Meeting of the Board
21 – 24 October 2024
Songdo, Incheon, Republic of Korea
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GCF/B.40/10

1 October 2024

Consideration of funding proposals: Consideration of a request for changes in the scope of funded activity FP077 ("Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal Project (AHURP)")

Summary

This document presents a request to approve a change in the scope of the funded activity FP077. Driven by substantial cost increases in the Mongolian construction sector, the Accredited Entity seeks a reduction in the target number of housing units to be constructed, which will result in a proportionate downscaling of the number of beneficiaries, greenhouse gas emissions and project Outputs 1 and 2 as part of the Design and Monitoring Framework.

I. Introduction

1. Funded activity FP077, titled "Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal Project (AHURP)", was submitted by the Asian Development Bank (ADB). The Board, by decision B.19/12 on 1 March 2018 ("Approval Decision"), approved the funding proposal (the "Funding Proposal") for the financing of the concessional loan (USD 95 million) and grant (USD 50 million) in the aggregate amount of USD 145 million. The funded activity agreement (FAA) was executed on 28 September 2018.

2. The FAA became effective on 18 December 2018. The anticipated Closing Date is 8 years and 4 months after the FAA effective date (18 April 2027). The Completion Date will be 5 months later than the Closing Date (18 September 2027). The project is expected to result in a calculated reduction in greenhouse gas emissions of 89 million tonnes of carbon dioxide equivalent (Mt CO_2 eq) and will reach 35,000 direct beneficiaries.

3. The first disbursement of the GCF funding for the project was made on 25 November 2019 and at the time of writing, ADB has received 3 disbursements for the project, totalling USD 12 million (i.e. USD 4 million in grants and USD 8 million in debt funding, which is 11 per cent of the original disbursement plan for fiscal year end 2023).

4. The total financing package includes in total USD 570.1 million. Breakdown:

- GCF funding: USD 145 million;
- Co-financing:
    - The Accredited Entity (AE), ADB: USD 80 million in form of concessional (USD 20 million) and regular (USD 60 million) loans; and
    - High Level Technology Fund (= a trust fund administered by the AE: USD 3 million in form of grant;
- Counterpart Financing (= funding to be provided by the Executing Entities (EEs) or the following counterparts for the implementation of the Funded Activity):
    - The Municipality of the City of Ulaanbaatar: USD 35 million in form of tax exemption and budgetary allocation (= equity);
    - The Development Bank of Mongolia and commercial banks in Mongolia: USD 111.4 million in form of subordinated loans; and
    - Construction project developers: USD 131.8 million in form of equity; and
- Beneficiaries: USD 63.9 million in form of equity.

5. The project aims to improve the climate resilience of the Mongolian capital Ulaanbaatar and reduce greenhouse gas (GHG) emissions and air pollution by creating eco-districts. Climate change in Mongolia periodically leads to sizable losses of livestock due to prolonged and increasingly cold winters. This results in rural–urban migration to areas around Ulaanbaatar predominated by gers, or traditional Mongolian dwellings. These unplanned areas are hotspots of GHG emissions and air pollution, mainly due to the widespread use of coal for heating and cooking. The creation of eco-districts in these highly climate-vulnerable and polluting ger areas will form zones which are low-carbon, climate-resilient and affordable. This will be done through urban infrastructure, public facilities, and social-housing units.

6. It has tried and will continue trying to leverage private-sector investment to (i) deliver 4,188 + 826 (was 10,000) affordable green housing units; and (ii) redevelop 30 ha of ger areas (was 100 ha) into eco-districts. The project will have the following outcome: access to low-carbon and climate-resilient eco-districts and green affordable housing in Ulaanbaatar ger areas increased. The project has an estimated lifespan of 40 years.

7. Original project outputs:

(a) Output 1: Resilient urban infrastructure, public facilities, and social-housing units in ger areas constructed (public-sector component). Social housing refers to rental housing. This will deliver (i) green social-housing units with climate adaptation and mitigation features; and (ii) resilient infrastructure, public space, and public facilities;

(b) Output 2: Long-term financing to developers for low-carbon affordable housing, market rate housing, and economic facilities in ger areas and to households for green mortgages increased (Financial Intermediation Loan component). Up to USD 75.7 million of the GCF loan will be made available under the proposed Financial Intermediation Loan to enable an Eco-district and Affordable Housing Fund (EDAF) to provide long-term debt financing (denominated in local currency) to eligible commercial banks to support real estate developers' participation in the low-carbon housing market and produce affordable green mortgages; and

(c) Output 3: Sector policy reforms implemented, and capacity strengthened. This will support:

(i) Project implementation;

(ii) Eco-district feasibility and development, policy improvement on climate-change adaptation and mitigation, and improved supply and access to affordable green housing units;

(iii) Detailed design and supervision; and

(iv) Sustainable green housing finance.

8. Through the restructuring proposal, the AE has requested the approval of the following changes:

(a) Changes in the scope of Outputs 1 and 2 (Beneficiaries, GHG emissions and various project outputs) as set out in table 1;

(b) Change in the length of the project as a result of the following extension requests:

- Closing Date from 18 April 2027 to 30 June 2030; and
- Completion Date from 18 September 2027 to 31 December 2030; and

(c) Change of ownership of the EDAF and accompanying change in the EE responsible for the implementation of the relevant activities associated with the ownership of the EDAF.

9. Following an evaluation by the Secretariat, the requests referred to in paragraph 8(b–c) above were determined not to constitute a "Major Change" and were approved by the Secretariat. The requested changes in the scope of Outputs 1 and 2 were determined to collectively constitute a Major Change pursuant to paragraph 16(b) of the GCF Policy on Restructuring and Cancellation and the accreditation master agreement entered into with the Accredited Entity, and the recommendation was that it be presented to the Board for approval.

II. Reasons for the request

10. The project budget at appraisal was USD 570.1 million, which at that time was estimated to be sufficient to build 10,000 housing units at 2018 prices. However, contract prices have increased 300 per cent for some materials since 2018, and therefore this reduces the purchasing power (based on 2023–2024 prices). Many of the assumptions and estimates made at the project design stage do not correspond to the market realities experienced during project implementation. Thus, the same budget can now build only 826 social units (updated from 800 in the Midterm Review for Phase 1) and 4,188 affordable and market units (updated from

2,200) for Phase 2. The total revised number of units is 5,014. Under Output 1 (public component) the eco-district serves as a pilot for subsequent phases. Due to the reduction in the number of housing units to be built, the originally planned 5 phases are correspondingly reduced to 2 phases. Phase 1 pertains to housing and infrastructure facilities under Output 1. Phase 2 refers to housing and facilities developed under Output 2.

11. The restructuring proposal provides a best-case scenario for Output 2 (affordable and market-based housing). However, the exact number of housing units to be delivered depends on the following variables: (i) establishment of the EDAF; (ii) involvement of commercial banks; and (iii) appetite of developers. Furthermore, the availability of land, through the voluntary land swap – currently being piloted – is another factor that will influence the number of units constructed.

12. Additionally, please note that each year of delay increases the cost per unit (inflation) so that less units may be built with every year of delay. ADB executed a project budget analysis and came to the following conclusion. The net fund available to build 107 additional units in 2024 will build only 71 units in 2029. In the same manner, with each year of delay in implementation, particularly for Phase 2, the likelihood of building all 4,188 units decreases.

13. The pilot project (220 housing units for Output 1) – currently under construction – will test the viability of many of the project's green, resilient, affordable, and innovative components such as the voluntary land swap, and the energy-efficient mechanisms.

14. Despite the reduction in the target indicators, the project maintains its sector loan modality, piloting clean climate technologies, to create a paradigm shift towards a low-carbon and climate-resilient path for the future development of Ulaanbaatar.

15. While the project loan and grant funds limit the number of residential and commercial units that can be constructed, any reduction in GHG emissions remain proportional to the number of units built. Thus, all targets stated in this proposal are being achieved as a proportion of the number of units built.

16. Furthermore, it is important to note that the architectural design of green and resilient engineering practices deployed under the project demonstrate energy-saving targets, which exceed the project targets, which is expected to have a positive effect on CO_2 reductions. With the number of housing units reduced from 10,000 to 5,014, the total GHG emissions reduction target is expected to decrease by 30 per cent to 142,155 t CO_2 eq per year. However, the GHG emissions per household will be reduced from 20 to 28 t CO_2 eq per year due to the additional CO_2 emission reducing active EE solutions from embodied energy, light-emitting diode lights, as well as water savings, waste management and flood control.

17. Overall, the proposed restructuring achieves the original objectives and broader goals, exceeding the Mongolian and international standards (Excellence in Design for Greater Efficiencies) in energy efficiency.

18. Table 1 summarizes the proposed changes, which will need to be adopted because of the downscaling of the number of house units to be built.

