaanbaatar city, by transforming the highly climate-vulnerable and high polluting peri-urban areas of Ulaanbaatar (ger areas) into eco-districts characterized as low-carbon, climate resilient, and affordable.
Primary measurable benefits	*Mitigation* • Direct economic lifetime GHG emission reductions of 7.92 million tCO2e • Indirect economic lifetime GHG emission reductions of 39.59 million tCO2e (including direct emission reductions) *Adaptation* • 35,000 primary direct beneficiaries from reduced climate change vulnerability • 100,000 total direct beneficiaries from reduced climate change vulnerability • 350,000 primary direct and indirect beneficiaries from reduced climate change vulnerability • 1,000,000 total direct and indirect beneficiaries from reduced climate change vulnerability *Co-benefits* • 1.4 million people in Ulaanbaatar benefitting from reduced air pollution, further estimated to grow to 2.7 million people by 2050 *Transformational impact* • Policies and regulations conducive to decentralized renewable energy in effect • Policies and regulation promoting energy efficiency in buildings in effect • Efficient supply chains for renewable energy systems and energy efficient construction technics and materials in effect • Green banking policies and sector capacity developed • Climate responsive urban planning and implementation capacity developed
Alignment with GOM strategy	• Mongolia's (Intended) Nationally Determined Contribution • Mongolia's National Action Programme on Climate Change • Mongolia's Second National Communication • Affordable Housing Strategy (AHS) for Ulaanbaatar • Ulaanbaatar City Master Plan

A.3. Project/Programme Milestone

Expected approval from accredited entity's Board (if applicable)	20/06/2018
Expected financial close (if applicable)	30/06/2027
Estimated implementation start and end date	Start: 02/07/2018 End: 31/12/2026
Project/programme lifespan	08 years 6 months (Construction period) 40 years 00 months (Expected minimum lifetime of investments) 48 years 10 months (Total)

B.1. Description of Financial Elements of the Project / Programme

AHURP is a sector project that was envisioned to support the development and construction of climate-resilient and low carbon eco-districts in polluting and substandard ger areas. The estimated total cost of the project is US$ 544 million. The scale of the proposed investment reflects the magnitude of the need. The project provides the city with an opportunity to reduce massively its greenhouse gas emissions, climate vulnerability, and pollution.

The AHURP's sector loan modality will foster the development of appropriate policies and regulations and catalyze replicable systems and mechanisms in UB and other Mongolian cities to build green, low carbon and climate resilient urban areas. It will have a strong impact on the construction sector in Mongolia, enabling it to provide improved and more climate-appropriate solutions.

Sector Loan Modality

Sector lending is a form of ADB assistance for project-related investments based on considerations relating to a sector or subsector. The purpose of a sector loan is to assist in the development of a specific sector or subsector by financing a part of the investment in the sector. Sector lending is expected to achieve a greater impact on a sector than stand-alone project lending by enabling an integrated focus on sector policies, sector development perspectives, and sector development plans, and on the adequacy of institutions to formulate and manage such plans for the sector as a whole. Sector lending assists to achieve economic and social progress in a sector or subsector through project-related investments in a geographic area (area slice), over a period of time (time slice), or both, based on considerations relating to the sector as a whole. The policy matrix is a key document for the sector loan. It, among others, foresees the gradual creation of the enabling conditions of private sector investments in resilience and low carbon ger area development in Mongolia. A sector lending modality is appraised based on core subprojects that demonstrate the overall feasibility of the project, establish policy and capacity frameworks, and define eligibility and selection criteria for similar subprojects to be appraised and financed during the loan implementation.

AHURP will leverage ADB and GCF finance to attract additional investments from commercial banks, as well as equity investments from real estate developers. It envisages grant and debt financing from GCF and ADB of up to US$225 million. The aggregate value of the GCF grants and loans would be up to US$145 million, which would finance about 26.7% of AHURP's total estimated cost. ADB will provide a blended loan of US$80 million. US$20 million will come from ADB's concessional ordinary capital resources (COL) and US$60 million from ADB's ordinary capital resources (OCR). ADB financing will constitute 14.7% of the project cost. The developers' contribution will be 19.1% representing an investment of USD103.7 million. The rest of the financing will come from the Municipality of Ulaanbaatar (MUB), the participating commercial banks' equities, and the down payments as well as cash payments from beneficiaries who would become new homeowners under the project.

Table B.1.1 Tentative Financing Plan

Source	Amount [a] ($ million)	Share of Total (%)
Asian Development Bank		
Concessional ordinary capital resources (loan)	20.0	3.7
Ordinary capital resources (loan)	60.0	11.0
Subtotal	**80.0**	**14.7**
Cofinanciers		
GCF (grant)	50.0	9.2
GCF (concessional loan)	95.0	17.5
Subtotal	**145.0**	**26.7**
HLT Fund (grant)	**5.0**	**0.9**
DBM/Commercial Banks	**111.4**	**20.4**
Developers	**103.7**	**19.1**
Beneficiaries	**63.9**	**11.8**
Municipality of Ulaanbaatar	**35.0**	**6.4**
Total	**544.0**	**100.0**

Totals may not add due to rounding off.

Source: ADB staff estimates.

For an integrated financial model including sensitivity analysis, see section I, annexes. This model has been used to demonstrate the financial sustainability of AHURP with the GCF financing in place, the level of concessionality required, and the need for GCF concessionality. Given the sector modality of AHURP, the financial analysis focused on two core subprojects prepared with technical assistance from ADB, see Section F.1 Economic and Financial Analysis. Two sets of documents are available: one is a set of spreadsheets representing the financial analysis model itself, and the second provides the main narrative and rationale for the economic and financial model, contained in Appendix 4, *Economic and Financial Analysis*.

Table B.1.2 Breakdown of Cost Estimates and GCF financing in million USD ($)[2]

Outputs	Activities	Amount (for entire project) *	GCF grant	GCF Loan
1. Climate resilient and low carbon urban infrastructure, public facilities, and social housing units built in *ger* areas				
1.1 Climate resilient and low carbon infrastructure and facilities	a. Climate Resilient Infrastructure /a	2.6	0.0	0.0
	b. Basic Infrastructure and Open Spaces /b	18.5	0.0	0.0
	c. Public Amenities /c	15.5	0.0	0.0
	d. Ecodistrict Climate Change Features			
	Low Carbon Infrastructure (Street Lighting)	1.4	1.3	0.0
	Mitigation Investments (Additional insulation)	3.8	3.5	0.0
	Mitigation Investments (Solar Panels)	30.2	6.3	18.4
	Mitigation Investments (SMART monitoring system)	5.0	0.0	0.0
	Adaptation Investments (Greenhouses in Social Housing)	0.3	0.2	0.0
	Subtotal (d)	*40.7*	*11.3*	*18.4*
	Subtotal (1.1)	***77.3***	***11.3***	***18.4***
1.2 Climate resilient and low carbon social housing	a. Green and Resilient Social Housing	34.3	0.0	0.0
Subtotal (1)		***111.7***	***11.3***	***18.4***
2. Climate resilient and low carbon affordable and market housing units and economic facilities built in *ger* areas				
2.1 Climate resilient and low carbon infrastructure and facilities	a. Open Space and Utilities /d	5.5	0.0	0.0
	b. Facilities /e	42.3	0.0	0.0
	c. Ecodistrict Climate Change Features			
	Mitigation Investments (Additional Insulation)	23.1	21.0	0.0
	Adaptation Investments (Greenhouse in Low-rise Buildings)	3.3	3.0	0.0
	Adaptation Investments (Greenhouse in Town Houses)	7.0	6.3	0.0
	Subtotal (c)	33.3	30.3	0.0
	Subtotal (2.1)	***81.2***	***30.3***	***0.0***
2.2 Climate resilient and low carbon affordable and market housing	a. Green and Resilient Affordable and Market Housing	295.8	0.0	75.7
Subtotal (2)		***377.0***	***30.3***	***75.7***
3. Policy Environment and Sector Capacity strengthened				
3.1 Policy Environment and Sector Capacity Strengthened	a. Project Management and Implementation			
	Project Management and Implementation Support	3.7	0.0	0.0
	Project Incremental Administration	4.0	0.0	0.0
	Subtotal (a)	7.7	0.0	0.0
	b. Ecodistrict Feasibility, Development and Policy Reforms			
	Climate Resilient Infrastructure Feasibility Design	0.9	0.8	0.0
	Low Carbon Infrastructure Feasibility Design	0.4	0.4	0.0
	Building Performance, Service Providers Ecoefficiency, and Renewable Energy	1.1	1.0	0.0
	Green Affordable Housing Policies	1.0	0.9	0.0
	Community Participation	1.0	0.0	0.0
	Green Economy and Business Opportunities Development	1.0	0.9	0.0
	Subtotal (b)	5.4	4.0	0.0
	c. Detailed Design and Supervision			
	Climate Change Mitigation/Adaptation Design and Supervision	2.8	2.6	0.0

	Green and Resilient Infrastructure Design and Supervision	16.1	0.0	0.0
	Operation and Maintenance	14.8	0.0	0.0
	Subtotal (c)	*33.7*	*2.6*	*0.0*
	d. Sustainable Green Finance			
	Green FInance for Low-Carbon and Climate Resilient Housing	1.0	0.9	0.0
	Green Finance Policy Reforms	1.0	0.9	0.0
	Subtotal (d)	2.0	1.8	0.0
Subtotal (3)		***48.8***	***8.4***	***0.0***
Total PROJECT COSTS		**537.5**	**50.0**	**94.1**
Interest During Implementation		6.3	0.0	0.7
Commitment Charges		0.2	0.0	0.2
Total Disbursement / Financing Required		**544.0**	**50.0**	**95.0**

* Note: Numbers may not add due to rounding off.
\a Water supply system, heating and wastewater treatment.
\b Roads, electricity, pedestrian/cycling paths, public parking, park, and townhouse gardens.
\c Kindergarten facilities and business incubators.
\d Pedestrian/cycling paths and townhouse gardens.
\e Covered parking and commercial facilities/workshops.

Table B.1.3 Summary GCF Financing (million USD)

GCF funding item	Grants		Loans	Total
Mitigation - GCF grant financing	35.1			35.1
Of which capacity building		*3.9*		
Mitigation - GCF concessional loan financing			18.6	18.6
Total GCF Mitigation financing	35.1		18.6	53.7
Adaptation - GCF grant financing	14.9			14.9
Of which capacity building		*3.3*		
Adaptation - GCF concessional loan financing			76.4	76.4
Total GCF Adaptation financing	14.9		76.4	91.3
Total GCF grant financing	50			50
Total GCF concessional loan financing			95	95
Total GCF funding	***50***		***95***	***145***

Table B.1.4 Summary of climate change funding (Millions USD)

Climate change finance item	Mitigation	Adaptation	Total
Mitigation investment	89.1		
Adaptation investment		334.6	
Total investment			423.7
Mitigation capacity building	11.9		
Adaptation capacity building		11.3	
Total capacity building			23.2
Total investment + capacity building			***446.9***
Total mitigation	101		101
Total adaptation		345.9	345.9
Total climate change			***446.9***

[2] Please note that the table rows are not meant to provide a complete breakdown of the totals, only the GCF financing for each item. Given the number of co-financiers, a full breakdown is hard to provide in the GCF proposal format. Please refer to a sheet provided separately for details.

The main investments initiative through which AHURP will address climate change are as follows:

1. **Mitigation investments in buildings**: This comprises energy efficiency and renewable energy, such as enhanced insulation of newly built housing and solar PV panels. These investments will produce significant greenhouse gas emission reductions that would be accompanied by substantial environmental benefits.
2. **Climate resilient housing investments**: This includes (i) investments in the construction of new housing connected to climate resilient infrastructure such as water supply, wastewater treatment, waste management; and (ii) investments in greenhouses for food production,[3] flood protection for houses, and protection against increased seismic risks.[4]
3. **Investments in low carbon and climate resilient infrastructure and open spaces / amenities**. This includes investments in roads that are less susceptible to flooding, investments in greenery (gardens and parks), climate-proofed investments in wastewater treatment and sanitation, water supply, waste management, efficient heating supply, and efficient street lighting.

The base cost estimates incorporating taxes and duties, physical and price contingencies, and financial charges during implementation have been calculated in accordance with ADB guidelines on project cost estimation (see https://www.adb.org/documents/project-cost-estimates). Detailed cost estimates and detailed financing plan are presented in the attachments that will be appendix of the FP. Moreover, in accordance with the sector financing modality of the project, base cost estimates from the feasibility studies prepared for two core subprojects were used as the basis for scaling up the cost estimates to 20 subprojects covering the targeted 100 ha. Some differences can be noted between the documents as they have been produced at different timing.

The total investment cost is $544 million. Of this, 3.7%, or $20 million equivalent, will be a concessional ordinary capital resources (OCR) loan, and 11.0%, or $60 million, will be an OCR loan. The Government has also requested the Green Climate Fund (GCF) to finance $145 million, or 26.7%, of the total investment requirement. Of this, it is proposed that 9.2%, or $50 million equivalent, will be financed from GCF grant resources, and 17.5%, or $95 million, will be financed by a highly concessional GCF loan.

Three key outputs are envisioned from the project: (i) Output 1, Climate resilient and low carbon urban infrastructure, public facilities, and social housing units built in ger areas; (ii) Output 2, Climate resilient and low carbon affordable and market housing units and economic facilities built in ger areas; and (iii) Output 3, policy environment and sector capacity strengthened. The proposed GCF grant of $50 million will finance the eco-district climate change features of both Output 1 ($11.3 million) and Output 2 (30.3 million). It will also finance the eco-district feasibility, development and policy reforms activities planned under Output 3 ($4.0 million), climate change mitigation/adaptation design and supervision ($2.6 million), and green finance capacity building and institutional strengthening ($1.8 million).

The GCF grant financing is justified for these sub-outputs and activities because of the significant positive externalities and co-benefits they will generate (see economic analysis which details the resource cost savings and health co-benefits these features/activities of the project will generate). The proposed highly concessional GCF loan will finance the mitigation investments of MUB in solar panels in Output 1 ($18.4 million), the private sector investments in green affordable and market rate housing ($75.7 million) and the loan's interest and commitment charges ($0.9 million, calculated following ADB's project cost estimates guidelines). The highly concessional GCF loan is warranted for these features/activities of the project because of the need for cheaper, more affordable financing amid the prevailing capital constraints and investment scarcity in Mongolia. The highly concessional financing from GCF will ultimately be passed on to the poorer, lower income households in the ger areas of Ulaanbaatar to address their current inability to access affordable green housing and green mortgage financing.

Main barriers to climate change investment

1. Barriers related to climate change mitigation investment in buildings: The barriers towards mitigation investments buildings are elaborated in Section C.2 but, in short, center on: (i) The lack of incentives resulting from the absence of net metering for solar PV (or more generally decentralized renewable energy) and heat metering in the case of building

[3] As suggested in the 5th assessment report prepared by IPCC.

[4] Seismic activity has been rising in Mongolia, and there exists an argument, open to contention, that climate change may increase seismic risks. See B. McGuire. 2013. *Waking The Giant: How a Changing Climate Triggers Earthquakes, Tsunamis and Volcanoes.* Oxford University Press.

energy efficiency through insulation. These barriers drive a significant wedge between the private and societal returns on mitigation investments in buildings, preventing commercial investments in climate change mitigation in buildings. (2) The lack of access to finance—even when the wedge between the private and social benefits from energy efficiency and renewable energy efficiency is eliminated, the investments required to access long-term financing are scarce and expensive in Mongolia, and often requires prohibitive collateral requirements. (3) There are limited technical skills to provide quality goods, works and services in Mongolia to implement energy efficiency and renewable energy investments, providing additional barriers towards mitigation investments, due to lack of sound materials, inputs, equipment, and construction skills.

2. Barriers related to climate resilient housing investments

This set of barriers is discussed in more detail in section C.2. In summary, the main barriers are: (i) limited access to long term and low cost financing for the developer, (ii) constrained access to long term and low cost financing for the buyer (e.g. in the form of long-term affordable mortgages), and (iii) inadequate supply of affordable, climate resilient housing. The investment gap stems from weaknesses in the financial sector where the cost of capital remains high (typically 19-24% for a MNT denominated loan), loan terms tend to be short, and collateral requirements onerous; and the particular circumstances of ger area residents, often low-skilled and low-income migrants from rural areas who left for Ulaanbaatar because of climate change related push factors (see Section C.1 and Section E.4).Access to cheaper and long-term financing will reduce the cost of constructing climate resilient housing units, a central feature of the AHURP intervention. This will enable the developers to increase the amount of equity in their investments and include climate resilience features that will increase housing values which is normally too expensive to do. Similarly, affordable financing is also essential in bringing down the costs to the buyer of the apartment, particularly when adding climate resilient features to conventional housing design given that their value tends to be realized only over a longer period of time. There is also the affordability barrier which limits the ability of the targeted population to access affordable, climate resilient apartments through formal channels such the end-buyer financing offered by banks. The inadequate supply of affordable apartments also limits the ability of the city's residents, particularly the *ge*r residents, to invest in climate resilient housing.

3. Barriers towards investments in low carbon and climate resilient infrastructure and open spaces / amenities

The barriers towards investments in low carbon and climate resilient infrastructure are qualitatively the same as discussed above. Quantitatively, the public nature of the infrastructure reinforces the gap between the private and social returns on investments in low carbon and climate resilient infrastructure, thereby causing the shortage.

4. Other barriers

There are other contributing factors that hinder investments including lack of knowledge on innovative and appropriate technologies and their performance, lack of awareness, etc. These barriers are addressed through capacity building, as described in Section C.2.

Concessional loans are critical to overcome key constraints

Concessional loans are used in two different ways to overcome the key affordability constraints:

- to provide a cheap source of funding for developers loans, lowering the cost of the new low carbon and climate resilient housing units;
- to provide a cheap source of funding for mortgages, allowing a lower interest rate as an effective way of lowering the monthly costs of a new low carbon and climate resilient housing units.

In addition, the project provides a mechanism to credit land and dwellings ownership against the cost of new low carbon and climate resilient housing units. All these mechanisms, taken together, make it possible to overcome the affordability constraint that otherwise might prevent the new low carbon and climate resilient housing units from being realized.

The following financing strategies will be employed to address the above barriers, and to leverage public and private finance towards the objectives of AHURP.

1. **Blended grant / debt / equity financing for energy efficiency and renewable energy investments**. Grants are deemed appropriate because significant barriers - briefly mentioned above and further elaborated in section F.1 Economic and Financial Analysis- currently exist preventing commercial investments in decentralized renewable energy and energy efficiency targeting heat demand. The grant financing will demonstrate the benefits from these investments by providing a strong impetus for an enabling environment that integrates policy, regulatory and supply

chain features for climate change mitigation. It is anticipated that the barrier will be short-lived if a short-lived, highly concentrated support of renewable energy and energy efficiency is available. The grants will be combined with commercial debt and equity financing, with the degree of commercial funding depending on the income-generating potential of the investment. Thus it is anticipated that investments in building insulation, with a very limited private return, will have a higher grant percentage than solar panels. New climate mitigation and adaptation technologies will also be studied through proposed technical assistance and can be piloted by the grant. Note that the selection and approval mechanisms of the later subprojects of AHURP are developed in such a way that there is an in-built incentive to leverage grant financing with increasing amounts of commercial financing.

2. **Concessional loan financing for ger area apartment building and townhouse developers.** Through the project, long-term concessional loans to real estate developers will aim at increasing access to new housing for *ger* area residents, who cannot afford to live in the city center's apartments. These concessional loans will target housing projects that are climate resilient and well connected to urban infrastructure, e.g., heating supply, drinking water, wastewater management and sanitation, waste management, and protection against flooding. Given the strong financial barrier facing *ger* area inhabitants (see section C.1 and E.4), long-term concessional loans using revolving funds will be necessary to ensure that they benefit from the project.

3. **Low cost and long-term green mortgages**. *Affordable segment*: Households who are income qualified and wish to purchase an Affordable Green Housing unit, but do not have the cash or cash-plus-coupon resources to do so may apply for an AHURP-A mortgage through the program's partner commercial bank(s). In order to make these units affordable to the target population, a new loan product (AHURP-A Mortgage) will be developed using a combination of cost-plus interest rates and longer loan tenors. *Market segment*: Households who wish to purchase a Market Green Housing unit, but do not have the cash or cash-plus-coupon resources to do so may apply for the AHURP-M mortgage through the program's partner commercial bank(s). This mortgage will be created by the banks with more favorable terms than the current market provides in order to facilitate access to housing through the project. The bank will acquire the funds for these mortgages through AHURP at a favorable rate, which is only financially viable for participating commercial bank(s) because of GCF's concessional loan financing. Based on the affordability model the highest interest rate within a reasonable tenor (up to 30 years) that the upper income deciles can support are between 7%-8%. The amount of financing required to support the AHURP-M mortgages has been calculated with an interest rate of 10%. The specific design and terms of this mortgage product will be further elaborated during the implementation phase. Affordability and financial sustainability for all institutions involved will be the primary determinants of the design and terms of the AHURP mortgages.

4. **Grant funding for technical assistance.** To create an enabling environment for climate change investments, new policies and regulations need to be developed (see section C.2) alongside developing the capability of designers, developers, and suppliers. Moreover, information is needed on new technologies that could be incorporated in investment plans. Grant funding of technical assistance is an appropriate instrument to address these issues.

Details on the financial mechanisms have been included in Section C.3 and C.7 of this proposal, to which we refer for details on the instruments employed.

AHURP is a sector project designed to promote affordable low carbon and climate resilient housing solutions in the *ger* areas. The core subprojects in Bayankhoshuu West and Selbe East have been designed in the project preparatory technical assistance (PPTA), and are described in the PPTA report *Green Affordable Housing and Resilient Urban Renewal Project: Draft Final Report* consisting of 4 volumes and appendices. The subprojects comprise about 11 hectares for an estimated 850 people (3,800 people after the redevelopment process).

Core subprojects

The core subprojects will construct 55,630 square meters (m^2) net area of town houses and low rise buildings with an average building annual heat load of around 150 kW/m2; 7,500 m^2 of PV solar panels installed; 9,100 m^2 of greenhouses built; and secondary and tertiary roads and urban services networks expanded (630 m of water supply network, 700 of sewer network, 630 m of heating network, 275m of electricity lines; 1,980m of tertiary roads; 7,600 m^2 of pedestrian and cycling paths; 17,200 m^2 of public green parks and 5,700 m^2 public parking in targeted areas; 15,800 m^2 of public facilities such as but not limited to kindergarten, community/ sport/commercial/entertainment centers, and parking space; 16,500 m^2 of private garages; and 4,000 m^2 of shops and offices).

The subsequent batches of subprojects will be developed and approved within a eligibility framework criteria (the minimum criteria that a proposed subproject need to meet in order to qualify for AHURP and support) and selection criteria (describing the criteria used to select from multiple eligible proposed subprojects). The core subprojects were used as the basis for scaling up the costs to estimate the total AHURP investment requirements and impacts, all of which therefore should be considered as anticipated.

B.2. Project Financing Information

	Financial Instrument	Amount	Currency	Tenor	Pricing
(a) Total project financing	**(a) = (b) + (c)**	544.0	Millions USD ($)		
(b) GCF financing to recipient	(i) Concessional Loan (ii) Grant	95.0 50.0	Millions USD ($) Millions USD ($)	High concessionality	High concessionality
	** Please provide economic and financial justification in section F.1 for the concessionality that GCF is expected to provide, particularly in the case of grants. Please specify difference in tenor and price between GCF financing and that of accredited entities. Please note that the level of concessionality should correspond to the level of the project/programme's expected performance against the investment criteria indicated in section E.*				
	Total requested (i+ii+iii+iv+v+vi)	145.0	Millions USD ($)		

	Financial Instrument	Amount	Currency	Name of Institution	Tenor	Pricing	Seniority
(c) Co-financing to recipient	Loan (conc.)	20.0	million USD ($)	ADB	(25) years	(2) %	senior
	Loan (OCR)	60.0	million USD ($)	ADB	(20) years	Libor-based	senior
	Loan	111.4	million USD ($)	Banks			
	Equity	103.7	million USD ($)	Developers			Options
	Equity	63.9	million USD ($)	Beneficiaries			Options
	Equity	35.0	million USD ($)	MUB			Options
	Grant	5.0	million USD ($)	HLT grant			
	Lead financing institution: Asian Development Bank						
	** Please provide a confirmation letter or a letter of commitment in section issued by the co-financing institution.*						
(d) Financial terms between GCF and AE (if applicable)	Not applicable						

B.3. Financial Markets Overview (if applicable)

Financial barriers are among the key factors constraining green affordable housing and resilient urban renewal in UB. There is limited long-term financing available resulting in exorbitant interest rates, restricting the expansion of both supply

and demand. This section provides some background on the financial sector, with added emphasis on the mortgage market.

Banking and Finance in Mongolia

The banking and finance sector in Mongolia is a primary determinant of investments in the real estate market, being (i) a major source of housing and infrastructure finance, (ii) an operational and policy partner in establishing international finance, and (iii) a key player in mortgage development within the domestic market. The Mongolian banking sector consists of 14 commercial banks, 195 non-bank financial institutions (NBFIs), 162 savings and credit cooperatives, and 17 insurance companies. The three largest banks make up 70% of total assets and 68% of total loans. In accordance with the Central Bank Law of 1996, the Bank of Mongolia has focused on price and exchange rate stability, while ensuring adequate money supply.

As a result of the financial downturn of 2008-2009, Mongolia's fourth largest domestic commercial bank went into receivership. Following this, new regulations were adopted in 2011 to increase the minimum capital requirements of commercial banks to 16 billion MNT (US$12 million). The minimum share capital requirement for a Mongolian subsidiary of a foreign bank is US$50 million, although protectionist practices continue to keep international banks out of the Mongolian finance sector.

Financial instruments in Mongolia have yet to attain sophistication. A significant portion of bank assets remain in cash and Central Bank bills. This lack of diversification explains the diminished liquidity and lack of suitable investment opportunities in Mongolia. Nevertheless, future trends point to the growth of fund, pension, and insurance subsectors. The persistent dominance of the banking sector represents an opportunity for investors who can offer new financing options and innovative financial products in the Mongolian markets. In real estate in particular, conservative bank lending practices have led to a significant demand for fund financing. Funds at present make up a negligible percentage of GDP, although demand for financing from high quality commercial real estate and infrastructure projects mean that new opportunities will continue to grow in this area. The passing of a new Fund Law during the first quarter of 2014 opened the way for real estate investment trusts (REITs) and other real estate investment tools to enter the Mongolian market.

The monetary authorities of Mongolia embarked on monetary easing programs in 2013 to offset slowing credit growth. This was carried out through policy lending programs on discounted terms, including targeted additional construction and housing development programs of up to MNT 1.1 trillion (~US$ 460 million) of low-interest rate mortgage lending and MNT 430 billion (~US$ 179 million) for construction companies since June 2013. Around 60% of the liquidity provided by monetary easing programs was used to support the construction and housing sectors.

Mortgage Market in Mongolia

The mortgage market in Mongolia, in some measure, is a resounding success. Since the first mortgage program in 2002, mortgage loans have grown from 0.01% of national debt to over 25%. For a country of just over three million citizens, it boasts of over 80,000 mortgage holders, worth over MNT 3.4 trillion - a ratio similar to a developed economy. The mortgage portfolio has only a 0.3% default rate, an enviable position for any investment portfolio anywhere in the world. However, a closer look reveals the market to be immature and still vulnerable to systemic shocks.

Despite the global shocks of the 2008-2009 financial crisis, the country's annual GDP growth rate rose to a high of 17.4% in 2011, but then started a downward trend primarily due to the drop in mineral prices and populist policy missteps that locked out the mining industry along with lower global demand for commodities. As with most developing economies in 2011, the saving rates were low, the maturity of bank deposits / retail portfolio ranged from 1 to 3 years, and loans to the corporate sector were given as 3 to 5 years of working capital. The fragility of the market was evident and there were fears of ending up in a vulnerable position if the global financial meltdown was to repeat itself. The subsidized mortgage programs introduced in 2011-2012 was partly an attempt to counteract systemic liquidity challenges in the economy. It was perhaps also an effort to provide jobs to the unemployed construction labour force due to the stalled mining sector as well as diversify the economic base. Compared to other traditional loan assets which had a non-performance record of as high as 20%, mortgages had a historically low default rate of 3.7% making it the least risky in terms of providing collateralized liquidity to commercial banks. There was also considerable pent-up demand from a huge number of *ger* areas residents, providing a poverty alleviation measure popular with international finance institutes and the electoral base. The publicly stated aim of the project was to provide improved access for the *ger* areas populations to low-cost

housing in a market characterized by extremely high interest rates and low levels of supply while stabilising the national economy. However, those aims are still far from being realised.

In 2013, the Residential Mortgage Backed Securities (RMBS) made an appearance in the hopes of creating a secondary market and thus improving liquidity by spreading the inherent risk levels away from the balance sheets of commercial banks. However, those commercial banks were still the key players in the market acting as both the originators and bondholders of RMBS, effectively creating not only high conflicts of interest but also high vulnerability to external shocks. The mortgage programs also failed to meet any of its tacit objectives: the market is still struggling with extremely low levels of liquidity, high mortgage interest rates, unstable real estate prices, and considerable barriers to entry for low income households. Various mortgage initiatives, while generally deemed successful, have managed to skew housing supply. Combined with the continued injections of capital to the construction sector, the supply of mid-to-high end real estate have increased, leaving the low-cost housing demand grossly undersupplied. Some estimates show that less than 11% of the existing housing supply is currently leveraged by mortgage loans. As GDP growth has continued to decline over the years, real estate prices have suffered and failed to close the affordability gap with the decrease in purchasing power and buyer appetite for risk.

The RMBS programs have been successful in increasing the loan portfolios of the commercial banks while increasing maturity periods to 20-30 years, but at the risk of increasing inflation through continued quantitative easing programs as the Central Bank, namely the Bank of Mongolia (BoM), continues to finance the mortgage subsidies (as well as the construction companies) by printing money. Even though the objectives were of merit, the mortgage programs have only been successful in establishing a vicious circle, where artificial capital is funnelled through a complicated process back to the BoM. This system is only sustainable as long as the BoM keeps pumping capital in the system (until a certain critical mass is met where repayments finance new mortgage issuances) and the real estate market does not suffer from a serious correction in capital values, there is also little proof that the program has created a long term injection multiplier effect in the construction sector.

The proponents of the subsidy program claim that intervention by the BoM in managing market forces has averted or at least reduced the impacts of a financial meltdown in Mongolia in the face of a flailing mining industry. However, it may have mitigated its impact in the short term and probably only delayed if not aggravated a financial crisis in Mongolia.

Earlier this year, the Government of Mongolia (GoM) reduced the mortgage rates from an already artificially low 8% to an even lower 5%. This meant that the BoM would be lending to commercial banks at 2% to enable them to give mortgages at 5% and still benefit from a 3% spread. Moreover, in order to deal with existing oversupply in the market and to spur mortgages further, there have been debates on whether the down payment should be reduced from 30% to 10%, and on whether property size limits should be increased from 80m2 to 110m2. The larger apartment sizes are clearly not meant for the lower income deciles whose affordability limits them to less than 60m2.

See *Appendix 2- AHURP – Sector Assessment* for further analysis and references.

Please fill out applicable sub-sections and provide additional information if necessary, as these requirements may vary depending on the nature of the project / programme.

C.1. Strategic Context

AHURP's aim is to support the development and construction of climate-resilient and low carbon eco-districts in polluting and substandard ger areas. This section provides the strategic context in which the project takes place,

Urbanization in Mongolia

In 2016, 67% of Mongolia's population lived in urban areas—2.1 million of the country's 3.12 million people. The 1.4 million population of the capital city, Ulaanbaatar, accounts for two-thirds of the urban population, more than 40% of the nation's population. The urban economy grew by an estimated annual average of 11.2% during 2006–2010 and now accounts for 65% of total gross domestic product (GDP), Ulaanbaatar generating most of it (more than 60% of the Mongolia's GDP).[5]

Ulaanbaatar and the Ger Areas

Ulaanbaatar's population rose from 773,000 in 2000 to 1,380,792 in 2016, representing an annual average increase of 3.1%. This growth was due to large in-migration from rural areas[6], due to (i) a series of climate change related extreme events, including harsh winter storms (which are known as "dzuds") that have killed more than 16 million heads of livestock between 2000 and 2010,[7] (ii) the transition to a market economy and economic opportunities developing much more rapidly in the cities than in the countryside, and (iii) the right of Mongolian citizens to decide where to live that was reinforced first in 1992 in the Mongolian Law, and then in the Land Law in 2002 securing land rights and social benefits. In Ulaanbaatar, it ensured each resident a plot of land of 700 m^2 on average. Despite the inflow of people, the city core was expanded only marginally to accommodate new migrants and the upgrading or extension of basic urban services was also limited. The migrants have settled (and newly arriving migrants continue to settle) in the city's periphery, often using their traditional tents (*gers*) for housing. The Land Law acknowledged the existence of the *gers* areas by giving the migrants land titles. These factors reshaped the geography of the capital city and generated a vast peri-urban area named *ger* areas.[8]

The ger areas are home to an estimated 774,000 residents in 2016[9] and are characterized by unserviced plots, unpaved roads, and unsanitary conditions. The traditional and serviced built-up areas of the city center comprise some 130 km^2, whereas the ger areas cover about 350 km^2. They account for 60% of Ulaanbaatar's population and 30% of the country's population. Household incomes are generally low to medium[10] accounting for 25% of Mongolia's poor. The ger areas have developed with very little planning or regulation. Infrastructure is lacking, providing poor access to basic urban services, and are highly exposed to the consequences of climate change. Unlike the residents of many in-migration settlements in urban areas of developing countries, ger area residents have land entitlement and recognized property rights.[11]

Climate as a Construction Constraint

[5] World Bank Data, 2017.

[6] In 2010, net in-migration to Ulaanbaatar was 40,600 people. Between 2000 and 2016, net in-migration is in average three times higher than natural growth rate http://www.ubstat.mn.

[7] The importance of the link between climate change and rural urban migration is well established and illustrated with anecdotal evidence. See for example: https://www.theguardian.com/world/2017/jan/05/mongolian-herders-moving-to-city-climate-change, http://weblog.iom.int/natural-disasters-and-climate-change-intensify-urban-migration-mongolia and https://reliefweb.int/report/mongolia/climate-change-and-savage-winters-fuel-urban-migration-mongolia.
A more academic source is Mayer B. (2015) Managing "Climate Migration" in Mongolia: The Importance of Development Policies. In: Leal Filho W. (eds) Climate Change in the Asia-Pacific Region. Climate Change Management. Springer, Cham, as well as the sources cited therein.

[8] These areas have taken on the name of the traditional round tents in which many of the in-migrants have made their homes, i.e., *ger* areas.

[9] Municipal Housing Organization (NOSK) Report. 2016.

[10] ADB country partnership strategy for Mongolia, 2012–2016.

[11] Three types of land ownership exist namely (i) rights-of-use licenses, (ii) right of possession, and (iii) right of ownership. The majority of *ger* residents have the right of possession or the right of ownership. Rights of possession are being gradually converted into rights of ownership, subject to an administrative procedure and a small fee.