Table 1: Summary of requested changes collectively constituting a Major Change

	Planned at Project Appraisal (2018)	**Proposed (2024)**
Beneficiaries of increased climate-change resilience (= Adaptation Impact)	Primary direct: 35,000 people (of which 17,500 women) Total direct: 100,000 (50,000 women) Primary indirect: 315,000 people (157,000 women) Total indirect: 900,000 (450,000 women)	Primary direct: 17,500 people (8,750 women) Total direct: 55,000 (27,500 women) Primary indirect: 157,500 people (78,750 women) Total indirect: 495,000 (247,500 women)

	Planned at Project Appraisal (2018)	Proposed (2024)
Greenhouse gas emissions (= Mitigation Impact)	Annual: 204,410 t CO_2 eq/yr Lifetime (40 yrs): 7.92 Mt CO_2 eq (direct emission reductions) and 39.59 Mt CO_2 eq (direct & indirect emission reductions. factor: 5x)	Annual: 142,155 t CO_2 eq/yr Lifetime (40 yrs): 3.99 Mt CO_2 eq (direct emission reductions) and 19.97 Mt CO_2 eq (direct & indirect emission reductions. factor: 5x)
Output 1	**Planned at Project Appraisal (2018)**	**Proposed (2024)** [1]
A. Infrastructure	6.1 km of sewerage network	1.9 km of sewerage network
	5.5 km of water supply pipes	2.7 km of water supply pipes
	5.5 km of district heating pipes	2.6 km of district heating pipes
	13.7 km of roads	2.4 km of road
B. Social housing, public spaces, and amenities	15 ha of public space and green areas	2.3 ha of public space and green areas
	36,000 m² of community facilities (such as education, health, and sports facilities)	3,200 m² of public commercial facilities
	1,500 units of social housing	**826 units of social housing**
C. Green components	2,000 m² of greenhouses	1,230 m² of greenhouses
	72,000 m² of photovoltaic panels;	3,800 m² of photovoltaic solar panels
	94,500 m² of extra isolation system, utilities metering, renewable energy and building performance monitoring systems, and air filter and heating regulation system	Passive and active energy-efficiency strategies for building envelope and heating, ventilating and air conditioning system for 58,204.8 m² of heated area
Output 2	**Planned at Project Appraisal (2018)**	**Proposed (2024)**
A. Affordable and market rate housing	**5,500 units of affordable housing,** **3,000 units of market rate housing**	**4,188 affordable and market rate housing**
B. Associated facilities	163,000 m² associated garages	11,778 m² associated garages
	204,200 m² of commercial facilities, workshops, and parking	43,503 m² of commercial facilities, workshops, and parking
	22.0 km of pedestrian and bicycling paths	46.7 km of pedestrian and bicycling paths
	79,000 m² of greenhouses	1,800 m² of greenhouses
	591,000 m² extra isolation system, utilities metering and building performance monitoring systems, and heating regulation and air filtration systems	Passive and active energy-efficiency strategies of the heating, ventilating and air conditioning for 304,702 m² of heated area

19. The following factors have contributed towards a higher cost of construction, which were thoroughly analysed by ADB in the restructuring proposal (RP) and financial models (see also table 2):

(a) Inflation. Costs increases have forced the reduction of housing units. Cement price increased by 251 per cent since the feasibility stage in 2017; the price of diesel increased by more than 230 per cent and the official construction cost index, which illustrates the unit cost of construction, increased by 1.81 from 2016 to 2023 – meaning the cost of construction almost doubled (1.81 times). At the project feasibility assessment stage, the residential building construction unit cost was estimated to be USD 250–350 per m², by December 2022, the cost increased to USD 750 per m², and by May 2024, the cost has further increased to USD 1,000 per m². (The latter includes the cost of the green components). In the initial study, only additional insulation costing as green components was included in the pricing. The updated cost estimates include the cost of green features such as triple-glazed windows, heat-efficient radiators,

[1] The decline in hectares of public space and green areas is related to the reduction in house units, which will impact the number of housing blocks but also the infrastructure needed, sewage network, supply and heating pipes. It is also visible in the decline in number of phases from 5 to 2.

thermostats, flooring, masonry blocks, gray water, and additional insulations. The cost of green features represents 13 per cent of total building cost.

The consumer price index growth rate was estimated at 7.0 per cent in 2017. However, the actual consumer price index rate doubled. Similarly, the core inflation rate was 17.1 per cent in June 2022, compared to 7 per cent in 2021. Mongolia has experienced double-digit inflation rate in the last couple of years and it remains high up to today.

(b) Coronavirus disease 2019 (COVID-19) Impacts. The pandemic highly impacted the costs of imported construction materials. The border closure with the People's Republic of China until 2022 exacerbated this issue for Mongolia, which is a landlocked country. The availability of materials, transportation costs and delays in general are the consequences of COVID, which are general trends that can be observed in the GCF portfolio; and

(c) Currency Devaluation. Coupled with high construction costs, the devaluation of the Mongolian tugrik by 44 per cent – compared to the 2018 Mongolia tugrik–United States dollar exchange rate – increased both the cost of imported construction materials, the costs of borrowing for materials and the labour costs.

III. Assessment

Material changes in the scope of Outputs 1 and 2 because of the downscaling of housing units to be built as a result of cost increases

20. Table 2 provides an overview of the various costs, which shows a large increase in material costs and therefore the number of housing units to be built will be reduced substantially. Please note that the project started the first phase of the construction of Output 1.

Table 2: Price changes

Construction materials - price changes between 2016 and 2024 based on the expertized sample detailed engineering drawing

					2016	2024Q1			2016	2024Q1		
№	Code	Материалын нэр	Material name	Unit	Unit price, MNT	Unit price, MNT	2016 USD FX	2024Q1 USD FX	Unit price, USD	Unit price, USD	Difference 2016vs2024, MNT	Difference 2016vs2024, USD
1	Jan-67	Хэв хашмалын бамбай	Panel forms	м2	6,500	21,500	2,147.10	3,386.20	3.03	6.35	331%	210%
2	1-0358	Хар тосон түрхлэг	Concrete form oil, black	kg	1,800	3,833	2,147.10	3,386.20	0.84	1.13	213%	135%
3	1-0525	Төмөр утас ф 5мм	Metal wire d 5mm	м2	1,300	2,818	2,147.10	3,386.20	0.61	0.83	217%	137%
4	1-0517	Бэхэлгээ төмөр	Fastening metal	kg	1,400	3,181	2,147.10	3,386.20	0.65	0.94	227%	144%
5		Хөөсөнцөр	Styrofoam EPS	м3	81,000	299,200	2,147.10	3,386.20	37.73	88.36	369%	234%
6	Jan-29	Цемент м-300	Cement m-300	tn	147,000	374,242	2,147.10	3,386.20	68.46	110.52	255%	161%
7	Jan-25	Цемент м-400	1-4027 Cement m-400	tn	152,000	374,242	2,147.10	3,386.20	70.79	110.52	246%	156%
8	1-0211	Эмульс	1-0212 Emulsion painting	kg	4,200	7,128	2,147.10	3,386.20	1.96	2.11	170%	108%
9	Jan-73	Банз I зэрэг 25мм	Wood Plank 1st grade 25mm	м3	247,000	575,700	2,147.10	3,386.20	115.04	170.01	233%	148%
10	Jan-77	Бетон зуурмаг м150	Concrete mix M150 grade	м3	114,000	270,000	2,147.10	3,386.20	53.09	79.74	237%	150%
11	1-0773	Арматур	Steel Rebar	tn	1,190,000	2,522,727	2,147.10	3,386.20	554.24	745	212%	134%
12	Jan-24	Ган бүтээц	Steel structure	kg	1,200	2,842	2,147.10	3,386.20	0.56	0.84	237%	150%
13	Jan-42	Ердийн тоосго м-100	Brick m-100	1000 p	220,000	367,000	2,147.10	3,386.20	102.46	108.38	167%	106%
14	Jan-53	Гипс, I зэрэг	Gypsum, grade I	kg	300	524	2,147.10	3,386.20	0.14	0.15	175%	111%
15	Jan-25	Дотор модон хаалга	Wooden interior door	м2	76,000	342,425	2,147.10	3,386.20	35.4	101.12	451%	286%
16	1-0555	Паркет зөөлөвчтэй	Parquet flooring	м2	13,000.00	40,429	2,147.10	3,386.20	6.05	11.94	311%	197%
17	Jan-33	Хар шороо	Earth soil	м3	2,500	8,000	2,147.10	3,386.20	1.16	2.36	320%	203%
18	Jan-12	3 давхар шилтэй вакум цонх	Triple glazed vacuum windows	м2	178,000.00	495,418	2,147.10	3,386.20	82.9	146.31	278%	176%
										AVG %	258%	164%

Land cost - price changes between 2016 and 2024 (land and asset valuation by independant appraisers)

№	Code	Нэр	Item	Unit	Unit price, MNT	Unit price, MNT	2016 USD FX	2024Q1 USD FX	Unit price, USD	Unit price, USD	Difference 2016vs2024, MNT	Difference 2016vs2024, USD
1		Баянхошуу талбар - газрын үнэ	Land price in Bayankhoshuu	м2	48,000	100,000	2,147.10	3,386.20	22.36	29.53	108%	32%

21. ADB included the following remark in the RP: "According to ADB policies, despite the changes in the target indicators, the project impact and outcome **remain unchanged** as the project aims to increase access to low-carbon and climate-resilient eco-districts and green affordable housing in Ulaanbaatar Ger areas".

22. In order to compensate the decreased installation of the solar photovoltaic (PV) panels on rooftops (reduced number of apartment blocks) and to reduce the use of coal heating to the maximum extent, ADB proposed to allocate USD 7.37 million of the available funding to insulate an additionally 324 units, which will result in an annual emission reduction of 5,252 t CO_2 eq. Alternatively, similar funding could be used to increase the use of PV panels on rooftops and landscaping. However, this results in lower emissions over the project lifetime. See also table 3.

Table 2: Option 1 versus Option 2

Options	Option 1 Increasing Solar PV	Option 2 Increasing Insulation
Budget	7.37 Million USD	7.37 Million USD
Increased amount	14,951 m2 Solar PV panels	324 units apartment with insulation
Decreased annual tCO2 emission	4,051 tCO2	5,252 tCO2
Life cycle	25 years	40 years
Total decreased tCO2 emission	54,175 tCO2	210,080 tCO2

23. Please note the use of solar PV for heating implies a large amount of battery storage, especially in the context of a cold climate, which is extremely costly compared to a relatively short lifespan of batteries. Coupled with the local challenges for grid integration issues in the country and highly distorted (extremely low) energy tariffs, use of solar PV for heating cannot be a viable option for the project in Mongolia. Also increasing the solar PVs is technically possible, it negatively impacts the internal rate of return (IRR) for the solar PV component, which will create substantial problems with the loan repayment by the borrower. Overall, investing in insulation rather than the solar PV is the most preferable option from an economic, financial and environmental point of view.

24. In order to realize the best possible solution for anti-flooding, 2 major drainage channels already exist at the Bayankhoshuu site and additional on-site anti-flooding channels are planned in Bayankhoshuu and Sharkhad.

- 3,570 m long anti-flooding drainage channels have been constructed;
- 1,408.08 m long anti-flooding on-site drainage channels planned; and
- 30 ha area anti-flooding detailed study is ongoing.

25. Additionally, in order not to reduce green space coverage as it is the only solution proposed in the funding proposal to tackle the concrete results of climate hazards, ADB planned to build rooftop storm-water collections and permeable car parking and pedestrian footpaths inside the eco-districts.

- 61,856 m^2 rooftop area storm-water collections;
- 32,733.8 m^2 permeable car parking area;
- 24,500 m permeable footpaths; and
- Detailed reporting during implementation will be done.

26. The below overview of the solutions under implementation to ensure procurement of low environmental impact materials or recycled materials for the construction of houses, greenhouses and any accompanying infrastructure is also welcomed. A waste management solution for operation and maintenance based on the avoid, reuse and recycle principle should also be assigned.

- Eco-friendly and reclaimed materials: Through Excellence in Design for Greater Efficiencies green building certifications low embodied carbon construction materials (like fly-ash blended cement, aerated concrete blocks, wooden flooring, cellular glass insulations) are selected for detailed engineering design. Moreover, for landscaping, recycled waste construction materials like waste brick blocks and recycled PVC materials are maximized;

- Recycle: The specific space for segregation of domestic waste is included in the detailed design. Segregation of municipal solid waste into 7 types, comprising glass, plastic, metal, cardboard, kitchen waste, e-waste and non-recyclables; selling recyclables to recycling companies; and providing incentives to the residents to encourage waste segregation will be done under the AHURP. User-friendly waste bins for people with disabilities will be introduced; and

- Avoid and Reuse: It will be forbidden to use/sell single-use plastic bags, plates and cutlery in supermarkets and restaurants within eco-districts, repair shops for various equipment and clothes will be established, donation boxes for clothes and toys will be set up, and thrift store/exchange spots will be facilitated. Capacity-building activities and sessions for eco-district residents will be organized.

27. Lastly, concrete activities that will ensure the replicability and scalability of active and passive EE solutions are 3-season greenhouses, wastewater treatment, design of infrastructure with low environmental impact, operation and maintenance of waste management, and green spaces designed for mitigating flooding.

28. Replicability and scalability will be ensured through sector policy reform such as amendment of the Construction Law (a proposal to add a specific chapter on green building has been submitted to the Ministry of Construction and Urban Development) and issuance of a new norm on green building and new standards on green construction materials. Additionally, a comprehensive guideline and a set of technical specifications on green building and eco-district development, will be developed under the project and will be handed out as a practical guidance for all stakeholders in the construction sector. The RP was revised accordingly to include more information on these policy reform related activities. The gender action plan was also revised.

Improved housing and utility services will be ensured for vulnerable households such as female-headed households who voluntarily participate in the programme.

29. Overall, the decline in impact results and consequent impact are substantial. The justification of ADB for a higher reduction in emissions per unit and three-season greenhouses only partially offsets the decrease in outputs summarized in the table on page 11 of the RP.

30. It is important to strike a balance between accepting the justification of ADB and seeking additional solutions that can strengthen a positive climate impact. The proposed solutions (see above) are acceptable. Option 2 (better insulation instead of more PV) is supported. The proposed replicability and scalability aspects shall be enumerated in the amended FAA for easy monitoring of the implementation from the GCF side.

31. The effectiveness and efficiency of the activities are characterized by the following key performance indicators:

- Mitigation:
  - GCF funding: USD 50 million;
  - Direct lifetime emission reductions: 3.99 Mt CO_2 eq (was 7.99 Mt CO_2 eq);
  - Direct and indirect emission reductions: 19.97 Mt CO_2 eq (was 39.59 Mt CO_2 eq);and
- Adaptation:
  - GCF funding: USD 95 million;
  - Primary direct beneficiaries: 17,500 (was 35,000); and
  - Primary indirect beneficiaries: 157,500 (was 315,000).

32. The implications of the costs increase and subsequent downscaling of the housing units to be built is visible in the 2 key performance indicators, which underline the conclusion that this is a “Major Change” as the scope reduction is roughly declining by 50 per cent:

- GCF funding per t CO2 eq reduced (direct): USD 12.53 (was USD 6.32); and
- GCF funding per total t CO_2 eq reduced (direct and indirect): USD2.50 (was USD 1.26).

33. Although GCF did not make use of an IRR calculation in its assessments, it is important to mention that the economic internal rate of return (EIRR) analysis of ADB shows that an acceptable return will be achieved despite the downscaling of the outputs.

34. The proposed downscaling is reflected in the construction of 826 social-housing units (originally 1,500) in phase 1, and 4,188 affordable/market units downscaled from 8,500 in phase 2.

35. The economic re-evaluation at midterm shows that the project is economically viable with Phase 1 investment (comprising Outputs 1 and 3) resulting in base case EIRR at 10.1 per cent and Phase 2 (Output 2) with EIRR at 11.3 per cent, both exceeding the economic opportunity cost of capital at 9 per cent. The combined outputs result in EIRR at 11.1 per cent for the project overall.

36. The sensitivity analysis reflects that under adverse conditions (such as cost increases, benefits reduction, and implementation delay) the EIRRs range between 7.9 and 10.2 per cent; on average, close to the minimum economic opportunity cost of capital at 9 per cent.

37. Likewise, the financial re-evaluation finds the project to be financially viable overall, with the combined financial IRRs for Phase 1 (2.9 per cent) and Phase 2 (13.9 per cent) at 11.7 per cent, higher than the recalculated weighted average cost of capital at 8.1 per cent.

38. The accreditation master agreement includes the following definition: "Major Change" means any restructuring of the Funded Activity that involves a substantial change in the Funded Activity's objective, scope, structure or design.

39. While the GCF Policy on Restructuring and Cancellation includes the following text "Without limiting the relevant provisions in the relevant legal agreements, a change will be deemed to be a Major Change if any of the following are proposed", and more specifically in paragraph 16(b): "A change in the scope of the project/programme which would result in a material and adverse deviation from the intended objectives or outcomes that the AE seeks to achieve from the implementation of the relevant project/programme, in particular its climate and/or environmental outcomes as set out in the funding proposal or FAA".

40. For the reasons explained above, the Secretariat has concluded that the proposed changes to the scope of the project set out in table 1 above collectively constitute a Major Change.

IV. Recommendation

41. In the light of the above considerations, the Secretariat recommends that the Board approve the following:

(a) Changes in the scope of Outputs 1 and 2 (Beneficiaries, GHG emissions and various project outputs) as set out in table 1 above.

42. Accordingly, it is recommended that the Board adopt the draft decision contained in annex I.

Annex I: Draft decision of the Board

The Board, having considered document GCF/B.40/10 titled "Consideration of funding proposals: Consideration of a request for changes in the scope of funded activity FP077 ('Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal Project (AHURP)')":

Approves, with respect to funded activity FP077 titled "Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal Project (AHURP)":

(i) The changes to the scope of Outputs 1 and 2 as set out in table 1 of document GCF/B.40/10.

Annex II: Confirmation of no-objection

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TOURISM OF MONGOLIA
CLIMATE CHANGE RESEARCH
AND COOPERATION CENTRE
STATE OWNED ENTERPRISE
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Date 2024.05.17
Ref. 79

To: Green Climate Fund ("GCF")

Re: Restructuring Proposal for FP 077- Mongolia "Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal Sector Project"

Dear Madam/Sir,

We refer to the restructuring proposal of the FP 077- Mongolia, Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal Sector Project submitted by Asian Development Bank.

The undersigned is the duly authorized representative of the Ministry of Environment and Tourism, Choikhand Janchivlamdan, the National focal point of Mongolia.

We were reached out by the Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal Sector Project team regarding a need for restructuring certain components of the project due to cost increases, currency devaluation and COVID-19 impacts.

In reference to the above-mentioned Restrucuturing Proposal, the content of which we acknowledge to have reviewed, we hereby communicate our no-objection to the changes presented in this Restructuring Proposal FP 077.

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

(a) The Government of Mongolia has no-objection on the proposed changes as included in the restructuring proposal FP 077 – Mongolia.
(b) The changes included in the restructuring proposal FP 077 – Mongolia, reflect accurately the changed circumstances since the project appraisal, and are duly justified;
(c) Despite the changes, the project will be able to deliver its initial objectives by ensuring paradigm shift towards sustainable low-carbon housing for the most vulnerable population.

We also acknowledge the implications of these proposed changes such as a reduction in the number of housing units to be delivered, that consequently results in reduction of the climate targets, and green components.

Choikhand Janchivlamdan

National focal point of Mongolia for the GCF

DIRECTOR CHOIKHAND JANCHIVLAMDAN

Annex III: Restructuring proposal

The restructuring proposal (including annexes) is contained below.

GREEN CLIMATE FUND

FP 077-Mongolia: Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal Sector Project

Restructuring Proposal

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Annex

Note to accredited entities on the use of the Restructuring Proposal template
• Sections **A, B, C, D** and **E** of the Restructuring Proposal require detailed inputs from the accredited entity. • The total number of pages for the Restructuring Proposal (excluding annexes) is expected not to exceed 50.