Construction to improve the areas is costly due to long winters during which temperatures sometimes drop below minus 40°C, requiring measures to prevent freezing and shortening the construction season.[12] The *ger* areas are predominately residential, with few commercial buildings, government offices, and public services. Density is comparatively low—an estimated average of 40 persons per hectare and a maximum of 80 persons per hectare in the so-called central ger areas, which were the first to develop at the edge of the city center.

Lack of infrastructure and vulnerability to climate change

Ulaanbaatar is heavily affected by air pollution especially during winter. The concentration of pollutants in the air is also exacerbated by the topography of the city. Acute respiratory diseases, tuberculosis and other lung diseases are higher during winter. With its aging and poorly maintained drainage facilities, and low quality houses, Ulaanbaatar is also vulnerable to intense flooding and storms. Floods often occur due to degradation of the land water retention capacity, urbanization in the hilly, steep sloped-areas, as well as deforestation in the watershed area. Lack of early warning systems and emergency management services, and lack of awareness among the citizen and public servants increase climate risk[13].

Water supply, wastewater treatment, district heating, and good roads are all lacking in the ger areas, which is the main constraint to sustainable urban development, also responsible for increased vulnerability to climate conditions, expected to be exacerbated by climate change.

Residents often get their water from kiosks operated by the Ulaanbaatar Water Supply and Sewage Authority (USUG). The kiosks are either connected to the central water system or supplied by trucks.[14] Daily water consumption in the ger areas is about 10 liters per capita, which is less than half the minimum recommended by the World Health Organization. The situation is not expected to improve without improvements to water delivery and wastewater disposal. Household pit latrines are the main means of sanitation. Commercial water users usually have sewage holding tanks, which are emptied by tanker trucks that convey wastewater to the city sewer system.

Energy demand and supply and greenhouse gas emissions

In contrast to apartment buildings which are connected to the central heating system, ger area households rely on inefficient[15] unsustainable wood- lignite-, or coal- burning stoves that produce significant greenhouse gas emissions and air pollution, which are also expensive[16] and time-consuming to operate. This is exacerbated by poor building insulation, which means that energy consumption for heating is very high, with accompanying high greenhouse gas emissions and very high pollution loads.

In principle, there is a possibility to utilize rooftops and Mongolia's high solar irradiation to generate power. This would be especially worthwhile because the Mongolian electricity supply system is inefficient and reliant on fossil fuels, mostly lignite. The latter has led to one of the world's highest grid emission factors for the Mongolian power grid (over 1.1 tCO_2/MWh). Notwithstanding the potential for solar PV on rooftops, this is currently not widely used, as described in the next section.

Ambient annual average particulate matter (PM) concentrations in Ulaanbaatar (UB) are 10–25 times greater than Mongolian air quality standards (AQS) and are among the highest recorded measurements in any world capital. The worst recorded annual average concentration was more than 10 times higher than the Mongolian AQS for PM10 and 25 times higher than the Mongolian AQS for PM2.5. Compared to other cities with available data in global databases, and also compared to Chinese cities with high PM concentrations, UB appears to be the most PM-polluted capital and is

[12] The high cost is compounded by high transportation costs of imported materials.

[13] UN-Habitat. 2010. *Cities and climate change initiative – Ulaanbaatar Factsheet.*

[14] People in ger areas now pay 2–10 times what core city residents pay for water supply due to the high cost of delivering water through kiosk or trucks.

[15] Projects such as the Millennium Challenge Account Energy and Environment Project and the World Bank Ulaanbaatar Clean Air Project have contributed to the sustainable reduction of air pollution in Ulaanbaatar through the adoption of cleaner stove and boiler technology.

[16] Ger area residents spend 5 times what city residents do on heating per year. Surveys in sub-centers targeted by proposed ADB program found that about 10% of monthly spending went to heating.

among the cities with the worst air quality in the world.[17] The ger districts are one of the main reasons why Ulaanbaatar is one of the world's cities with the highest air pollution.

A history of attempted action on ger area climate change mitigation, adaptation and development issues

The low density of ger areas coupled with the extremely cold climate, makes the provision of basic public services very costly. Poor urban services have led to dramatic environment degradation, including the pollution of air and soil, which poses health risks such as respiratory diseases and hepatitis[18]. Air pollution in Ulaanbaatar especially during winter, mostly coming from the individual stove-heating system in the ger areas, has been declared by top public authorities a serious threat to the country. Despite these life-threatening urban issues, the ger areas continue to spread because of the widening housing demand-supply gap in the city, particularly for the benefit of the very low- and moderate- income households. [19]

Inadequate long-term planning, infrastructure investment, and land use regulation in ger areas have resulted in high vulnerability to climate change, haphazard development, limited availability of space for public facilities, poor access to socioeconomic services, poor livelihood opportunities, and unsafe neighborhoods. The lack of basic urban infrastructure prevents rational and dynamic urban development, and raises the costs of doing business and accessing services. Meanwhile, the city's central core, where jobs and services are concentrated, is experiencing unprecedented congestion. Poor services in the ger areas, compared with those in the city core, result in poor integration of ger residents into the overall urban economy. This is expected to worsen as ger areas continue to grow and constitutes one of the most urgent and difficult development challenges facing the government.[20]

In February 2013, the country's parliament approved the Ulaanbaatar City Urban Development Master Plan 2020 and Development Directions 2030[21]. The development of the new master plan was supported by the Asian Development Bank (ADB) and marks a significant shift in policy.[22] The plan integrates the ger areas into the city development strategy and infrastructure program for the first time. It also acknowledges the functions and added value of the sub-centers as key elements to the city's future growth.

In March 2013, the MUB established a steering committee led by the city council chairman to supervise the redevelopment of ger areas. The MUB also established the Ger Area Development Agency (GADA), under the supervision of the vice mayor in charge of urban development and investment. The objective was to redevelop identified ger areas through significant private sector participation. The MUB also launched the Ger Area Housing Project (GAHP).[23] The GAHP aimed to support community to get organized and to develop a land readjustment plan and the development plan in order to attract private sector investment. On 30 May 2013, Ulaanbaatar city council endorsed the Ulaanbaatar Urban Services and Ger Areas Development Investment Program (GADIP) co-funded by ADB and EIB and identified the locations of the sub-centers to be targeted under the first tranche of the program, as well as coordination of the ADB proposed program with the master plan. The GADIP framework financing agreement was signed on 9 December 2013 and ratified by the Mongolian Parliament on 23 May 2014.

In 2016, the GADA program was suspended. Under this program, land acquisition and resettlement was directly managed by the private developers, through a land for apartment swapping mechanism, resulting in a high dissatisfaction rate

[17] World Bank. 2011. *Air Quality Analysis of Ulaanbaatar Improving Air Quality to Reduce Health Impacts*. http://documents.worldbank.org/curated/en/900891468276852126/pdf/660820v10revis00Mongolia0Report0Web.pdf
[18] World Bank. 2011. *Air Quality Analysis of Ulaanbaatar Improving Air Quality to Reduce Health Impacts.* http://documents.worldbank.org/curated/en/900891468276852126/pdf/660820v10revis00Mongolia0Report0Web.pdf
[19] World Bank. 2009. *Heating in Poor, Peri-urban Ger Areas of Ulaanbaatar*.http://documents.worldbank.org/curated/en/339891468247270369/pdf/696620ESW0P1010taar0ASTAE0October09.pdf
[20] MUB Presentation. https://sustainabledevelopment.un.org/content/documents/6883Mr.Gerelchuluun-Chief%20%20of%20the__%20Mayor%27s%20Office%202.pdf
[21] Parliament resolution #23 of 8 February 2013.
[22] These changes have been supported by two technical assistance projects: (i) ADB. 2010. Technical Assistance to Mongolia for Ulaanbaatar Water and Sanitation Services and Planning Improvement. Manila and (ii) ADB. 2012. Technical Assistance to Mongolia for Ulaanbaatar Urban Services and *Ger* Areas Development Investment. These projects aimed at helping the MUB develop a strategy for the *ger* areas that (i) demonstrates options to upgrade existing sub-centers; and (ii) uses infrastructure investment to initiate structural changes in the land use pattern and provide improved water, sanitation, and heating services delivery.
[23] The GAHP is a MUB funded project which proposes the redevelopment of 12 sites. The MUB project and the ADB program do not conflict or overlap.

among former land owners. Moreover, GADA projects were not properly coordinated with other municipality initiatives. The GAHP is still on going, however no development plan has been funded so far. At the beginning of 2017, a new agency was established, the Ger Area Infrastructure Agency (GAIA), to merge the activities of the suspended GADA initiative and the GAHP. GAIA is under the supervision of the vice mayor in charge of infrastructure development.

Other relevant mitigation and adaptation initiatives from development partners include

- The World Bank's Ulaanbaatar Clean Air Project (2012-2018)[24], which aims to to enable consumers in Ger areas to access heating appliances producing less particulate matter emissions and to further develop selected medium-term particulate matter abatement measures in Ulaanbaatar in coordination with development partners
- UNDP Strengthening the Disaster Mitigation and Management System in Mongolia (2008-2011)[25] which aimed to support the Government in decreasing Mongolia's vulnerability by developing a strategy to: i) prepare better for disasters, ii) respond more quickly to emergencies, and iii) reduce climate-related risks
- UNDP LGGE: Energy Efficiency in New Construction in the Residential and Commercial Buildings Sector in Mongolia (2009-2013)[26] which aimed to reduce the annual growth rate of GHG emissions from the buildings sector in Mongolia, by improving the energy utilization efficiency of new construction in the residential and commercial buildings sector.
- UNDP-GEF: Nationally Appropriate Mitigation Actions (NAMA) in the Construction Sector in Mongolia, which will be implemented during 2016-2020, and aims to facilitate market transformation for energy efficiency in the construction sector through the development and implementation of NAMA[27]
- UN Habitat Community-Led Ger Area Upgrading in Ulaanbaatar City[28] which aimed to empower the Ger area communities through social mobilization and organization; and to support community-based assessment and prioritization of local needs for Ger area upgrading
- ADB Proposed Policy-Based Loan, Mongolia: Ulaanbaatar Air Quality Improvement Program, aimed to reduce Ulaanbaatar's air pollution and greenhouse gas emissions under the National Program framework, by helping the government deliver on its implementation action plan commitments, prioritized based on cost-effectiveness

AHURP will ensure thorough coordination with these institutions to gather all available knowledge and best practices on adaptation in ger areas, and low-carbon housing development in Ulaanbaatar.

Sub-centers and redevelopment approach

On 12 December 2013, the Asian Development Bank (ADB) approved the Ulaanbaatar Urban Services and *Ger* Areas Development Investment Program (GADIP) using the multi-tranche financing facility (MFF) modality. The program's framework financing agreement (FFA) was signed on 9 December 2013 and ratified by the Mongolian Parliament on 23 May 2014. The implementation period is 9 years (December 2013–December 2022) and comprises three tranches. The overall program cost is $320 million. It supports the Ulaanbaatar city master plan in upgrading priority services and developing economic hubs (subcenters) in *ger* areas. Responding to the urgent demand for basic urban services and the ongoing densification, it proposes an integrated solution to initiate a redevelopment process in *ger* areas and develop urban subcenters as catalysts for growth. Improving infrastructure within the *ger* area subcenters is critical for the city's inclusive development. Better urban planning combined with infrastructure along priority roads will initiate the structural change of subcenters. This will (i) improve residents' access to basic urban services, public space, and socioeconomic facilities; (ii) support local economic development; (iii) allow residents and businesses to take advantage of urban economies; and (iv) provide better housing options. The GADIP will upgrade the sub-centers of Selbe and Bayankoshuu (Tranche 1) and Denjin 1000 and Dambadarjaa (Tranche 2) by installing utility trunk lines and supporting local economic growth; and enable residents and businesses to take advantage of the dynamics of an urban economy to diversify, innovate, and help create a more vibrant, more competitive, greener, and more inclusive city.

The extension of main trunk infrastructure and the sub-centers development strategy is offering to AHURP implementation an ideal background to reach the entire *ger* areas and to strengthen the GADIP approach by leveraging private sector investment to deliver affordable and green housing stock and transforming ger areas into eco-districts. AHURP will initially focus on strategic sub-centres in the north of the ger areas of Ulaanbaatar city. Other ger areas will be included in AHURP if the main trunk infrastructure is accessible.

[24] http://projects.worldbank.org/P122320/ulaanbaatar-clean-air-project?lang=en
[25] http://www.undp.org/content/dam/undp/library/crisis%20prevention/disaster/asia_pacific/Mongolia_Strengthening%20the%20Disaster%20Mitigation%20and%20Management%20System.pdf
[26] https://www.thegef.org/project/lgge-energy-efficiency-new-construction-residential-and-commercial-buildings-sector-mongolia
[27] https://www.thegef.org/project/nationally-appropriate-mitigation-actions-construction-sector-mongolia
[28] http://www.fukuoka.unhabitat.org/projects/mongolia/detail02_en.html

C.2. Project / Programme Objective against Baseline

Baseline

Very few housing options in Ulaanbaatar are affordable and meet the demands of the most vulnerable/low-income population. [29] New housing stock constructed by real estate developers is usually targeted towards high- and upper middle-income households to secure higher profit margins. Suitable financing is lacking to support developers facing a volatile market with low potential margins. There are no sustainable affordable housing solutions that comprehensively cover infrastructure, developers, and housing finance. Moreover, many of the new residential blocks are focused on price minimization to the detriment of community's well-being and/or sustainable urban planning. There is a lack of attention to maximize There is lack of attention to maximize energy efficiency and renewable energy options. Without appropriate public financial and institutional interventions, there will be chronic undersupply of affordable housing for the current and future *ger* population. Substandard living conditions, pollution/emission, and vulnerability in the *ger* areas will worsen as a result. The need to transform current ger areas into efficient, low carbon, resilient, and affordable urban areas will not be met. We refer to appendix 19 of the PPTA for further details and the calculation of emissions and emission reductions.

The baseline describes the current situation and problems in the ger areas as follows:

- No investment in solar PV on rooftops. 0MW installed solar PV
- No investment in additional building insulation: energy consumption is 395 kWh (thermal) per m^2 per year. See Appendix 19 to the PPTA report for further details.
- Ger residents remain unconnected to modern heating supply, causing reduced energy efficiency (50% conversion efficiency) and use of polluting fossil fuels (50% coal and 50% lignite by energy input)
- No investment in efficient street lighting
- Ger residents have no access to newly built housing units and remain highly vulnerable to climate change, living in areas prone to flooding, lack of access to piped drinking water, sanitation services and waste management services. No systematic collection of waste, and no systematic treatment of wastewater.
- High pollution loads, especially air pollution, affecting the health of all residents of Ulaanbaatar

Without AHURP investments, financial and technical barriers will prevent the shift towards low-carbon and climate-resilient urban development in Ulaanbaatar. These barriers have been described in section B.1 and are summarized below:

Barriers

Several barriers contribute to the persistence of the baseline situation:

- Barriers related to PV solar investments
    - Lack of incentive due to unsuitable net metering regulations, reducing the return of power generated in excess of own requirements
    - Subsidized electricity tariffs, not including the full costs of power generation and externalities
    - High costs of equipment, caused by limited domestic production and lack of experience with solar PV installation
    - Financial barriers – high costs of initial investment, combined with high cost of capital
    - Lack of awareness of the return characteristics of solar PV, also in case the above issues are addressed.
- Barriers related to additional insulation investments
    - Absence of incentives – heat is not metered, meaning that heat-related payments are not affected by insulation investments that reduce the amount of heat consumed

[29] Average affordability (affordability means that households do not allocate more than 30% of their disposable income in housing rental or purchase expenses) and willingness-to-pay below the seventh income decile are both estimated to about MNT1.2 million ($600) per square meter ($m^2$) for a 35 m^2 apartment, while average market price was about MNT2.6 million ($1,300) per m^2 in September 2015.

- Subsidized heating tariffs, not including the full costs of heat generation and externalities
- High costs of insulation materials, caused by lack of domestic production
- Financial barriers – high costs of initial investment, combined with high cost of capital
- Lack of awareness of the return characteristics of insulation, also in case the above issues are addressed.

- Barriers related to investment in modern, climate resilient housing connected to key urban service networks
  - Financial constraints on the project developer – high costs of capital, suppressing supply
  - Financial constraints on the demand side – high costs of capital, suppressing demand
  - Lack of affordability – high costs of new housing in relation to existing assets and income
  - Lack of examples of best practice and procedures to develop modern eco-districts addressing climate-related issues
  - Capacity constraints – inability to deliver sufficient technical quality, e.g., use of suitable products in energy efficient buildings (buildings with additional insulation)
- Barriers related to investment in efficient street lighting
  - Awareness about the cost and return implications of efficient street lighting
  - Additional barriers to be identified based on the results of the first two core subprojectts

There is lack of knowledge about adaptation and mitigation solutions in the housing sector. These solutions include new green technologies that could be of interest to Mongolia, if adopted alongside appropriate policies and regulations.

Without AHURP support, current urban development initiatives will likely fail to foster a paradigm shift towards sustainable low-carbon housing for the most vulnerable population. Financial barriers will prevent substantial investments from being directed towards the development of eco-districts and low-carbon housing units. Moreover, vulnerable populations currently living in ger areas will not be able to access newly built climate-resilient housing unless affordability mechanisms are set up.

Affordability as means to the end

The purpose of the project is to enable an important and (among others because of climate change) fast growing segment of the population of UB, the ger area population, to live and climate resilient and low carbon housing. Affordability is an important constraint, because the ger area population, rural migrants often fleeing for climate change, have limited resources, low income, lower education, fewer employment opportunities and in general, lower prospects. It is true that the project involves a subsidy of climate resilient, low carbon housing, to make the shift to this climate sound solution affordable for the targeted population. Affordability is a condition to achieve the goal, climate change mitigation and climate reliance housing and urban development in the ger areas.

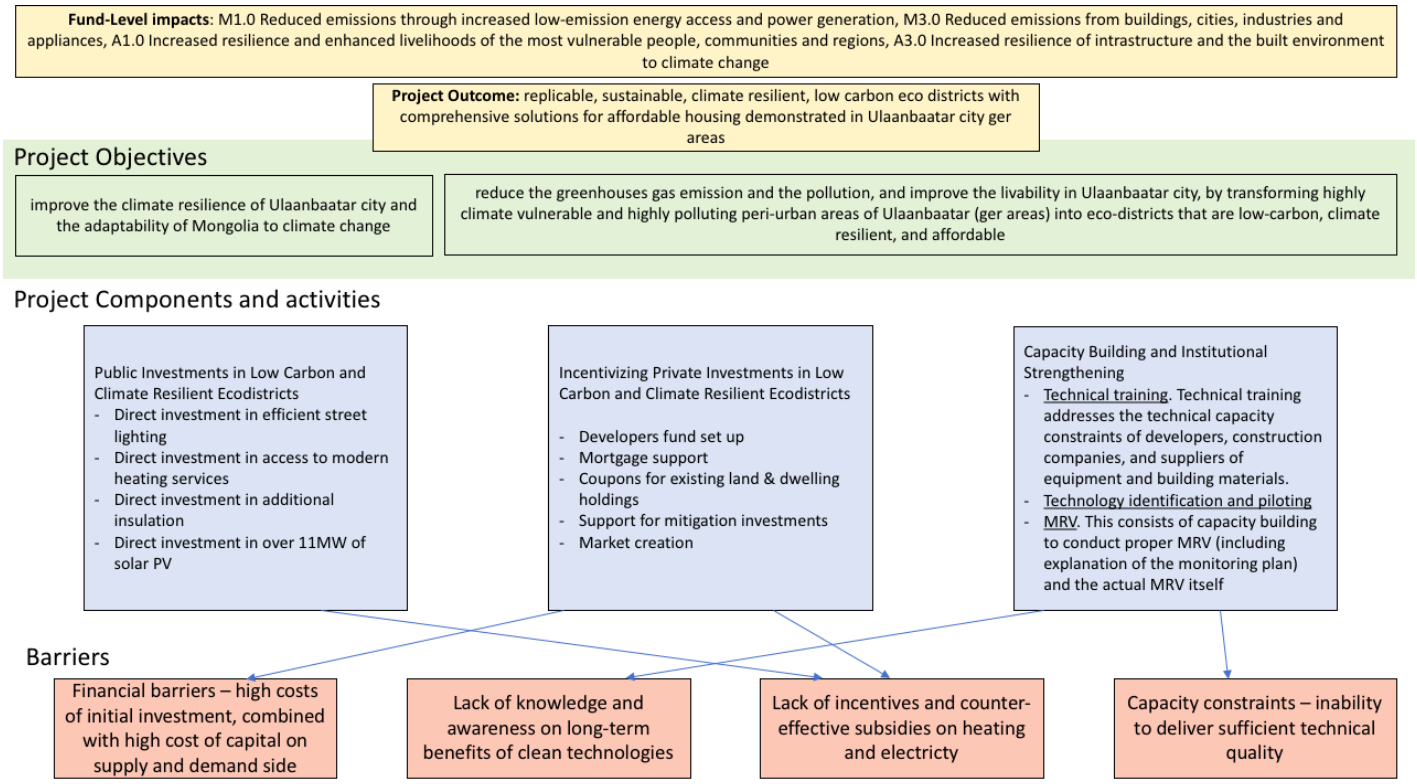
Barrier removal actions

As there is some overlap between the types of barriers, it makes sense to present the barrier removal actions not by types of investment but by mechanism or intervention, describing the issues each addresses.

- Developers fund. AHURP creates a fund to support developers in developing and constructing projects that provide low-carbon climate-resilient housing as identified in AHURP. This addresses the issue of the high costs of capital affecting the supply of new, modern eco-districts in the ger areas. This fund is described in more detail in Section C.3 and Appendix 4, *Economic and Financial Analysis* of the PPTA report.
- Mortgage support. AHURP provides support for mortgages of the target population for which the AHURP housing is aimed, lowering the impact of the demand barrier caused by the high costs of capital. This fund is described in more detail in Appendix 4, *Economic and Financial Analysis* and Appendix 8, *Affordability Mechanisms* of the PPTA report.
- Coupons for existing land and dwelling holdings. Some of the target population currently live on ger area land and have dwellings that have value. AHURP has developed an innovative mechanism to assess the value of existing holdings and offer compensation, in the form of a coupon, which can be used towards the new housing. This is a powerful mechanism to lower the affordability constraint. The mechanism is described in more detail in Appendix 8, *Affordability Mechanisms;* Appendix 17, *Land Valuation and Voluntary Resettlement;* and Appendix 18, *Land Acquisition Resettlement Framework* of the PPTA report.
- Support for mitigation investments. AHURP provides a significant support in the form of grants for mitigation investments. This is needed in view of the lack or absence of incentives, and the need to create pilots as basis for awareness raising and a starting point for discussions on modification of policies and regulations.
- Technical training. Technical training addresses the technical capacity constraints of developers, construction companies, and suppliers of equipment and building materials.

- Market creation. As a result of AHURP, significant production of materials and equipment will occur inside Mongolia, reducing the costs of materials and equipment used for mitigation investments. In addition, AHURP investments can be considered pilots of a model of best practice, the results of which can be monitored, disseminated and replicated, and thus provide the basis for awareness raising.
- Technology identification and piloting. This addresses the lack of knowledge about new technologies that could be included and scaled up, if successful.
- Barrier identification and identification of barrier removal actions and mechanisms. This involves the systematic identification of barriers to mitigation and adaptation investment and addressing them through a variety of measures, mostly consisting of suggestions for improve policies and regulations or creating new ones. The sector loan structure of AHURP provides a mechanism through which the implementation of such proposed measures could be promoted.
- MRV. This consists of building capacity to conduct proper MRV (including explanation of the monitoring plan) and the actual MRV itself.
- M&E. This consists of building capacity to conduct a proper M&E and the actual M&E, taking into consideration lessons learned from the implementation of the first subprojects of AHURP.
- Dissemination, awareness raising and replication. This includes the development of dissemination materials and their dissemination, with the dual objective to raise awareness and promote replication of successful elements of AHURP subprojects.

Figure C.2.1. Project Barrier removal strategy



AHURP expected impacts against baseline

In the AHURP scenario, the baseline situation is expected to be addressed as follows:

- Systematic barrier removal actions (see above) to address the barriers outlined above
- Direct investment in over 11MW of solar PV generating 15.6 GWh per year for annual emission reductions, resulting in 17,261 tCO_2e/y in emission reductions
    - Including replication triggered by elimination of barriers: 55 MW, 78 GWh, 86,305 tCO_2e/year. (direct + indirect investment)
- Direct investment in additional insulation of 940,312 m^2 of newly constructed buildings, bringing down the specific energy consumption for heating from 395 kWh/m^2 per year to 151 kWh/m^2 per year, for a total reduction of 229,436,128 kWh thermal energy input (826 TJ)

  - Including replication triggered by elimination of barriers: 4,701,560 m^2, 1,147,180,640 kWh, 4130 TJ/year (direct + indirect investment)
- Direct investment on access to modern heating services, reducing overall losses from 50% to 35% (65% conversion efficiency including transport losses), reducing primary energy input from 2674TJ (baseline) to 786 TJ (AHURP scenario); switch to less polluting fossil fuels, from 50% lignite and 50% coal to 100% coal)
  - Including replication triggered by elimination of barriers: primary energy input reduced from 13,371 TJ to 3,932 TJ/year (direct + indirect investment)
- As a result of the previously outlined direct investments, greenhouse gas emissions from heating reduced from 261,541 tCO_2e/y to 74,393 tCO_2e/y for an emission reduction of 187,149 tCO_2e/y
  - Including replication triggered by elimination of barriers: annual emission reductions of 935,744 $tCO_2e/year$ (direct + indirect investment)
- Direct investment in efficient street lighting (impacts not quantified).
- 10,000 households (35,000 people) provided with climate resilient housing solutions, piped water, sanitation flood protection, waste management services and protection against seismic risks.
  - Including replication triggered by elimination of barriers: 100,000 households, 350,000 beneficiaries (direct + indirect investment)
- Increased adaptive capacity of ger areas inhabitants moving to eco-districts, adopting sustainable livelihood options provided in the newly built districts
- Pollution loads from heating by covered residents reduced by more than 70% relative to the baseline

The following table provides an aggregate summary of baseline emissions and AHURP emissions, as well as the resulting project emissions.

Emission source	Baseline emissions per year	AHURP scenario	Emission reductions
Electricity	17,261	0	17,261
Heating	261,541	74,393	187,149
Total	***278,802***	***74,393***	***204,410***

Discussion of potential emission sources and elements of the energy baseline

There are some measures in AHURP that could potentially give rise the GHG emissions: wastewater treatment, waste treatment, waste collection and efficient street lighting. We discuss these in turn. Annex 2 to Appendix 19 of the PPTA report contains all supporting calculations along with further details.

Wastewater treatment

Wastewater treatment could potentially give rise to GHG emissions, notably in the form of methane. However, In the case of AHURP the wastewater collected will be treated in a modern wastewater treatment plant. The Government and MCUD have approved the use of a soft loan from PRC to build a new 150,000 m3/d domestic central wastewater treatment plant. CWWTP design is based on Artelia/Veolia construction design. For treatment of sludge generated from domestic wastewater the CWWTP will use (i) Mesophilic Sludge Digestion for reducing and stabilizing the sludge produced, (ii) Cogeneration technology in order to generate power and thermal energy from sludge (Digesters: Volume: 4 x 14,500 m3 / Biogas production: 33,223 Nm3/d; Co-generation: Electricity production: 3000 kW / Reducing CO2 emission: 105,000 t/y (equal to 10700 cars running 40,000km/year) / Covering 53% of the power consumption of the whole plant Savings of 24,184,000 KWh per year). This is outside of the AHURP project but means that the wastewater services, if anything, reduce greenhouse gas emissions. Note that in the current situation: Pit latrine, soil organic pollution, and waste water (grey water) discharged on the plot or the street are all sources of methane emissions that, as shown in Annex 2 of Appendix 19 of the PPTA, are likely to be higher than the emissions due to wastewater collection and treatment in the CWWTP.

Waste treatment

Municipal solid waste, if previously not collected, and now collected could lead to an increase in emissions, depending on the treatment chosen. For example, landfilling of the collected waste could lead to an increase in GHG emissions. However, the AE is convinced that in the case of AHURP, such fears are unfounded, and that in fact the treatment of waste will result in a reductions of GHG emissions. Underlying this conviction are the following arguments:

- In general, it should be mentioned that due to climatic factors, methane production from the waste is pretty low in Mongolia. To illustrate, Mongolia's initial BUR, p.35 gives the total emissions from the waste sector as 159.91 Gg CO2e (0.46%) of the national total in 2014. And that covers all waste instead of a small fraction of total waste, as is the case for the proposed project. If required, we can run calculations to show the limited impact of the waste collection on GHG emissions even in the most unfavorable case (landfilling without GHG recovery).
- However, it is perhaps more relevant that we do not anticipate landfilling of the collected waste. Our intention is to use the waste collected within the project, together with other MSW (collected outside of the project boundaries) for productive purposes. Especially, a community based solid waste management will be introduced in each eco-district and will include organic composting to be use in the greenhouses financed by the projects.
- In addition, several options exist for the treatment of the waste. For example, options are (1) to landfill (1a) with or (1b) without capture of CH4 emissions, (2) recycling of recyclables and composting of the organic fraction which is included in the project proposal, (3) recycling of recyclables and digestion of the organic fraction and use for energy generation, (4) recycling of recyclables and incineration, and (5) recycling of recyclables and digestion of the organic fraction and use for energy generation followed by incineration for further energy generation. In terms of contribution to climate change mitigation, the 5th option would lead to the most energy production and the most comprehensive net reduction of GHG emissions, and is currently the most likely option to be pursued.
- There are also several ways in which the option selected, which may include financing outside of AHURP. It may be carried out by the private sector or public sector, with or without ADB support, and in case of ADB support (or support by other donors) may be provided by a variety of funding programs. Because of these remaining uncertainty regarding the option and financing mechanism chosen, the above analysis has not been reflected in the AHURP funding proposal, and the resulting emission reductions have not been included in the AHURP documentation because it would likely be the result of non-AHURP sources of financing.

Waste collection

Collection of waste requires the use of vehicles which rely on fossil fuel, which gives rise to CO2 emissions. However, this sources of GHG emissions is minor. In this regard, please note:

- A quick back-of-the envelop calculation shows that waste transportation trucks account less than 0.01% of the total emission reductions achieved by the project (about 15 tCO2/yr)[30], which is fairly negligible, in particular given the fact that we are not taking credit for the future use of the waste to produce energy and reduce GHG emissions.
- The above estimate assumes that the baseline would be no collection and that we would move to a project situation where all waste is collected by trucks that only collect waste from the AHURP project site. However, note that waste collection truck are already operating in the area, and that the proposed project will make the collection more efficient by using the available transport vehicles more efficiently.
- Finally, note that the funding proposal also did not quantify the emission reductions due to the lack of need for water trucks to provide water to the ger areas; this is a small source of GHG emission reductions resulting from the connection to water supply networks

Street lighting

If efficient street lighting is introduced, but the baseline involves no street lighting, GHG emissions will increase. However, this is not a real concern in the case of AHURP.

- Note, to start with that there is some street lighting in the ger areas using inefficient street lights. The baseline would show an increasing amount of street lighting, again using inefficient lights.
- The project foresees installation of solar LED lights with zero emissions. It is a minor factor and not accounted for in our mitigation calculations for reasons of conservativeness, but the efficient street light component of the proposed project will reduce emissions, and not increase emissions.

Finally, we would like to emphasize that during the implementation of AHURP TA will support the selection of the most appropriate low carbon technology options. The impacts of these selections have not been reflected in the current proposal and GHG emission reduction calculations, which is conservative.

Comments on baseline emission calculations (heating)

[30] See Annex 2 of Appendix 19 to the PPTA report for details.

Baseline emission calculations for the heating component have been calculated on the basis of the assumption that the heating area is unchanged, and a relatively low assumption of heating losses. Below we discuss the change in heating area from the baseline to the AHURP scenario, heat loss assumptions, and the impact of increased level of comfort / rebound effects. We refer to Vol. II of the PPTA draft report for details.

- The ger area has a combination of gers and wooden houses. Compared to the national standard in 2009, ger tents lose 4 to 5 time more heat, and house loses 2-3 time more heat. With the increased stringency of the new standard, we can expect these relative losses to have increased to 5 times for gers and 3 times for houses (pre-2000 heat demand is 461 kWh/m2 per year, whereas in the AHURP case it is 151 kWh/m2). The insulation gains assumed in the calculations is more modest than this.
- In our calculations, we have based ourselves on equal heating in the baseline and project case. That, however, is conservative. The average detached housing size in our targeted areas is 70m2. Through land swap the average housing proposed by the project will be less than 60m2. Average size of affordable housing for sell is 45-50m2 and for renting is about 40m2.
- In the case of gers, the heating area in the baseline is 30m2, which means that the actual heating area is reduced. However, this is compensated by the much higher rate loss. The amount of heat required in a 50m2 house, compared to a 30m2 ger, is 33% of the baseline, whereas our calculations are based on 38%. In other words, our calculations are conservative.
- The above source of conservativeness – underestimating the extent of the reduction of heat losses, and in the case of a shift from wooden houses in the baseline assuming that the heating area is constant while in fact it is reduced – compensate for any 'additional comfort' effect that might occur and that could lead to a minor increase in average winter indoor temperatures.
- It is not expected that the increase in comfort and rebound effects will be very significant in the context of AHURP. In any case, this will be monitored and if contrary to expectations necessary, actions will be taken to reduce such impacts.

Appendix 11, *Consulting Services & Supervision TA-Terms of Reference* contains a detailed description for the implementation of required activities mentioned in the last bullet points above. Furthermore, see Appendix 19, *Climate Change and Climate Finance*.

C.3. Project / Programme Description

The objectives of the project are to (i) improve the climate resilience of Ulaanbaatar city and the adaptability of Mongolia to climate change; and (ii) reduce greenhouses gas emission and pollution, and improve livability in Ulaanbaatar city, by transforming the highly climate vulnerable and highly polluting peri-urban areas of Ulaanbaatar (*ger* areas) into eco-districts characterized as low-carbon, climate resilient, and affordable. The project is a large-scale demonstration initiative that will leverage private sector investment to deliver affordable and green housing stock, and redevelop *ger* areas into urban areas that are resilient to climate change, contribute to decreased air and soil pollution, and will provide livable urban environment to *ger* area residents. It will also establish policies, mechanisms, and standards for sustainable affordable housing and green urban redevelopment. The project was envisioned to address the widening housing demand-supply gap in the city, particularly for the benefit of the very low- and moderate-income households. The physical component will deliver 10,000 housing units and redevelop 100 hectares of ger areas into eco-districts that will be (i) climate resilient, resource efficient and maximizing the use of renewable energy; (ii) mixed-use with ample public space and public facilities; and (ii) mixed-income with about 65% of combined affordable and social housing units. The project outcome is a replicable, sustainable, climate resilient, low carbon eco-districts with comprehensive solutions for green affordable housing in Ulaanbaatar city *ger* areas demonstrated and replicated.

Summary of expected Outputs and activities

The project will be developed through three main outputs [values in bracket correspond to the core subprojects]:

Output 1: Climate resilient and low carbon urban infrastructure, public facilities, and social housing units built in *ger* areas (Public sector investment). This includes the delivery of (i) green and resilient social housing,[31] (ii) climate

[31] In Mongolia, "social housing" refers to rental housing.

adaptation and mitigation features; and (iii) resilient infrastructure, public space, and public facilities. Output 1 will deliver the following items:

a) 6.1 kilometers (km) (0.7 km) of sewerage network, 5.5 km [0.6 km] of water supply pipes, 5.5 km [0.6 km] of district heating pipes, 13.7 km [1.6 km] of roads;
b) 15 ha [1.7 ha] of public space and green areas,[32] 36,000 m^2 [4,180 m^2][33] of community's facilities (such as education, health, and sports facilities), 1,500 units [168 units] of social housing; [34]
c) 2,000 m^2 (240 m^2) of greenhouses; (iv) 72,000 m^2 [8,300 m^2] of photovoltaic (PV) panels; and (v) 94,500 m^2 [11,250 m^2] of extra isolation system, utilities metering, renewable energy and building performance monitoring systems, and air filter and heating regulation system.[35]

Output 2: Climate resilient and low carbon affordable and market housing units and economic facilities built in *ger* areas (Private sector investment)**.** This includes the delivery of (i) green and resilient affordable and market rate housing, (ii) housing units with climate adaptation and mitigation features, and (iii) commercial facilities and workshops. Output will deliver the following items:

a) 5,500 units [584 units][36] of affordable housing, 3,000 units [327 units][37] of market rate housing, and 163,000 m^2 [18,800 m^2] associated garages;
b) 204,200 m^2 [23,620 m^2] of commercial facilities, workshops, and parking; 22.0 km [2.5 km] of pedestrian and bicycling paths; 79,000 m^2 [9,130 m^2] of greenhouses; 591,000 m^2 [68,200 m^2] extra isolation system, utilities metering and building performance monitoring systems, and heating regulation and air filter system.

Output 3: Policy environment and sector capacity strengthened. This will support (i) project implementation and management; (ii) eco-district feasibility and development, sector reform on climate change adaptation and mitigation, and improve supply and access to green social and affordable housing; (iii) detailed design and supervision; and (iv) sustainable green finance:

- **a) Project implementation and management** will support MUB PMO in (i) overall coordination of the project; (ii) compliance with ADB's Safeguard Policy Statement, Mongolia's safeguard requirements, and due diligence policies; (iii) overall support for project physical and policy development plan implementation; (iv) the procurement for works, goods and consulting services; (v) project monitoring and ensuring the effective enforcement of the affordability mechanisms; (vi) managing and monitoring of the land swapping process phase by phase; (vii) act as resource persons for training and development activities; and (viii) building and facilities operation and maintenance.

- **b) Eco-district feasibility and development** will support (i) subprojects identification and selection; (ii) community engagement and ecodistrict feasibility studies; (iii) Climate change adaptation and awareness; building performance, low carbon emission and renewable energy, (iv) land swapping mechanism, urban policies and regulations, community and private sector-led redevelopment during ecodistrict detailed design, construction and development; (v) service provider performance and eco-efficient; (vi) community solid waste management; (vii) greenhouse gardening, business development; (viii) Improve regulatory and institutional framework for social and affordable housing, and marketing, policy and institutional development of NOSK and TOSK for social and affordable housing.

- **c) Detailed design and supervision** will (i) based on the feasibility studies prepare the preliminary and detailed architectural and engineering designs, technical specifications, bill of quantities, cost estimates, and tender documents; (iii) provide support to the PMO for the supervision of construction in compliance with project designs, specifications; (iv) develop the project risk management procedures; and (v) act as resource persons for technical training and development activities.

[32] It is estimated that this will include 5 ha covered by trees.
[33] Already financed by the Ulaanbaatar Urban Services and Ger Areas Development Investment Program.
[34] Based on average housing unit size of 37 m2.
[35] The energy efficiency and building performance monitoring system will also estimate the avoided black carbon and other emissions to air, and avoided impacts, achieved through the mitigation measures envisioned and undertaken in the project.
[36] Based on average housing unit size of 42 m2.
[37] Based on average housing unit size of 63 m2.

- **d) Green finance** will to assist the PIU located at the DBM under its Asset Management Company to manage the EDAF. The consultants will support the PIU (i) to develop and secure approval from the Project Steering Committee (PSC) for the guidelines, criteria, and procedures to be followed by participating commercial banks in accessing, and using loan proceeds from the EDAF; (ii) to conduct preliminary due diligence of real estate developers for the project in coordination with the MUB PMO; (iii) to conduct briefings for commercial banks, developers, and the targeted household beneficiaries on the project and EDAF's policies and procedures; (iv) to undertake due diligence of commercial banks borrowing from EDAF, and recommend approval by MOF/PSC of their proposed EDAF loans; (v) to manage EDAF's on-lending activities to qualified commercial banks in accordance with the project's approved guidelines, criteria, and procedures; (vi) to manage the Advance Account for the GCF Concessional Lending; (vi) to monitor the utilization of EDAF loans for developer and mortgage financing and prepare the necessary periodic progress reports for submission to MUB and the MOF; (vii) to prepare financial management reports on the EDAF and other reports required by MOF and the project; and (viii) to facilitate the preparation and timely submission of EDAF audit reports. In addition, the consultants will help the PIU to prepare and implement a strategic plan for sector capacity development and institutional strengthening in green banking for climate resilient housing

Policy dialogue and reforms

Output 3a will have the following expected policy reforms:

- **Climate change adaptation and mitigation.** A primary policy reform objective of the project is to overcome the lack of capacity, incentives, and investments for climate change and adaptation. Three key policy reform initiatives with their corresponding action plans will be pursued. (i) Climate change mitigation and adaptation study and awareness will increase the general understanding and awareness of the extent of urban climate change vulnerability and technical options for urban adaptation and mitigation in Mongolia, with focus on *ger* areas. It will also develop and implement *communication and awareness strategy linked to Breathelife*,[38] to show the benefits to air quality and health from energy and building efficiency, and electricity from renewable sources. (ii) Improve buildings' performance, lower carbon emission, and promote the switch to renewable energy. This will remove the barriers to the increased adoption of energy efficient technology and renewable energy in construction sector. It will also develop and implement a measuring, reporting, and verification (MRV) system for eco-efficient construction technics and materials, and use of renewable energy. Among others, this policy initiative will promote the establishment of green building standards, support technical skills improvement, promote net metering regulation for solar PV and heating as well as grid-connected electricity generation from renewable sources, support tariff reforms and incentives, propagate the domestic production of eco-efficient and renewable energy materials, pilot the operation of a central smart renewable energy and building performance control and monitoring system, and will monitor the intervention's actual health benefits through continuous air quality monitoring (both outdoor and indoor) at fixed locations, before, during and after the development of the ecodistricts. (iii) Develop more resilient, low carbon, participative, and liveable urban areas. This policy reform initiative will establish land swapping mechanisms and redevelopment processes for *ger* areas for their transformation into resilient and low carbon urban eco-districts. It will also include the establishment of mechanisms, standards, and principles for low carbon and resilient urban planning, urban planning regulations for ecodistrict development; professional skills enhancement programs; regulations to support greenhouses and urban farming;[39] piloting of community-based solid waste management, waste segregation and composting; and policies for more ecoefficient service providers based on end-user metering system and consumption-based tariffs.

  Improve access to green social and affordable housing. This will address the institutional and regulatory environment of green housing, specifically for those targeted toward the bottom seven deciles of Ulaanbaatar's household income distribution, in other words, the poor and lower-income households. Two key areas of policy reform with their corresponding action plans will be emphasized. (i) Improvement of the regulatory and institutional framework for green social and affordable housing. This will enable clearer and more targeted affordable housing policies and regulations; a more transparent housing market; simplified and more efficient administrative procedures for housing access; improved intra-institutional coordination among the various government agencies involved in housing; improved capacity at NOSK and TOSK to regulate and manage social

[38] http://breathelife2030.org/news/mongolia-joins-the-breathelife-network/.

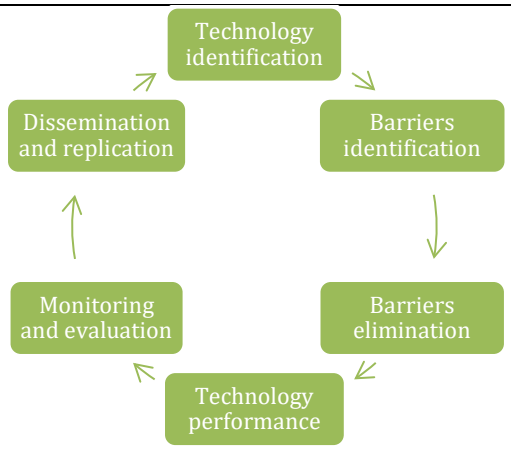
and affordable housing; and clearer targeted subsidy mechanisms to support the rental housing stock. ii) Green social and affordable housing supports the housing policy of Ulaanbaatar to increase the supply of affordable and rental housing and to create sustainable financing and institutional mechanisms for green affordable housing. This policy reform initiative will entail the establishment of efficient supply mechanisms and more demand-responsive financing solutions, as well as their replication for the sustainable production of green affordable housing; formulation of clear and transparent rent-to-own schemes targeting the lowest income households; implementation of parallel government programs to support the stock of rental housing; and streamlining public planning regulations and processes to fast-track decision making and rental housing construction. The following will also be covered: (i) develop more sustainable financial mechanisms for green affordable housing targeted towards the low- to moderate-income deciles; (ii) develop an effective marketing program for the sale of green affordable housing units; (iii) design replicable housing financing strategies combined with carefully targeted subsidies; (iv) streamline public planning regulations and processes to fast-track decision making and process for affordable housing construction; and (v) develop measures to improve cooperation between the government, private sector, and communities.

Output 3c will have the following expected policy reforms:

Sustainable green finance. This supports the third pillar of policy reforms for green affordable housing and resilient urban renewal in Ulaanbaatar. Two major policy initiatives with their relevant policy action plans have been identified. (i) Green banking and finance policy environment, institutions, and capacity strengthened. This aims to establish an attractive and solid policy environment driving the demand for green banking and finance, backed by strong investor protection and simple, predictable, as well as transparent processes. Using the project implementation as a catalyst for green banking and finance policy issuances, simple and clear lending and underwriting guidelines customized for green housing mortgages and green building development finance will be formulated and issued for the compliance of all project participating banks. A system of credit enhancements such as grants, risk sharing mechanisms including guarantees, and other incentives will be developed for MUB through the GBF. Green technology start-ups and pilots with demonstrated bankability and readiness for commercialization will be monitored and identified. Another policy objective is to set up sustainable financial institutions with strong capacity for green banking and climate finance. This will cover the establishment of the EDAF as a properly structured, staffed, and resource apex financial institution for the project, channeling ADB and GCF funds for green buildings, eco-districts, and housing mortgages through qualified commercial banks. This will also support the establishment of the Mongolian Green Development Fund based on the EDAF experience. A roadmap including a 10-year strategic implementation plan for accelerating green banking and finance as a key element of Mongolia's green growth will also be formulated and agreed with major stakeholder groups. (ii) Green finance widening and deepening. This policy initiative will use the project to broaden green finance by developing more green financial products and services such as green mortgages, green home equity loans, green buildings and property finance, green project finance, and also potentially green securitization, green home insurance and guarantees, and green housing savings fund(s). To deepen green finance and enable financial inclusion, green housing mortgages and/or finance more suited to the lower income households will be developed and offered to qualified and deserving target end-user beneficiaries.

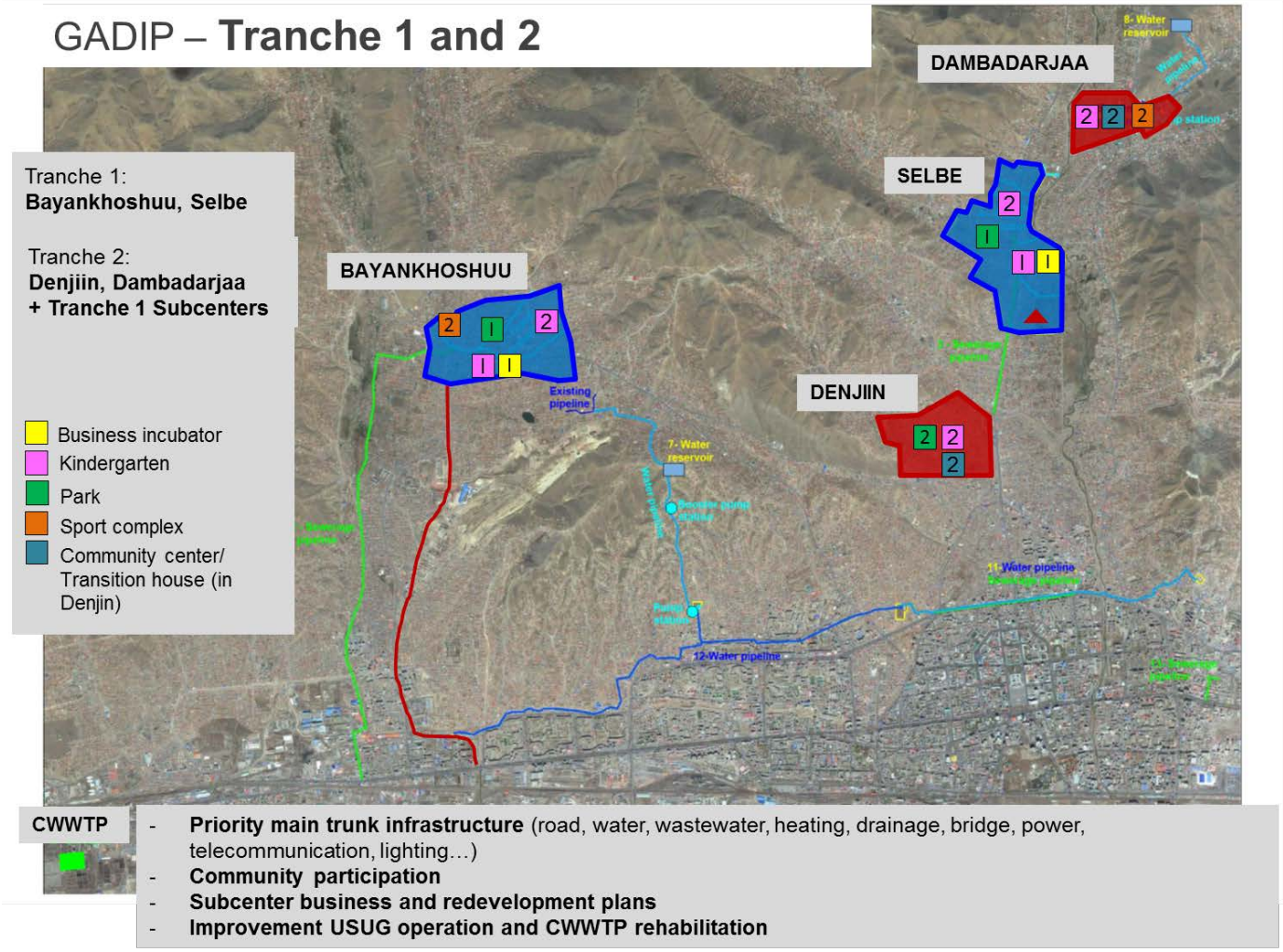
<u>Sector lending modality, core subprojects, and subsequent subprojects development</u>

AHURP is a sector project, which means that disbursements are contingent on the agreement and implementation of specific policy recommendations. This provides a clear pathway through which the recommendations and policy suggestions resulting from AHURP can be realized . The following figure illustrates the approach to project implementation.



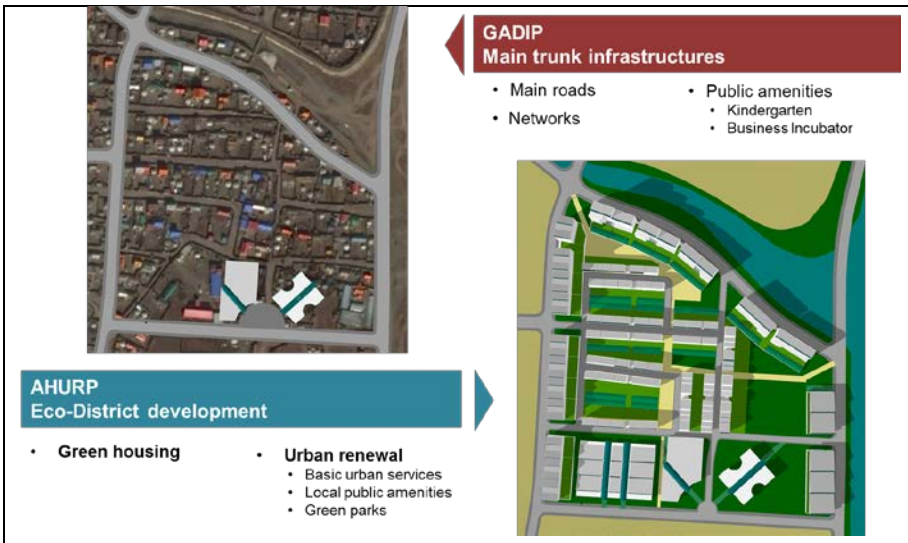
Sector lending is the proper modality for the project because (i) it will cover the delivery of low carbon and climate-resilient affordable housing and the redevelopment of ger areas into eco-districts spread across the city to be identified and constructed during the project implementation; and (ii) it is designed to help the Municipality of Ulaanbaatar (MUB) translate its green master plan/action plan and affordable housing strategy (AHS) into implementable plans, investments, and institutional reforms. MUB has the institutional capacity and is committed to undertake the necessary policy reforms identified in its two strategic documents. Feasibility studies and loan application will be formulated for core subprojects as basis for project approval and implementation of the sector loan. The core subprojects are located in Bayankhoshuu and Selbe subcenters which are also targeted by the ADB financed Ulaanbaatar Urban Services and Ger Areas Development Investment Program – Project 1 currently being implemented by MUB. The core subprojects cover around 15% or 15 hectares of the targeted 100 hectares. Due diligence, implementation, and safeguard frameworks have been formulated to guide the identification, preparation, and implementation of subprojects comprising the remaining 85 hectares. Subsequently, during project implementation, subprojects will be submitted for approval, and selected in accordance with the agreed criteria. The core subprojects will be appraised by ADB to serve as models for replication.

Figure C. 3. 2 GADIP Tranche 1 and 2 location

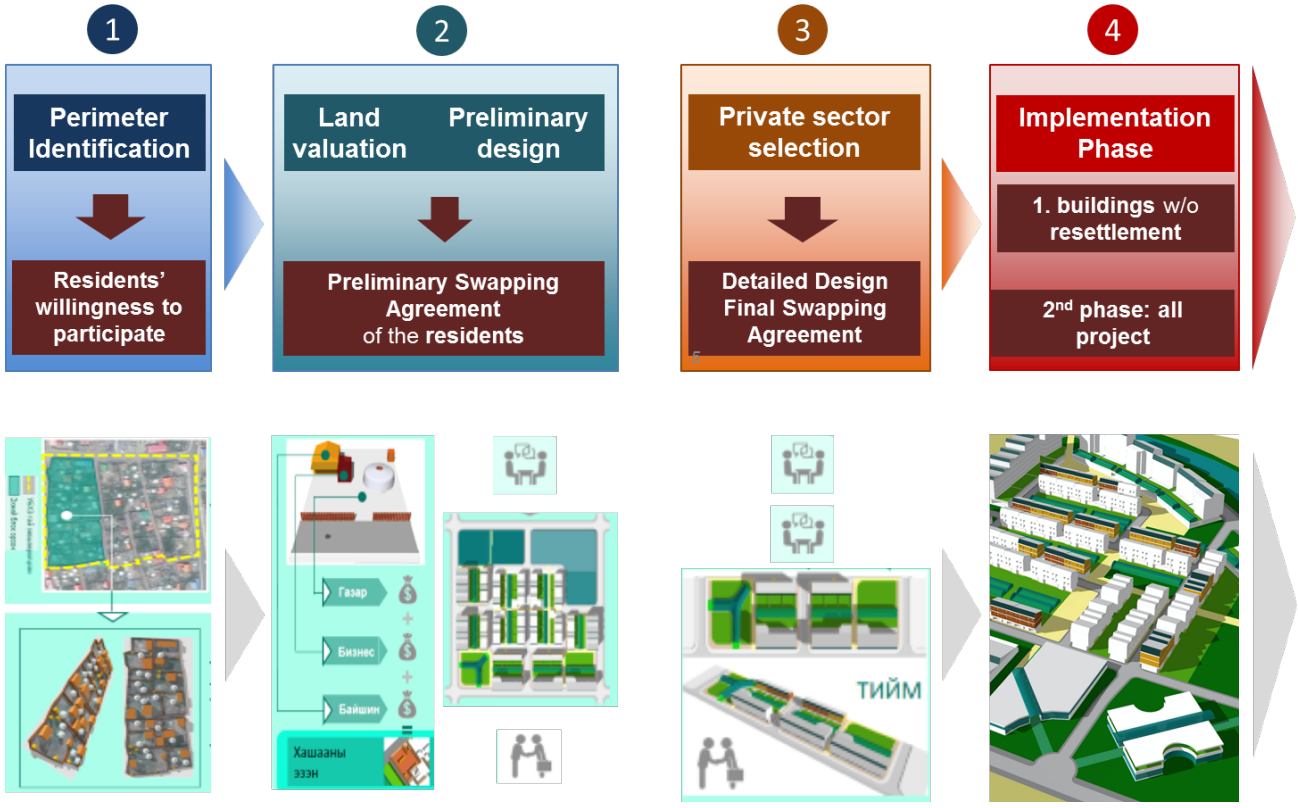


The project will be divided into two stages: a 11 hectare core subproject in Bayankhoshuu West and Selbe, followed by at least 85 hectares during the project implementation. The project will use the sector loan modality to allow for the appropriate adjustment of the policy and regulatory framework as well as the roadmap towards sustainable sector reforms, and incorporating lessons learned. AHURP in its totality can be considered a pilot and model project for Ulaanbaatar's sustainable development. It will be used to pilot clean climate technologies and formulate supporting clean climate technologies, creating a paradigm shift towards a low-carbon and climate resilient path for the development of Ulaanbaatar.

Figure. C.3.3 Synergies between the GADIP and the AHURP in Selbe subproject



The first stage focuses on two areas, Bayankhoshuu West and Sel where urban re-development subprojects will be developed as follows:



The implementation mechanism will be the same regardless of the site chosen for the AHURP. There will be four phases, the first two phases taking place before loan approval:

Phase 1 – identifying the perimeters for the core subprojects and assessing the willingness of communities to participate

Phase 2 – land valuation leading to a preliminary agreement of plot owners for swapping, followed by the preliminary design

Phase 3 –detailed design following loan approval and the final agreement on land valuation and land swapping

Phase 4 – the implementation phase requiring the selection of land developers

Main criteria for subprojects selection

- Approval of the masterplans agency and the urban planning department of the MUB.
- Should be located in *ger* areas and close to main trunk infrastructure. The project can therefore take full advantage of the extension of main trunk infrastructure in *ger* areas by ADB finance GADIP project, currently under implementation.
- Willingness to participate from plot owners in subproject sites should be at least of 80% and should form an area of around at least 4 ha.
- 4. Each subproject should be financially feasible for private sector intervention.

Financial Mechanisms Set-up

The project will use incentivizing financial mechanisms that combine grants and loans as follows:

- Grants demonstrating low carbon equipment and climate resilience investments and their economic viability under proper incentives, in addition to formulating appropriate policy shifts to allow replication on a commercial basis
- Grants to formulate innovative solutions as well as grants and concessional loans piloting the most promising climate technologies
- Concessional loans to developers to address financing constraints while keeping financial costs of eco-district development under control
- Concessional loans to households to address financing constraints and make the shift to non-polluting mode of life affordable

ADB concessional loan to the MUB will be blended with MUB budget under a sector loan to finance eco-district secondary and tertiary infrastructure, public space, social facilities, social housing, and project implementation technical assistance. This will form the core component driving project implementation. It will also be used to identify and design areas for redevelopment during implementation under the sector loan framework that will channel and condition other financing sources for implementation.

The TA fund is grant financed and will be used to support the formulation of policy measures, the monitoring of the impact of various green investments and green investment promoting policies and regulations, the promotion of new building materials and insulation, and the consolidation and dissemination of lessons learned. It does not involve actual investments, but provides a key input to identifying and scaling up successful innovative solutions included in AHURP.

C.4. Background Information on Project / Programme Sponsor (Executing Entity)

The Executing Agency (EA) for the project is the Municipality of Ulaanbaatar (MUB). MUB has experience in implementing internationally funded projects, including ongoing ADB-financed projects. It is currently implementing the first Tranche of the Ulaanbaatar Urban Services and Ger Areas Development Investment Program and has started the implementation of the second Tranche. The MUB will manage the overall project implementation PMO, working closely with the Development Bank of Mongolia to coordinate the green finance activities of the project. During the project implementation phase, the following organizations will be the main stakeholders at MUB level:

- Capital City Governor's Office (MUB) is the main Project Executing Agency of the AHURP in charge of approval of the project and provision of overall guidance to the preparation and implementation of the project
- Land Agency (LA) is responsible for the development sites cadaster, title information and identification of sites; and land, property valuation, and title transfer related issues during the preparation and planning of the project. LA will play an important role for the land acquisition and compensation in cooperation with the Project Implementation Unit (PIU)
- Urban Planning and Master Planning Agency (UPMPA) is responsible for the development plan and design approval, issuance of building permits and final state commissioning
- Ger Area Infrastructure Agency (GAIA) coordinates AHURP project with GAIA initiatives and recommend adequate development sites for the AHURP close to the main trunk infrastructure; in addition to working with community groups and supporting capacity building

- Capital City Housing Corporation (NOSK) is responsible for the operation and maintenance of social housing
- Urban Planning and Design Institute (UPADI) is a city owned entity which developed the Ulaanbaatar City Master Plan by 2020 and detailed plans of the Selbe and Bayankhoshuu Sub-centers. The development plans of sites will be consistent with master plan as well as detailed plans done by the UPADI.

C.5. Market Overview (if applicable)

Market analysis

Addressing climate change vulnerability, high greenhouse gas emissions, and high pollution in ger areas requires a change from traditional ger area land use and dwellings to a redevelopment model based on adopting climate-proofed infrastructure and housing embodying low-carbon principles. To make this switch possible, housing options will have to be made more affordable.

According to the housing demand and supply survey carried out by NOSK in 2016 on ger area households (*205,000 households representing 58% of the total population lived in ger areas)*, 72% of households need housing with public infrastructure, 24% need improvements on current ger area housing conditions, and 8% needs to rent within 3 years.

The market and affordable housing sectors can be (and is) served by private developers, although several barriers exist, such as lack of long-term financing, high interest rates, and severe winters that shorten the building season. The AHURP addresses these barriers by providing access to cheap capital sources for on-lending to qualified private sector market participants. The social segment of the market requires more substantial public sector support that AHURP aims to provide through a combination of soft financing and grants. The table below provides an overview of the development in each of these market segments.

	Social (15%)	**Affordable (55%)**	**Market (30%)**
Tenure option	Rental	Purchase, possibly Rent-to-Own	Purchase
Financing options	Monthly rental payment to a social landlord	Subsidized bank mortgage, "Compensation Coupon," cash, or a combination of the three; possibly rent-to-own if either the developer or municipality is willing retain ownership	Market rate bank mortgage or cash
Average construction costs	320 USD/m^2= 704,000MNT/ m^2 finished apartments (rental)	280 USD/ m^2= 670,000 MNT/ m^2 unfinished apartments (shell and bone) 320 USD/ m^2 = 770,000 MNT/ m^2 finished apartments	350 USD/ m^2 = 850,000 MNT/ m^2 finished apartments at higher standards
Target price	Rental: average 150,000 MNT/month Income dependent Apartment 40 m^2	Average 1,100,000 MNT / m^2 Income dependent	Uncontrolled price Current market price for conventional buildings: 2,100,000 MNT / m^2
Construction	Private contractor	Private developer	Private developer
Marketing & sales process	Owned by MUB; rented to poorest people	Sold by private developer at fixed price: 1,100,000 MNT/ m^2 Compensation coupon holders[40] having priority	Sold by private developer at market price Compensation coupon eligible
Operated by	MUB (NOSK)	Owners association	Owners association
Access criteria	Based on household situation, income level (Decile1-3) and current residential location	Based on household situation, income level (Decile4-7) and current residential location	None

[40] Compensation coupon holders are former khashaa owners that have left their land for the development within AHURP to occur, and who have received compensation coupons in return.

In all market segments, very few measures have been included to utilize renewable energy (yielding a modest return in the form of the avoided electricity tariff), increase building energy efficiency,[41] and water saving[42]. Other barriers apart from the lack of a market return from these investments are split incentives, high costs of finance, and difficulty of arranging longer term finance, lack of reliable information about performance, and lack of skilled personnel.

AHURP will go beyond this by including solar PV panels for electricity generation, providing insulation beyond the minimum requirements under the Mongolian building code BnDB 24-02-09, and water saving features. In synergy with GADIP, ADB is also investing in improved environmental, low carbon, and climate-resilient infrastructure. Apart from including these physical climate-relevant investments, AHURP will also work on soft measures to address the various barriers mentioned to create better enabling conditions for these types of investment, for example through development of policies and regulations with appropriate incentives, metering, and capacity building to address technical and skills barriers.

Competition analysis

There are no competitors. AHURP will work through the private sector where possible (the affordable housing segment and the market segment), while the social segment is currently underserved and relies on government contributions. See also above.

Pricing structures, price controls, subsidies available, and government involvement

The mortgage market in Mongolia is fairly young and up until the early 1990s, the GoM used to provide free housing to its citizens. In mid-1997, GoM and ADB began developing a legal and policy framework for the housing sector in Mongolia. In 1999, GoM approved the Housing Law, the National Housing Strategy (NHS), the Housing Privatisation Law and the Condominium Law. Under the NHS, housing policies were made more demand-driven with new standards and regulations shifting responsibilities to the private sector. A few banks had started experimenting with very limited mortgage lending programs, but the first structured housing finance project only dates back to 2002. Set in place by ADB, the Housing Finance Sector Project (HFSP) issued between 2003-2007 a total of 2,473 mortgage loans amounting to over 15 USD million under the scheme. The project was the first to introduce long-term mortgage lending to Mongolia's banking system.

The first subsidized mortgage program was established by the Ministry of Construction and Urban Development (MCUD) in cooperation with the GoM in 2006 with the objective to construct and provide financing for 40,000 homes by 2009. MCUD created the Housing Finance Corporation in August 2006 to manage the implementation of the program. Mortgage loans under the program were available for a maximum of 10 years with an annual interest rate ceiling of 10%, which was 9.8% less than the market average interest rate. It was also in 2006 that the Mongolian Mortgage Corporation (MIK) was incorporated. It was established by the Bank of Mongolia and 10 other commercial banks, aiming to create a pool of long-term funds to stimulate a secondary mortgage market. The funding for most of the mortgage programs has been through international bonds, debt or simply through printing money by the Bank of Mongolia. Partial funds are used to boost the supply-side of the market by making funds available to the construction sector and the demand-side by subsidizing the mortgages. However, housing finance that expanded due to the Government of Mongolia's mortgage loan program mainly caters to upper middle-income households who are able to finance down payments and repay the loans, and had no impact on the lower and middle income population.

C.6. Regulation, Taxation and Insurance (if applicable)

Licenses and approval procedures

Before any construction activities can commence, the following permits and licenses need to be obtained:

- Transfer of land ownership and possession right
- Approval of preliminary and detailed design
- Technical specifications
- Construction permits
- Technical requirements for design, construction materials and civil works need be met
- Requirements for construction sites need be met

[41] Currently there is no incentive to do so in absence of an impact on amount paid for heating as tariff in apartment buildings is based on floor space instead of amount of heat consumed.

[42] There are very limited incentives for water saving investments andwater is often unmetered and in any case, water tariffs are low if metered.

Taxes and foreign exchange regulations.
There is a 2% income sales tax payable by the seller on the sale of any immoveable property and a 10% VAT on the sale of new property applicable to the developer. There are no relevant foreign exchange regulations that could negatively affect AHURP.

Insurance policies
There are no relevant insurance policies that could negatively affect AHURP.

C.7. Institutional / Implementation Arrangements

Project steering committee
A project steering committee, comprising the Vice Minister of Finance, the Governor of Ulaanbaatar and government officials from the Ministry of Finance, Ministry of Environment and Tourism, Municipality of Ulaanbaatar, Ministry of Construction and Urban Development, and Development Bank of Mongolia, will be established to oversee the project implementation, and provide strategic and policy guidance. The steering committee will, among others:

- Provide the Project Executing Agency and Project Implementation Units (PIUs) with the policy guidance to facilitate, complete, and achieve the project objectives specified in underlying agreements in a timely manner
- Provide coordination and cohesiveness within the sector and between subsectors to ensure effectiveness and efficiency of project activities;
- Review and approve the pipeline of subprojects to be prepared, financed, and implemented;
- Review and approve teh project mid-term implementation plan, detailed annual implementation plan, as well as procurement and financial plans based on the latter;
- Review and evaluate on a semi-annual basis the implementation of plans and related monitoring and evaluation reports, review and evaluate an annual project progress assessment report during the meeting to be held in the first quarter of the following year, and provide recommendations on remedial actions to the Project Executing Agency, PMO and PIUs, if required, and oversee implementation of such recommendations; and
- If implementation of recommendations is considered not satisfactory, advise the Project Executing Agency to impose disciplinary measures on responsible staff.