Please submit the completed form to:
OPM@gcfund.org

Please use the following name convention for the file name:
"[FP077]-[Asian Development Bank]-[07 May 2024]-[Version 1]"

A.1. Project/Programme Milestones

Date of Board Approval	01/MAR/2018		
Date of Signature	26/DEC/2018		
Date of Effectiveness	18/DEC/2018		
Closing Date	18/APR/27	Revised Closing Date	30/JUN/2030
Project Completion date	18/SEP/2027	Revised completion date	31/DEC/2030
Number of Disbursements to date (by instrument - loans, grants, equity)	ADB $6.32m Co-financing: $1.63m		
Total disbursed Amounts (by instrument- loans, grants, equity)	Loans – USD 8,000,000.00 Grants – USD 4,000,000.00 Equity		
Undisbursed amounts (by instrument- loans, grants, equity)	Loans -USD 87,000,000.00 Grants – USD 46,000,000.00 Equity		
Cancelled amounts (broken down by instrument - loans, grants, equity)	N/A	Cancellation date	N/A

A.2. Summary of proposed changes to the project/programme (max 300 words)

Please provide a brief description of the proposed changes to the project/programme, including the rationale and justification for the restructuring changes including the objectives and primary measurable benefits (see investment criteria in section E). The detailed description can be elaborated in section C.

The proposed amendment to the project seeks a reduction in the target number of housing units to be constructed within the current project implementation period. The reduction is required principally because substantial cost increases within the Mongolia construction sector have forced a reduction in the total number of units, which can be financed and built using the project loans and grants.

Whilst the project loan and grant funds limit the number of residential and commercial units that can be constructed, any reduction in green house gas (GHG) emissions remain proportional to the number of units built. Thus, all targets stated in this proposal are being achieved as a proportion to the number of units built. Furthermore, the architectural design of green and resilient engineering practices deployed under the project demonstrate energy saving targets, which exceed the project targets.

The proposed changes are a necessary adjustment to reflect the impacts of Covid-19 and the ensuing economic shocks, which Mongolia continues to experience. The existing project scope remains critical, as the project demonstrates to the government, private sector, and residents, that by applying **energy efficient techniques** into architecture and engineering design of the residential developments and combining this with **compact and resilient urban planning systems**, Mongolia is **moving towards decarbonizing its urban energy system**. The project therefore is essential to demonstrate **energy efficiencies of its building stock**, as well as affordability and interest from the private sector, to replicate the project.

Many of the assumptions and estimates made at the project design stage do not correspond to the market realities experienced during the project implementation. For instance, at the feasibility stage in 2017, the unit cost per square meter to construct a residential building was estimated to be between $250-350. By December 2022, the cost increased to $750. By January, 2023 construction materials, such as cement, and diesel increased by 251% and 230% respectively. The consequences for project Output 1 and Output 2, is a reduction in the number of social, affordable and market-based housing units which, can be built under the project.

Since the project feasibility study period, the economic shocks ranging from Covid-19 pandemic to the double digit inflation and devaluation of the Mongolian Tughrik by 44%, have tested the willingness of Government of Mongolia and the private sector to experiment with new forms of housing finance. Consequently, Output 2, has been delayed since the inception. The Ministry of Finance has now chosen to on-lend the project funds allocated for Output 2: EDAF to MUB. The project implementation unit of the Development Bank of Mongolia Asset Management Company (DBM-AMC) will remain as the manager of the eco-district and affordable housing fund (EDAF).

Given the above-mentioned construction costs increase by 300%, the target number of housing units will need to be reduced from 10,000 to 5,014.

The restructuring proposal provides a best-case scenario for Output 2 (affordable and market-based housing). However, the exact number of housing units to be delivered is is contingent on the following variables: (i) establishment of the EDAF; (ii) involvement of commercial banks (Please refer to **ANNEX 3** for the meeting minutes of the latest engagement with commercial banks and the Mongolian Mortgage Corporation); and (iii) appetite of developers. Furthermore, the availability of land, through the voluntary land swap - currently being piloted – is an additional factor that will influence the number of units constructed. This is currently under review. The expectation is that EDAF will contribute 35% into the Eco-district matched by 35% from the banks and 30% from the developers. Given these contingencies, this restructuring proposal projects a best-case scenario of 4,188 units for Output 2 with the Output 1 target remaining at 826 units. The total number of units is approximately 5,014 units.

The pilot project (220 housing units for Output 1), currently underway, will test the viability of many of the project's green, resilient, affordable, and innovative components such as the voluntary land swap, and the energy efficient mechanisms.

The proposed restructuring achieves the original objectives and broader goals, exceeding the Mongolian and international standards (EDGE) in energy efficiency. The project presents a strategic move that will support a **paradigm shift** and **leverage private sector investment** delivering sustainable and comprehensive solutions to transform the substandard, climate-vulnerable, and heavily polluting ger areas of Ulaanbaatar city into affordable, low carbon, climate-resilient, and livable eco-districts.

A summary of changes is summarized in **ANNEX 1.**

A.3. Is there any deviation from the AMA required for this project? Yes ☐ No ☒ If yes, please elaborate and justify why

No, there is no deviation from the Accreditation Master Agreement (AMA) required for this project. The proposed changes are proportional to cost increases incurred on the project. Thus, the number of units which can be constructed with less finance is proportionally reduced. This would imply a minor change to the existing contract, not a deviation. The changes align the project to its original objectives and continues to support a **paradigm shift** of achieving (**and exceeding**) the energy efficient baseline targets established by GCF, whilst fulfilling the goals of executing agency to upgrade the ger areas. Therefore, the proposed changes are in line with the AMA and do not necessitate any deviation from it. *Minor changes explained below.*		
Change in Implementing/Executing Agency	*Yes [ ]*	*No [✓]*
Change in Project's Objectives	*Yes [ ]*	*No [✓]*
Change in Results Framework	*Yes [✓]* ***[modification to Design and Monitoring Framework (DMF) include only proportional reduction in targets – no changes in the DMF itself]***	*No [ ]*
Change in Expected Impact	*Yes [ ]*	*No [✓]*
Change in Legal Terms, Conditions and Covenants	*Yes [ ]*	*No [✓]*
Change in Closing Date(s)	*Yes [✓]*	*No [ ]*
Change in Completion Date	*Yes [✓]* ***Additional time will be required to ensure the full disbursement of funds, complete the construction and full occupancy of the eco-design units to attract the private sector investors, which is subject to confirmation of the Ministry of Finance of Mongolia***	*No [ ]*
Change in Technical/Project Design	*Yes [ ]*	*No [✓]*
Change in Scope	*Yes [ ]*	*No [✓]*
Any Cancellations Proposed	*Yes [ ]*	*No [✓]*
Change to Financing Plan	*Yes [ ]*	*No [✓]*
Changes to GCF Financing Amount	*Yes [ ]*	*No [✓]*

Change in Disbursement Arrangements	*Yes [✓]*	*No [ ]*
Reallocation between Disbursement Categories	*Yes [✓]*	*No [ ]*
Change in Disbursement Estimates	*Yes [✓]*	*No [ ]*
Change to Components and Cost	*Yes [✓]*	*No [ ]*
Change in Institutional Arrangements	*Yes [ ]*	*No [✓]*
Change in Financial Management	*Yes [ ]*	*No [✓]*
Change in Procurement	*Yes [ ]*	*No [✓]*
Change in Implementation Schedule	*Yes [✓]*	*No [ ]*
Change of ESS category	*Yes [ ]*	*No [✓]*
Other Changes to Safeguards	*Yes [ ]*	*No [✓]*
Change in Economic and Financial Analysis	*Yes [✓]*	*No [ ]*
Change in Technical Analysis	*Yes [ ]*	*No [✓]*
Change in Environmental and Social Analysis	*Yes [ ]*	*No [✓]*
Change in Risk Analysis	*Yes [✓]*	*No [ ]*
Other Change(s)	*Yes [ ]*	*No [✓]*

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

B.1. Any Changes to Strategic Context, financial market and/or project baseline since approval

THAT HAVE INFLUENCED THE CHANGE? YES ☐ NO ☒ IF YES, PLEASE ELABORATE

No. The strategic context in the original funding proposal (FP) remains valid and Section B.3 of the FP states that the Financial Markets overview is applicable to this project. However, the breakdown of cost estimates for major budgeted sub-activities has substantially changed since the project approval and has influenced the change in budget cost estimates.

The project cost estimates at the project appraisal and subsequent ADB and GCF Board approval and contained in the FAA were prepared based on the earlier pricing of the 2017 detailed engineering designs, land and supervision costs, as well as construction costs. Since the project appraisal date, the following factors have contributed towards a higher cost of construction:

1. **Inflation.** Costs increases have forced the reduction of housing units. As stated in A2 above, cost increases have significantly impacted the project implementation. Cement price increased by 251% since the feasibility stage in 2017; the price of diesel increased by more than 230% and the official construction cost index, which illustrates unit cost of construction, increased by 1.81 from 2016 to 2023 - meaning the cost of construction almost doubled (1.81 times). At the project feasibility assessment stage, the residential building construction unit cost was estimated to be \$250-350 per m^2, by December 2022 the cost increased to \$750 per m^2, and by May 2024, the cost has further increased to \$1,000 per m^2 (the latter includs the cost of the green components).
2. The consumer price index (CPI) growth rate was estimated at 7.0% in 2017. However, the actual CPI rate doubled. Similarly, the core inflation rate was 17.1% in June 2022, compared to 7% in 2021. Mongolia has experienced double-digit Inflation rate in the last years and it remains high today.
3. **Currency Devaluation**. Coupled with high construction costs, the devaluation of the Mongolian Tugrik by 44% compared to 2018 MNT-USD exchange rate, increases both the cost of imported construction materials, the costs of borrowing for materials and the labor costs.
4. **COVID-19 Impacts**. The pandemic has highly impacted the costs of construction materials, most of which are imported. The border closure with China until 2022 exacerbated this issue for Mongolia, which is a landlocked country. The availability of materials, transportation costs and delays as reflected by the engineering cost estimates and the bid prices already received (details of the cost increases are in **ANNEX *2***).

The changes in cost estimates are reflected in the breakdown table for the total project costs and GCF financing by sub-component presented in Section B.4 below. These illustrate the need to reallocate funds to accommodate the revision of housing units that can be constructed within the limits of the project-allocated funds.

The project budget at appraisal was USD 570.10 million, which at that time was estimated as sufficient to build 10,000 housing units at 2018 prices. As contract prices increased 300% for some materials since 2018, there was reduced purchasing power (based on 2023-24 prices). Thus, the same budget can now build only 826 social units (updated from 800 in the MTR) for Phase 1, and 4,188 affordable and market units (updated from 2,200) for Phase 2. This total revised number of units is 5,014.

Table 1 below compares the updated investment costs with the project budget at appraisal to illustrate if the current budget is sufficient to build all 5,014 units. Phase 1 is sufficient to build 826 units plus appurtenant works and components. Phase 2 budget is sufficient to build 4,188 units.

Table 1. Project Budget Analysis (Revised April 2024) Source. Consultants

Project Budget Analysis

Items	Unit	Phase 1 Outputs 1&3	Phase2 Output 2	Phases 1&2 Total
A. Total Budget at Appraisal	USD mill	157.00	413.10	570.10
B. Less: Fin Cost During Implementation	USD mill	6.52	28.00	34.52
C. Base Cost incl Contingency (A - B)	USD mill	150.48	385.10	535.58
D. ForEx at 2018 Appraisal	MNT:USD		2,400	2,400
E. Base Cost at 2018 Appraisal (C x D)	MNT mill		924,240	924,240
F. Project Cost at 2023/24 Rescoping	MNT mill		910,557	910,557
G. Balance available (E - F)	MNT mill		13,683	13,683
H. Cost per unit in 2024	MNT mill		128.20	128.20
I. Additional units may be funded (G / H)	no.		107	107

There is an impact to delay completion of Phase 2 on the cost per housing unit and the number of additional units that may be built using the net budget balance at MNT 14 million. Each year of delay increases the cost per unit so that less units may be built with every year of delay. The net fund available to build 107 additional units in 2024 will build only 71 units in 2029. In the same manner, with each year of delay in implementation, particularly for Phase 2, the likelihood of building all 4,188 units becomes less.

Table 2. Effects on delays on the Cost and Additional Units Funded under Phase 2 (Source. Consultants)

Effects of delays on costs and additional units that may be funded under Phase 2

	Unit	2026	2027	2028	2029
G. Balance available	MNT mill	13,683	13,683	13,683	13,683
H. Cost per unit	MNT mill	150.92	163.74	177.66	192.76
I. Additional units may be funded (G / H)	MNT mill	91	84	77	71

Finally, to the time requirements to accommodate Covid-19 impacts, had an impact on the Implementation Schedule– with more than one year delay for both Output 1 and Output 2.

Hence, the project needs to extend until December 2030 to complete Output 2 (affordable and market housing).

B.2. Changes to Project / Programme Objective against Baseline? YES ☐ NO ☒ IF YES, PLEASE ELABORATE

*Describe the baseline scenario (i.e. emissions baseline, climate vulnerability baseline, key barriers, challenges and/or policies) and **the outcomes and the impact** that the project/programme will aim to achieve in improving the baseline scenario.*

No, there are no changes proposed to the project/program objectives against the baseline. The project's primary objective remains the same. Ulaanbaatar faces a critical shortage of affordable housing, with new developments primarily targeting higher income households. Insufficient financing and a lack of sustainable solutions contribute to the problem. The focus on profit-driven construction neglects community well-being, sustainable urban planning, and energy efficiency. Without public interventions, the chronic undersupply of affordable housing will persist, leading to worsening living conditions, pollution, and vulnerability in ger areas. The transformation into green, efficient, low-carbon, and affordable urban spaces remains unaddressed. The attached project Design and Monitoring Framework (DMF) shows that only project targets are proposed to be revised downwards, while the project impact, outcome and outputs remain unchanged **(ANNEX *5*).**

The current state of ger areas in Ulaanbaatar presents various challenges, including a lack of investment in solar PV on rooftops, absence of additional building insulation, and reliance on inefficient and polluting heating methods. Ger residents face limited access to modern amenities, including efficient street lighting, newly built housing units, and essential services like piped drinking water, sanitation, and waste management. The situation is worsened by high pollution levels, particularly air pollution, impacting the overall health of Ulaanbaatar's residents.

Several barriers contribute to the persistence of the baseline situation such as a lack of investment in solar PV. Additional insulation, active energy efficiency measures, modern housing connected to urban service networks, and efficient street lighting, which are included in the project design, do not alter the project objectives but rather, strengthen the means to achieve them.

B.3. Changes to Project/Programme Description YES ☐ NO ☒ IF YES, PLEASE ELABORATE

Describe the main activities and the planned measures of the project/programme according to each of its components. Provide information on how the activities are linked to objectives, outputs and outcomes that the project/programme intends to achieve, in relationship to the project ToC and how it will substantiate results with evidence. The objectives, outputs and outcomes should be consistent with the information reported in the logic framework in section H.

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 liveability in Ulaanbaatar city, by transforming the highly climate vulnerable and highly polluting peri-urban areas of Ulaanbaatar (ger areas) into ecodistricts characterized as low-carbon, climate resilient, and affordable, remain the as originally intended. However, the physical component that was planned to deliver 10,000 housing units and redevelop 100 hectares of ger areas into eco-districts, needs to be scaled down to 5,014 housing units with a redeveloped area of approximately 30 hectares of ger areas. In this proposal, low and high range scenarios are illustrated for Output 2 (EDAF). These figures can be confirmed once the fund is established, and developers are onboard.

Change (reduction) to Output 1 of target outputs. 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; (ii) climate adaptation and mitigation features; and (iii) resilient infrastructure, public space, and public facilities. Table 3 below shows the comparison of the original and revised outputs under Output 1.

Table 3. Comparison of the original and revised targets for Output 1

	Planned at Project Appraisal (2018)	**Proposed (2024)**
A. Infrastructure	6.1 kilometers (km) of sewerage network	1.9 km of sewerage network
	5.5 km of water supply pipes	2.7 km of water supply pipes
	5.5 km of district heating pipes	2.6 km of district heating pipes
	13.7 km of roads	2.4 km of road
B. Social housing, public spaces, and amenities	5 ha of public space and green areas	2.3 ha of public space and green areas
	36,000 m^2 of community's facilities (such as education, health, and sports facilities)	3,200 m^2 of public commercial facilities
	1,500 units of social housing	826 units of social housing
C. Green components	2,000 m^2 of greenhouses	1,230 m^2 of greenhouses
	72,000 m^2 of photovoltaic (PV) panels;	3,800 m^2 of photovoltaic solar panels
	94,500 m^2 of extra isolation system, utilities metering, renewable energy and building performance monitoring systems, and air filter and heating regulation system	Passive and active energy efficiency strategies for building envelope and HVAC system for 58,204.8 m^2 of heated area.

Economic environment in Mongolia, and particularly Ulaanbaatar, since Covid-19, has required a reduction in the number of social housing units against the planned 2018 targets. As noted in the table above, with the reduction in units, correspondingly, the amount of infrastructure and physical component required for Output 1 need to be reduced.

Separately, the delayed start of the project implemenation and construction followed by delays to establish EDAF prior to the construction works beginning, required Output 1 & 3 components to proceed independently of Output 2. To expedite housing construction for the final 3 years of the project, from April 2024-June 2026, Output 1 will be implemented under 'Phase 1'. Under Phase 1, the following actions are required: (i) readjust the housing finance model - to reflect current cost increases; (ii) evaluate the effectiveness of the Voluntary Land Swap for Outputs 1 & 2; (iii) demonstrate the viability of Eco-District design to encourage private developers into Output 2 (financed with the GCF loan). Output 1 funding will enable the construction of social housing that can be rented, swapped, or purchased.

Subsector changes in Output 1:

Energy Efficiency. Due to the reduction of the number of housing units from 1,500 to 826, the original building insulation area of 94,500 m^2 was reduced to 60,055 m^2. The result is the CO_2 mitigation target is proportionally reduced from 18,805.5tCO_2 e/y to 13,398.3 tCo_2 e/y.

Solar Photovoltaics. The coverage for Solar PV originally 72,000 m^2 was intended to cover rooftops and gardens of *townhouses*. Given that there are no townhouses in the redesign of the project and the overall numbers of housing units have decreased, the coverage of PV is reduced 9,528m2. The result is the CO_2 mitigation targets are proportionally reduced from 17,261tCO_2 e/y to 3,296 tCo_2 e/y.

Despite the reduction in the rooftop areas to host solar PV panels, all best efforts were made to maintain the coverage area of solar PV panels the maximum while considering the economic, financial and environmental factors. More specifically, following two options were considered:

- Option 1: Increasing rooftop solar PV coverage area from the proposed 9,528m2 allowed with grant financing only (USD 5.88 M) to 13,838 m2 through maximization of the use of the available rooftop area of 5,014 housing units with combination of grant (USD 5.88 M) and loan financing (USD 3.97 M). In addition, it was considered to increase the coverage of solar PV area by 7,404m2 through installation of solar PV panels on the public spaces inside the eco-districts such as car parking with an additional loan financing of USD 3.4 M. Overall, the option 1 will enable to obtain additional reduction of CO2 emission of 54,175 tCO2 over the 25 years of lifecycle of solar PV with a total financing of USD 7.37 M from the GCF loan (MON 8348).
- Option 2. Use the same loan amount (USD 7.37) to build additional 324 housing units with extra insulation (already included in the proposed number of housing units of 5,014) to obtain additional CO2 emission of 210,080 tCO2 over the 40 years of lifespan of the housing units.