Executing /Implementing Entity
The Municipality of Ulaanbaatar (MUB) is the Executing Entity or Executing Agency (EA) and the Implementing Entity or Implementing Agency (IA) where the Project Management Office (PMO) is located. The MUB will be responsible for identifying, prioritizing, formulating, appraising, approving, and implementing subprojects in accordance with technical, financial, and economic appraisal criteria, including social and environmental criteria, agreed with the ADB. It will be tasked with the:

- Overall responsibility for program oversight and administration
- Setting up of a multimodal coordination committee and following up on the action plan
- Overseeing the implementation of project sector reform
- Submitting progress reports to the steering committee for decision making
- Preparing the redevelopment sites components/Urban Redevelopment Unit
- Accountability and responsibility for the proper use of funds from ADB loans and GCF grants advance accounts
- Endorsing withdrawal applications
- Ensuring compliance with project covenants
- Holding quarterly meetings with the PMO
- Monitoring cooperation among related official development assistance (ODA)-funded projects

The PMO for public investment
The MUB PMO will be established under the Governor of the Ulaanbaatar Capital City. The MUB PMO will be responsible for the overall implementation of the project. The DBM PIU will closely coordinate and report to the MUB PMO regarding project implementation. The MUB PMO will:

- Perform day-to-day management work during project preparation, implementation and supervision periods
- Coordinate with government agencies and other involved parties for project implementation
- Communicate and coordinate with ADB for project management and implementation
- Report project implementation progress and compliance monitoring to ADB

- Engage project management consulting services
- Engage external resettlement, environmental and social monitors
- On behalf of the implementation agencies and their PIUs, review and submit bidding documents, bid evaluation reports, and other necessary documentation for ADB approval
- Submit withdrawal applications to the Ministry of Finance
- Submit required annual audit reports and financial statements of project account to ADB complying with international accounting standards
- Identify sub components and selection
- Responsible for community engagement, land valuation and land swapping process
- Take responsibility for detailed architectural and infrastructure design
- Ensure due diligence and compliance with ADB safeguard policies
- Carry-out the procurement for infrastructure, social housing, public space
- Undertake construction supervision
- Undertake the performance audit of buildings
- Manage the Green Building Fund

<u>The Development Bank of Mongolia and PIU for Private Investments and Green Banking</u>

A Project Implementation Unit (PIU) will be located at the Development Bank of Mongolia under its Asset Management Company to manage the EDAF (Eco-district Development and Green Affordable Housing Fund). The PIU will:

- Develop and secure approval from the Project Steering Committee (PSC) for the guidelines, criteria, and procedures to be followed by participating commercial banks in accessing, and using loan proceeds from the EDAF
- Conduct briefings for commercial banks, developers, and the targeted household beneficiaries on the project and EDAF's policies and procedures
- In coordination with the MUB PMO, conduct preliminary due diligence of real estate developers for the project
- Undertake due diligence of commercial banks borrowing from EDAF, and recommend approval by MOF/PSC of their proposed EDAF loans
- Manage EDAF's onlending activities to qualified commercial banks in accordance with the project's approved guidelines, criteria, and procedures
- Manage the Advance Account for the GCF Concessional Lending
- Monitor the utilization of EDAF loans for developer and mortgage financing and prepare the necessary periodic progress reports for submission to MUB and the MOF
- Prepare financial management reports on the EDAF and other reports required by MOF and the project
- Facilitate the preparation and timely submission of EDAF audit reports
- Under the project, prepare and implement a strategic plan for sector capacity development and institutional strengthening in green banking for climate resilient housing

<u>The ADB (Accredited Entity)</u>

The ADB will oversee the project administration, monitor the project implementation, and will insure project compliance with ADB safeguards and relevant policies. The ADB will reviews the execution of subprojects, monitors the capability and performance of the executing agency, and assesses any change in circumstances that may have a bearing on the sector development plan in general and on the implementation and operation of the sector subprojects in particular. More specifically, ADB will:

- conduct review missions
- monitor the government's compliance with loan effectiveness conditions,
- update of the Project Administration Manual (PAM),
- monitor the procurement of goods, works, and consulting services,
- monitor implementation and development performance, using the elements of the project performance management system (PPMS), DMF, and the PAM
- analyze progress reports,
- disburse loan proceeds, and monitoring project cash flows, both from ADB and other financing sources,
- reviewing unaudited and audited project accounts and agency financial statements,
- monitoring the government's compliance with applicable ADB policies as set out in the loan, grant and project agreements
- monitor the project compliance with environmental and social safeguards, social dimensions and gender development.

- monitor physical works progress, sector policy changes, sector restructuring, and tariff reform,
- monitor the government's and the executing agency's (EA's) compliance with covenants
- strengthening the EA's and implementing agencies' financial management and developing their capacity,
- preparing project completion reports, and
- assessing the achievement of the project outcome and outputs, and the contribution to achieving the development impact.

Figure C.7.1. Project Implementation Arrangements

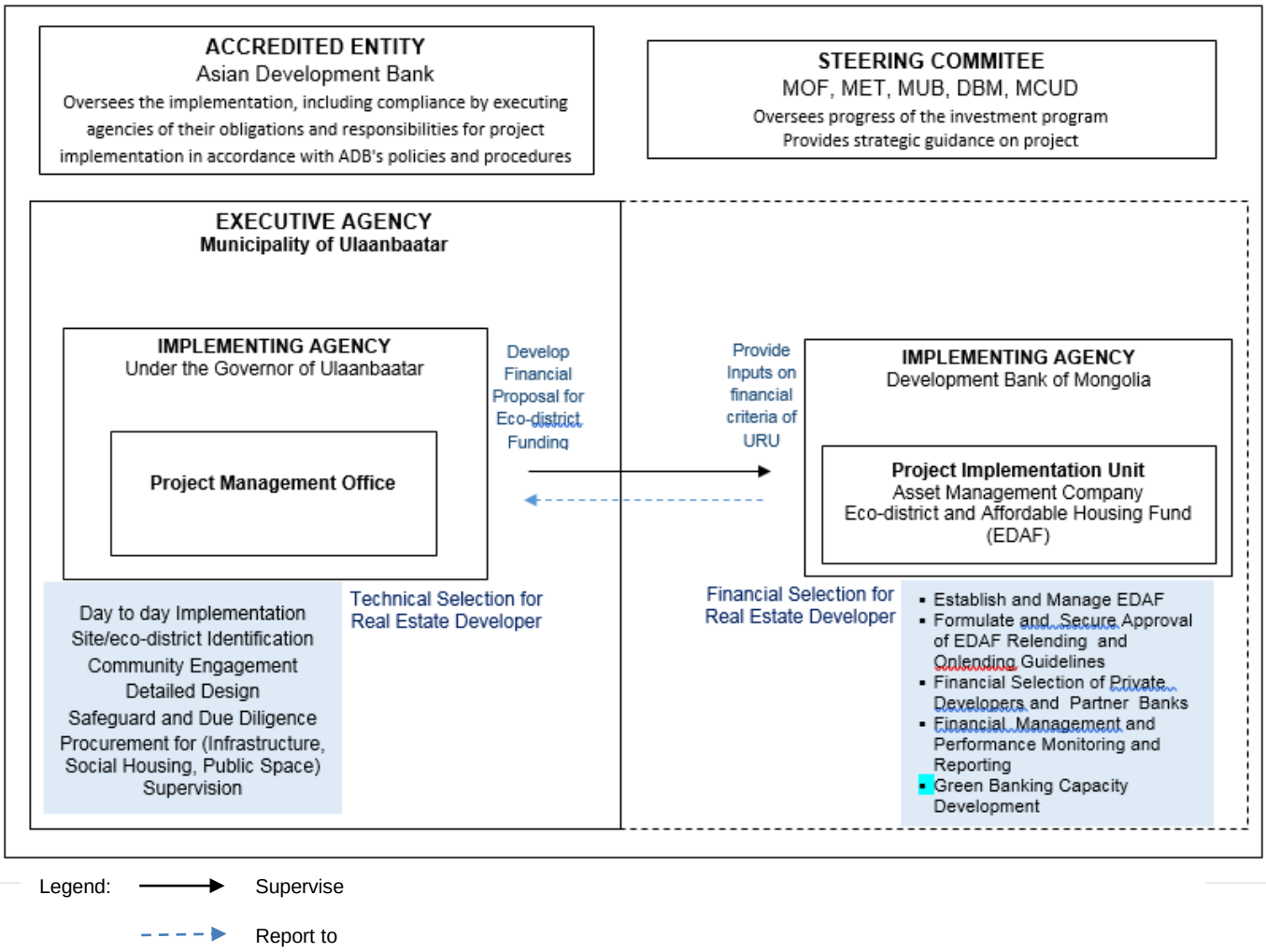
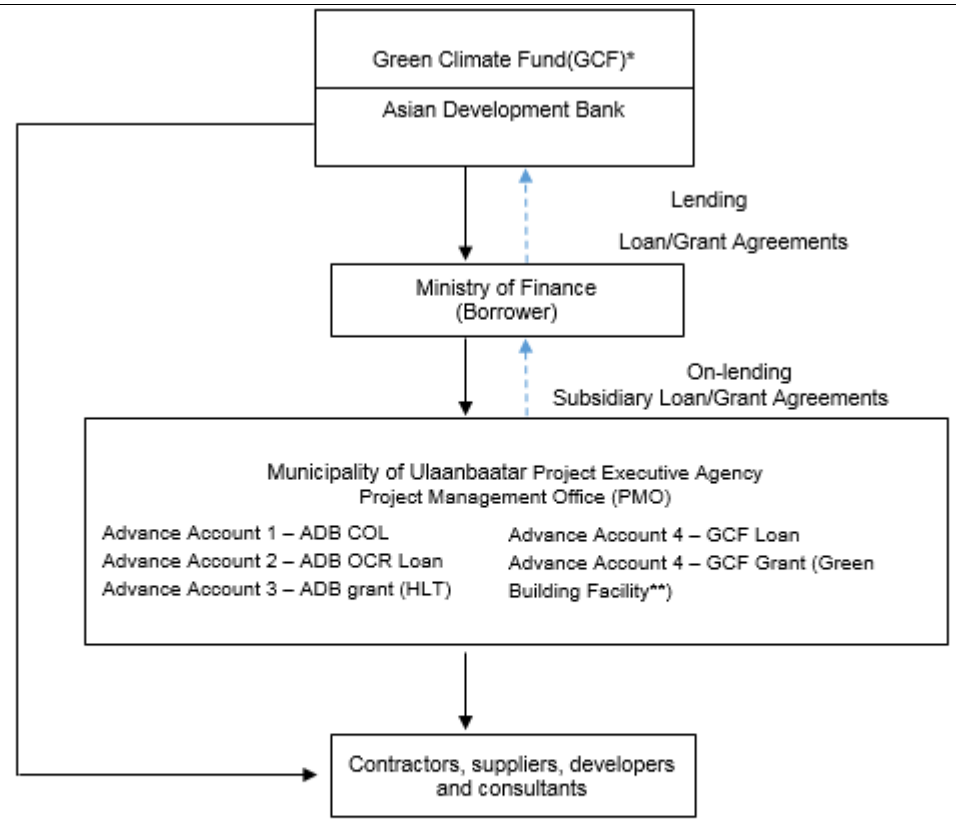


Figure C.7.2: Funds Flow Diagram for the Municipality of Ulaanbaatar



* The GCF grant and loan will be fully administered by Asian Development Bank.
** The Green Building Facility will be established and managed by MUB in accordance with the relevant Mongolian policies.

Legend: payments released to advance accounts and/or directly to contractors, suppliers, developers, and consultants
withdrawal application prepared by MUB and forwarded to Ministry of Finance (MOF)

Figure C.7.3: Funds Flow Diagram for Green Banking

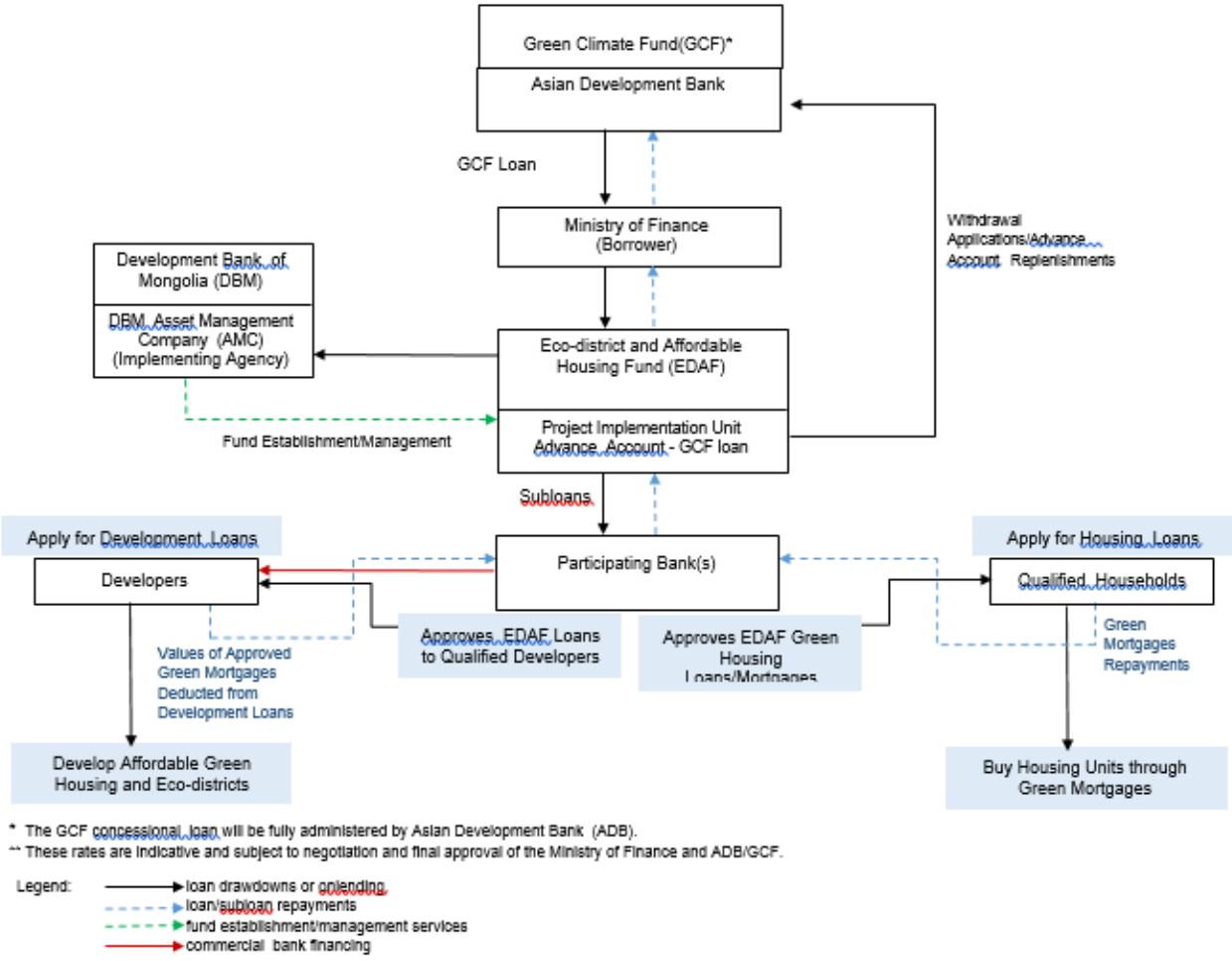


Figure C.7.2 Funds Flow Diagram for Green Banking and the box insert below explains the approach to the EDAF in more detail. The MOF will request a sovereign loan from ADB (using GCF funding sources) and will relend the loan proceeds to the Development Bank of Mongolia (DBM) where the EDAF will be established. DBM will establish and manage the EDAF and DBM will subsequently relend the funds to an eligible and qualified participating commercial bank which will establish an EDAF financing facility (EFF) for on-lending to qualified private developers and homebuyers using a methodology that optimizes the use of the funds, minimizes transaction costs for end-borrowers, and provides greater security to the participating bank.

EDAF financing mechanisms and operations. The EDAF will provide debt financing to participating commercial banks which will onlend to qualified private developers, and home buyers. It will use a methodology that optimizes the uses of mobilized financial resources, minimizes the transaction costs for the targeted end-buyers, and provides greater security to the participating bank. Box 1 below describes more fully the proposed EDAF financing mechanics and operations.

Box 1: Proposed EDAF Financing Mechanics and Operations

The proposed EDAF operations are briefly summarized in the ensuing paragraphs below.
Funds will be made available to domestic commercial banks on a private sector loan basis.

1. The participating commercial bank releases the funds required by the private developer to cover up to 70%–75% of its total construction cost (the remaining 25%–30% will be covered by the developer's own equity). About 35% (depending of the amount of mortgage necessary) will be covered by the EDAF. The rest of the financing will come from the developer's partner bank lending product. The debt disbursed to the developers will be in accordance with a precise set of requirements which will set out what can be built, using what materials, under a certain timeline, among others. It is expected that the loans to the developers will carry a combined average interest rate of about 15% per annum, be denominated in the local currency, and have a term of up to 5 years

with a grace period of a maximum of 3 years. The combined average interest rate is calculated based on a EDAF lending product at 8% interest rate and a lending product from commercial bank at market rate, that is about 20%.

2. The developer uses the financing from the bank and EDAF to develop the housing and private sector component of the ecodistrict based on the eco-district land use plan and detailed design.
3. The developer will, after agreement with the bank, be able to advertise and promote low cost green mortgages (currently estimated to be between 8%–10%) to eligible and qualified homebuyers. The developer will only promote the green mortgages of the participating bank through which it obtained its project financing.
4. Eligible and qualified homebuyers, once made aware of preferential conditions for mortgages through the participating bank, will go to the bank to apply to receive a green housing mortgage. The application process for the mortgage will be based on the Government's 8% plus program but modified to suit the requirements of the project. However, given that the ecodistrict developer works with a pre-identified and pre-approved partner commercial bank, there should be a reduction in the time taken for due diligence and property valuation, leading to a faster application process.
5. Should the mortgage application be successful, the homebuyer will receive the green mortgage papers, but the participating bank will neither pay the funds to the developer nor the homebuyer. Instead, the developer will be issued with a permission to transfer the property ownership to the homebuyer.
6. The participating bank will retain the value amount of the green mortgage and simply deduct this value from the developer's outstanding loan amount. Subsequently, it will transfer the corresponding loan amount to the successful homebuyer. Any residual value after the developer's loan has been paid off will be paid to the developer.

The proposed methodology allows for far greater liquidity for the bank since it does not have to disburse funds to homebuyers through mortgages, eliminating the need for them to go to the developer who then must pay off their outstanding loans. That inefficiency is reduced greatly and the exchange of papers minimized mean that the limited funds can be deployed far more efficiently. It also provides greater security to the participating bank they have already carried out the due diligence on the borrowing developer, have approved the loan, and are aware of the property, for which they already hold the collateral pledge.

Developers' equity contributions and acceptable use of funds

The project will develop rules for the minimum equity contributions of borrowers and grant recipients to ensure efficient use of funds. Moreover, the project will provide guidelines for the acceptable use of funds and maintain a list of accredited suppliers of technological solutions. This will ensure that funds are spent wisely on equipment and materials of good quality.

Relending and onlending. The EDAF will relend the GCF loan proceeds to qualified commercial banks and they, in turn, will onlend to the private developers and household beneficiaries of the project. The EDAF subloan to a selected private developer will be for a term of up to 5 years, including a grace period of a maximum of 3 years, at a rate that would facilitate an aggregate benchmark lending rate that is currently estimated to be 15% per annum.[43] Green housing mortgages to be offered to qualified households will have a term of up to 30 years at an interest rate currently determined to be 8%–10% per annum.[44]

For the project to achieve the desired impact, it is necessary that the GCF's highly concessional financing terms be passed on to as much end-users as possible through the EDAF. Consequently, the amount of EDAF financing to be used to develop one ecodistrict should be limited to the amount that would enable the target households to access green housing mortgages for the affordable and market rate housing units in the ecodistrict. This limit has been estimated to correspond to about 35% of the total private sector financing needs of one ecodistrict. Except under specific circumstances approved by the project steering committee, the 35% limit should, therefore, be applied as the maximum EDAF financing available for each ecodistrict. The resulting financing gap from this EDAF limit will be funded by the developer's equity, preselling proceeds from the housing units, and the financing share of the developer's partner commercial banks through its other lending facilities and debt finance instruments.[45]

[43] The terms of the GCF concessional loan make possible the use of benchmarking (or near market) lending. The GCF concessional loan will provide a final financing cost to the project that is lower than it would have been without the fund's participation.

[44] The EDAF financing could potentially be matched by DBM's green fund resources, valued at about $15 million, and by commercial banks' funds.

[45] The remaining financing can also come from other green finance instruments such as those from the Green Development Fund to be established by DBM which the project will help to structure or from the participating

With the current scarcity of loanable funds in the Mongolian financial market which has prompted surging domestic interest rates, the project's financing arrangement underscores the need for the EDAF financing to pass on the highly concessional GCF loan first to the developers, and ultimately to the end-household buyers. Maintaining the highly concessional lending terms of the GCF loan through the EDAF would, therefore, effectively allow the borrowing commercial banks to blend resources[46] and onlend at a benchmark rate lower than the existing domestic rates guaranteeing the financial feasibility of the ecodistrict and the production of affordable units that are linked to green housing mortgages. To compensate for the prevailing high cost of commercial bank lending, it has been estimated that the EDAF financing should be on lent at a maximum of 8%.[47] The funds flow for the EDAF for Output 2, incorporating the proposed relending and onlending rates through loans and subloans, is shown in **Annex 2**.

Eligibility and selection criteria for participating commercial banks. The EDAF will relend the GCF loan proceeds to commercial banks using an eligibility and selection criteria that include the following: (i) must be a duly registered bank in Ulaanbaatar under the applicable laws of Mongolia; (ii) must have a proven track record of at least 5 years in financing medium-scale to large-scale urban property development including mixed-income housing development; (iii) must be currently implementing or have plans to implement a financing program for green growth initiatives; (iv) be compliant with orders or instructions of the Bank of Mongolia (BOM) such as minimum capital to risk assets ratio, legal and liquidity reserve requirements, and general loan loss and provisioning requirements for six consecutive months prior to filing of accreditation application under the project; (v) have no past due obligations with BOM or adverse audit findings; (vi) have an adequately maintained financial management system including accounting records, procedures, and internal as well as risk management control systems; and (vii) be willing to designate experienced professional staff who will report progress to, and coordinate relevant activities with, the EDAF and the MUB.

Financial monitoring, reporting, auditing, and monitoring (EDAF). DBM, through the AMC, will put in place adequate financial management systems and procedures to meet ADB requirements, including separate accounting, reporting, auditing, and monitoring systems for the EDAF FIL component of the project.

To facilitate subproject implementation, the EDAF will prepare, for each project phase and from time to time as warranted, a list of commercial banks eligible to partner with qualified real estate developers. To be prequalified, a financial due diligence will be conducted by DBM's AMC following the criteria agreed for the project (see para. 30 for an indicative list) and the relevant ADB guidelines. Under the project preparatory technical assistance, a financial due diligence has been undertaken on XacBank which has expressed an interest to participate in the project.[48]

Incentives and credit enhancements for investments in climate change mitigation and adaptation. An estimated $40.7 million or 81.5% of the GCF grant will be used to finance the GBF which will be established by MUB under the applicable Mongolian law. The GCF will make grants available to qualified private developers and contractors participating in Outputs 1 and 2 to cover the costs of their green investments such as solar PV panels, insulation, and solar water heaters plus the costs of feasibility studies for innovative climate technologies.[49] Grants will be disbursed on a reimbursement basis after a performance assessment of the relevant project buildings/facilities and provided that the works performed, conform to the designed technical specifications. The GBF might be complemented with other sources of financing such as a GEF grant to support the piloting of innovative climate technologies. Potential residual income by participating commercial banks from interest rate differentials on the EDAF loans to private developers could also be used to fund the GBF to enable the distribution of targeted capital subsidies to qualified lower income households availing of green housing mortgages.

commercial banks which will be prequalified based on their ongoing green finance programs or plans, among other eligibility criteria.

[46] The blending can be done internally by the bank such that only one loan is issued to the developer or by developer who can avail of an EDAF loan through the bank and a supplementary loan from the bank at the higher interest rate.

[47] For the developers, the target aggregate average interest rate from the commercial bank financing (ranging from 20%–24% per annum) and the EDAF financing (ranging from 7%–8 %) is 15% per annum.

[48] The results of the financial due diligence conducted on XacBank are summarized in para. 48.

[49] Examples of technologies that could be considered as using natural pozzolans in the production of concrete (low carbon and climate resilient), utilizing deep geothermal resources for district heating, and using liquefied air and other energy storage technologies to allow a larger percentage of renewable energy on the Mongolian grid.

Financing output 3: Policy environment and sector capacity strengthened. For Output 3, $4.7 of the ADB concessional OCR loan and $6.4 million of the GCF grant will be used to support the formulation of policy measures, the monitoring of the impacts of the various green investments and green investment promoting policies and regulations, the promotion of new building materials and insulation and the consolidation and dissemination of lessons learned. These will not involve actual investments, but will be vital to addressing the policy and institutional constraints to implement the project and scale-up affordable green housing and resilient urban renewal in Mongolia.

Implementation and supervision steps

Project implementation follows a series of clear steps under the supervision of ADB as accredited entity:

Subprojects eligibility and selection criteria. The project is based on demand-led principles, in-situs redevelopment, and a comprehensive and integrated urban development and housing solution. Subproject eligible sites should (i) be located in *ger* areas and their redevelopment into eco-district are in line with the city master plan, (ii) cover a minimum of 4 ha where no more than 10% of the plot owners are not willing to participate, and (iii) be in a reasonable distance of main trunk infrastructure. The feasibility and appraisal criteria for a subproject to be eligible for detailed design and construction into eco-district stages are (i) identified sites should be within the minimum of 4 ha and 100% of the land owners who cover a continuous land area of 3 ha are willing to participate, (ii) access to main trunk infrastructure must be available at least on one side of the perimeter of the subproject,[50] and (iii) the financial feasibility of an eco-district guaranties a reasonable margin for the real estate developer. It integrates the eco-district characteristics. No Category A subproject for environment or involuntary resettlement will be financed under the project.

Demand-led and land swapping mechanism. The land valuation mechanism (which includes valuation of land, structure, and business) formulated for each subproject will distribute an equitable compensation amongst the landowners. The compensation amount calculated will vary from one subproject to another depending of the financial feasibility established for each eco-district. It will be translated in apartment unit size (no cash compensation) to be built in the eco-district, and will follow a voluntary resettlement framework formulated for the project. The voluntary resettlement framework and will include two steps: (i) at feasibility stage, residents express their willingness to participate based on the swapping principles through a preliminary agreement; and (ii) at detailed design stage, final compensation value and swapping are fixed and agreed with the residents. Those two steps will be driven by the project PMO, and will follow a consultation and participation plan, including a stakeholder analysis and mapping that has been prepared under this project. The consultation and participation plan comprises three stages of stakeholders' participation: (i) project feasibility, to build a consensus and cooperation with affected communities on land swap and resettlement scheme; (ii) detailed design, to build a consensus with the project key stakeholders including affected communities, municipal and government organizations, private sector and relevant associations and non-government organizations on the final eco-district development plans; and (iii) construction, supervision, operation and maintenance (O&M) arrangements to ensure good cooperation with key project stakeholders as per the work schedule.

A housing option will be proposed to all the residents leaving on a subproject site, using land swap mechanisms for landowners, and rent-to-own or rental schemes[51] for the renters. For landowner, the land valuation, based on the financial feasibility and the land redevelopment arrangements of each eco-district, reflects two key elements: (i) the maximum price that developers are able to pay for the aggregate value of the land and assets, also known as the residual value of land,[52] and (ii) the maximum apartment size[53] to be built in the future eco-district in exchange from the land. A minimum apartment size of 35 m^2 irrespective of the actual aggregate value of the land and assets is guaranteed by the project.[54] The translation of land and asset into m^2 of apartment will vary from one eco-district to another, depending mainly on the land use characteristics, the estimated land price in the area, the overall cost of assets, and the geographical location of the subproject, all of which will impact the financial feasibility of the eco-district. Involuntary resettlement will be considered only when certain infrastructure development outside the subprojects perimeter is affecting households.

[50] If the estimated cost of connection of a subproject to main trunk infrastructure exceeds 10% of the cost of internal infrastructure and public facilities, the selection of this specific subproject should be reconsidered.
[51] The monthly cost of the rent and rent-to-own schemes should not be more than 25% of the monthly income of one household.
[52] The residual value must be considered as a simple parameter/marker of the financial feasibility for the land developer.
[53] Apartment size will also be translated into ownership of other structure or facility such as greenhouses, workshops, or garages.
[54] Based on Mongolian standard.

Eco-district design parameters. Each eco-district subproject feasibility study and detailed design should ensure that 30% of land use is public space (including 15% of open space and green areas), and that the ratio of m^2 of public amenities/facilities, commercial facilities, and entertainment areas per person correspond to average international standard (respectively 1.2 m^2/persons, 1.5 m^2/persons, and 0.5 m^2/persons).[55] Housing units to be constructed in one eco-district should comprise 15% social housing, 55% affordable housing, and 30% market rate housing. The average density of an eco-district should be about 300 p/ha and housing building should comprise townhouses or low-rise building of a maximum of five to six floors. Each building should reach an energy efficiency performance guarantying an energy consumption of 150 kilowatt hours per square meter per year and should comply with Mongolian Norm and Regulation BnDB 23-02-09 "Thermal Performance of Buildings" (as amended from time to time and complemented with the Green Building Regulation) and housing units should be equipped with indoor air filtration system. Building and facilities should have 18% of their footprint covered with solar panels. At least 10% of the eco-district surface should be covered with greenhouses[56]. If other renewable energy solution is demonstrated technologically and economically viable at feasibility study stage, it can be introduced in the eco-district design.[57] The extra cost related to energy efficiency and air ventilation system to comply with thermal performance building regulation will be subsidized by the Green Building Facility. Solar panel will be financed, installed, and operated by the MUB using portions of the GCF loan proceeds.

Housing units to be constructed in one eco-district should comprise 15% social, 55% affordable, and 30% market rate. The social housing units, representing 15% of the project's total housing offer in the eco-districts will be financed and built by MUB and managed by NOSK. The rent of the social housing should not exceed 25% of the monthly income of the targeted lowest income decile (deciles 1–3). The developers will build and sell the affordable and market rate housing units. The financial feasibility should ensure a margin for the developer which will be calculated for each phase depending on the socioeconomic and the market situation. For the core subprojects, this margin has been estimated at 20%. The cost–price structure to be adopted should be able to sell 65% of the housing units built by the developers as affordable to households belonging to the 4th to the 7th deciles of Ulaanbaatar' income distribution. For the purpose of estimating the affordability of housing units, the resulting monthly amortization from an 8% mortgage with a 25% down payment and a term of 30 years should not exceed 30% of the monthly income of the targeted household beneficiaries. Table 3 presents the selling and buying conditions of each housing category to be offered by the project. These conditions will be revisited at the start of each project phase to reflect the socioeconomic and market changes in Ulaanbaatar, ensuring that the objectives and principles of the project are met. The financial feasibility of each subproject will be calculated based on the land swapping agreement with 10% contingency provision to absorb adjustments that could potentially arise during the detail design and final agreement.

Table 3: Core Subproject Housing Units Selling and Buying Conditions

Social housing Units	Household monthly income target	>MNT740,000/month
	Average rental rate	MNT145,000/35 m^2/month
	Rent-to-own bank conditions	Down payment of 0%, tenor of 30 years, interest rate of 5%
	Reserved to	Renters living in the subproject areas Residents living in the *ger* areas To be a temporary or permanent citizen of the city

[55] If public facilities, commercial facilities or entertainment areas are already existing in the vicinity of the subproject, the ratio of m^2/p to be built should be modified accordingly.

[56] All South oriented the greenhouses will be located (i) mostly along pedestrian / cycle lanes between courtyards of townhouses, thus with preferential access for the neighborhood residents; and (ii) or, on rooftop of the covered private parking or on the top terrace of the low-rise buildings. Both location take advantage of a stream of warm air supplied by the ventilation ducts coming from the apartments. This features is considered as an additional livelihood improvement measure for low and mid-low income household, targeting households living in social and affordable housing. Social housing renters will receive a priority access to the greenhouses that are owned by the Municipality. Affordable housing owners will receive about 9m2 of greenhouse that they will own. Urban farming community committees will be established as cooperative and to overview the overall O&M of the greenhouses.

[57] Such as heat pump or solid waste energy recovery technology.

		Priority for: people with disabilities, seniors without caretakers, and vulnerable people
Affordable housing units	Household monthly income target	MNT740,000 < monthly income < MNT1,400,000
	Selling price	MNT1.1 million/m^2
	Purchase/bank conditions:	Down payment of at least 25%, mortgage tenor of 30 years, interest rate of 8%
	Swapping condition	Based on land and asset valuation Cannot sell apartment before 10 years under conditions
	Reserved to	Land owners and renters living in the subproject area Residents living in the *ger* areas To be a temporary or permanent citizen of the city Priority for: people with disabilities, seniors without caretakers, and vulnerable people
Market rate housing units	Household monthly income target	None
	Selling price	≥MNT2.1 million / sqm
	Purchase/bank conditions	Down payment of at least 30%, mortgage tenor of 20 years, interest rate of at least 10%
	Reserved to	No restriction

Infrastructure and architectural detailed design. For each phase, a consulting firm will be hired to produce detailed infrastructure and architectural design, bill of quantity, and technical specifications for each phase of the eco-districts. Final design will cover all aspects of eco-district such as infrastructure, facilities, townhouse and apartment buildings, green area, parking, greenhouse, pedestrian and bicycling lane. It will be in line with the feasibility study and will be done in close consultation with the communities, urban planning and construction agencies, and private sector. This stage will confirm or adjust the financial feasibility developed by the feasibility study for each eco-district under one phase and will produce the final land swap agreement with landowners. The consulting firm responsible of the detailed design will oversee the construction supervision activities for each phase and will be in charge of the building performance assessment. The detailed design will produce the procurement documents of infrastructure and facilities including both the financial and technical criteria, for real estate developer selection.

Contractors and real estate developer selection and eligibility criteria. The procurement of goods, civil works, and consulting services financed by the public component will be subject to and governed by ADB's Procurement Guidelines (2015, as amended from time to time) and Guidelines on the Use of Consultants by ADB and its Borrowers (2013, as amended from time to time). It will be under the responsibility of MUB and will be managed by the PMO. For the FIL component, the selection of real estate developers will be based on qualification criteria and bid responsiveness using a scoring method for both the technical and financial aspects of their proposals. The developer should partner with one of the preselected commercial banks. The developer's eligibility will follow ADB's qualification criteria.[58] Qualified developers' proposal assessment will include the following criteria (i) implementation capacity; (ii) adequacy of technical proposal's detailed design, bill of quantity, and technical specification; (iii) technical alternatives compliance;[59] (v) financing capacity; and (iv) financing and business plans. The financial scoring will also take into consideration (i) the amount of EDAF requested for the project in order to minimize the use of the EDAF, (ii) the capacity of the partner

[58] These will include (i) eligibility criteria (conflict of interest, and ADB/UN eligibility); (ii) no pending litigation and arbitration; (iii) financial situation (historical financial performance, average annual construction turnover, and financial resources); and (iv) construction experience (contracts of similar size and nature and construction experience in key activities).

[59] With the technical specifications and resulting improvements (compliance with the project objective, with the subproject land use and development plan, and with the energy efficiency performances), cost benefits (such energy efficiency performance and reduction of the implementation schedule), quantifiable nonconformities, and omissions.

commercial banks to supplement the EDAF financing at a rate that would support the benchmark lending rate which will be market based but below the current domestic interest rate charged for similar types of investments, and (iii) a financing plan that would be fully supportive of the financial viability of the eco-district and the financial sustainability of the developer, yet not jeopardizing that of its partner bank. The developer who is most responsive to the evaluation criteria and obtain the best combined score from the technical and financial evaluations will be selected. Each qualified developer will undertake procurement of good and civil works with due attention to economy and efficiency in accordance with established private sector or commercial practices acceptable to ADB. The MUB PMO will be responsible for the technical evaluation scoring and the DBM PIU for the financial evaluation scoring.

Construction. The construction process will ensure a progressive development process based on sub-block development within each eco-district subprojects. The first step includes the construction of the main trunk infrastructure and social housing. Social housing will be built without resettlement on the space available on site and will be used as transition resettlement units. Once the developer has been selected, real estate development will start in phases for each sub-block together with the finalization of the infrastructure and the construction of the public facilities and public space. Solar panel and building performance sensors will be installed in the constructed building and facilities. Construction supervision will be performed by the detailed design and supervision consultants and the PMO. The building performance will be audited, and the cost of the green features that meet the standards will be reimbursed to the developer by the GBF.