As a result of a comparative analysis of two options above, it is clear that Option 1 provides lower CO2 emission reduction compared to extra insulation, which is proposed in Option 2, results in a lower IRR due to increase of capital cost induced by the highly subsidized extremely low energy tariffs that subsequently will trigger substantial problems with the loan repayment by the borrower. Option 2 on the other hand provides a significantly greater CO2 emissions reduction while supporting the housing supply and loan repyament by the borrower. Therefore, we reconfirm that Option 2 is more beneficial for the project. The restructuring proposal was formulated based on this Option 2.

Greenhouses. Due to the reduction of the number of housing units, the total area for greenhouses under Output 1 has decreased from 2,000 m^2 (summer greenhouse) to 1,230 m^2 (three season greenhouse), and the greenhouses footprint has reduced the area of the Eco District allocated to greenhouses from 10% to 1%.

Change to Output 2- reduction of target outputs. 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.

Reduction of target outputs:

Subsequent to the 300% increase in the construction costs (MNT 1.3 million per m^2 to MNT 3.95 M) since the 2018 feasibility stage, the number of affordable and market rate housing units needs to be reduced by 35% with a proportional reduction of the associated facilities to be delivered under Output 2. Table 4 below shows the comparison of the original and revised outputs under the Output 2:

Table 4. Comparison of the original and revised targets under the output 2:

	Originally planned (2018)	**Proposed (2024)**

A. Affordable and market rate housing	5,500 units of affordable housing,	4,188 affordable and market rate housing
	3,000 units of market rate housing	
B. Associated facilities	163,000 m^2 associated garages	11,778 m^2 associated garages
	204,200 m^2 of commercial facilities, workshops, and parking	43,503 m^2 of commercial facilities, workshops, and parking
	22.0 km of pedestrian and bicycling paths	46.7 km of pedestrian and bicycling paths
	79,000 m^2 of greenhouses	1,800 m^2 of greenhouses
	591,000 m^2 extra isolation system, utilities metering and building performance monitoring systems, and heating regulation and air filter system.	Passive and active energy efficiency strategies of the HVAC for 362,907 m^2 of heated area.

Subsector changes in Output 2:

Energy Efficiency. Due to the reduction of the number of housing units from 8,500 to 4,188, the original building insulation area of 591,000 m^2 reduced to 304,702 m^2 with 4,188 units for Output 2 in the high case scenario. The result is the CO_2 mitigation target is proportionally reduced from 117,609tCO_2 e/y to 67,979tCo2 e/y (with 4,188 units) for Output 2.

Table 5. Energy Efficiency under 826 units (output 1) and Output 2 (2200 or 4188 units)

Site	Number of building	Unit	Residential, m2	Commercial, m2	Garage, m2	Total, m2	Yearly GHG / year	GHG / 40 years
Output I	25	826	51,737.8	3,073.4	5,244.0	60,055.2	13,398.3	535,932.3
Output II - Option 1.	58	2200	137,800.3	8,185.8	13,967.1	159,953.2	35,685.6	1,427,422.5
Output II - Option 2.	110	4188	262,321.7	15,582.8	26,588.2	304,492.8	67,932.3	2,717,293.5

Greenhouses. Due to the reduction of the number of housing units, the total area for greenhouses under Output 2 has decreased from 79,000 m^2 (summer greenhouse) to 1,800 m^2 (three-season), and the greenhouses footprint has reduced the area of the Eco District allocated to greenhouses from 10% to 1%.

In addition to the changes in the target indicators for Output 2, the original debt to income ratio of 30% for the mortgage loan needs to be increased to 45%, which is current market benchmark for the mortgage loan in Mongolia, to ensure viability of financing for the homebuyers.

Output 3: There are no changes to Output 3 that comprises sector policy reforms intended to ensure the scalability and replicability of the green solutions implemented under AHURP. In this regard, a comprehensive set of technical specifications and guidelines has been developed. A total of 27 technical specifications covering essential areas such as architecture, building structure, HVAC, water supply and sewerage, and power supply, were developed. Thus, the above policies are setting robust foundation for sustainable building practices for green housing in Ulaanbaatar. Additionally, the Eco-district Development Guidelines, which are divided into sections on urban planning, architecture, landscaping, and energy efficiency, offer detailed instructions for creating sustainable, energy-efficient communities, were developed as a reference for future green urban development initiatives by public and private sector stakeholders.

Policy reforms and the development of local standards based on the AHURP guidelines further support the implementation of these solutions. A proposal to incorporate green building practices in the Construction Law of Mongolia was submitted to the Ministry of Construction and Urban Development of Mongolia with the aim to include new green building norms and material standards in the Government Agenda 2024.

The ongoing development and refinement of technical specifications and guidelines, along with regular updates based on the feedback and technological advancements, ensure that these green solutions can be scaled and replicated across various

projects and regions in Mongolia. This comprehensive approach not only promotes the widespread adoption of sustainable practices but also ensures that the benefits of green development are realized on a larger scale.

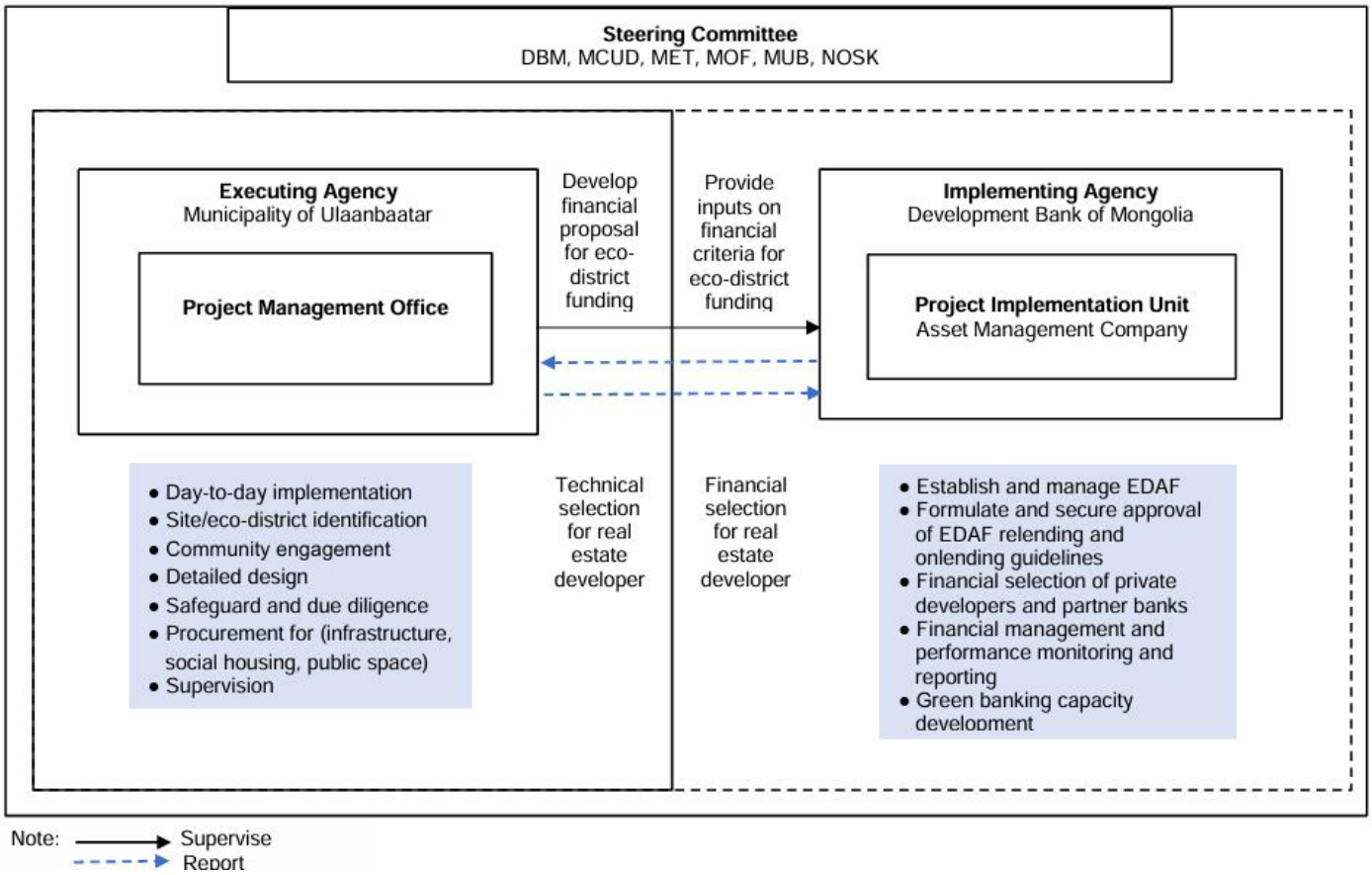
Sector lending modality, and its subprojects

The loan disbursement for the project activities required compliance to 10 policy conditions, which support sustainable sector reform for Ulaanbaatar. By 2023, all policy conditions were fulfilled, except for the establishment of EDAF. As EDAF under Output 2 is yet to be established, disbursement could not begin. Financial disbursement was not possible because Output 2 was linked to Output 1 (social housing and ancillary infrastructure) and Output 3 deliverables (sector reforms). Therefore, in 2023, the ADB delinked policy conditions relating to Output 2 from Output 1 and 3.

Under Output 1 (public component) the Eco-District serves as a pilot for subsequent phases. Due to the reduction in the number of housing units to be built, the originally planned 5 phases are correspondingly reduced to 2 phases. Phase 1 pertains to housing and infrastructure facilities under Output 1. Phase 2 refers to housing and facilities developed under Output 2.

Despite the reduction in the target indicators, the project maintains its sector loan modality, piloting clean climate technologies, to create a paradigm shift towards a low-carbon and climate resilient path for the future development of Ulaanbaatar. The institutional arrangements for Output 2, as illustrated below remain the same.

Figure 1. Institutional and Implementation Arrangements



B.4. Changes to financial elements of the Project/Programme

Please Indicate any changes proposed relative to the Funded Activity Agreement (FAA) in:

- *the integrated financial model in Annexes that includes a projection covering the period from financial closing through final maturity of the proposed GCF financing with detailed assumptions and rationale; and a sensitivity analysis of critical elements of the project/programme*
- *the breakdown of cost estimates for total project costs and GCF financing by sub-component. Please indicate breakdown in local and foreign currency, highlighting any changes in allocation and comment on any (changes) in currency hedging mechanism, as applicable:*

Table 6. Proposed changes to the Funded Activity Agreement

Project Output/ Component	***Project subcomponent***	*Current Budget Allocation*	*Proposed Budget Allocation*	*% Change* ***Remarks (as applicable)***[1]
Output/ Component 1	*Photovoltaic solar panels*	*USD 15,580,000.00*	*USD 0.00*	*No longer needed for solar panels and will be added to the FIL component under Output 2 (Loan Agreement 8348)*
	All Works Except Photovoltaic Solar Panels	*USD 6,560,000.00*	*USD 9,990,000.00*	*To reallocate USD 3,43 million from performance-based grants for eco-district climate change (greenhouse) under Output 2, will be used for greenhouse and EE technologies for social housing under Output 1*
Output/ Component 2	*Financial Intermediary*	*USD 75,700,000.00*	*USD 91,280,000.00*	*To increase by USD 15,580,000.00 to be reallocated from Works Work (Photovoltaic solar panels) under Output 2 (Loan Agreement 8348)*
	Performance based grants for eco-district climate change (greenhouse)	*USD 9,300,000.00*	*USD 1,500,000.00*	• *USD 3,43 million to be reallocated for greenhouse and EE technologies for social housing under Output 1;* • *USD 4,37 million to be reallocated for greenhouse and EE technologies for affordable housing under Output 2*
	performance based grants for eco-district	*USD 21,000,000.00*	*USD 25,370,000.00*	*To increase by USD 4,37 million to be reallocated from performance-*

[1] For Activities delayed, provide the respective explanation/justification for proposed reallocation .

	climate change (insulation)			*based grants for eco-district climate change (greenhouse)*

** Please expand the table if needed.*

- *The revised breakdown of cost/budget by expenditure type (project staff and consultants, travel, goods, works, services, etc.) and disbursement schedule in project/programme confirmation (term sheet) as included in Annexes.*

B.5. Changes in Project Financing Information? Yes ☐ No ☒ If Yes, Please elaborate below

	Financial Instrument[2]	Amount	Currency	Tenor	Pricing (% interest or IRR for equity)
(a) Total project financing	**(a) = (b) + (c)**	……	Options		
(b) GCF financing to recipient			Options Options		
	** Please provide any changes to original economic and financial justification 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.*				
	Total requested	……	Options		

(c) Co-financing to recipient	Financial Instrument	Amount	Currency	Name of Institution	Tenor (years)	Pricing (% interest or IRR for equity)	Seniority[3]
	Lead financing institution: ……						
	** Please provide a confirmation letter or a letter of commitment, for any additional co-financing resulting from changes, issued by the co-financing institution.*						

[2]Broken down by instrument i.e. (i) Senior Loans; (ii) Subordinated Loans; (iii) Equity; (iv) Guarantees; (v) Reimbursable grants & (vi) Grants

[3] Seniority categories include Pari-passu; senior; junior

(d) Financial terms between GCF and AE (if applicable)

In cases where the accredited entity (AE) deploys the GCF financing directly to the recipient, (i.e. the GCF financing passes directly from the GCF to the recipient through the AE) or if the AE is the recipient itself, in the proposed financial instrument and terms as described in part (b), this subsection can be skipped.

If there is a financial arrangement between the GCF and the AE, which entails a financial instrument and/or financial terms separate from the ones described in part (b), please fill out the table below to specify the proposed instrument and terms between the GCF and the AE and justify any deviation from initial terms described in the original Funding Proposal/FAA agreement.

Financial instrument	Amount	Currency	Tenor	Pricing
Choose an item.	……	Options	( ) years	( ) %

C.1. Any updates To Background Information on Project / Programme Sponsor (EXECUTING ENTITY)?

YES ☐ NO ☒ IF YES, PLEASE ELABORATE

Describe any changes in the project/programme sponsor and the implications for the quality of the management team, overall strategy and financial profile of the Sponsor (Executing Entity) and how it will support the restructured project/programme in terms of equity investment, management, operations, production and marketing

As reflected in the original project concept, the Development Bank of Mongolia (DBM) will act as the project implementing agency (PIU), providing overall support to the AMC-DBM in its establishment and management of the eco-district and affordable housing fund (EDAF). The Ministry of Finance (MOF) has requested to onlend the funds allocated for Output 2: EDAF to the Municipality of Ulaanbaatar (MUB), the project executing agency, and establish the EDAF under MUB and keep the AMC-DBM as the EDAF Manager, according to the original projet concept. The respective MOF letter is in **ANNEX *6*.**

C.2. Any Institutional / Implementation Arrangements? Yes ☒ No ☐ If yes, please elaborate

Please describe in detail any changes to the governance structure of the project/programme, including but not limited to the organization structure, roles and responsibilities of the project/programme management unit, steering committee, executing entities and so on, as well as the flow of funds structure. Also describe which of these structures are already in place and which are still pending and which will be new. For the pending and new ones, please specify the requirements to establish them.

As indicated above, MOF has requested to on-lend the project funds allocated for EDAF to MUB. If approved by ADB and GCF, MOF and MUB will establish a subsidiary loan agreement for the GCF loan (L8348-MON) to establish EDAF under MUB (Please see Annex 8 for the updated schedule.3 of the FAA).

Describe any new operational arrangements with key contractual agreements. If applicable, provide the credit analysis of key counterparties of key contractual agreements and/or structural mitigants to cover the counterparty risks.

C.3. UPDATED TIMETABLE OF PROJECT/PROGRAMME IMPLEMENTATION

Please provide a project/programme implementation timetable in section I (Annexes) with information on milestones, deliverables and results in the cells. The Table 7 below is for illustrative purposes. If the table format below is used, please refer to the activities as numbered in Section H. In the case of outputs, please mark when all the required activities will be completed see example.

Table 7. Updated Project Implementation Schedule, Ulaanbaatar Mongolia

	2018		2019				2020				2021				2022				2023				2024				2025				2026				2027				2028				2029				2030			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1: Output 1 and 2: Climate resilient and low carbon urban infrastructure, public facilities, social housing units, affordable and market housing units, and economic facilities																																																
A1 Infrastructure and architectural detailed design															Detailed design for 220 housing completed (pilot project)				Detailed design for 606 housing underway																																	
A2 Advance action and resettlement			8.5 ha site was vacated in 2020 by MUB, and ADB DDR was completed in 2022.																																														
A3 Construction (infrastructure and public space)																					Construction of infrastructure (pilot project) started in 2023 and will continue through 2027.																																	
A.4 Construction (buildings and facilities)																					Construction of 220 housing units and associated facilities (pilot project) is underway. Construction of 606 housing units initiated in Q2, 2024.																																	
Phase 2																																																
B1 Identification																			Project site identified in Bayankhoshuu.																																	
B2 Preliminary design and land swap agreement																			Preliminary design to be completed in Q3 2024.																																	
																					Swapping agreement to be established through 2027.																																	
B3 Infrastructure and architectural detailed design																									To be developed by selected developers.																											
B4 Construction (infrastructure, public space, buildings and facilities)																											To be done in stages from Q3 2025 till the project's end.																										
Output 3: Policy Environment and Sector Capacity																																																
3.1 Project Implementation and Management																																																
3.1a Recruit staff and train PMO staff		Recruited and trained.																																															
3.1b Hire capacity development consultants				Consultant hired and operational.																																													
3.1c Train and increase capacity of PMO staff and targeted institutions									Capacity building activities are conducted yearly.																																												

	2018		2019				2020				2021				2022				2023				2024				2025				2026				2027				2028				2029				2030			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
3.2 Eco-district feasibility and development																																																
3.2a Hire capacity development consultants					Consultant hired and operational.																																													
3.2b Implement eco-district planning, green building standard, social and affordable housing, and development guidelines and regulations											Guidelines developed.												Guidelines to be approved.																													
3.2c Complete feasibility study for the implementation phases											Completed.																																							
3.2d Implement policy and sector reforms related to climate change adaptation and mitigation, improved supply and access to green social and affordable housing															Ongoing. To be carried out until the project is completed.																																			
3.3 Detailed design and supervision																																																
3.3a Hire capacity development consultants (2018)					Consultant hired and operational.																																												
3.3b Complete detailed design and final land swapping agreement for each phase											Phase 1 to be completed by Q2 2024, and phase 2 to be completed by Q2 2027																																									
3.3c Supervise construction for each phase																							Initiated with ongoing construction works and to be continued throughout the project duration.																													
3.4. Sustainable green finance																																																
3.4a Hire capacity development consultants				Consultant hired and operational.																																													
3.4b Develop standard, guidelines and regulations for the use of the EDAF											Draft documents developed and to be continued under EDAF establishment.																																									

D.1. Any changes to Value Added for GCF Involvement? Yes ☐ No ☒ If yes, please elaborate
Please specify why the GCF involvement is still required for the project/programme, in consideration of the new design or revision to the project and climate change rationale. *No changes proposed.*
D.2. Any Changes to Exit Strategy? Yes ☐ No ☒ If yes, please elaborate
Please explain if and how the restructuring affects the initial project/programme sustainability considerations as well as strategies for longer term maintenance of physical assets (if applicable) while also taking into consideration the long-term financial viability of the project/program. *No changes proposed.*

In this section, the accredited entity is expected to provide a brief description of changes in the expected performance of the proposed project/programme against each of the Fund's six investment criteria resulting from the proposed changes. 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.