Development, monitoring, and sustainable operation and maintenance. The selling, marketing, and branding of the affordable and market rate housing units will be supported by specific technical support provided by the PMO to ensure full occupancy of the eco-district units. The O&M provision during the project implementation will be covered by the project. The secondary/tertiary infrastructure (roads and networks), the social housing units, and the public amenities would be operated by the MUB relevant departments while NOSK will operate and maintain the social housing units. For the social housing, it is expected that a public sector home-owners association (HOA) will be established at the sub-block level. These HOAs will be managed by khoroo (administrative subunit in Mongolia) authorities supported by the PMO and NOSK. Second, for the affordable housing and market rate units, a similar HOA structure will be set up under the management of private companies selected through a specific EoI. The affordability effort limited to 20% to 30% of the households' income includes the O&M charges. A system of property taxes for maintenance of the facilities will be piloted (especially for the green houses also solid waste management). The operation, maintenance, and monitoring of building energy performance and renewable energy will be established under the smart energy efficiency and renewable energy monitoring and control system. This will establish an economic model and management contract agreement with private sector to take over the combined operation, maintenance, and monitoring of the green feature component.

The following table illustrates the allocation of the main responsibilities in AHURP:

Table C.7.4. Allocation of main responsibilities in AHURP implementation

Action item	Private Sector	Municipality	Khashaa owner
Valuation of lands		X	X
Swap negotiation process		X	X
Property demolition and land clearing		X	
Land for public use (swap or cash)		X	
Land for development (swap with apartments)	X		
Secondary infrastructure and connections		X	
Road building and ground infrastructure		X	
Residential and retail development	X		
Access criteria		X	
Marketing and sales process (affordable and market housing)	X		
Property management and operations –Affordable and Market Housing	X		
Property management and operations –Social Housing		X	

ADB will oversee project implementation, including compliance by executing and implementing agencies of their obligations and responsibilities for project implementation in accordance with ADB's policies and procedures.

A key supporting role in implementation will come from the Detailed Engineering Design and Construction Supervision Support Consultants. These consulting services will include an estimated 433 person months of consulting services (433 person-months national) to assist the PMU in detailed engineering design and construction supervision. The consultants will be recruited using the quality-and-cost-based selection (QCBS) method with a quality-cost ratio of 90:10.

See the Appendix 5, *Project Administration Manual* of the PPTA report for more details.

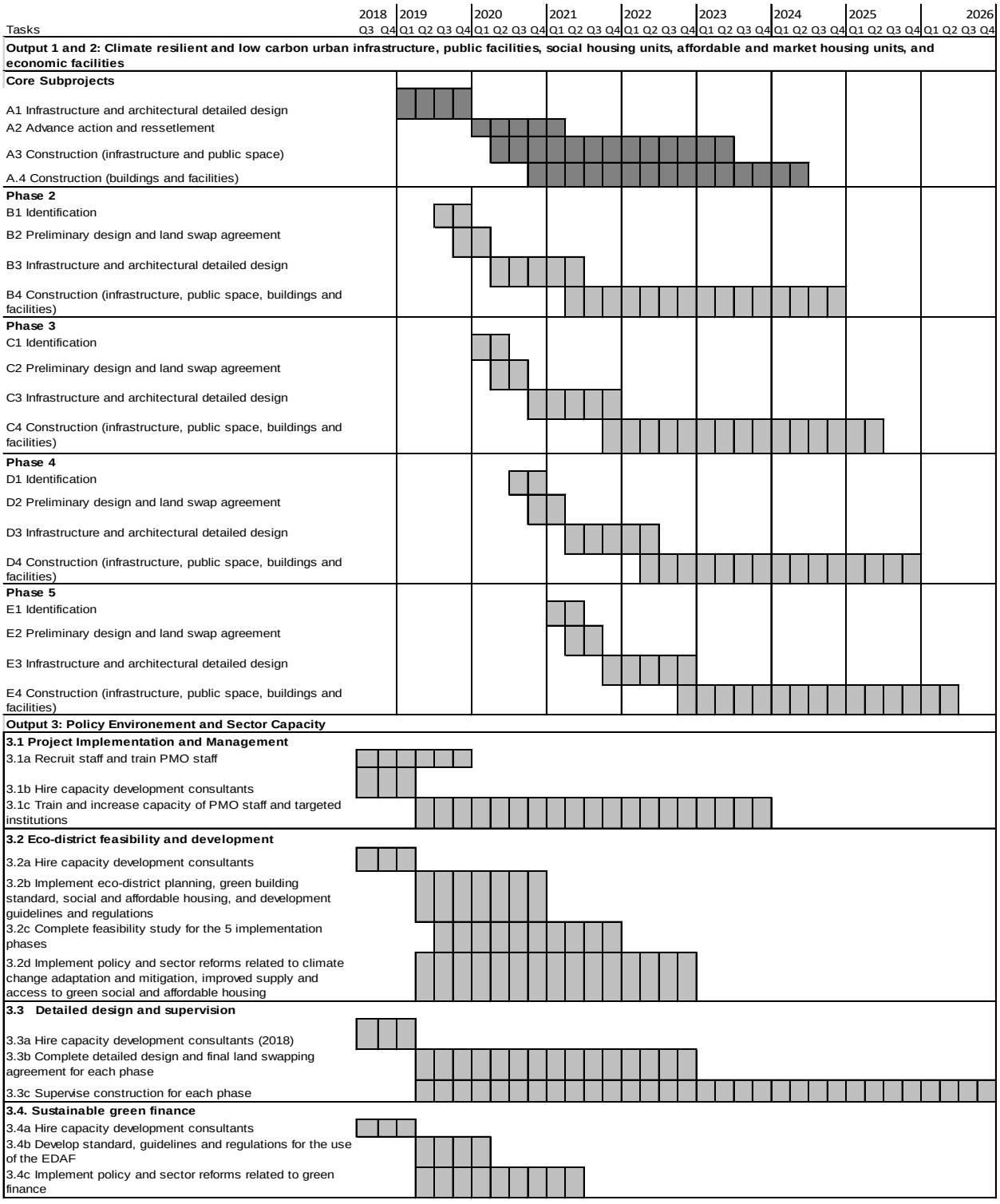
Table C.7.5. PMO/PIU staffing and budget

Position	Quant.	Unit Cost US$ (incl.soc.ch.)	Duration mths	Total US$	*Remarks*
MUB / PMO					
Project Coordinator (PC)	1	4,500	108	486,000	*Full time*
Deputy pC	1	3,500	108	378,000	*Full time*
Civil engineer	1	2,500	81	202,500	*Threequarter time*
Architect	1	2,500	81	202,500	*Threequarter time*
Water & Sewerage Engineer	1	2,500	54	135,000	*Half time*
Heating Engineer	1	2,500	54	135,000	*Half time*
Road Engineer	1	2,500	54	135,000	*Half time*
Electric Engineer	1	2,500	54	135,000	*Half time*
Renewable Energy / Climate Change Specialist	1	2,500	54	135,000	*Half time*
Procurement	1	2,500	81	202,500	*Threequarter time*
Finance / Affordable Mechanisms Specialist	1	2,500	54	135,000	*Half time*
Social Specialist	1	2,500	81	202,500	*Threequarter time*
Environment Specialist	1	2,500	54	135,000	*Half time*
Resettlement / Swapping Specialist	1	2,500	81	202,500	*Threequarter time*
Office Manager	1	1,000	108	108,000	*Full time*
Drivers	3	1,000	108	324,000	*Full time*
Sub Total MUB / PMO				**3,253,500**	
Green Banking - DBM / PIU					
Finance / Bank Specialist Coordinator	1	3,500	54	189,000	*Half time*
Finance Specialist	1	2,500	54	135,000	*Half time*
Finance Specialist	1	2,500	54	135,000	*Half time*
Office Manager	1	1,000	81	81,000	*Threequarter time*
Drivers	1	1,000	54	54,000	*Half time*
Sub Total MUB / PMO				**594,000**	
TOTAL PMO/PIU				**3,847,500**	

C.8. Timetable of Project/Programme Implementation

The target ADB board approval date is 20 June 2018, the core subprojects is expected to be finished by mid 2024. The completion of additional modules, which will extend the AHURP to 100 hectare coverage are expected to be completed by 2026. The following figure provides the implementation schedule of AHURP.

Figure C.8.1 Implementation Schedule of AHURP


2018 Q3 Q4
2019 Q1 Q2 Q3 Q4
2020 Q1 Q2 Q3 Q4
2021 Q1 Q2 Q3 Q4
2022 Q1 Q2 Q3 Q4
2023 Q1 Q2 Q3 Q4
2024 Q1 Q2 Q3 Q4
2025 Q1 Q2 Q3 Q4
2026 Q1 Q2 Q3 Q4
Tasks
Output 1 and 2: Climate resilient and low carbon urban infrastructure, public facilities, social housing units, affordable and market housing units, and economic facilities
Core Subprojects
A1 Infrastructure and architectural detailed design
A2 Advance action and ressetlement
A3 Construction (infrastructure and public space)
A.4 Construction (buildings and facilities)
Phase 2
B1 Identification
B2 Preliminary design and land swap agreement
B3 Infrastructure and architectural detailed design
B4 Construction (infrastructure, public space, buildings and facilities)
Phase 3
C1 Identification
C2 Preliminary design and land swap agreement
C3 Infrastructure and architectural detailed design
C4 Construction (infrastructure, public space, buildings and facilities)
Phase 4
D1 Identification
D2 Preliminary design and land swap agreement
D3 Infrastructure and architectural detailed design
D4 Construction (infrastructure, public space, buildings and facilities)
Phase 5
E1 Identification
E2 Preliminary design and land swap agreement
E3 Infrastructure and architectural detailed design
E4 Construction (infrastructure, public space, buildings and facilities)
Output 3: Policy Environement and Sector Capacity
3.1 Project Implementation and Management
3.1a Recruit staff and train PMO staff
3.1b Hire capacity development consultants
3.1c Train and increase capacity of PMO staff and targeted institutions
3.2 Eco-district feasibility and development
3.2a Hire capacity development consultants
3.2b Implement eco-district planning, green building standard, social and affordable housing, and development guidelines and regulations
3.2c Complete feasibility study for the 5 implementation phases
3.2d Implement policy and sector reforms related to climate change adaptation and mitigation, improved supply and access to green social and affordable housing
3.3 Detailed design and supervision
3.3a Hire capacity development consultants (2018)
3.3b Complete detailed design and final land swapping agreement for each phase
3.3c Supervise construction for each phase
3.4. Sustainable green finance
3.4a Hire capacity development consultants
3.4b Develop standard, guidelines and regulations for the use of the EDAF
3.4c Implement policy and sector reforms related to green finance

D.1. Value Added for GCF Involvement

AHURP has significant climate change benefits, both in terms of adaptation and mitigation. Those benefits will, however, only be unlocked if significant financial barriers can be overcome. As we demonstrate in Section F.1, without the support from GCF, the financial returns from the project are insufficient to pay the sources of capital used, while the macro-economic situation of Mongolia is such that neither the public sector nor the private sector are able to make these investments on their own. We also demonstrate that with the targeted GCF support, financial sources can be compensated and a sufficient budget for operation and maintenance can be set aside. In other words, GCF support will make this project financially viable and sustainable.

The amount of GCF support requested is based on the "minimum concessionality required" argument, as elaborated in Section F.1 Economic and Financial Analysis, and also considers the climate change benefits that justify the GCF funding. Thus, the mitigation investment requested from GCF of $35.1 million of grant funding and $ 18.6 million in concessional loans enables direct AHURP lifetime emission reductions of over 7.9 million tCO2e and total emission reductions (direct and indirect) of almost 40 million tCO2e. Meanwhile, the adaptation funding requested from GCF of $14.9 million in grants and $76.4 million in concessional loans will affect 100,000 in total direct beneficiaries, and a total number of 1,000,000 total direct and indirect beneficiaries. GCF support will be key to ensure that the most vulnerable population in ger areas benefit from urban redevelopment investments through community participation activities and the provision of alternative livelihood opportunities in new eco-districts.

Apart from the significant direct climate change impacts that the GCF investment would unlock, AHURP is expected to yield further development benefits. This include generating significant learning and knowledge that will support similar activities within and outside Mongolia, and in other regions with cold winters and high rates of rural-urban migration. AHURP will provide a reference for future mitigation and adaptation initiatives in the housing sector and urban development in general, at national and regional levels.

Finally, AHURP is expected to have a catalyzing effect for long-term investment in low-carbon urban infrastructure and urban redevelopment in Ulaanbaatar. GCF is therefore instrumental to ensure that urban development in Ulaanbaatar shifts towards a low-carbon path, and increased climate-resilience of its inhabitants.

Institutional capacity strengthening and technical assistance provided through AHURP will also be essential to ensure the sustainability and expansion of such investments.

D.2. Exit Strategy

AHURP will result in net cash flows. With the proposed concessional GCF financing in place, the cash flow is sufficient to service the sources of finance and pay for the operation and maintenance of investments. This has been a key selection and design criterion for the core subprojects of the sector loan, and will also be a selection and design condition for the subsequent parts of the sector loan. Sustainability of the investments supported with GCF funding is therefore guaranteed.

Long-term sustainability of the project is embedded in the project design, which aims at overcoming systemic barriers and creating market conditions for low-carbon housing and eco-district investment thus catalyzing impacts beyond the end of the GCF funding. Sustainable market opportunities for climate resilient housing and eco-district development will be created by (i) addressing policy needs including legislative barriers to public and private sector investment at national, sub-national and local authority levels, in addition to addressing technical and capacity barriers; (ii) addressing financing needs by putting in place arrangements for long-term sustainable provision of affordable financing for EE building renovation, which matches the risk-return profile of such investment which will be achieved by building the knowledge and experience of local banks; and (iii) catalyzing initial investment through financial incentives by seeding a critical mass of investment to attract eco-efficient building materials and renewable energy equipment suppliers, as well as repair and maintenance service providers which will lead to decreasing the cost of energy efficient and renewable energy components. Practical experience and know-how will also be created, thus addressing these systemic barriers. By removing market distortions and barriers, both the incentives and the means for continued implementation and replication of the project interventions will be guaranteed. Moreover, the creation of revolving funds will ensure that the

initiated shift will continue to operate after the end of the AHURP implementation period. The mechanisms established with GCF funding will therefore continue to function after the end of the AHURP implementation period.

Community participation and capacity-building components of the project will also ensure that local institutions, local banks, and urban dwellers have the capacity to further invest and adopt a low-carbon path for urban development, after the project implementation period. AHURP outcomes, by demonstrating the benefits of shifting towards climate-resilient and low-carbon urban infrastructure and livelihoods, are expected to have long-term impacts well beyond the project implementation period.

In this section, the accredited entity is expected to provide a brief description of the expected performance of the proposed project/programme against each of the Fund's six investment criteria. Activity-specific sub-criteria and indicative assessment factors, which can be found in the Fund's Investment Framework, should be addressed where relevant and applicable. This section should tie into any request for concessionality made in Section B.2 Project Financing Information.

E.1. Impact Potential

Potential of the project/programme to contribute to the achievement of the Fund's objectives and result areas

E.1.1. Mitigation / adaptation impact potential

Climate mitigation impact.

The annual greenhouse gas emission reductions due to AHURP are preliminary estimated at 204,410 tCO2e, as the result of investments in solar PV (17,261 tCO2e/y) and insulation of buildings (187,149 tCO2e/y). The total direct amount of greenhouse gas emission reductions that will be achieved over the 40-year lifetime of AHURP (taking into account the shorter lifetime of solar PV panels of 25 years) is 7,917,480 tCO2e (7,485,955 tCO2e plus 431,525 tCO2e, respectively). The estimated amount of direct plus indirect emission reductions is 35.8 million tCO2e over a 40 year period, assuming a factor 5 for the replication of original mitigation investments of the project (this assumption is consistent with targeting approximately 25% of the current ger area population in Ulaanbaatar, and does not consider replication in ger areas of cities outside Ulaanbaatar or replication in non-ger areas of Ulaanbaatar).

Adaptation impact

The total number of primary direct beneficiaries enjoying enhanced resilience to climate change will be at least 35,000, which corresponds to the expected number of inhabitants of the new apartments built within AHURP. The new apartments will provide better protection against harsh Mongolian winters and the consequences of climate change through better flood protection, providing access to water and sanitation, improved waste and wastewater management, etc. The above estimate excludes the inhabitants of the apartments that will be built after the end of AHURP using the funding mechanisms developed during AHURP. The number of beneficiaries including direct replication is at least another 35,000 people and including indirect replication is projected to be 350,000 people assuming a factor 10 for the replication of the original adaptation investments of the project (this assumption is consistent with covering approximately 50% of the current ger area population in Ulaanbaatar, and does not consider replication in ger areas of cities outside Ulaanbaatar or replication in non-ger areas of Ulaanbaatar).

Avoiding lock-in

One of the key benefits of AHURP is avoiding lock-in of high-carbon buildings and infrastructure poorly adapted to climate change. Given the long lifetime of buildings and infrastructure, estimated at a minimum of 40 years but probably longer, this is a key benefit from AHURP. AHURP will also increase the awareness of the benefits associated with low-carbon and climate resilience planning, development, and construction of apartments in ger areas, which, through replication, will lead to further avoidance of lock-in of high-carbon and climate-vulnerable housing and infrastructure.

E.1.2. Key impact potential indicator

Provide specific numerical values for the indicators below.

GCF core indicators	*Expected tonnes of carbon dioxide equivalent (t CO_2 eq) to be reduced or avoided (Mitigation only)*	*Annual*	204,410 tCO2e/y (not including replications)
		Lifetime	7.92 million tCO_2e (not including replications) 39.59 million tCO_2e (including replications)
	• *Expected total number of direct and indirect beneficiaries, disaggregated by*	*Total*	Primary direct beneficiaries of increased climate change resilience: 35,000

	gender (reduced vulnerability or increased resilience) • *Number of beneficiaries relative to total population, disaggregated by gender (adaptation only)*		people, of which at least are 17,500 women Total direct beneficiaries of increased climate change resilience: 100,000 people, of which at least are 50,000 women Primary indirect beneficiaries of increased climate change resilience: 315,000 people, of which at least are 157,500 women Total indirect beneficiaries of increased climate change resilience: 900,000 people, of which at least are 450,000 women
		Percentage (%)	Primary direct: 2.5% of UB population / 1.1% of Mongolia's population Total direct: 7.1% of UB population / 3.2% of Mongolia's population Primary direct and indirect: 25% of UB population / 11% of Mongolia's population Total direct and indirect: 71% of UB population / 32% of Mongolia's population
Other relevant indicators	• Over 11 MW of decentralized renewable energy constructed • 10,000 apartments constructed complying with high energy efficiency and insulation norms • 10,000 families living in successfully developed affordable, low carbon and climate resilient housing blocks with access to climate-proofed urban infrastructure, such as road networks, water supply, sanitation and waste management services • Creation of a model to be followed in ger areas within and outside of Ulaanbaatar		

Estimates for the adaptation indicators are calculated directly from the design of AHURP, reflecting the number of housing units to be constructed and the average occupancy of each housing unit. A total of 10,000 housing units at 3.5 people per housing unit (based on surveys) is equivalent to 35,000 primary direct beneficiaries. The replication estimates are based on the ger area population in Ulaanbaatar, and the strong wish of the government of Mongolia, to replace the GHG-intensive, unsustainable way of living that is poorly adapted to climate change and highly polluting with a low carbon, climate resilient and sustainable alternative.

A hierarchy of beneficiaries

Most of the efforts of AHURP in quantifying the number of beneficiaries focus on a set of beneficiaries that are easy to identify and for which the AHURP are especially clear and large. However, it is proper to think of the beneficiaries as in a hierarchy of direct beneficiaries and the equivalent for the indirect beneficiaries resulting from the replication of the project.

1) Primary direct beneficiaries: These are the households that will settle in the new housing units, estimate at 35,000 (10,000 housing units at average 3.5 occupancy per housing unit). This is the definition used originally in the proposal, based on an easy to identify and quantify group with very significant benefits from the project.

2) Secondary direct beneficiaries. These are the group of people that live outside the newly built eco-districts, but spent significant amounts on time per day on average within the businesses, schools, health centers, entertainment centers etc. that are located within the newly built eco-districts benefitting from an improved and better adapted environment. Based on AHURP estimates, this would be around 25,000 beneficiaries.
3) Tertiary direct beneficiaries are the groups that benefit from network effects of the project, e.g. reduced flooding in UB from improved drainage, and reduced impacts from climate change related communicable diseases. This group of direct beneficiaries is estimated at 50,000.

There is some overlap between the groups of secondary and tertiary direct beneficiaries. Avoiding double-counting, the total number of direct beneficiaries is estimated at 100,000. The number of indirect beneficiaries is estimated as 9 times the original, so primary indirect beneficiaries 315,000, secondary indirect beneficiaries 225,000, tertiary indirect beneficiaries 450,000, and total number of indirect beneficiaries 900,000.
The total numbers (direct + indirect) are: primary beneficiaries (direct and indirect) 350,000, secondary beneficiaries (direct and indirect) 250,000, tertiary beneficiaries (direct and indirect) 500,000, total number of beneficiaries (direct and indirect): 1 million.

The co-benefits from the greenhouse gas mitigation, reduced air pollution, will benefit the whole population of UB (1.4 million people or 45% of the population of Mongolia. Note that the population of UB is expected to grow faster than the population of Mongolia, and will approximately double to 2.7 million by 2050). Air pollution in UB is a big and literally and figuratively very visible issue, which is a significant concern for all people living in UB. The ger areas are known to be a significant source of pollution (both because of the amounts of pollutants emitted and the low stacks, causing poor dispersal of the pollutants).

The following table summarizes the above.

Hierarchy of beneficiaries of AHURP

	Adaptation beneficiaries				Mitigation co-benefits beneficiaries
	Primary	**Secondary**	**Tertiary**	**Total**	
Direct	35,000	25,000	50,000	100,000	1,400,000
Indirect	315,000	225,000	450,000	900,000	
Total	350,000	250,000	500,000	1,000,000	1,400,000

The mitigation indicators are calculated as follows:[60]

Solar PV
For solar PV, the methodology used for the calculation of emission reductions is based on the approved UNFCCC CDM methodology ACM0002 *Grid-connected electricity generation from renewable sources* Version 17.0[61] and the small-scale CDM methodology for grid connected renewable energy[62] which leads to the same result. Estimates of m^2 of rooftops converted to PV, combined with solar radiation figures, were used to calculate projected power generation, expressed in MWh. This was converted to tCO2e emission reductions on the basis of the latest calculated grid emission factor for Mongolia published by the CDM Designated National Authority at 1.103 tCO2e/MWh.

Below we provide the input data used and the specific calculations performed.

Table: Input data for calculation of GHG emission reductions from PV

Name	Number	Unit	Source
Grid emission factor	1.103	tCO2/MWh	Published grid emission factor

[60] We also refer to Section C.2 for some of the underlying assumptions and discussions.
[61] CDM EB. 2016. *ACM0002 Large-scale Consolidated Methodology: Grid-connected electricity generation from renewable sources* Version 17.0. CDM EB of the UNFCCC. Bonn.
[62] CDM EB. 2014. *AMS-I.F Small-scale Methodology: Renewable electricity generation for captive use and mini-grid* Version 03.0. CDM EB of the UNFCCC. Bonn.

Solar PV panel area	69,272	m2	AHURP PPTA report
Expected power supply per m2	225.904	kWh/y/m2	Performance calculated with NREL PVWatts website

The formula for calculating the GHG emission reduction per year is:
GHG ER = Solar PV panel area * Expected Power Supply per m2 / 1000 * Grid emission factor

Using the above input data, the greenhouse gas emission reductions from the PV panels can be calculated as follows
GHG ER/y = 69,272 * 225.904/1000 * 1.103 = 17,261 tCO2e/y
Lifetime emission reductions are calculated assuming a lifetime of 25 years: 25*17,261 = 431,525 tCO2e.

Insulation

For insulation measures, emission reductions were calculated in line with the approved small-scale CDM methodology *Energy efficiency and fuel switching measures for buildings* Version 10.0.[63] The calculation is as follows:

- Calculate baseline energy consumption for heating per m^2 on the basis of the following: Energy consumption 395 kWh (thermal) per year per m^2 as baseline energy consumption, 50% efficiency, fuel mix used 50% coal, 50% lignite, fuel specific CO2 emission factors[64] 101 tCO2/TJ for lignite and 94.6 tCO2/TJ for coal. Baseline GHG emissions can then be calculated as 0.278 tCO2/ m^2 per year.
- Calculate project energy consumption for heating per m^2 on the basis of the following: Energy consumption 151 kWh(thermal) per year per m^2, 65% efficiency (changed because of connection to district heating – the efficiency used considers heat transmission losses), fuel mix used 100% coal, 0% lignite, fuel specific CO2 emission factor 94.6 tCO2/TJ for coal. Baseline GHG emissions can then be calculated as 0.079 tCO2/ m^2per year.
- Emission reductions per m^2 due to the project is the difference between these two numbers: 0.278 tCO2/ m^2 per year - 0.079 tCO2/ m^2 per year = 0.199 tCO2/ m^2 per year.
- Multiply m^2 of new, low carbon apartments with the emission reduction per m^2 (0.199 tCO2/ m^2 per year) to obtain the estimate for the total CO2 emission reductions from better insulated buildings.

Below we provide the input data used and the specific calculations performed.

Table: Input data for calculation of GHG emission reductions from insulation

Name	Number	Unit	Source
Baseline energy consumption for heating	395	kWh/y/m2	GIZ Nexus project estimate
Baseline energy conversion efficiency	50%		AHURP project team
Percentage lignite in baseline fuel mix[65]	50%		AHURP project team
Percentage coal in baseline fuel mix	50%		AHURP project team
Lignite CO2 emission factor	101	tCO2/TJ	IPCC default
Coal CO2 emission factor	94.6	tCO2/TJ	IPCC default
AHURP energy consumption for heating	151	kWh/y/m2	AHURP target
AHURP energy conversion efficiency[66]	65%		Project facilities
Percentage lignite in AHURP fuel mix	0%		Project facilities
Percentage coal in AHURP fuel mix	100%		Project facilities
Heated area	940,312	m2	

The calculation of the greenhouse gas emission reductions from improved insulation proceeded as follows:
(1) Baseline emissions per m2 heated =
(Baseline energy consumption for heating * (3.6 / 1,000,000) / Baseline energy conversion efficiency) * Percentage lignite in baseline fuel mix * Lignite CO2 emission factor

[63] CDM EB. 2007. AMS-II.E *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories Energy efficiency and fuel switching measures for buildings* Version 10.0. CDM EB of the UNFCCC. Bonn.
[64] The emission factors used are the IPCC default values as indicated by the CDM methodology, in absence of national or local values. See IPCC. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Volume 2. Energy. Chapter 2: Stationary Combustion. Institute for Global Environmental Strategies (IGES), on behalf of the Intergovernmental Panel on Climate Change (IPCC). Hayama, Japan.
[65] All fuel mix percentages based on percentage in the total energy supply, not by weight.
[66] This figure includes conversion efficiency in generation and transport and distribution losses.

+
(Baseline energy consumption for heating * (3.6 / 1,000,000) / Baseline energy conversion efficiency) * Percentage coal in baseline fuel mix * coal CO2 emission factor

(2) AHURP emissions per m2 heated =
(AHURP energy consumption for heating * (3.6 / 1,000,000) / AHURP energy conversion efficiency) * Percentage lignite in AHURP fuel mix * Lignite CO2 emission factor
+
(AHURP energy consumption for heating * (3.6 / 1,000,000) / AHURP energy conversion efficiency) * Percentage coal in AHURP fuel mix * coal CO2 emission factor

(3) GHG emission reductions from insulation = (Baseline emissions per m2 heated - AHURP emissions per m2 heated) * Heated Area

Using the data provided, and noting that small discrepancies may occur due to rounding, while unrounded numbers have been used in the actual calculations:

(1) Baseline emissions per m2 heated = 395/50%*3.6/1000000*50%*101 + 395/50%*3.6/1000000*50%*94.6 = 0.278
(2) AHURP emissions per m2 heated = 151/65%*3.6/1000000*0%*101 + 151/65%*3.6/1000000*100%*94.6 = 0.079
(**3**) GHG emission reductions from insulation = (0.278-0.079) * 940312 = 187,149 tCO2e/y

Lifetime emission reductions are calculated assuming a lifetime of 40 years: 40*187,149 = 7,485,955 tCO2e.

Note that the data provided above may also be used to calculate the emission factor for heat supply in the baseline and in the AHURP case:

- EF (heat, baseline) in tCO2/TJ = 1/0.50 * ((0.5 * 94.6) + (0.5 * 101)) = 195.6 tCO2/TJ (heat, baseline)
- EF (heat, AHURP scenario) in tCO2/TJ = 1/0.65 * (1 * 94.6) = 145.5 tCO2/TJ (heat, AHURP scenario)

Total emission reductions
Total emission reductions are obtained by summing the estimate of CO2 emission reductions from solar PV panels and from insulation of buildings.

Total emission reductions = Emission reductions from PV + Emission reductions from insulation

Using the numbers calculated above, the total emission reductions can be calculated as follows:
Annual total emission reductions: 17,261 + 187,149 = 204,410 tCO2e/y
Lifetime total emission reductions: 431,525 + 7,485,955 = 7,917,480 tCO2e

E.2. Paradigm Shift Potential

Degree to which the proposed activity can catalyze impact beyond a one-off project/programme investment

E.2.1. Potential for scaling up and replication (Provide a numerical multiple and supporting rationale)

AHURP uses a differentiated assumption for replication of AHURP components in Mongolia: a factor 5 for mitigation, and a factor 10 for adaptation. See Section E.1.2, Key Impact Potential Indicator for the justification for replication estimate for adaptation. It is a conservative estimate, because opportunities to replicate outside of Ulaanbaatar have been ignored. For mitigation, a lower replication estimate has been used, partly reflecting the fact that replication on the basis of private incentives will require the successful elimination of the misalignment of private incentives and economic costs and benefits – in particular the low price of heating and electricity, the lack of heat metering, and the constraints on the use of decentralized renewable energy, requiring some type of net metering rules. Again, the estimate ignores the potential for replication within Mongolia, but outside of Ulaanbaatar.

Both replication estimates focus on Mongolia only, and do not consider the possibility for replication outside of Mongolia. However, the AHURP method for dealing with the influx of migrants resulting from climate-induced disasters (and creeping loss of productivity due to gradual climate change) and the reduction of heat losses in buildings could

be very well replicated in other countries, for example in the northern part of Central Asia, North and Northeast Asia, and other mountainous areas throughout the world.

ADB will support replication, both inside Mongolia and outside Mongolia, through the preparation of dissemination materials highlighting the accomplishments and results of AHURP and lessons learned. The materials produced shall be a combination of knowledge papers and project briefs. In addition ADB will develop relevant pilots both within Mongolia (focused outside of Ulaanbaatar) and within ADB's developing member countries to initiate the replication of AHURP. ADB's ongoing and planned affordable climate-resilient and low-carbon housing projects will be an excellent vehicle for this purpose.

E.2.2. Potential for knowledge and learning

The potential for the creation of knowledge and learning through AHURP is critical. The key concept is to carry out assessments of various climate technologies that could be included into AHURP. This may include technologies that are novel to Mongolia (see the next section), and technologies that are already known in Mongolia, but of which the performance is in doubt. One of the key objectives of AHURP is to demonstrate the possibility to comply with new, stringent building energy efficiency standards, as well as the benefits thereof. There are also other types of knowledge creation that AHURP will support, in relation to novel technologies, novel policies, regulations and mechanisms to address barriers, and new funding instruments that allow the construction of low carbon, climate resilient housing and urban districts in the ger areas.

Thus AHURP monitoring will focus on:

- Performance of climate technologies (novel and existing technologies with not well known performance)
- Novel funding mechanisms
- The relative success of measures to reduce the impact of identified barriers
- Barriers not previously identified

Lessons learned from the overall approach may provide benefits that go beyond the borders of Ulaanbaatar and outside of Mongolia. ADB's role in other countries will enable lessons and best practices to be carried over in areas facing similar challenges. Project monitoring and evaluation activities which generate materials for knowledge dissemination are detailed in Appendix 19 of the PPTA Report, *Climate Change and Climate Finance*, Section V: Monitoring of Climate Related Aspects of AHURP.

E.2.3. Contribution to the creation of an enabling environment

The project will strengthen the institutional and regulatory systems relevant to low carbon housing development. It will do this through working with national, sub-national, and local authorities towards the adoption and implementation of an enabling policy framework for more stringent energy efficiency housing regulations. This will be supported by the development of an MRV framework that will provide data for planning of further investments. Building capacity of government and financial institutions supporting low-carbon housing will enable the development of a market that will continue to exist beyond completion of the intervention.

AHURP also utilizes innovative funding mechanisms that make climate-resilient, low-carbon housing affordable to the ger area population. These mechanisms are based on land swap, which allow current ger area residents to get value from their existing land holdings and dwellings to serve as credit towards the newly built apartments, at the same time giving them access to subsidized mortgages and subsidized developer loans. The first two help to create demand, while the last mechanism will help developers respond to the demand with targeted supply of new climate proofed housing with urban amenities such as water supply, waste and wastewater services, and centralized heating. AHURP creates the conditions for the private sector's sustained participation both the supply and demand side.

Grants for renewable energy and additional insulation of buildings will also incentivize developers to invest in these mitigation measures. This will help demonstrate the value of these measures, as an initial step to regulatory reform that will incentivize the standard inclusion of these technologies into new buildings and the retrofitting of existing buildings.

In terms of identifying novel technologies (novel and innovative from the perspective of Mongolia), these will be assessed to determine what could be incorporated into AHURP including assessing their impacts on the cost of housing and utilities and quality of life, identifying the suitability of these technologies taking into consideration the state of development of Ulaanbaatar, the income level of the target population, and then piloting them. Barriers that prevent the use of relevant new technologies will also be identified and addressed (see next subsection) and lessons learned on the deployment of new technologies will be formulated and disseminated (see previous subsection).

AHURP, through its scale, will also generate a powerful indirect effect on the production of low carbon construction materials, renewable energy equipment, and insulation materials. It will change business as usual urban planning paradigms in Ulaanbaatar by mainstreaming best practices and climate friendly interventions in Ulaanbaatar's urban development practices. It will also change, through learning by doing, the productions costs and prices of low carbon and climate resilient construction materials and technology and thus enable a deeper penetration of these technologies, materials, and practices.

E.2.4. Contribution to regulatory framework and policies

AHURP systematically assesses the barriers that prevent worthy climate technologies, practices and materials to be taken up. The last step is to identify measures that can be used to reduce or eliminate the constraints imposed by these barriers and to create the right enabling environment. This may involve suggestions for policy or regulatory changes.

The project aims to support the development and implementation of policies and regulations conducive to decentralized renewable energy use, as well as policies and regulation ensuring energy efficiency in the construction sector. To promote decentralized renewable energy, the use of net metering may need to be discussed and agreed to, including changing heating tariffs and metering heat consumption (rather than pay a fee based on the size of the apartment) to support investments in building insulation.

The project will introduce robust MRV with improved data allowing policymakers to set priorities for energy efficiency programs within the building sector. The MRV system will inform the formulation of policies and programs based on actual consumption and performance data from the building sector.

One of the key objectives of AHURP is to contribute to the regulatory framework and policies in Ulaanbaatar. The sector loan structure of the program provides a mechanism to influence the regulatory framework and policies.

E.3. Sustainable Development Potential

Wider benefits and priorities

E.3.1. Environmental, social and economic co-benefits, including gender-sensitive development impact

Economic co-benefits

AHURP will create around 60,000 person-months of jobs, not only in construction, but also through upward and downward linkages (building materials and renewable energy equipment suppliers, repair and service sectors). Improved access to infrastructure will also create jobs through business incubators in the eco-districts' commercial space and enterprises. Moreover, the project will create significant savings due to reduced spending on energy for the estimated 35,000 ger areas residents who will move to newly built law-carbon housing and, as a result, would greatly benefit from reduced energy poverty.

Social co-benefits

A total of 35,000 people will obtain quality yet affordable housing with adequate provision of clean water, waste and wastewater management facilities, and heating. Additional 25,000 will benefit from improved urban environment, and from lighting and road conditions that will contribute to safety, while improved environmental conditions (reduced levels of indoor and outdoor pollution) will contribute to better health. The key benefit of AHURP is improved standard of living and better health. Ger families that move into AHURP housing will benefit from:

1. Piped potable water supply

2. Central wastewater collection and offsite treatment
3. Central hot water and heating
4. Solid waste collection and management
5. Modern housing construction with energy efficient technologies
6. Improved climate resilience

Piped water supply in AHURP apartments will help meet the minimum requirements for water consumption set by WHO at 3.6 to 7.5 liters per day. The provision of centrally heated homes will eliminate poor in-house air quality (PM2.5 from coal and wood, VOCs from garbage and plastics burning) generated by stoves used for heating. Connecting to central wastewater collection and installing modern toilet facilities will eliminate the use of pit latrines and reduce respiratory and gastrointestinal illnesses. The collective impact of increased water consumption, improved household and property air quality, and use of modern sanitation are critical to people's health in ger areas.

Organized collection and removal of garbage from the URU housing complexes, and living in modern housing with access to green space amenities such as greenhouses and small parks contribute to better quality of life. Better health and fewer sick days increase productivity, thereby strengthening families and communities which otherwise have to cope with the stress associated with low income living standards.

Environmental co-benefits

Ulaanbaatar is today one of the most polluted cities in the world. Air pollution has reached critical levels, with city residents are exposed to annual average concentrations of fine particulate matter (PM2.5) over seven times higher than World Health Organization (WHO) international guidelines (10 µg/m3). In 2016, the annual average of ambient PM2.5 concentration was 80 µg/m3 . The peak values of monthly average mass concentrations of PM2.5, during winter (in Mongolia In winter last 5 months), reaching 157µg/m3, 15 time higher than WHO standard. In January 2017, the daily peak of PM2.5 reached 1017 µg/m3, or 100 time higher than WHO standard. The average annual concentration of PM2.5 in Bayankhoshuu in 2008-2009 was 600µg/m3 (World Bank, 2011). In Ulaambaatar 10% mortality attributable to air pollution in Ulaanbaatar and $463 million annual health cost -2009 estimates, Figure E.3.1 shows the PM2.5 concentrations at 4 sites in ger areas north of Ulaanbaatar reflecting elevated levels of smoke from coal burning in winter. Ger areas individual stoves are responsible of 80% of air pollution (rest is transport, power plant, dust suspension…).

Figure E.3.1 Suspended particulate (PM2.5) levels in 4 ger areas[67]

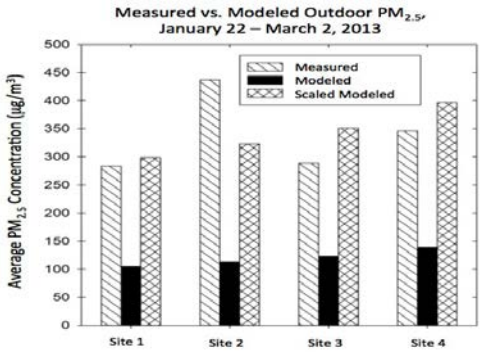


Figure E.3.1 shows that the most important ambient environmental indicator of respiratory health is adversely affected in ger areas during the heating season. National and international standards for PM2.5 are much lower than the values shown.

The same picture emerges for other pollutants, such as SOx, NOx and PM10, however, PM is the most relevant indicator due to the direct human respiratory effects, and its contribution to smog.

[67] 2014. MET. *Air Pollution and Health in Ulaanbaatar*.

Burning coal and wood for household heating and cooking produces upwards of 95% of the ground-level loads of $PM_{2.5}$ and PM_{10} in ger districts (WHO, 2011) with the highest contributions from the older, denser ger areas such as Selbe and Bayankhoshuu. The move to eco-districts will effectively bring down indoor and outdoor PM production / household to zero due to the shift to central hot water heating, and electric stoves and hot water heaters supported by renewal sources of electricity. An estimate of the regional impact on air quality of the reduction in PM and other coal/wood burning air pollutants from the targeted 10,000 AHURP housing units becomes the ratio of AHURP households and total regional ger households.

AHURP achieves the reduction in air pollution through a shift in the source of heating supply, switching to a more efficient, less pollutant central supply source (also equipped with a higher stack), while at the same time reducing heating demand through better building insulation. The project also involves the installation of solar PV panels, which provides zero emission electricity that partly displaces power produced in the CES using old, inefficient, lignite-fired power plants – a considerable source of air pollution. Through these two mechanisms, considerable air pollution reductions are achieved for the benefit of the whole population of UB.

AHURP reduces overall energy use, and includes a switch to renewable sources of electricity, leading to a substantial reduction of pollutant emissions and marked improvement in air quality.

Gender-sensitive development impact

Gender is an important consideration in the design of AHURP, and significant attention has been paid to ensure that women benefit from the project and are adequately represented in consultations. See Section F.3 which provides a summary of the Gender Action Plan.

E.4. Needs of the Recipient

Vulnerability and financing needs of the beneficiary country and population

E.4.1. Vulnerability of country and beneficiary groups (Adaptation only)

Mongolia's unique geographical location, harsh climate with hot summers and extremely cold winters, and rural dependence on animal husbandry make it vulnerable to natural disasters and the impacts of climate change.

Ulaanbaatar climate

Ulaanbaatar is located at about 1,350 meters above mean sea level. It has brief, warm summers and long, cold and dry winters. The coldest temperatures are between −36 and −40 °C with no wind, due to temperature inversion. Most of the annual precipitation of 267 millimeters falls from June to September. Ulaanbaatar has an average annual temperature of −0.4 °C making it the coldest national capital in the world.

In Mongolia, climate induced disasters have been occurring at an increasing frequency during the past decade. Major natural disasters can be ranked by social-economic risks as follows: drought, dzud (harsh winter storms, see the box insert below for more explanation), forest and wild fires, snow and dust storms, floods and cold surges. In the last 10 years, economic losses from natural disasters are costing 50-70 billion MNT[68] each year, the cost of damage have increased 10-14 times as compared to the previous decade.[69]

Dzuds

Depending on their cause, dzud can be categorized as white or black. White dzud is mainly caused by heavy snow fall, with an average depth of snow on pasture land from above 21 centimeters in the mountain areas, to above 10 centimeters in semi-desert regions. Meanwhile, black dzud is due to lack of water during summer, followed by lack of snow during winter. White dzud occurs every two years in the basin of Tes river; once every three years in the mountain regions of Khangai, Khentei, Khankhokhii, Kharkhiraa, and Turgen; and one to two

[68] Current exchange rate is 1 USD = 2429.5 MNT

[69] Ministry of Environment and Green Development. 2014. *MARCC-2014: Mongolia Second Assessment Report on Climate Change 2014*. Ministry of Environment and Green Development. Ulaanbaatar.

times every 10 years at the foothills in the hilly mountainous region of Altai, Khangai, Khuvsgul and Khentii ranges. Dzuds occur frequently in the northern part of Dundgovi province.

As result of a series of dzuds, the rural areas of the country have seen particularly high rates of livestock death (about 8.4 million heads of livestock in the early 2000s and 7.8 million in 2010), causing dramatic rural-to-urban migration, concentrated mostly in Ulaanbaatar. Other adverse impacts of climate change include a decrease in biomass production of grasslands and the falling productivity of the husbandry sector.[70] The gradual loss of productivity combined with the increased frequency and severity of extreme weather events cause herder families to migrate to urban areas, with Ulaanbaatar as the most common destination.

Within Ulaanbaatar, new migrants settle mostly in ger areas, a combination of wooden houses and ger. Leaving behind their rural way of life, they move into an urban environment where they are poorly adapted to climate change – susceptible to flooding,[71] without access to piped drinking water, poor sanitation, poor waste management, unpaved roads, etc. They also have to pay high energy bills due to the need to purchase either coal or unsustainable biomass, combined with inefficient heating methods. Another consequence is the relatively high greenhouse gas emissions, combined with very high air pollution loads, with adverse effects to their health and to other residents of Ulaanbaatar. The ger areas are a significant source of high pollution levels and GHG emissions in Ulaanbaatar.

New migrants and ger area residents of Ulaanbaatar are also economically vulnerable. They generally have much lower income levels[72] compared to the rest of the Ulaanbaatar population, have lower education, and often lack formal employment.

The triple climate dilemma
We conclude that the ger area population, generally speaking (1) has already been the victim of climate change, causing them to migrate to Ulaanbaatar's ger area, (2) are currently very vulnerable to climate change in an urban context, and (3) have limited economic and social capacity to cope with climate change.

A UNEP report has noted that the major impacts of climate change on water resources in Ulaanbaatar will manifest themselves through the change in the hydrological systems of the Tuul River. These include, among others: an earlier start of spring snowmelt, a shortening of ice, increased summer flood frequency, and increases in periodic droughts. The report concludes that "*the level of performance and maintenance of the existing drinking water facilities, storm and flood water management, and wastewater treatment infrastructure in Ulaanbaatar is unsatisfactory. This existing infrastructure will also experience serious repercussions from the effects of climate change, such as reduced snow cover and increased frequencies of storm and drought.*"[73]

Taken together, these climate change impacts will lead to exacerbation of energy poverty and worsening of health and living conditions of low-income and middle-income households in urban areas, especially in ger areas. The target beneficiaries in ger areas are in dire need of support to shift towards sustainable livelihood, improved living conditions, and resilience to climate change adverse impacts.

E.4.2. Financial, economic, social and institutional needs

[70] Ministry of Environment and Green Development. 2014. *MARCC-2014: Mongolia Second Assessment Report on Climate Change 2014*. Ministry of Environment and Green Development. Ulaanbaatar.
[71] C. Rodgers. 2016. *Climate Risk and Vulnerability Assessment for Proposed Loan and Grant, Mongolia: Supporting Infrastructure Development Project for the Combined Heat and Power Plant Number 5 in Public Private Partnership*. Manila. Rodgers explains that climate change has led to an increased occurrence of flooding in Ulaanbaatar, an impact that is expected to increase in severity over time.
[72] The median household income is 1,040,000 MNT/month in core subprojects areas, or slightly less than $430.
[73] UNEP. 2011. Urban Water Vulnerability to Climate Change in Mongolia
https://www.uncclearn.org/sites/default/files/inventory/unep149.pdf

AHURP addresses significant financial, economic, social, and institutional needs. As mentioned above, the target population is characterized by low income levels and additional vulnerabilities coming from lower education levels, lack of skills, and worse access to formal employment opportunities. Median per capita income is about $1200 per year, which compares unfavorably with GDP/capita of over US$3,600.[74]

Mongolia is classified as a lower-middle income country by the World Bank, its economy is characterized by persistent economic imbalances. GDP growth slowed down to 1.2% in 2016 due to declining exports from the weakening commodity market and slower growth in the key export market of the People's Republic of China[75]. The economy has become increasingly reliant on the mining sector— representing 20% of GDP, twice the ratio a decade ago—and the lack of diversification amplifying the impact of changes in commodity prices. Mongolia's government currently does not have the financial capacity to undertake the necessary investment that would produce a shift towards low-carbon housing. Government revenues were US$2.868 billion in 2016 while total expenditures were estimated at US$4.035 billion. With a GDP of US$11.16 billion, this means a government deficit of 10.5%. Public debt was at an estimated 60% of GDP in 2016. The current account shows a deficit of US$449 million or 4% of GDP. From these figures, it is clear that opportunities for domestic and international financing by the government are limited. A significant constraint for private sector financing is the cost of capital: the prime lending rate of commercial banks is 19.3% (31 December 2016 est.) and the central bank discount rate is 12% (14 January 2016). This clearly demonstrates the country's vulnerability and its limited capacity to cope, and emphasizes the need for additional sources of financing at concessional rates to undertake projects with significant public welfare positive externalities.

At an institutional level, AHURP has identified a number of capacity building needs which have been documented in Appendix 14 of the PPTA Report, *Implementation Arrangements Institutional Strengthening*. A capacity building plan has been developed to address the key challenges identified.

E.5. Country Ownership

Beneficiary country (ies) ownership of, and capacity to implement, a funded project or programme

E.5.1. Existence of a national climate strategy and coherence with existing plans and policies, including NAMAs, NAPAs and NAPs

Coherence with national climate strategies, policies and plans.

Mongolia's key reference documents on climate change are the National Action Programme on Climate Change (NAPCC) and Mongolia's Nationally Determined Contribution (NDC) submitted as Intended Nationally Determined Contribution (INDC) in the run up to the negotiations leading to the Paris Agreement.

The NAPCC was endorsed by the Parliament 2011 which includes concrete measures addressing climate change covering all principal sectors of economy. The NAPCC is implemented in two phases. The first phase (2011-2016) aimed to strengthen national mitigation and adaptation capacity, setting up the legal environment, structure, institutional and management system, and improving community and public awareness and participation in climate change activities. The second phase (2017-2021) aims to implement climate change adaptation and mitigation measures. The Mongolian government also developed the National Renewable Energy Programme (2005-2020) which aims to promote reliable, independent, and effective operation of centralized energy grids and regional power supply systems through the increased use of renewable energy ; and the Green Development Policy (2014) which defined key indicators of green development as savings of natural resources derived from production and services, level of recycling, green employment and green procurement growth, reduction of usage of energy, water, GHG emissions and ecological footprint per unit of production.[76]

[74] World Bank data, 2017
[75] http://www.worldbank.org/en/country/mongolia/overview
[76] Grantham Institute of Research. 2015. *2015 Global Climate Legislation Study A Review of Climate Change Legislation in 99 Countries. Climate Change Legislation in Mongolia*. http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2015/05/MONGOLIA.pdf

These and other relevant national level policy documents served as basis for the development of Mongolia's INDC, which was shaped and finalized through comprehensive consultation exercises with a broad range of stakeholders. The INDC indicates Mongolia's expected contributions as communicated to the UNFCCC.

Key contributions to the INDC related to mitigation include

- Increasing renewable electricity capacity from 7.62% in 2014 to 20% by 2020 and to 30% by 2030 as a share of total electricity generation capacity
- Reducing building heat loss by 20% by 2020 and by 40% by 2030, compared to 2014 levels

An additional contribution is the development of a waste management plan, including recycling, waste-to-energy, and best management practices.

All of the above are contingent upon international support to complement domestic efforts, and all of these are reflected in AHURP.

Among adaptation intentions, Mongolia's INDC recognizes the importance of reducing water consumption in Ulaanbaatar by introducing water saving technologies and water treatment technologies. Again, this is well reflected in AHURP.

Another key reference document is the Second National Communication of Mongolia to the UNFCCC, submitted in 2010.[77] This includes, among others, the following priority strategies, policies and measures that are relevant to AHURP:

- The strategy to increase renewable and other clean energy use
- The policy and measure of heating efficiency improvement in ger district area
- The strategy of building energy efficiency improvement
- The policy and measure of improvements of district heating system and installation of heat meters in buildings
- The policy and measure of insulation improvements for existing buildings and implementation of new energy efficient standards for new buildings
- The policy and measure of improvement of waste management
- The policy and measure of waste recycling
- The strategy of increased urban food supply
- The strategy of increased urban water supply
- The strategy of improved water quality

AHURP is fully aligned with existing climate change strategies and plans and will participate in the implementation of the strategies. Moreover, AHURP will support the improvement of current policies and regulations that present barriers for climate actions in the housing sector, as outlined in section E.2.4. Contribution to regulatory framework and policies

<u>Alignment with sectoral policies</u>

AHURP is very well aligned with relevant strategies and policies for the housing sector in Ulaanbaatar. The Affordable Housing Strategy (AHS) for Ulaanbaatar was developed by the Affordable Housing Institute, a specialist NGO based in the United States that worked with MUB staff under the Ulaanbaatar Clean Air Project, which was financed by the World Bank from 2013 to 2015. At the same time, ADB launched a study focusing on the range of options for improving access to housing finance in Ulaanbaatar. These studies have led to the AHS, a long term strategy approved by the Ulaanbaatar City Council, for the provision of affordable housing in Ulaanbaatar for families earning up to 140 per cent of the median monthly household income. AHS has three strategic thrusts: (i) increase affordable housing supply; (ii) create sustainable financing mechanisms; and (iii) define an institutional and legal framework. The Government of Mongolia and the MUB have requested the support of ADB to formulate a project, the Affordable Housing and Urban Renewal Project (AHURP), to translate the AHS into implementable plans, investments, and institutional reforms.

AHURP will also be fully in line with and support the Ulaanbaatar City Master Plan. The project will build on existing ADB projects aiming to integrate and upgrade the ger areas and transform Ulaanbaatar into a more inclusive city; and will also build on prior ADB Housing Sector Finance Project and housing loans to the very poor. The project is consistent

[77] http://unfccc.int/resource/docs/natc/mongnc2.pdf

with ADB's interim country partnership strategy for Mongolia, 2014-2016 and the present country partnership strategy for Mongolia, 2017-2021.

AHURP is aligned with Mongolia's National Development Strategy (NDS), consistent with achieving the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs), for the period through to 2020. It is likewise linked to ADB's country partnership strategy (CPS) for Mongolia, 2017-2021, consistent with government priorities, which aims to support key development challenges of the country through (i) promoting economic and social stability, (ii) developing infrastructure for economic diversification, and (iii) strengthening environmental sustainability that benefits all Mongolians. At a micro perspective, the project is going to supplement and build on the results of ADB financed Ulaanbaatar Urban Services and Ger Areas Development Investment Program – Project 1 which is currently being implemented by MUB. This will help the MUB undertake all initiatives in an integrated manner.

E.5.2. Capacity of accredited entities and executing entities to deliver

Accredited Entity: ADB

ADB has more than 25-year cooperation with Mongolia. During this period, ADB has been the Government of Mongolia's single largest source of official development financing, with cumulative lending of $2 billion. ADB has led donor support with a broad-based portfolio that is particularly active in urban development, education, transport, trade facilitation, health, employment, agribusiness, and climate change. The sovereign active portfolio consisted at the end of 2015 of 20 loans ($728.3 million), 11 grants from the Asian Development Fund (ADF), Japan Fund for Poverty Reduction, and other sources ($102.5 million), and 40 technical assistance projects ($36.5 million). ADB is the main sponsor of AHURP. The intended co-financiers of ADB in AHURP are all either international financial institutions with a long and distinguished track record, and/or the Government of Ulaanbaatar municipality, Mongolian commercial banks, and Mongolian real estate project developers, all with significant experience under the local circumstances.

ADB has considerable experience and expertise in the ger areas of Ulaanbaatar. To illustrate, ADB has been implementing the Urban Services and Ger Area Development Investment Programme (USGADIP or GADIP) project and will build on the experiences gained from this significant project.

Executing entity / Implementing Entity

The Municipality of Ulaanbaatar (MUB) is the Executing Entity or Executing Agency (EA) and Implementing Entity or Implementing Agency (IA) where the Project Implementation Unit (PIU) is located. The MUB has a strong experience in project design and implementation, it is currently executing two large scale and complex ADB financed programs: the Ulaanbaatar Urban Services and Ger Areas Development Investment Program and the Ulaanbaatar Urban Transport Investment Program.

DBM

The Development Bank of Mongolia (DBM) is a Government-owned, government policy-oriented statutory financial institution established on 25 March 2011 pursuant to Resolution No. 195 dated 20 July 2010 issued by the Government of Mongolia and under the Law on Development Bank of Mongolia passed by Parliament on 10 February 2011. The Bank conducts its business under the direct supervision of the Cabinet, which is the highest institution of Government administration in Mongolia, and is regulated, principally, by the Law on Development Bank of Mongolia. The Bank commenced its operations in May 2011.

E.5.3. Engagement with NDAs, civil society organizations and other relevant stakeholders

Country ownership and engagement of NDA

AHURP has been formulated in response to an explicit request from the Mongolian government and as part of an ongoing strategy to improve the ger areas of Ulaanbaatar. The alignment with national and municipal policies, including prominently climate policies and strategies, has been highlighted above. The intention to seek GCF support for AHURP has been discussed and agreed with the Mongolian NDA at the early stage of development of AHURP in November 2016. A preliminary draft of the concept note, which was previously submitted to the GCF Secretariat, was shared with the NDA in April 2017 for inputs, and the comments received have been used to adapt and strengthen the concept

note. Further consultations took place in June 2017 during the last mission of the PPTA. The Mongolian NDA fully supports the application for funding from the GCF.

Stakeholder engagement and consultations

The key objective of AHURP is to provide the residents in the ger areas of Ulaanbaatar with a more climate resilient, low carbon, and sustainable housing alternative. The proposed approach will only succeed if the offer of alternative housing is attractive to all stakeholders – including current ger area residents, project developers, banks, and the municipality, among others (a full stakeholder analysis is contained in the PPTA report, Volume IV). To ensure the attractiveness of the alternative housing offer, stakeholder consultation and engagement is crucial, both in the project preparation phase and during implementation.

PPTA period (design & preparation)

The stakeholders consulted include ger area residents, private sector, service providers, local government, Ulaanbaatar Municipal Government, public utilities, and line Ministries. Extensive consultations have been held during project design to ensure affordability of the social and affordable housing units and improved services for the poor and vulnerable groups. The PPTA has conducted a poverty and social analysis and looked at social safeguards. Socioeconomic surveys, affordability surveys, stakeholder workshops, focus group discussions, and key informant interviews have also been conducted during the PPTA, concentrated mostly during three project preparation missions in November 2016, March 2017, and June-July 2017.

The following stakeholder consultations have already been conducted:

- GADIP Tranche 1 Socio-Eco Analysis
- AHURP Pre-Feasibility Focus Group Discussions (FGD): 57 FGDs with 500 participants
- Focused Phase 1 Bayankhoshu and Selbe Project Area Surveys covering all Khasaas (280 participants)
- Ger Area (Re)Development Agency (GADA) / State Housing Organization (TOSK) surveys
- Various informal discussions and other project FGDs
- Focus Phase 1 Bayankoshuu and Selbe Project Area Consultations covering all Khashaas with three consultations: (1) project presentation and willingness to participate, (ii) compensation valuation method, and (iii) preliminary design and swapping agreement.

Details on the consultations have been included in the PPTA Report, Volume IV, Annex 4.2, Community Participation Plan for PPTA.

Implementation period

Extensive consultations will be held during project implementation to ensure actual affordability of the social and affordable housing units and improved services for the poor and vulnerable groups. Key documents, such as the social development action plan, gender action plan, community participation plan and stakeholder communication strategy, resettlement plans, and environmental management plan outline the consultation and participation activities during implementation. Loan assurances will address implementation and monitoring of the plans.

Of these, especially the stakeholder communication strategy is important. The preparation and adoption of a stakeholder communication strategy (SCS) is required by ADB to ensure inclusiveness, transparency, timeliness, and the meaningful participation[78] of stakeholders in the project. The SCS promotes messages targeted at key stakeholders consistent with established communication objectives as to what perspectives, actions and changes should be promoted to ensure the project's success. The SCS ensures that vulnerable groups such as the poor, elderly, indigenous and ethnic groups, and women, who are at risk of being marginalized, are provided with opportunities.

[78] Meaningful participation is defined as a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues. See ADB. 2009. *Safeguard Policy Statement*. ADB. Manila.

Key stakeholders, who are essential for the achievement of project objectives and to mitigate project specific risks and challenges, have been identified. Stakeholders include direct beneficiaries (mostly targeted ger areas inhabitants), relevant MUB bodies and agencies, relevant ministries and national government agencies, funding financial institutions, and private developers. The strategy serves to inform and support community development, enhance government agency capacity to manage project outcome and enhance project benefits, and mitigate negative impacts.

The objectives of the SCS are to

- Enhance project benefits and mitigate potential negative impacts, through timely information on the project components and potential social and economic benefits, particularly for the poor, women, and ethnic minorities
- Establish two-way information sharing and dialogue mechanisms with stakeholders
- Raise public awareness on environmental sanitation behavior and hygiene
- Communicate IR livelihood support measures
- Communicate the project's grievance redress mechanism and procedures;
- promote gender equity, women empowerment, and women's access to economic opportunities
- Involve local communities and private developers in the preparation of the detailed design
- Raise public awareness on project mechanism and access criteria
- Coordinate project implementation between the PIU and the involved municipal sector agencies and central departments

E.6. Efficiency and Effectiveness

Economic and, if appropriate, financial soundness of the project/programme

E.6.1. Cost-effectiveness and efficiency

Overall financial structure

See Section F.1 Economic and Financial Analysis for a concise argument on why the GCF concessionality is necessary for the implementation of the project and the least concessionality necessary to make AHURP possible and financial sustainable. See Sections B and C for in depth explanation of the overall financial structure of AHURP. GCF funding will not crowd out private and public investment in low carbon and climate resilient housing and urban development in the ger area; in contrast, it will crowd in private and public resources, demonstrate the viability of these type of investments, therefore reducing barriers towards the replication of the AHURP investments with lower (or no) concessionality. GCF funding will be given as a temporary targeted incentive to address the needs of the most vulnerable households. As explained in previous sections ger areas inhabitants cannot currently afford moving to the newly built districts, therefore the affordability mechanisms developed with GCF support will allow them access to social housing (for the lower income groups) and affordable housing (for the middle income groups) in climate-resilient, low-carbon eco-district.

Efficiency and effectiveness

In order to fully assess the efficiency of the GCF funding, it is useful to distinguish two GCF funding streams: one for mitigation (grant, $50 million) and one for adaptation (concessional loan, $95 million). Overall mitigation funding is $73.8 million (of which $59.9 million is for mitigation investment and the remainder for capacity building) and overall adaptation funding is $373.9 million (of which $361.9 million is for adaptation investment and the remainder for capacity building).

The proposed project, by focusing on addressing systemic barriers to low-carbon and climate resilient urban development represents an efficient and effective way to address Mongolia's future GHG emissions and adaptation needs. By providing incentivized financing, the project will also address initial investment barriers and kick start market-based shift towards low-carbon housing. The effectiveness and efficiency of the proposed activities are characterized by the following key performance indicators:

- Mitigation: Total funding $73.8 million, GCF funding $50 million, direct lifetime emission reductions 7.92 million tCO2e, direct and indirect emission reductions 39.59 million tCO2e, GCF funding per direct tCO2e reduced: $6.32, GCF per total tCO2e reduced (direct and indirect): $1.26
- Adaptation: Total funding 373.9 million, GCF funding $95 million, primary direct beneficiaries 35,000, primary indirect beneficiaries 315,000

- Significant replication potential within Mongolia, outside of Ulaanbaatar, and outside of Mongolia not reflected in the above numbers, through learning, dissemination, and inclusion into ADB projects and programs in Asia

Reviewing a wide range of energy efficiency in households CDM projects, AHURP's key indicators suggest strong efficiency in terms of tCO2e reduced per dollar.[79] It is essential to note that comparison relevance is limited since cost will depend to a large extent on the measures to be implemented and on the carbon intensity of the local electricity grid, which explains the big difference between the direct emission reductions as a result of investments made in the project and indirect emission reductions, which include investments that will be made due to the barrier removal and market creation by the project.

E.6.2. Co-financing, leveraging and mobilized long-term investments (mitigation only)

The total GCF funding for the project of $145 million leverages $399.1 million in additional financing. This is a co-financing rate of over 73%. Alternatively put, each $1.00 of GCF funding leverages $2.75 in co-financing. These numbers show that the GCF funding are used in a sound manner and make it possible to deploy a significant amount of co-financing.

E.6.3. Financial viability

As demonstrated in the financial analysis of core subprojects in Section F.1, without the support from GCF, the financial returns from the project would be insufficient to pay the sources of capital used, while the macro-economic situation of Mongolia is such that neither the public sector nor the private sector are able to make these investments on their own. We also demonstrate that with the targeted GCF support, financial sources can be compensated and a sufficient budget for operation and maintenance can be set aside. Without GCF support, the project would not be financially viable, while with GCF support, the project would be financially viable and sustainable. Sustainability of the investments supported with GCF funding will be a key design consideration, and therefore guaranteed as shown in the financial analysis of core subprojects. See section F.1 for details on the financial and economic analysis.

Moreover, the project includes technical assistance activities that focus on addressing systemic barriers to the market for energy efficient and climate-resilient housing and public buildings. This includes the development of policy, legislation and incentives to support low-income households' access to low-carbon housing. Through the use of grants and loans, the market will be transformed such that, after the Fund intervention, additional investment in the market will continue to take place at a faster rate than before Fund intervention.

E.6.4. Application of best practices

Technology choices will be based on the best available technologies, considering climate change, environment, social and economic criteria and the desire for innovation. Technology choices will also be informed by the technical assistance that is provided as part of AHURP, and will be subject to systematic learning and dissemination for the benefit of other projects in Mongolia (inside and outside of Ulaanbaatar) and in the wider region. The same is also true in the case of 'soft innovation' in the form of contractual, regulatory, and policy approaches that are novel to Mongolia.

Best available technologies have been considered and will be applied including:

- Passive Solar Design relying on the relevant orientation of the buildings, considering the best choices in terms of solar impact and wind protection, complemented by a high level of insulation and good quality of windows and doors;
- PV (Photo Voltaic) Panels as common technology for herding families and mobile phone providers in the rural areas of Mongolia not served by the electrical grid, but are not common in urban areas; AHURP plans to install PV systems to meet approximately 50% of residential electricity demands, but this will require working with the Energy Regulatory Commission (ERC) and other agencies on procedures for installation and operations; and

[79] Review undertaken using CDM data, investments in energy efficiency projects range from $45 to $3,000 der tCO2e but over shorter lifetime periods. http://www.cdmpipeline.org/

- Building Energy Performance Monitoring was part of the AHURP Renewable Energy systems, so that data can be available for tuning systems operations and verifying design performance under actual operating conditions.

A review of the successful introduction of EE technologies for housing construction including Insulated Masonry, Timber Framed, Structures, and Insulated Panels and Insulated Concrete undertaken during the implementation of the GEF-funded "Energy Efficiency in New Construction in the Residential and Commercial Buildings Sector in Mongolia" Project (BEEP)[80] will be taken into account in the design phase.

Best international practice is followed in terms of project design. The project includes both technical assistance focused on permanent reduction and removal of market barriers and reduction of risks, coupled with incentivized commercial lending in conjunction with an international financial institution. The demonstration effect in residential and public sector buildings and within involved banks, coupled with systemic barrier removal activities, is considered best practice and a cost-effective means to create markets, an approach followed by multilateral development banks around the world.

E.6.5. Key efficiency and effectiveness indicators

GCF core indicators

Estimated cost per t CO_2 eq, defined as total investment cost / expected lifetime emission reductions (mitigation only)

(a) Total project financing	US$ 544.0 million
(a*) Total mitigation financing	US$ 101 million
(b) Requested GCF amount	US$ 145.0 million
(b*) GCF mitigation financing	US$ 53.7 million
(c) Expected lifetime emission reductions overtime	7,917,480 tCO_2eq (direct)
(c*) Total lifetime emission reductions (direct + indirect)	39,587,400 tCO_2eq
(d) Estimated cost per tCO_2eq (d = a* / c)	US$12.75 / tCO_2eq (mitigation funding / direct ER)
(e) Estimated GCF cost per tCO_2eq removed (e = b* / c)	US$6.78 / tCO_2eq (mitigation funding from GCF / direct ER)
(f) Estimated cost per tCO2eq (f = a / c*)	US$13.72 tCO_2eq (total funding / total ER)

A methodology for expected lifetime emissions reductions is detailed in section E.1.2 Key impact potential indicator. Within the budget, a split is made between adaptation and mitigation expenditures. To compare like with like, the mitigation results are related to the mitigation budget only (see [d] and [e]), however, we have also added a ratio (f) which relates the total emission reductions (direct + indirect) to the total project budget.

The indicator values demonstrate an attractive ratio between investment amount and mitigation results, consistent with high baseline emissions resulting from a combination of a very cold climate (high heating requirements), inefficient buildings and heat supply in the baseline, and reliance on fossil fuels (both for heating and for power supply).

Expected volume of finance to be leveraged by the proposed project/programme and as a result of the Fund's financing, disaggregated by public and private sources (mitigation only)

[80] The project was implemented by UNDP over the 2009-2014 period, see BEEP Terminal evaluation at https://www.thegef.org/sites/default/files/project_documents/3010_UNDP_TE_BEEP%2520TE%2520Final%2520Report%2520%25282%2529.pdf

	The breakdown of the funding resources of the Program is detailed in Section B.2 Project Financing Information. The GCF's leverage ratio to ADB and other additional financial resources is projected to be 1USD : 2.75 USD (GCF 26.7% to other 73.3%).
Other relevant indicators (e.g. estimated cost per co-benefit generated as a result of the project/programme)	

**** The information can be drawn from the project/programme appraisal document.***

F.1. Economic and Financial Analysis

1 Economic Analysis

An economic analysis of the project was undertaken in accordance with the following relevant ADB guidelines: (i) Guidelines for the Economic Analysis of Projects (2017), (ii) Key Areas of Economic Analysis of Projects (2013), (iii) Cost Benefit Analysis for Development: A Practical Guide (2013), and (iv) Economic and Financial Appraisal of Urban Development Sector Project (1994). Given that AHURP is proposed as a sector project, a cost benefit analysis was conducted on four core subprojects which have been prepared under ADB's project preparatory technical assistance (PPTA). They include the Bayankhoshuu West and Selbe East subprojects under Output 1: Climate resilient and low carbon urban infrastructure, public facilities, and social housing units built in *ger* areas (Public sector investment), and the Bayankhoshuu West and Selbe East subprojects under Output 2: Climate resilient and low carbon affordable and market housing units and economic facilities built in *ger* areas (Private sector investment).

The cost benefit analysis used estimates based on preliminary design. The costs and benefits of the subprojects were valued using the domestic price numeraire which converts border prices to their equivalent domestic prices through the application of shadow prices. The annualized benefits and costs of the subprojects were assessed over a 30-year period, allowing a five-year construction period, followed by an operating period of 25 years.

Economic costs. Financial costs comprising capital and recurrent O&M costs, inclusive of physical contingencies and in constant mid-2017 prices, were converted into economic costs by subtracting all transfer payments, including taxes and duties, before applying the shadow prices. For this analysis, the shadow price adjustment factors used were taken from a recent Mongolia project of a similar nature. The factors used were 1.01 for tradeable goods, and 0.70 for unskilled labor. The analysis considered not only the capital costs required for the investment but also the recurrent O&M costs throughout the cost-benefit evaluation period. **Table 1** below summarizes the conversion of financial costs into economic costs for the four core subprojects.

Table F.1.1. Conversion of Financial Costs into Economic Costs
(in MNT million, constant 2017 prices)

Subproject	Financial Costs	Financial Costs Less Taxes	Financial Costs Excluding Tax								Total Economic Costs
			Unskilled Labor		Skilled Labor		Nontradeable Goods		Tradeables		
			%	Total	%	Total	%	Total	%	Total	
A, Public Investments in Low Carbon and Resilient Eco-Districts											
1. Bayankhoshuu West											
a. Investment Cost	9,102	8,212	9%	755	21%	1,731	40%	3,263	30%	2,463	8,010
b Operations and Maintenance	165	150	9%	14	21%	32	40%	60	30%	45	147
2. Selbe East											
a. Investment Cost	13,106	11,824	9%	1,088	21%	2,492	40%	4,698	30%	3,547	11,534
b Operations and Maintenance	238	217	9%	19	21%	45	40%	87	30%	65	211
B, Private Investments in Low Carbon and Resilient Eco-Districts											
1. Bayankhoshuu West											
a. Investment Cost	53,908	48,636	9%	4,474	21%	10,251	40%	19,324	30%	14,588	47,440
b Operations and Maintenance	980	891	9%	80	21%	187	40%	356	30%	267	870
2. Selbe East											
a. Investment Cost	59,214	53,423	9%	4,914	21%	11,260	40%	21,226	30%	16,024	52,109
b Operations and Maintenance	1,077	979	9%	88	21%	206	40%	391	30%	294	955

Economic benefits The economic benefits of the project were derived and quantified mainly from three sources: (i) the annualized market rental values of the green housing subcomponents of the subprojects, (ii) the global warming damages avoided as a result of reduced GHG emissions, and (iii) the health benefits arising from the reduced environmental pollution. To estimate the annual market rental values, the prevailing price-to-rent ratio in Ulaanbaatar of 14.15% was used. The selling prices assumed for the social, affordable, and market green housing were based on the latest city-wide survey of real estate properties and ranged from MNT2.52 million per m^2 to MNT3.48 million per m^2.

For the global warming damages avoided, in accordance with ADB guidelines, a value of $36.30/ton was applied to the estimated reduction in GHG emissions as a result of the subprojects. This value was increased annually in real terms by 2%. The health benefits of the subprojects were quantified through savings in the disability adjusted life years (DALY) as a result of improved access to clean air. A DALY is an indicator of life expectancy combining mortality and morbidity into one summary measure of population health to account for the number of years lived in less than optimum health. Estimates prepared by the World Health Organization of the environmental burden of respiratory diseases in Ulaanbaatar, measured in DALYs per 1000 capita per year, were converted into economic benefits by assuming that each DALY was equivalent to the GDP per capita of Ulaanbaatar. Furthermore, for the purpose of the analysis and based on the World Health Organization's estimate of the environmental burden of respiratory diseases in Mongolia, it was assumed that the project will result in savings of 63.2 DALYs per 1000 capita.

Other co-benefits identified were not quantified either due to lack of relevant data at the time the analysis was conducted or lack of universally accepted valuation methodology for the co-benefit. These include benefits from reduced incidence of flooding, energy savings from reduced consumption as a result of the switch to climate-mitigating technology, and incremental income from new business investments, including those in micro-, small and medium enterprises, or from business expansions induced by the green housing and eco-district development.

EIRR calculations and sensitivity analysis. The resulting base case economic internal rate of returns (EIRRs) of the subprojects ranged from 10.78% to 15.17%, exceeding the minimum discount rate of 9% which is prescribed by the 2017 ADB guidelines on the economic analysis of projects. This confirms that the subprojects are economically viable, with anticipated economic benefits greater than the estimated economic costs. A sensitivity analysis, undertaken to further test economic viability showed that the subprojects will remain economically robust under the following scenarios: (i) a 10% increase in investment cost possibly arising from a delayed implementation schedule; (ii) a 10% increase in operation and maintenance costs which can result from higher-than-budgeted personnel salaries and other related costs; (iii) a 10% decline in benefits possibly resulting from lower-than-projected annualized market rental values, reduction in GHG emissions, and health benefits; (iv) a combination of scenarios (i), (ii), and (iii); and (v) a delay in subproject benefits by a year as shown in **Table 2.**

Table F.1.2. Summary Economic Evaluation of Subprojects

	Public Investment Core Subprojects		Private Investment Core Subprojects	
Base Case/Sensitivity Scenarios	**Bayankhoshuu West**	**Selbe East**	**Bayankhoshuu West**	**Selbe East**
Net Present Value (MNT million)	**1,363**	**1,679**	**11,984**	**28,755**
Base Case EIRR (%)	**11.09%**	**10.78%**	**12.07%**	**15.17%**
Sensitivity Tests:				
Case 1: Capital Cost + 10%				
EIRR	10.10%	9.80%	11.02%	13.99%
Switching Value	21.10	18.22	29.07	52.21
Sensitivity Indicator	4.74	5.49	3.44	1.92
Case 2: O & M Cost + 10%				
EIRR	10.96%	10.65%	11.95%	15.06%
Switching Value	162.93	136.60	247.31	569.52
Sensitivity Indicator	0.61	0.72	0.40	0.18
Case 3: Benefits - 10%				
EIRR	10.33%	9.57%	10.78%	13.75%
Switching Value	27.49	14.68	23.69	43.52
Sensitivity Indicator	3.64	6.81	4.22	2.30
Case 4: Benefits delayed by one year				
EIRR	8.80%	8.51	9.65	12.52%
NPV (US$ Million)	(135)	(476)	2612	16,901
% Drop in NPV	109.9	128.4	78.2	41.2
Case 5: Combination of Cases 1,2 & 3				
EIRR	10.46%	9.46%	10.60%	13.30%
NPV (US$ Million)	617.00	453	6510	21,084
% Drop in NPV	54.7	73.0	45.7	26.7

The main conclusion is that AHURP and its core subprojects are economically justified by their significant economic benefits and resulting development impacts. GCF funding would be used to reduce the barriers towards the implementation of AHURP, while the result of economic analysis demonstrates that if incentives become better aligned with the country's needs (prices reflect economic costs and benefits by reducing distortions and market imperfections), funding of the project on the basis of market conditions would become more viable. Achieving better alignment of incentives with economic costs and benefits would be the subject of the capacity and institutional strengthening component of AHURP.

We could add that the foregoing argument, in cases of countries with more advantageous macroeconomic circumstances, could be an argument for funding from the public budget, or taking on international debt to finance the economically beneficial project. However, in the case of the constrained macroeconomic situation and public finances of Mongolia, this is not feasible.

See Appendix 4 of the PPTA report, *Economic and Financial Analysis* for details of the analysis.

2 Financial Analysis

A financial analysis was carried out in accordance with the relevant ADB guidelines for the project, specifically the Guidelines for the Financial Management of Projects (2005). Given AHURP's sector modality, the financial analysis focused on assessing the viability of the core subprojects to be financed using the GCF grant and loan proceeds. The financial analysis was undertaken from the developer's perspective. The subprojects, upon completion, would generate revenues from the sale of affordable and market housing units, as well as the sale of parking spaces and commercial lots for shops and offices. Hence, a financial benefit-cost analysis for each subproject was conducted to estimate the financial revenues to be generated and in conformity with ADB guidelines, financial internal rates of return (FIRRs) were calculated followed by a comparison of the resulting FIRRs with the calculated weighted average cost of capital (WACC) for the subproject.

General Approach and Cost Assumptions. The total estimated costs of the subprojects are MNT49,685 million for Bayankhoshuu West and MNT54,575 million for Selbe East. The subprojects will be funded from the GCF loan, GCF grant, and the developers' equity participation. The underlying assumptions used in the financial analysis are as follows: (i) the model is presented in MNT million in constant mid-2017 prices, (ii) physical contingencies were computed at 10% of base cost estimates, and (iii) price contingencies were computed at an average of 1.45% on foreign exchange costs and 5.0% on local currency costs. Subprojects will be implemented over a 5–year period, with sales of the affordable and market housing and commercial lots generated to be completed in 3 years after subproject completion.

Sources and Estimation of Financial Revenues. The sale prices used were based on a city-wide survey conducted under ADB's project preparatory technical assistance and they are as follows: (i) for affordable housing, MNT1.08 million per m2; (ii) for market housing, MNT2.04 million per m2; (iii) for garage shops/parking spaces, MNT0.90 million per m2 to MNT10.06 per m2; and (iv) for the commercial lots for shops and offices, MNT2.25 million per m2 to MNT2.76 per m2. The prices used for market housing and commercial plots were within the latest updated estimates published by real property specialists for the city center and outside the city center of Ulaanbaatar.

FIRR Calculations and Sensitivity Analysis. The FIRR calculations show that **without the GCF grant and concessional lending**, both subprojects will not be financially viable. For both subprojects, the base case FIRRs fell below the calculated WACCs, (see **Table 3** the summary financial evaluation). On the other hand, w**ith the GCF grant and concessional lending**, both subprojects become financially viable with base case FIRRs exceeding the subprojects WACCs.

A sensitivity analysis, undertaken to further test financial viability determined that for both subprojects, even **with the GCF grant and concessional lending**, some of the FIRRs will be below the WACCs. The sensitivity analysis scenarios assumed are in line with the potential impacts identified in Section G but would have low probability. In addition, appropriate risk mitigating measures in the form of adequate technical and management support to the PMO and PIUs have been built into the project design.

Table F.1.3. Summary Financial Evaluation of Subprojects

	Without GCF Grant and Loan Fiinancing		With GCF Grant and Loan Fiinancing	
Base Case/Sensitivity Scenarios	**Bayankhoshuu West**	**Selbe East**	**Bayankhoshuu West**	**Selbe East**
Financial Cost (MNT million)	**49,685**	**54,575**	**49,685**	**54,575**
Net Present Value (MNT million)	(3,052)	(1,717)	370	2,164
Base Case FIRR (%)	**8.49%**	**11.02%**	**8.49%**	**11.02%**
Weighted Average Cost of Capital (%)	**14.33%**	**13.99%**	**7.93%**	**8.02%**
Sensitivity Tests:				
Case 1: Capital Cost + 20%				
FIRR	-2.21%	0.67%	-2.21%	-0.05%
Switching Value	10.92	5.74	1.04	5.42
Sensitivity Indicator	6.30	17.41	95.75	18.46
Case 2: O & M Cost + 20%				
FIRR	-8.28%	10.81%	8.28%	10.81%
Switching Value	554.70	283.35	806.01	285.94
Sensitivity Indicator	0.12	0.35	1.89	0.35
Case 3: Benefits - 20%				
FIRR	-4.55%	-2.47%	-4.55%	-2.47%
Switching Value	8.96	4.40	0.86	4.44
Sensitivity Indicator	7.68	22.71	116.73	22.50
Case 4: Combination of Cases 1,2 & 3				
FIRR	-14.24%	-12.50%	-14.24%	-12.50%
NPV (US$ Million)	(16038.00)	(16435.00)	(15750.66)	(15852.49)
% Drop in NPV	(425.49)	(857.19)	4351.88	832.71
Case 5: Benefits delayed by one year				
FIRR	-6.17%	-3.94%	-6.17%	-3.94%
NPV (US$ Million)	(12641.00)	(12459.00)	(11158.37)	(10493.50)
% Drop in NPV	(314.19)	(625.63)	3112.19	585.02

See Appendix 4 of the PPTA report, *Economic and Financial Analysis* for details of the analysis.

F.2. Technical Evaluation

Mongolian climate and the long history of energy infrastructure developed under a planned economy present a challenge for integrating energy efficiency, but also reinforce its importance. AHURP's objective is to achieve energy efficiency higher than present Mongolian Standards require and reduce dependence on CO2 producing energy sources.

Mongolia is moving towards integrating modern energy efficiency technology into prevailing standards for design, construction and operation of buildings, and utilities services. The policy and legal framework for energy efficiency in building construction and renewable energy are mostly in place, but the regulatory framework and the institutional capacity to implement these policies are still in development. Most importantly, the economic and environmental benefits that are recognized at government levels have not been translated into economic incentives for building owners and developers to adopt energy efficiency measures.

The Mongolian Norm and Regulation BnDB 23-02-09 "Thermal Performance of Buildings" will be the basis for setting building performance objectives for the AHURP. Unlike Mongolian building norms that are mostly prescriptive, BnDB 23-02-09 provides performance objectives with measurement and monitoring criteria, which allow building designers

the flexibility to determine their own methods for achieving the requirements. The AHURP objective is to achieve a 25% reduction in heating energy from the present average for new construction.

AHURP uses in the core subprojects a mix of technologies that are either known in Mongolia, or known in other countries but that have not yet been used at scale in Mongolia. Technological risks involved in the implementation of AHURP's core subprojects are therefore limited and controllable (see Section 9), while at the same time AHURP assures that the technological envelop is pushed outward, so that more climate technologies are considered and implemented by developers. Furthermore, note that capacity building will be conducted to enhance the capacity of Mongolian developers, contractors, and building material suppliers to meet the required technical quality standards. The same is true for all subprojects under the sector loan modality, which alongside the core subprojects, are subject to technical due diligence to ensure their practicability and feasibility.

For renewable energy technologies, the PPTA identified the following options, taking into account various budgetary constraints:

- Passive Solar Design based on the relevant orientation of buildings (not under thermal mass storage), considering the best choices in term of solar impact and wind protection; complemented by a high level of insulation and good quality of windows and doors
- PV (Photo Voltaic) Panels as common technology for herding families and mobile phone providers in rural areas not served by the electrical grid, but are not common in urban areas; AHURP plans to install PV systems to meet approximately 50% of residential electricity demands, but this will require working with the Energy Regulatory Commission (ERC) and other agencies on procedures for installation and operations

The project will provide infrastructure connections to the ecodistricts and accordingly within the re-development perimeters, for water, sewer, heating, electricity and communications, in addition to insuring that these, and the roads and drainage facilities constructed within an ecodistrict, are compatible with the adjoining ecodistrict's and the city infrastructure networks to which they will be connected.

AHURP has assumed that connections to facility networks will be made at or near the borders of the URU blocks, for areas that will be located within the USGADIP sub-centres. The proximity to existing infrastructure will be a major factor in the evaluation of areas for feasibility of the AHURP model.

The procurement of goods, civil works, and consulting services financed by the public component will be subject to and governed by ADB's Procurement Guidelines (2015, as amended from time to time) and Guidelines on the Use of Consultants by ADB and its Borrowers (2013, as amended from time to time). It will be under the responsibility of MUB and will be managed by the PMO. For the FIL component, the selection of real estate developers will be based on qualification criteria and bid responsiveness using a scoring method for both the technical and financial aspects of their proposals. The developer should partner with one of the preselected commercial banks. The developer's eligibility will follow ADB's qualification criteria.[81] Qualified developers' proposal assessment will include the following criteria (i) implementation capacity; (ii) adequacy of technical proposal's detailed design, bill of quantity, and technical specification; (iii) technical alternatives compliance;[82] (v) financing capacity; and (iv) financing and business plans. The financial scoring will also take into consideration (i) the amount of EDAF requested for the project in order to minimize the use of the EDAF, (ii) the capacity of the partner commercial banks to supplement the EDAF financing at a rate that would support the benchmark lending rate which will be market based but below the current domestic interest rate charged for similar types of investments, and (iii) a financing plan that would be fully supportive of the financial viability of the eco-district and the financial sustainability of the developer, yet not jeopardizing that of its partner bank. The

[81] These will include (i) eligibility criteria (conflict of interest, and ADB/UN eligibility); (ii) no pending litigation and arbitration; (iii) financial situation (historical financial performance, average annual construction turnover, and financial resources); and (iv) construction experience (contracts of similar size and nature and construction experience in key activities).

[82] With the technical specifications and resulting improvements (compliance with the project objective, with the subproject land use and development plan, and with the energy efficiency performances), cost benefits (such energy efficiency performance and reduction of the implementation schedule), quantifiable nonconformities, and omissions.

developer who is most responsive to the evaluation criteria and obtain the best combined score from the technical and financial evaluations will be selected. Each qualified developer will undertake procurement of good and civil works with due attention to economy and efficiency in accordance with established private sector or commercial practices acceptable to ADB. The MUB PMO will be responsible for the technical evaluation scoring and the DBM PIU for the financial evaluation scoring.

Further details on technical evaluation can be found in Volume II of the PPTA report, "Project Core Subprojects."

F.3. Environmental, Social Assessment, including Gender Considerations

ADB has conducted a full set of environmental and social assessments, the results of which has been used to prepare appropriate action plans in line with ADB safeguard policies summarized below. For full details see PPTA report Appendices 5, 12, 13, 15 and 16 (Project Administration Manual, Initial Environment Examination, Environment Assessment Review Framework, Poverty Reduction – Social Strategy, and Gender Action Plan, respectively).

Environment

The design of the AHURP fulfills the requirements of ADB's Safeguard Policy Statement (SPS 2009) along with the directives of the supporting Good Practice Safeguard Sourcebook (2012) which clarifies the rationale, scope, and content of the environmental and social assessment that must be conducted. Explicit with the application of the SPS (2009) is the application of the comprehensive World Bank Group/IFC Environmental Health and Safety (EHS) Guidelines for development projects which provide general and industry-specific Good International Industry Practice (GIIP) guidelines. For the AHURP, IFC Guidelines for (i) Cement and Lime Manufacturing, (ii) Construction Material Extraction, (iii) road construction guidelines of Toll Roads, and (iv) Retail Petroleum Networks must be applied.

The scope of ADB SPS (2009) and Good Practice Safeguard Sourcebook addresses the eight (8) IFC Performance Standards. Specifically, IFC Performance Standards 1, 2, 3, 4, 6, and 8 are central to Safeguard Requirements 1: Environment; while IFC Performance Standards 5 and 7 are addressed by Safeguard Requirements 2: Involuntary Resettlement and Safeguard Requirements 3: Indigenous Peoples. The ADB Prohibited Investment Activities List applies to all IFC Performance Standards.

ADB projects are initially screened to determine the level of assessment that is required according to three environmental categories (A, B, or C). Category A is assigned to projects that normally cause significant or major environmental impacts that are irreversible, diverse, or unprecedented such as hydroelectric dams (an Environmental Impact Assessment is required). Category B projects have potential adverse impacts that are less adverse than those of category A, are site-specific, largely reversible, and for which mitigation measures can be designed more readily than for category A projects (an Initial Environmental Examination is required). Category C projects are likely to have minimal or no negative environmental impacts. An environmental assessment for Category C projects is not required but environmental implications need to be reviewed.

The AHURP is category B for environment pursuant to ADB SPS (2009). A category B project will have potential adverse impacts that are less adverse than those of a Category A project, are site-specific, largely reversible, and can be mitigated with an environmental management plan (EMP).

The design of the AHURP will also satisfy the requirements the Mongolian Law on Environmental Impact Assessment (2012). The independent screening of the project determined that a government Environmental Management Plan (EMP) will be prepared for the AHURP to guide and ensure safeguard compliance with the law. A government EMP is assigned to projects that are not deemed likely to cause significant impacts. The government did not require the AHURP to undergo a full detailed EIA (DEIA).

Social

A social, poverty, and gender analysis was undertaken in accordance with ADB guidelines. The project is expected to improve the housing and living conditions of residents in the target ger areas of Ulaanbaatar by creating sustainable,

climate resilient, low-carbon eco-districts with comprehensive solutions for affordable housing in Ulaanbaatar city ger areas.

Social Development Action Plan
The social development action plan (SDAP) includes measures to (i) facilitate and support the affected communities to avoid any loss of livelihood and business; (ii) support vulnerable households who do not have assets to afford better houses through skills training and linkage with job opportunities, training, and financial institutions; iii) identify and integrate beneficiary community needs into project design documents; (iv) sustain awareness and support for the project by the different stakeholders; (v) mobilize and organize beneficiary community members to support the development and implementation of the overall redevelopment plan and detailed designs of houses and infrastructure; and (vi) facilitate proper monitoring and evaluation of the different aspects of these components.

Table F.3.1 provides SDAP activities to be undertaken aimed to maximize positive outcomes and minimize negative impacts of the project for beneficiary communities; and sustain the involvement and support of the affected communities, organized primary groups, CDCs, and other relevant project stakeholders throughout all the stages of project implementation. The resources for implementation of SDAP are part of project output 3 (PMO Support).

Table F.3.1 Social Development Action Plan

Social Impacts/Issues/ Risks	**Actions**	Target Groups	**Responsible**	**Indicative Budget**	**Monitoring Indicators**
Suitability of design of proposed housing and infrastructure	Conduct series of co**nsultations/ focus group discussions with** communities and project stakeholders **for** identification and integration of gender specific design requirements in the designs and plans of proposed houses, public spaces and infrastructure	Affected plot owner and other households inclusive women and other vulnerable groups, kheseg and khoroo leaders, CDCs, BCs, and other stakeholder groups	• Executing Agency • Selected Company for Detailed Design and other Plans Development • Consultancy Services for Community Engagement and Development		• Number of community consultations, sex disaggregated • Number of communities needs and interests integrated into the plans and designs
Displacement and Loss of Assets, Livelihoods and Businesses during Construction	Facilitate developers and other stakeholders in community consultations for resettlement/relocation to start the construction activities	Affected plot owner and other households inclusive of women and vulnerable groups	• Executing Agency • Developers • Consultancy Services in charge of Environmental Safety and Social Safeguard plans development		• Number of consultations, sex disaggregated • Number of documentations
	Facilitate and link the affected households with legal, social and financial support institutions to prevent loss of assets,	Affected plot owner and other households inclusive of women and			• Number of meetings, sex disaggregated • Number and types of implemented

	livelihoods and businesses	vulnerable groups	• Consultancy Services for Community Engagement and Development		activities, sex disaggregated • Number of facilitated individuals, sex disaggregated • Types of facilitations
	Develop and disseminate information materials and organize information sharing events for communities, stakeholders and wider public to keep them fully informed on ongoing project activities and project social and safeguard policies to prevent violation of any human rights, politicizing, fraud and illegal actions	Project Stakeholders including affected plot owner and other households inclusive of women and vulnerable groups			• Number and types developed IEC materials • Number and types of disseminated IEC materials • Number of information events • Number of informed people, sex disaggregated
Risk for HIV/AIDS and other communicable diseases in construction areas	Implement an IEC program for (i) basic hygiene practices, (ii) water conservation, iii) HIV/AIDS and other communicable diseases	Affected plot owner and other households inclusive of women and vulnerable groups			• Number and types developed IEC materials • Number and types of disseminated IEC materials
Affordability of Houses and Services for various income groups	Facilitate and link the affected households and individuals to the affordable housing and MSME support microfinance loans and government social and financial support, job generation and skills development programmes as per the availability	Affected plot owner and other households inclusive of women and vulnerable groups	• Executing Agency • Developers • Banks • Consultancy Services for Community Engagement and Development		• Number of facilitated HHs, sex disaggregated • Types of facilitation
Assurance of Operational Quality and Reliability of Houses and Services during and after construction	Continue community mobilization, organization and capacity building to support CDCs to become neighborhood representative organizations	Affected plot owner and other households inclusive of women and vulnerable	• Executing Agency • Developers • Consultancy Services for Community Engagement		• Number of PGs, sex disaggregated • Number of CDCs, sex disaggregated

	Facilitate the establishment and capacity building of Home Owners' Associations (HOA) under the CDCs	groups, PGs and CDCs	and Development		• Number of HOAs, sex disaggregated • Number and types of capacity building activities, sex disaggregated • Number of monitoring reports done by HOAs

ADB = Asian Development Bank, CDC = Community Development Council, MUB = Municipality of Ulaanbaatar, HOA = Home Owners Association, PG = Primary Group

*Implementation and monitoring***.** The Executing Agency with the assistance of the project consulting service (see PAM Section VI, Project Consulting service on PMO Support and Appendix 11) is responsible for the implementation of SAP and the Gender Action Plan (GAP), and reporting on progress and achievements of the project. Key indicators from both plans will be included in the PPMS. The impact analysis will include the effectiveness of social activities under the SAP.

Gender action plan
*Key actions***.** The GAP ensures that the project (i) includes design features as per the safety and security needs of vulnerable groups of beneficiary communities including women, children, elderly, and differently-abled; (ii) collects sex disaggregated data for all key issues; (iii) further investigates affordability issues under improved housing and services provision to make recommendations on providing support for vulnerable groups including female-headed households; and (iv) provides social service infrastructure which has targets for serving women so they can have access economic opportunities.

A gender mainstreaming approach has been developed and included in the project design. A GAP has been prepared and the actions agreed on summarized in Table F.3.2. Analysis of primary and secondary data reveals that (i) majority of households currently access water supply from public kiosks on a daily basis done primarily by women (73%) or children; (ii) open pit latrines are mostly used (95% of surveyed households) and these are especially hard for children, elderly and women to use in the winter months; (iii) use of traditional stoves for heating and cooking is common in ger areas (59% of households in Bayankhoshuu), which is a major source of air pollution in the city, especially in the household; women are among the most at risk for health problems from cooking and heating; (iv) road network within the ger areas is mostly unpaved and lacking sidewalks and/or lighting which is risky for majority of road users who are pedestrians; and unsafe at night especially women; and (v) lack of public space such as parks and social services such as kindergartens, schools, and vocational training opportunities. The provision of such services and opportunities would have significant effect in improving quality of life, through providing safe and secure educational opportunities for young children thus freeing women from the burden of providing childcare at home. Training in alternative livelihood options and entrepreneurship would also allow them to reach new economic opportunities.

Improvements in infrastructure (roads, water supply and sanitation, heating) will have a significant impact on time savings, mobility, economic opportunity, health, safety, and security of the target area residents, particularly women. The project has prepared a comprehensive GAP covering actions in all of the outputs. These are in addition to the gender targets outlined in the actions for the SAP. Both GAP and SAP emphasize the need to ensure women's participation in decision making bodies and in consultations with the local population throughout all the stages of the project. Women already have high representation on local community councils. The gender analysis found that while there is good representation of women in local administrative structure, within MUB, men dominate, especially at the decision making levels, while at the khoroo and kheseg levels, women dominate. The project will help ensure that

substantive roles for women are further supported to ensure that women's visions and concerns are fully integrated into planning and implementation of activities.

Table F.3.2. Gender Action Plan

Proposed Action	Targets and Indicators	Responsible Agencies	Timeline	Budget and Cost
Output 1: Resilient and low carbon urban infrastructure, public facilities, and social housing units built in *ger* area				
1. Identify and integrate gender sensitive features in the design of public facilities and social housing	• Number of consultation meetings with at least 50% female participation • Number and type of gender-sensitive design features	• Executing Agency • Gender specialist • Consultancy Service Provider for Community Engagement and Development • Consultancy Service Provider for Detailed Design Development • Consultancy Service Provider for Development activities	2019-2020	50,000 USD
2. Train for and conduct participatory monitoring of construction works	• Number and % of community members trained and participated in the monitoring with at least 50% female participants.			
3. Integrate gender perspective in IEC on ecofriendly technology introduction	• Number and type of IEC gender-sensitive materials • Number of community members participated in gender-responsive IEC activities (sex-disaggregated)			
4. Employment and income generation activities during project implementation and operation	• xx person-months of employment opportunities created during project construction and xx person-month/year for O&M of facilities and infrastructure built, of which 30% are women (2017 baseline: 0)			
5. Conduct gender-sensitive outreach and awareness campaigns to promote women's housing property ownership rights	• Around 10 gender-sensitive outreach and awareness campaigns implemented promoting women's housing property ownership (2017 baseline: 0)			
Output 2: Resilient and low carbon affordable and market housing units and economic facilities built in *ger* areas				
1. Identify and integrate gender sensitive features in the design of affordable and market housing and economic facilities	• Number of consultation meetings with at least 50% female participation • Number and type of gender-sensitive design features	• Executing Agency • Gender specialist • Consultancy Service Provider for Community		

2. Ensure access to improved houses and utility services for vulnerable households including female-headed	• At least 30% of women-headed households have access to improved housing and utility services.	Engagement and Development • Consultancy Service Provider for Detailed Design Development • Consultancy Service Provider for Development activities		
3. Conduct a gender sensitive training needs assessment of impacted households	• 100% of women head will participate in the assessment			
4. Implement gender sensitive support activities for start-up businesses and households to improve their capacities	• At least 30% of women-led start-up businesses and women-headed households will get a relevant training			
5. Employment and income generation activities during project implementation and operation	• xx person-months of employment opportunities created during project construction and xx person-month/year for O&M of facilities and infrastructure built, of which 30% are women (2017 baseline: 0)			
6. Conduct gender-sensitive outreach and awareness campaigns to promote women's housing property ownership rights	• Around 10 gender-sensitive outreach and awareness campaigns implemented promoting women's housing property ownership (2017 baseline: 0)			
Output 3: Policy environment and sector capacity strengthened				
1. Enhance capacity of PMO staff	• By 2018, at least 90% of PMO positions filled with trained staff, of which at least 40% are women (2017 baseline: 0)	• Executing Agency • Gender specialist • Consultancy Service Provider for Program Management Support • Community Engagement and Development • Consultancy Service Provider for Detailed Design Development • Consultancy Service Provider for Development activities		
	• Establish a PMO with fully trained staff, at least 30% women representation			
2. DBM PIU established and fully functioning	• By 2018 with fully trained staff, at least 30% of whom are women (2017 baseline: 0)		2018	
3. The PMO and IAs assign persons to be responsible specifically for the implementation and reporting of GAP and SDAP	• Number of staff members of the PMO and IAs responsible for GAP and SDAP implementation and reporting			
4. Social and gender specialists are recruited as part of	• Number of recruited social and gender specialists			

the loan supervision consultant to support the implementation of the GAP and SDAP				
5. Development of sex-disaggregated program performance monitoring system (PPMS)	• Sex disaggregated PPMS operational (2017 baseline: 0)			
6. Consultation and awareness raising on the project design and implementation	• At least 50% of communities consulted on the project activities are women (2017 baseline: 0)			
Financial Intermediation Loan Component				
1. Conduct a gender sensitive assessment of bank activities regarding housing finance	• At least 50% of women representation	• Executing Agency • Gender specialist • Consultancy Service Provider for Programme Management Support		
2. Improve access to green banking systems and mechanisms for the housing finance	• At least 40% of female-headed households have access to green banking systems and mechanisms for the housing finance (2017 baseline: 0)			

CDC = Community Development Council, GAP = Gender Action Plan, GHG = Greenhouse Gas, MSME = Micro-small- and medium- enterprise, MUB = Municipality of Ulaanbaatar, BC = Business Council, IEC = Information, Education and Communication, HHs = Households

Budget and monitoring of the gender action plan. All actions in the GAP have been integrated into the project budget. In addition, 36 person-months of consulting services (16 international and 20 national) will be provided to support the executing agency in establishing the mechanisms, implementing, and monitoring the actions. This is complemented by activities under the community development plan, and the consulting services which support these activities. Within the first 3months of implementation, the gender specialist of the Executing Agency along with the community development consultants will prepare an implementation plan for the GAP to be agreed with ADB. Monitoring of implementation will be supported by ADB gender and social development specialists during regular review missions. GAP implementation progress reporting will be included in the overall semi-annual progress reports by the executing agency. Poverty, gender, and social assessments will be done in preparation for next phases of the project to determine their respective gender categorization and required actions.

F.4. Financial Management and Procurement

The financial resources from the GCF will be managed according to the general provisions of the AMA between the GCF and ADB. In using GCF resources for AHURP, ADB will, unless otherwise specified in the AMA, use the same internal financial management policies and procedures when administering technical assistance or making a loan from its ordinary capital resources. ADB will exercise the same amount of care and diligence in using the GCF resources as when using its own capital resources. Compliance with ADB's policies and requirements will be monitored and reported by ADB's department responsible for compliance.

Procurement

ADB promotes the creation of reliable and stable markets for climate technologies, products, services and works; and puts strong emphasis on procurement of relevant goods, works, and services. Each of ADB's procurement policies and rules are designed to promote efficiency and effectiveness and minimize credit and other risks in ADB's operations.

A procurement assessment was conducted by ADB and is contained in Appendix 9, *Procurement Plan and Procurement Assessment Capacity* of the PPTA report. Results of this assessment have been reflected in the Project Administration Manual (PAM), Appendix 5 of the PPTA report. Key provisions included in the PAM are as follows:

Advance contracting
All advance contracting will be undertaken in conformity with ADB's Procurement Guidelines (2015, as amended from time to time) and ADB's Guidelines on the Use of Consultants (2013, as amended from time to time). The issuance of invitations to bid under advance contracting will be subject to ADB approval. The borrower, the EA/IA have been advised that approval of advance contracting does not commit ADB to finance the project.

To accelerate project implementation, advance actions for consulting services will be used. ADB will recruit a technical assistance individual start-up consultant to assist the EA in recruiting the Project Implementation Support Consultant. Prior to loan approval, the EA will launch the recruitment process for the Project Implementation Support Consultant.

Procurement of goods, works, and consulting services
All procurement of goods and works will be in accordance with ADB's Procurement Guidelines. Civil works will be procured through international competitive bidding (ICB) procedures for packages exceeding and including $5,000,000 equivalent, and through national competitive bidding (NCB) procedures acceptable to ADB for packages up to $5,000,000 equivalent. Goods will be procured through ICB procedures for packages exceeding and including $2,000,000 equivalent, and through NCB procedures acceptable to ADB for packages up to $2,000,000 equivalent. For packages of $100,000 equivalent or less, shopping may be used.

The procedures to be followed for the procurement of goods, non-consulting services, and works under contracts awarded on the basis of NCB shall be those set forth in reference to the Mongolian Regulation. Whenever any procedure in the National Procurement Laws is inconsistent with ADB Procurement Guidelines (May 2015, as amended from time to time), ADB Procurement Guidelines shall prevail. The total consulting service requirements are estimated at 587 person-months (154 international and 433 national) and include (i) Project Implementation and Management Support Consultants (capacity building will be integrated and delivered by the PIMS consultants); and (ii) detailed engineering and construction supervision consultants. All consultants will be recruited according to ADB's Guidelines on the Use of Consultants.

Project Implementation and Management Support Consultants. These consulting services will include an estimated 391 person-months of consulting services (154 person-months international and 237 person-months national) to (i) provide project implementation and coordination support to the PMU, (ii) assist regarding compliance with ADB's policies and operational requirements, including social and environmental safeguards monitoring and compliance, and (iii) design and conduct capacity strengthening and training programs to identified stakeholders. The consultants will be recruited using the quality-and-cost-based selection (QCBS) method with a quality-cost ratio of 90:10.

Detailed Engineering Design and Construction Supervision Support. These consulting services will include an estimated 433 person-months of consulting services (national) to assist the PMU in detailed engineering design of the project and construction supervision. The consultants will be recruited using the QCBS method with a quality-cost ratio of 90:10.

Procurement plan
A procurement plan indicating threshold and review procedures, goods, works and consulting service contract packages, and national competitive bidding guidelines is in Appendix 9, *Procurement Plan and Procurement*. The

procurement plan will be updated annually. It may be revised, as required following a project review mission. In case procurement arrangements need to be changed during project implementation, the EA/IA shall prepare a letter justifying the change with the updated procurement plan and submit the documents for ADB's approval. The change in procurement arrangements will be done in consultation with ADB. ADB will be responsible for posting the initial procurement plan and subsequent updates on ADB's website.

See PAM and the Procurement Plan and Procurement Assessment Capacity.

Financial management

ADB conducted a Financial Management Assessment (FMA) in accordance with ADB's Guidelines for the Financial Management and Analysis of Projects (the Guidelines) and the publication Financial Due Diligence: A Methodology Note. FMA incorporates the Financial Management Internal Control and Risk Management Assessment required by the Guidelines.

FMA considered the Municipality of Ulaanbaatar (MUB) as the Executing Agency (EA) and the Capital City Housing Corporation (NOSK) as the PMO/Implementing Agency (IA) for rental and affordable housing subprojects under the proposed Affordable Housing and Urban Renewal Program. The activities included a review of available documents, an interview with the Accountant of the MUB Department of Finance and Treasury, the Head of Project and Cooperation Unit, the Vice Director of the NOSK where the PMO will be established, and discussing issues with stakeholders. The expanded version of ADB's Financial Management Assessment Questionnaire was accomplished with the participation of the EA and IA prior to completing the FMA.

G.1. Risk Assessment Summary

AHURP is a sector loan, which means that large parts of AHURP still need to be developed. Only the so-called "core subprojects " of the sector loan have been developed in detail. Risk assessments will be conducted on the overall AHURP and for individual subprojects under the AHURP sector loan. Only subprojects with limited risks will be accepted under AHURP by the AE.

The level of key risks that will affect AHURP's performance are generally moderate and expected to be mitigated to a substantial degree by AEs' established operational tools and control mechanisms and additional mitigation measures. Key risks to AHURP and its core subprojects and their specific additional mitigation measures are listed in Section G.2 below. For more details regarding the analysis of risk and risk mitigation, see Appendix 20 of the PPTA report, *Risk Assessment and Management Plan*.

G.2. Risk Factors and Mitigation Measures

Please describe financial, technical and operational, social and environmental and other risks that might prevent the project/programme objectives from being achieved. Also describe the proposed risk mitigation measures.

Selected Risk Factor 1

Description	Risk category	Level of impact	Probability of risk occurring
Project effectiveness could suffer due to lack of sufficient human resources for project management and implementation	Technical and operational	Medium (5.1-20% of project value)	Low

Mitigation Measure(s)

The project includes project implementation and management support consultant (PIMSC) services that will provide the necessary support and on-the-job training for staff of the project management office (PMO) for project management. Separate consultant teams will be recruited for design, construction supervision, and capacity building works. MUB action for authorizing and staffing the PMO as early as possible.

Selected Risk Factor 2

Description	Risk category	Level of impact	Probability of risk occurring
Irregularities in procurement and financial management	Financial	Medium (5.1-20% of project value)	Low

Mitigation Measure(s)

The financial management assessment (PPTA report Appendix 7, *Financial Analysis and Management*) and the procurement capacity assessment (PPTA report Appendix 9, *Procurement Plan and Procurement Assessment Capacity*) have concluded that appropriate control mechanisms are in place and contain additional measures to reduce risks, in particular: (i) implementation of a financial management improvement plan, and (ii) training on ADB procurement, disbursement, reporting and other procedures during the project implementation.

Selected Risk Factor 3

Description	Risk category	Level of impact	Probability of risk occurring
Lack of coordination with government agencies, especially the Master Plan Agency, Land Agency, and Ger Area Development Investment Programme (USGADIP) PMO	Technical and operational	High (>20% of project value)	Low
Mitigation Measure(s)			
The PMO will be set up directly under the office of the Vice-Mayor of Infrastructure Development instead of the Capital City Housing Corporation (NOSK) to facilitate coordination between government agencies and reduce the sensitivity of the PMO to several levels of political influence. Furthermore, the AHURP PMO will include one senior officer of the MPA, the Land Agency, and the USGADIP PMO.			
Selected Risk Factor 4			
Description	Risk category	Level of impact	Probability of risk occurring
Political change impacts political support to the project, which is an essential requirement	Other	Low (<5% of project value)	Low
Mitigation Measure(s)			
Providing municipal infrastructure and facilities in the ger areas and affordable housing for all residents in Ulaanbaatar are identified as essential priorities by both municipal and state governments. Thorough consultations at all institutional levels will guarantee and widespread support among policymakers.			
Selected Risk Factor 5			
Description	Risk category	Level of impact	Probability of risk occurring
Lack of PMO capacity to engage with communities, manage the valuation process, and reach a swapping agreement; as well as involve the private sector in the swapping agreement and detailed design phase	Technical and operational	Medium (5.1-20% of project value)	Medium
Mitigation Measure(s)			
The project includes PIMSC services that will provide the necessary support and on-the-job training for PMO staff to manage communities' and private sector participation, estimate compensation valuation, and reach a swapping agreement. A capacity building plan will be put in place to support all stakeholders in this process. See the PPTA report and Appendix 11, *Consulting Services and Supervision TA Terms of References* of the PPTA Report for details.			
Selected Risk Factor 6			
Description	Risk category	Level of impact	Probability of risk occurring
Financial sustainability adversely affected by the lack of financial management skills and insufficient utility tariff adjustments	Financial	Medium (5.1-20% of project value)	Low
Mitigation Measure(s)			

The capacity building consultants recruited by the PMO will provide training and capacity development in sustainable operation and maintenance (O&M) of the new facilities, tariff setting, and financial management. While tariffs will be adjusted over time to cover cost of O&M, the government will cover any funding gap if revenues from tariffs are insufficient. See PPTA Report Appendix 10, *Operation and Maintenance*.			
Selected Risk Factor 7			
Description	Risk category	Level of impact	Probability of risk occurring
Adequate counterpart funding for project administration is not made available promptly	Financial	High (>20% of project value)	Low
Mitigation Measure(s)			
Counterpart funding will be secured by loan signing. This is a condition for signing of the loan agreement.			
Selected Risk Factor 8			
Description	Risk category	Level of impact	Probability of risk occurring
Adverse economic shocks such as severe winters or collapsing commodity prices make the project financially not feasible	Financial	Medium (5.1-20% of project value)	Low
Mitigation Measure(s)			
Financial projections have been run based on ADB's economic scenarios for Mongolia and relevant contingencies have been included in the project costs. The project is resilient to expected levels of economic shocks with costs and affordability rising or falling at similar levels.			
Selected Risk Factor 9			
Description	Risk category	Level of impact	Probability of risk occurring
Economic boom in Mongolia (led by mining investments) make the proposed profit margins unattractive to private sector developers	Financial	Medium (5.1-20% of project value)	Low
Mitigation Measure(s)			
While economic boom may lead certain private sector developers to refocus on other asset classes or income deciles, there is overcapacity in most sectors that will take 3 to 5 years to absorb. Provision of financial tools and infrastructure support will mean that the project remains attractive to private sector investments. This is the only asset class remaining with sufficient demand capacity and volume.			
Selected Risk Factor 10			
Description	Risk category	Level of impact	Probability of risk occurring
Energy Regulatory Commission and UBEDN do not implement net metering regulations or power sales agreement with the project	Financial	Medium (5.1-20% of project value)	Low
Mitigation Measure(s)			
Agreement on a project basis is expected to be reached during detailed design phase.			
Selected Risk Factor 11			
Description	Risk category	Level of impact	Probability of risk occurring

Government requirements and ADB procurement processes may result in delays in the recruitment of consultants and the procurement of civil works and goods.	Other	Medium (5.1-20% of project value)	Low
Mitigation Measure(s)			
ADB will provide an individual start-up procurement advisor to help in the selection of the PIMSC and to provide training on ADB's processes for project administration and implementation			
Selected Risk Factor 12			
Description	Risk category	Level of impact	Probability of risk occurring
Lack of PMO capacity to write detailed terms of reference for the recruitment of consultants and to monitor consultant and contractors works	Other	High (>20% of project value)	Low
Mitigation Measure(s)			
ADB will provide 'advanced-actions' consultants to support the PMO in the set-up and preparation of detailed terms of reference for PIM consultants and provide training to monitor and evaluate consultant works.			
Selected Risk Factor 13			
Description	Risk category	Level of impact	Probability of risk occurring
Insufficient capacity of the construction sector to mobilize personnel to deliver multiple simultaneous projects, raising bid prices and reducing bidder participation	Other	Medium (5.1-20% of project value)	Low
Mitigation Measure(s)			
Private developers will be consulted during detailed design preparation to ensure attractiveness of the tender documents and compliance with actual private sector capacities.			
Selected Risk Factor 14			
Description	Risk category	Level of impact	Probability of risk occurring
Lack of technological capacity of the private sector to provide climate resilient and low carbon buildings equipped with solar panels.	Other	Medium (5.1-20% of project value)	Low
Mitigation Measure(s)			
The PPTA team included technical specialists to ensure that proposed technologies comply with current construction work standards in Mongolia. A shortlist of private developers will be compiled during the detailed design process and capacity building will be provided to ensure the quality of offers made.			
Selected Risk Factor 15			
Description	Risk category	Level of impact	Probability of risk occurring
Commercial banks are unwilling to establish new mortgage products with lower interest rates to make the sale of units affordable to target households.	Other	Low (<5% of project value)	Low
Mitigation Measure(s)			

The MUB / PMO will hold multiple preliminary discussions with the banks to ensure their interest in moving ahead. Additionally, the capital for such mortgages will be made available to the banks through the project fund at preferential rates.			
Selected Risk Factor 16			
Description	Risk category	Level of impact	Probability of risk occurring
Commercial banks are unwilling to underwrite target households.	Other	Medium (5.1-20% of project value)	Low
Mitigation Measure(s)			
Pre-project discussions with the banks, and subsequent TA to be provided by consultants, will focus on applying appropriate underwriting standards to the new mortgage products developed specifically for this project.			
Other Potential Risks in the Horizon			
Please describe other potential issues which will be monitored as "emerging risks" during the life of the projects (i.e., issues that have not yet raised to the level of "risk factor" but which will need monitoring). This could include issues related to external stakeholders such as project beneficiaries or the pool of potential contractors.			

** Please expand this sub-section when needed to address all potential material and relevant risks.*

H.1. Logic Framework.

Please specify the logic framework in accordance with the GCF's Performance Measurement Framework under the Results Management Framework.

H.1.1. Paradigm Shift Objectives and Impacts at the Fund level

Paradigm shift objectives	
Shift to low-emission sustainable development pathways *Increased climate-resilient sustainable development*	The proposed project, by focusing on addressing systemic barriers to low-carbon and climate resilient urban development will address Mongolia's future GHG emissions and adaptation needs in urban areas. This investment will deliver significant climate-resilient and low carbon eco-district housing capacity and catalyze the development of a new industry in Mongolia, which can be utilized in Ulaanbaatar and other Mongolian cities. By providing incentivized financing, the project will overcome initial investment barriers and kickstart market-based shift towards low-carbon housing that will go beyond project implementation. Through private sector participation and implementation of affordability mechanisms, the project will allow ger areas residents to move to low carbon and climate-resilient eco-districts, with higher density, access to modern urban infrastructure providing energy, water and wastewater services, waste management, green zones, and better building insulation, therefore reducing significantly household GHG emissions in these areas. The project will also foster the integration of more stringent standards in terms of low-carbon building and will introduce a number of energy efficient technologies into urban redevelopment projects. Overall, AHURP will provide replicable, sustainable, climate resilient, and low carbon eco-districts with comprehensive solutions for affordable housing in Ulaanbaatar city ger areas. This will allow for a wider shift towards low-carbon and climate-resilient urban development in Ulaanbaatar. Specific contributions expected are: *Mitigation* • Direct economic lifetime GHG emission reductions of 7.92 million tCO2e. • Indirect economic lifetime GHG emission reductions of 39.59 million tCO2e (including direct emission reductions) *Adaptation* • 35,000 primary direct beneficiaries from reduced climate change vulnerability • 350,000 primary indirect beneficiaries from reduced climate change vulnerability

Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term[83] (if applicable)	Final	
Fund-level impacts						
M1.0 Reduced emissions through increased low-emission energy access and power generation.	1.1 *tonnes of carbon dioxide equivalent (t CO2eq) reduced or avoided as a result of fund-funded projects/programmes– *gender-sensitive*	Project progress reports Municipality of Ulaanbaatar (MUB) reports	0 tCO2e/y 0 tCO2e over AHURP lifetime	1,990 tCO2/y NA	17,260 tCO2/y Lifetime (25y) 431,500 tCO2	Buildings and facilities are constructed in line with designed technical specifications and building performance and ger areas residents are kin to

[83] Midterm is throughout Section H defined as 2023, corresponding to the completion of the core subprojects.

	energy access power generation sub-indicator	Consultants' reports in line with AHURP MRV (Measurement Reporting and Verification) system established according to the monitoring plan in Annex 19				move and live in the project ecodistricts
M3.0 Reduced emissions from buildings, cities, industries and appliances.	3.1 *tonnes of carbon dioxide equivalent (tCO2eq) reduced or avoided as a result of fund-funded projects/programmes – *buildings, cities, industries, and appliances sub-indicator*	Project progress reports MUB reports Consultants' reports in line with AHURP MRV system established according to the monitoring plan in Annex 19	0 tCO2e/yr 0 tCO2e over AHURP lifetime	19,000 tCO2/y NA	187,150 tCO2/y Lifetime (40y) 7,486,600 tCO2/yr	Buildings and facilities are constructed in line with designed technical specification and building performance
A1.0 Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions.	Total number of primary, secondary and tertiary direct beneficiaries Total number of primary, secondary and tertiary beneficiaries (direct and indirect) Number of primary, secondary and tertiary beneficiaries (direct and indirect) relative to total Mongolian population	Project progress reports MUB reports Surveys Consultants' reports in line with AHURP MRV system established according to the monitoring plan in Appendix 19 of the PPTA report	0 0 0%	11,000 NA 0.3% (direct)	100,000 1,000,000 3.1% (direct) 31.3% (total)	Buildings and facilities are constructed in line with designed technical specifications and building performance and *ger* areas residents are kin to move and live in the project ecodistricts
A3.0 Increased resilience of infrastructure and the built environment to climate change.	3.1 Number and value of physical assets made more resilient to climate variability and change, considering human benefits	Project progress reports MUB reports Consultants' reports in line with AHURP MRV system established according to the	0	USD 40 million	USD 421.8 million 10,000 climate-resilient housing apartments built	The full scope of the project is implemented as design

		monitoring plan in Annex 19				

H.1.2. Outcomes, Outputs, Activities and Inputs at Project/Programme level

Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term[84] (if applicable)	Final	
Project/programme outcomes	**Outcomes that contribute to Fund-level impacts**					
M5.0 Strengthened institutional and regulatory systems.	5.1 Institutional and regulatory systems that improve incentives for low-emission planning and building and their effective implementation	Project progress reports MUB' reports	0	NA	2	Regulatory agencies adopt the regulatory and institutional recommended by the project
	5.2 Number and level of effective coordination mechanisms	Project progress reports MUB reports	0	NA	2	
M6.0 Increased number of small, medium and large low-emission power suppliers.	6.3 megawatts (MWs) of low-emission energy capacity installed, generated and/or rehabilitated as a result of GCF support	Project progress reports MUB reports	0	1 MW	11 MW	Buildings and facilities are constructed in line with designed technical specification and building performance
	Percentage of new buildings equipped with solar PV panels in ger areas supported by AHURP	Project progress reports MUB reports Surveys	0%	11%	100%	
M7.0 Lower energy intensity of buildings, cities, industries and appliances.	7.1 Energy intensity / improved efficiency of buildings, cities, industries, and appliances as a result of fund support	Project progress reports MUB reports Surveys	395 kilowattt hour (kWh)/m^2/yr	151 kWh/m^2/y	151 kWh/m^2/y	Buildings and facilities in the ecodistricts are fully occupied
A5.0 Strengthened institutional and regulatory systems for climate-responsive planning and development.	5.1 Institutional and regulatory systems that improve incentives for climate resilience and their effective implementation	Project progress reports MUB' reports	0	NA	2	Financial and institutional mechanisms for the project are established
A7.0 Strengthened adaptive capacity and reduced exposure to climate risks.	At least 10,000 families move to climate resilient housing connected to climate proofed urban	Project progress reports MUB reports	0	1,100	10,000	Households are kin to move and

[84] Midterm is throughout Section H defined as 2023, corresponding to the completion of the core subprojects.

	environmental infrastructure and roads	Surveys				live in the ecodistricts
AHURP used as a model for urban renewal within and outside Mongolia	Number of knowledge products prepared; and Number of accumulated downloads and printed copies	Knowledge products prepared Reporting and statistics	0	2 1,000	4 4,000	Project visibility is high High quality of dissemination material
Project/programme outputs	**Outputs that contribute to outcomes**					
1. Resilient and low carbon urban infrastructure, public facilities, and social housing units built in *ger* areas	1.a Number of social housing built 1.b Average building annual heat load in kW/square meter 1.c Area of PV solar panels installed (m2 panels) 1.d Area of greenhouses (m^2) 1.e Expansion of tertiary roads and urban services networks in target areas (m). - water supply network (m), - sewer network (m), - heating network (m), - electricity lines (m), - low consumption street lighting (unit) - paved tertiary roads (km) 1.f Area of public green parks in target areas (ha) 1.g Area of public facilities such as but not limited to kindergarten, community center, and sport complex (m^2) 1.h Percentage of new buildings in project area with meters installed for water and heating supplies in all new buildings	Construction records Construction records Project progress reports (MUB reports) Consultants' reports Energy Monitoring Program	0 0 0 0 0 0 0 0 0 0 0	168 150 8,300 240 630 700 630 275 50 1.6 1.7 4,180 100%	1,500 150 71,900 2,000 5,500 6,100 5,500 2,400 450 13.7 15 36,000 100%	Good coordination between with MUB and GADIP projects for infrastructures extension in *ger* areas Adequate technology available to supply energy efficient building and solar panel

	1.e Percentage of buildings constructed by the project with air filter and heating regulation system installed		0	100	100	
	1.j Percentage of new buildings by the project with energy efficiency monitoring system installed		0	100	100	
	1.k Percentage of building constructed equipped with high energy efficiency isolation system		0	100	100	
	1.l Smart monitoring system and sensors for building performance and renewable energy control		0	System constructed	System constructed	
	1.m Number of person-months of employment opportunities created during project construction and number of person-month for O&M of facilities and infrastructure built, of which 30% are women		0 and 0	2,000 and 500	3,300 and 6,000	
2. Resilient and Low carbon affordable and market housing units and economic facilities built in *ger* areas	2.a Number of new affordable and market rate housing units built	Private developers' - Sales documents - Project progress reports - MUB reports Consultants' reports	0	584 affordable housing units and 327 market rate housing units	5,500 affordable and 3,000 market rate housing units	Developers and commercial banks interest to the project remain high
	2.b m2 of commercial facilities, workshops		0	23,620	204,200	Construction cost do not raise exponentially
	2.c Km of pedestrian lane		0	2.5	22	Developer build residential areas in conformity with technical specifications and building performance criteria
	2.d Area of greenhouses built		0	9,130	79,000	
	2.e Percentage of building constructed by the project equipped with high energy efficiency isolation system		0	100	100	
	2.f Percentage of buildings constructed by the project with air filter		0	100	100	

	and heating regulation system installed 2.g Percentage of new buildings by the project with energy efficiency monitoring system installed 2.h Percentage of building constructed equipped with high energy efficiency isolation system 2.i Sex-disaggregated data collected on beneficiary households 2.j At least 10% of housing units are entitled under women's names; 2.k At least 50% of female-headed households have access to improved houses and utility services		0 0 0 0 0	100 100 100 100 100	100 100 100 100 100	
3. Policy environment and capacity strengthened.	**3.1 Project implementation and management** 3.1a PMO positions filled with trained staff, of which at least 40% are women 3.1b Sex disaggregated program performance and monitoring system operational **3.2 Eco-district feasibility and development** 3.2aCommunication and awareness campaign on climate change adaptation and mitigation, and on benefit of air quality and health from energy and building efficiency, and electricity from renewable sources	MUB reports and resolutions USUG operating and financial reports USUG business plan Ulaanbaatar Heating Network Company operating and financial reports Operating Entity organization and management plan, operations reports MCUD reports and resolutions	PMO not established Not operational No awareness campaign	PMO established Operational Awareness campaign implemented	PMO established Operational Awareness campaign implemented	MUB commitment to the project remain high Master plan Agencies and MUB department are fully supportive of the project Successful policy dialogue with tariff regulatory agencies Service provider fully supportive of the proposed policy and institutional reforms The Energy Regulatory Commission (ERC) puts in place the legal

	3.2b Program is launched for a new tariff system based on actual consumption.		No program	Program launched	Program launched	framework and Ulaanbaatar Electricity Distribution
	3.2c Utility tariffs linked to direct cost recovery of O&M, including asset depreciation		No cost-recovery tariffs	Cost-recovery tariff in place	Cost-recovery tariff in place	Network (UBEDN) implement net metering regulations or a
	3.2d Revised performance contract between MUB and service providers in place		Old contract	New contract	New contract	power sales agreement with the project.
	3.2e Organizational agreement for building and utilities operation and maintenance within the project areas		No agreement	Agreement in place	Agreement in place	MUB adopt a modify condominium scheme suitable for operation and maintenance of the project areas
	3.2f Policies and regulations (P&R) conducive to decentralized renewable energy and on energy efficiency in buildings in effect in effect		No conducive P&R	Conducive P&R	Conducive P&R	Communities participation and awareness is high Master plan remain fully supportive of AHURP
	3.2g Efficient supply chains for renewable energy systems and energy efficient construction technologies and material in effect		No efficient supply chains	Efficient supply chains in place	Efficient supply chains in place	principles and objectives Private sector interest to expend their operation in the
	3.2h Gendered impact assessment conducted		Not conducted	Conducted	Conducted	ecodistricts Government and DBM
	3.2i Organizational agreement for building and utility O&M within the project areas in place[85]		No agreement	Agreement in place	Agreement in place	commitment in green banking is high
	3.2j Green building standards and code approved		No Standard	Standard approved	Standard approved	Green development remain a high priority for the government
	3.2k Urban development regulatory framework integrates principles and		Urban regulatory	Urban regulatory	Urban regulatory	Private sector, commercial

[85] Buildings will be managed through institutions known as the “Homeowner’s Association” which can be both a private or a public body and which will be set up whenever a condominium (multiple owners) of immoveable properties is approved by the State Inspection Agency. This Homeowners Association will be responsible for the collection of fees dedicated to the maintenance and upkeep of common areas of the building and large scale capital expenditures (such as inner plumbing, electrical work or roof repair).

	standards set by the project local zoning and urban regulation based on mixed-use and mixed-income principles		framework not updated	framework updated	framework updated	bank and developers interest in green business/banking
	3.2l Affordable housing mechanisms and policies in effect		Mechanism not in effect	Mechanism in effect	Mechanism in effect	
	3.2m kg/ m^2 annual average of vegetables produced in greenhouses		0	8	8	
	3.2n Average of 1.2/1.3 m^2 per person of shops and offices in the new eco-districts following international standards		no	yes	yes	
	3.2o Around 30% of women-owned start-up businesses benefitted from the income generation opportunities		no	yes	yes	
	3.3 Detailed design and supervision 3.3a Communities involved under PMO supervision in detailed design process follow objectives and development framework set by the project: minimum of three community meetings held at the block level		0	yes	yes	
	3.3b Number of gender-sensitive outreach and awareness campaigns implemented promoting women's housing property ownership		0	6	4	
	3.3c Infrastructure and architectural detailed design completed in phases		no	yes	yes	
	3.3d Percentage of women consulted on identification of gender-specific needs and concerns to design and implement proposed eco-districts		50	50	50	

	3.3e Number of gender-specific community needs integrated into the detailed design and implementation of proposed eco-district		0	5	5	
	3.4 Sustainable green finance					
	3.4a DBM PIU established and fully functioning with fully trained staff, at least 30% of whom are women		Not established	Established	Established	
	3.4b EDAF rules and mechanisms are established		Not established	Established	Established	
	3.4cGreen banking systems and mechanisms formulated and implemented under the project		Not implemented	Implemented	Implemented	
	3.4d Green banking financial products and services for climate resilient housing developed and availed by developers and target end -buyers		Not developed	Developed	Developed	
	3.4e Percentage of women beneficiaries of the housing finance		0	40	40	
	3.4f Percentage of female-headed households having access to green banking systems and mechanisms for the housing finance		0	40	40	

Outputs	**Description**	**Inputs**	**Description**
1. Construction of resilient and low carbon urban infrastructure, public facilities, and social housing units built in ger areas	1.1 Infrastructure and architectural detailed design	PMO/Consultant	Preparation and submission of DD
	1.2 Land acquisition and resettlement process	PMO/Consultant	Completion of resettlement
	1.3 Procurement of goods and works	PMO/Consultant/ADB	Prepare bidding documents and guide bidding process
	1.4 Select developers		Bidding process of developers
	1.5 Infrastructure and facilities constructed, commissioned, and operating	PMO/DBM PIU/ADB	Construction and supervision

		PMO/Consultant/DBM	
2. Construction resilient and Low carbon affordable and market housing units and economic facilities built in ger areas	2.1 Residential building architectural design 2.2 Procurement of goods and works (for social housing) 2.3 Select developers 2.4 Residential building constructed and commissioned	PMO/DD consultant PMO/Consultant/ADB PMO/DBM PIU/ADB PMO/Consultant/DBM	Preparation and submission of DD Prepare bidding documents and guide bidding process Bidding process of developers Construction and supervision
3. Policy environment and sector capacity strengthened	**3.1 Project implementation and management** 3.1a Recruit staff and train PMO staff 3.1b Hire capacity development 3.1c Train and increase capacity of PMO staff and targeted institutions **3.2 Eco-district feasibility and development** 3.2a Hire capacity development consultants 3.2b Implement eco-district planning, green building standard, social and affordable housing, and development guidelines and regulations 3.2c Complete feasibility study for the 5 implementation phases 3.3d Implement policy and sector reforms related to climate change adaptation and mitigation, improved supply and access to green social and affordable housing **3.3 Detailed design and supervision** 3.3a Hire capacity development consultants 3.3b Complete detailed design and final land swapping agreement for each phase: core subprojects and	 MUB/PMO/ADB MUB/PMO/ADB PMO/Consultant/MCUD/ MPA/UPADI MUB/PMO/ADB PMO/Consultant/MCUD/ MPA/UPADI PMO/Consultant/MCUD/ MPA/Communities PMO/MUB/MET/MCUD/MOSK/Sector associations/Environmental NGOs/Energy Regulatory Commission/International donor agencies/ Communities PMO/Consultant/MCUD/ MPA/UPADI	Procurement of consulting services Stakeholder consultations, training, guideline, regulation, policy dialogue, reporting

	phase 2, phase 3, phase 4, and phase 5 3.3c Supervise construction for each phase: core subprojects and phase 2, phase 3, phase 4, and phase 5 **3.4. Sustainable green finance** 3.4a Hire capacity development consultants 3.4b Develop standard, guidelines and regulations for the use of the EDAF 3.4c Implement policy and sector reforms related to green finance	PMO/Consultant/MCUD/ MPA/UPADI/Communities PMO/Consultant/MCUD/ MPA/UPADI/Communities DBM/MOF/ADB Consultant DBM PIU/Consultant	

H.2. Arrangements for Monitoring, Reporting and Evaluation

Monitoring

Project performance monitoring. The MUB PMO will be responsible for all aspects of monitoring and evaluation, including (i) performance against project milestones, (ii) safeguards monitoring, and (iii) financial commitments. Reports on project achievements will be provided quarterly and summarized annually.

Within 3 months of loan effectiveness the consultants will have presented and the MUB approved a Project Performance Monitoring Information System (PPMIS) using targets, indicators, assumptions, and risks from the DMF. The PIU will conduct regular monitoring, using the same indicators and submit reports on their findings to the MUB and ADB. Results of a comprehensive completion survey will be included in the project completion report.

*Compliance Monitoring***.** The status of compliance with loan covenants, covering policy, legal, financial/economic, environmental and others will be reviewed at each ADB review mission. Any non-compliance issues will be specified in the quarterly progress reports together with remedial actions.

The status of implementation of the IEE/EMP and RP will be discussed at each ADB review mission and integrated into semi-annual reports for IEE/EMP and RP implementation using the *integrated safeguards monitoring format*. These will be prepared by the MUB with assistance from the safeguard specialists of project consultants and the safeguards officer at the PIU, based on the information provided by contractors and community mobilizers, where relevant. The MUB will submit semi-annual reports to ADB, within 30 days of the end of the reporting period, for review and disclosure. The safeguards monitoring team structure and responsibilities are summarized in Table H.2.1 below.

Table H.2.1. Safeguards monitoring team structure and responsibilities

Task Team	Responsibility
Project Director	Oversee safeguard implementation for the project through PCU, PMUs and consultants Submit semi-annual safeguard monitoring reports to ADB
PMO Safeguards Officer/s	Analyze consolidated monitoring data on safeguards and report the results and corrective actions to the Project Director Oversee field work of contractors and consultants Review and consolidate monthly environmental reports submitted by consultants and contractors
PIMSC Environmental Safeguards Specialist Social Safeguards Specialist	Assist the MUB/PMO in the overall safeguards implementation and monitoring

Evaluation and reporting

The government, GCF, and ADB reporting requirements will be harmonized by the consultants, who will produce detailed reporting formats within one month of project commencement.

The MUB PMO and DBM PIU will provide ADB with quarterly progress reports in a format consistent with ADB's PPMS and consolidated annual reports including: (i) progress achieved by output as measured through the indicator's performance targets, (ii) key implementation issues and solutions, (iii) an updated procurement plan, and (iv) an updated implementation plan for the following 12 months. See Appendix 11, *Consulting Services & Supervision TA-Terms of Reference* for the outline of the quarterly progress report.

The government and ADB will jointly review the project at least twice a year. This includes (i) the performance of the PMO/PIU consultants and contractors, (ii) physical progress of each project output, (iii) effectiveness of capacity development and awareness building programs, (iv) compliance with loan covenants, and (v) assessment of subprojects sustainability in technical and financial terms.

In addition to regular reviews, government and ADB will undertake a comprehensive mid-term review after 2.5 years of project implementation to identify problems and constraints and suggest measures to address them. Specific items to be reviewed will include (i) assessing need to restructure or reformulate the project; (ii) updating the project's DMF; and (iii) assessing need to extend the loan closing date.

The MUB PMO and DBM PIU will submit financial reports in the prescribed format to the MUB on a monthly basis. Financial reports will be audited annually by qualified auditors approved by ADB and government; and the audit report, together with comments on any action being taken, will be submitted to ADB by the MUB annually. These reports should be adequately reviewed and comply with international accounting standards.

The MUB (and the PMO/PIU) will also provide other reports as may be reasonably requested by ADB, including the project's environmental reports and resettlement reports.

Within 6 months of physical completion of the project, the MUB will submit a project completion report to ADB, detailing, among others, (i) information on project completion, (ii) use of loan proceeds, and (iii) the extent to which the project outcome has been accomplished.

Table H.2.2. GCF reporting schedule (as per term sheet)

Milestones	**Expected Dates**
Start of Project Implementation	FAA Effective Date
Inception report	Within 6 months after FAA Effective Date
Independent interim evaluation Report	Within 6 months after end of Year 4
Project Completion Report (Final APR)	Within fifteen (15) months after completion date
Independent Final Evaluation Report	Within eighteen (18) months after the submission of Project Completion Report
End of GCF Loan Repayment Reporting Period	Upon the full repayment of the loan provided with GCF Reimbursable Funds

I. Supporting Documents for Funding Proposal

- ☒ NDA No-objection Letter
- ☒ Feasibility Study (PPTA Report: Green Affordable Housing and Resilient Urban Renewal Project, all volumes, appendices included
- ☒ Integrated Financial Model that provides sensitivity analysis of critical elements (xls format, if applicable)
- ☒ Confirmation letter or letter of commitment for co-financing commitment (If applicable)
- ☒ Project/Programme Confirmation/Term Sheet (including cost/budget breakdown, disbursement schedule, etc.) – *see the Accreditation Master Agreement, Annex I*
- ☒ Environmental and Social Impact Assessment (ESIA) or Environmental and Social Management Plan (If applicable)
- ☐ Appraisal Report or Due Diligence Report with recommendations (If applicable)
- ☐ Evaluation Report of the baseline project (If applicable)
- ☒ Map indicating the location of the project/programme
- ☒ Timetable of project/programme implementation

** Please note that a funding proposal will be considered complete only upon receipt of all the applicable supporting documents.*

MINISTRY OF ENVIRONMENT,
AND TOURISM

ENVIRONMENT AND CLIMATE FUND
7th floor, 22 building, Amar street, 8th micro-district,
Sukhbaatar district, Ulaanbaatar, Mongolia
Tel: (976-11) 310753, Fax: (976-11) 310743
E-mail: contact@ncf.mn, http://www.ncf.mn

Date 2017.10.13 № 154

To: The Green Climate Fund ("GCF")

Ulaanbaatar, October 13th 2017

Re: Funding proposal for the GCF by Asian Development Bank regarding "Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal"

Dear Madam, Sir,

We refer to the project, Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal Project in Mongolia as included in the funding proposal submitted by Asian Development Bank (ADB) to us on October 10th 2017.

The undersigned is the duly authorized representative of the Ministry of Environment and Tourism, Mr. Batjargal Zamba, the National focal point of Mongolia.

Pursuant to GCF decision B.08/10, the content of which we acknowledge to have reviewed, we hereby communicate our no-objection to the project as included in the funding proposal.

By communicating our no-objection, it is implied that:

(a) The government of Mongolia has no-objection to the project as included in the funding proposal;
(b) The project as included in the funding proposal is in conformity with Mongolia's national priorities, strategies and plans;
(c) In accordance with the GCF's environmental and social safeguards, the project as included in the funding proposal is in conformity with relevant national laws and regulations.

We also confirm that our national process for ascertaining no-objection to the project as included in the funding proposal has been duly followed.

We also confirm that our no-objection applies to all activities to be implemented within the scope of the project.

We acknowledge that this letter will be made publicly available on the GCF website.

Kind regards,

Dr. Batjargal Zamba

National Focal Point of Mongolia for the GCF

Environmental and social report(s) disclosure

Basic project/programme information	
Project/programme title	Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal
Accredited entity	Asian Development Bank
Environmental and social safeguards (ESS) category	Category B

Environmental and Social Impact Assessment (ESIA) (if applicable)	
Date of disclosure on accredited entity's website	2018-01-25
Language(s) of disclosure	English and Mongolian
Link to disclosure	https://www.adb.org/projects/documents/mon-49169-002-earf https://www.adb.org/mn/projects/documents/mon-49169-002-earf https://www.adb.org/projects/documents/mon-49169-002-iee https://www.adb.org/mn/projects/documents/mon-49169-002-iee A simplified ESIA consistent with the requirements for a category B project is contained in the Environmental Assessment and Review Framework (EARF) and Initial Environmental Examination (IEE)
Other link(s)	http://
Environmental and Social Impact Assessment (ESMP) (if applicable)	
Date of disclosure on accredited entity's website	2018-01-25
Language(s) of disclosure	English and Mongolian
Link to disclosure	https://www.adb.org/projects/documents/mon-49169-002-earf https://www.adb.org/mn/projects/documents/mon-49169-002-earf https://www.adb.org/projects/documents/mon-49169-002-iee https://www.adb.org/mn/projects/documents/mon-49169-002-iee An ESMP consistent with the requirements for a category B project is contained in the Environmental Assessment and Review Framework (EARF) and Initial Environmental Examination (IEE)
Other link(s)	http://
Resettlement Action Plan (RAP) (if applicable)	
Date of disclosure on accredited entity's website	2018-01-25
Language(s) of disclosure	English and Mongolian
Link to disclosure	Resettlement Framework: https://www.adb.org/projects/documents/mon-49169-002-rf https://www.adb.org/mn/projects/documents/mon-49169-002-rf Voluntary Land Swapping Plan:

	https://www.adb.org/projects/documents/mon-49169-002-rp https://www.adb.org/mn/projects/documents/mon-49169-002-rp
Other link(s)	http://
Any other relevant ESS reports and/or disclosures (if applicable)	

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