E.1. Any Changes To Impact Potential? YES ☒ NO ☐ IF YES, PLEASE ELABORATE

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

Specify the mitigation and/or adaptation impact, taking into account the relevant and applicable sub-criteria and assessment factors in the Fund's investment framework.When applicable, specify the degree to which the project/programme avoids lock-in of long-lived, high emission or climate-vulnerable infrastructure.

Climate mitigation impact.

The annual greenhouse gas (GHG) emission reductions of the project are preliminary estimated at 142,155 tCO2e. This derives from investments into passive and active strategies such as solar PV 3,296 tCO2e/y (based on 5,014 units), insulation of buildings, triple glazing, and radiators with thermostats 80,965 tCO2e/y, water conservation strategies (269 tCO2e/y), LED lights energy saving 15,522 tCO2e/y and embodied energy saving 42,105 tCo2e/y (based on 5,014 units)

The total direct amount of GHG emission reductions made from energy saving strategies applied to water, insulation, LED lights and embodied energy over a 40-year lifetime of the project can be calculated as illustrated in the table below (noting solar PV panels account for shorter lifetime of 25 years). The estimated amount of direct and indirect emission reductions is 3.94 million tCO2e over a 40-year period. With a factor of 5 for the replication (19.7million tCO2e over 40 years) of original mitigation investments of the project (this assumption is consistent with targeting approximately 25% of the current ger area population in Ulaanbaatar. This does not consider replication in ger areas of cities outside Ulaanbaatar or replication in non-ger areas of Ulaanbaatar).

Table 8. Solar PV lifetime estimated at 25 years, Embodied energy saving CO2 emission reduction estimated only at first year.

Original target		Output I	Output II	TOTAL / 1 y	TOTAL lifetime
		A	C	A+C	40
GHG emission reduction		tCO2 e/year		tCO2 e/year	tCO2 e/40 year
Housing units		826	4188	5014	
Solar PV	17,261	1,328	1,968	3,296	82,394
Insulation	187,149	12,985	67,979	80,965	3,238,581
Embodied	n/a	7,785	34,320	42,105	42,105
LED lights	n/a	2,570	13,032	15,603	624,114
Water	n/a	43	225	269	10,741
Total	204,410	24,712	117,524	142,236	3,997,935

Adaptation impact

The total number of primary direct beneficiaries to experience enhanced resilience to climate change is at least 17,500 assuming the average household size of 3.5 people. This number corresponds to the expected number of inhabitants of the new apartments built under the project. The new apartments will provide better protection against harsh Mongolian winters and the consequences of climate change through improved flood protection, providing access to water and sanitation, improved waste and wastewater management. The above estimate excludes the inhabitants of the apartments that will be built after the end of project using the EDAF funding mechanism developed under the project. The number of beneficiaries is at least another 17,500 people. This includes indirect replication to 175,000 people which assumes a factor of 10 for the replication of the original adaptation investments. This assumption is consistent with covering approximately 15% 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 project objectives 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 crucial for the project. However, due to conventional construction practices and a lack of proper construction management processes, it has been difficult to implement what has been prescribed. It is important that as the project progresses, the project is able to reevaluate decisions and adopt more low carbon materials across all developments. As it does so, the project will be able to 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*	142,155
		Lifetime	3,994,699
	• *Expected total number of direct and indirect beneficiaries, disaggregated by gender (reduced vulnerability or increased resilience);* • *Number of beneficiaries relative to total population, disaggregated by gender (adaptation only)*	*Total*	Primary direct beneficiaries of increased climate change resilience: 17,500 people, of which at least are 8,750 women Total direct beneficiaries of increased climate change resilience: 55,000 people, of which at least are 27,500 women Primary indirect beneficiaries of increased climate change resilience: 157,500 people, of which at least are 78,750 women Total indirect beneficiaries of increased climate change resilience: 495,000 people, of which at least are 247,500 women

		Percentage (%)	Primary direct: 1.03% of UB population / 0.50% of Mongolia's population[4] Total direct: 3.23% of UB population / 1.57% of Mongolia's population Primary direct and indirect: 10.3% of UB population /5.0 % of Mongolia's population Total direct and indirect: 32.3% of UB population / 15.7% of Mongolia's population
Other relevant indicators	*Examples include:* ● *Expected increase in the number of households with access to low-emission energy* ● *Expected increase in the number of small, medium and large low-emission power suppliers, and installed effective capacity* ● *Expected increase in generation and use of climate information in decision-making* ● *Expected strengthening of adaptive capacity and reduced exposure to climate risks* ● *Others*		

4 The Ulaanbaatar population and Mongolia's population data was sourced by National Statistics Information (2022) https://www.1212.mn/mn/statistic/fun-statistic/population

Describe the detailed methodology used for calculating the indicators above.Describe how the project/programme's indicator values compare to the appropriate benchmarks (i.e. the indicator values for a similar project/programme in a comparable context).

Table 9. A hierarchy of beneficiaries

	Primary	Secondary	Tertiary	Total
Direct	17,500	12,500	25,000	55,000
Indirect	157,500	112,500	225,000	495,000
Total	175,000	125,000	250,000	550,000

The mitigation indicators are calculated as follows:

Solar PV

The tables below on solar PV illustrate total unit of PV units needed and kilowatt peak generated (kWp) by solar in the allotted area. Calculations are made for least case scenario for Output 2 (4,188 units) with annual and 'lifetime' CO2 emission savings.

Table 10. Solar PV estimation (source AHURP Phase 1 design) based on 826 units (Output 1) and 4,188 (Output 2)

Site code	Number of building	Unit number	Number of PV	PV, kWp	Area, %	PV Area, m2
Output I						
B15	4	110	240	161	22	646
B13-1	4	150	232	155	22	624
B13-2	2	76	116	78	22	312
S27-5	4	110	258	173	22	694
S27-2	6	228	348	233	22	936
Selbe	5	126	232	155	22	624
Total output I	**25**	**826**	**1,426**	**955**	**22**	**3,836**
Output II						
Not determined yet	**46**	**4188**	2,116	1,418	22	5,692
Total AHURP by PV system	**71**	**5014**	**3,542**	**2,373**	**22**	**9,528**

		Number of PV	PV, kWp	E prod [MWh]	Yearly GHG	GHG 25 years
AHURP						
Output I	826	1,426.0	955.4	1,204.0	1,328.0	33,200.3
Output II	4188	2,116.0	1,417.7	1,784.0	1,967.8	49,193.8
Total	**5014**	**3,542.0**	**2,373.1**	**2,988.0**	**3,295.8**	**82,394.1**

Table 11. Calculation of GHG emission reductions from PV

Name	Number	Unit	Source
Grid emission factor	1.103	tCO2/MWh	Published grid emission factor
Solar PV panel area	9,528	m^2	EFDP technical study
Expected power supply per m2	313.6	$kWh/y/m^2$	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 / 1,000 * 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 =9,528 * 313.6/1000 * 1.103 = 3,295.74 tCO2e/y

Lifetime emission reductions are calculated assuming a lifetime of 25 years: 25*3,295.74 = 82,394 tCO2e.

Passive and Active Strategies

Estimates for the mitigation indicators

Estimates for the mitigation indicators are calculated directly from the project design, reflecting the number of housing units to be constructed and the average occupancy of each housing unit. The heated area of the project's Output I, Phase I design. Heated area of Output 2 calculated based on the data of Phase 1. For the total heated area, the calculations for Output 2 illustrates the option of achieving 4,188 units, totalling almost 5,014 units for the project.

Table 12. Heated area calculation source AHURP Phase 1 design

Site code	Number of building	Unit number	Heated area (sqm)		
			Residential area	Commercial area	Heated garage
Output I					
B15	4	110	7,020	1,170	1,872
B13-1	4	150	9,277.4	223.4	
B13-2	2	76	4,680	-	936
S27-5	4	110	7,020	500	
S27-2	6	228	14,040	700	2,340
N4	5	152	9,700	480	96
Total Output I	**25**	**826**	**51,737.8**	**3,073.4**	**5,244**
Output II					

Not determined yet	110	4,188	262,231.7	15,582.8	26,588.2
Total project by area type	135	5,014	314,059	18,656	31,832
Total heated area of AHURP construction			**364,546**		

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

- Occupancy per unit (pp/unit): 3.5 pp/unit (as per original proposal)
- Heated area under project construction (m^2): 364,546 m^2

Table 13. Calculation from GHG Emissions reduction from Active and Passive measures

Name	Number	Unit	Source
Baseline energy consumption for heating	395.0	kWh/y/m^2	GIZ Nexus project estimate
Baseline energy conversion efficiency	50.00%	%	Project team
Percentage lignite in baseline fuel mix	50.00%	%	Project team*
Percentage coal in baseline fuel mix	50.00%	%	Project team*
Lignite CO2 emission factor	101.0	tCO2/TJ	IPCC Default**
Coal CO2 emission factor	94.6	tCO2/TJ	IPCC Default**
AHURP energy consumption for heating	104.9	kWh/y/m2	Project team (as per actual design)
AHURP energy conversion efficiency	65.00%	%	Project Facilities***
Percentage lignite in AHURP fuel mix	0.00%	%	Project Facilities
Percentage coal in AHURP fuel mix	100.00%	%	Project Facilities
Heated area (baseline, AHURP scenario)	218,264	m^2	based on project's Phase 1 design.
Conversion factor for kWh to KJ	0.0000036	kJ	conversion factor

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)

Calculation Methodology
For passive and active 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****

Table 14. The calculation for Active and Passive measures:

No	Calculation Step	Value	Unit	Description	Application
(1)	**Baseline emissions per m² heated**				
1.1	Baseline calculation of emissions (Lignite Based)	0.144	tCO2e/m²	((Baseline energy consumption for heating * (3.6 / 1,000,000)) / Baseline energy conversion efficiency) * (Percentage lignite in baseline fuel mix * Lignite CO2 emission factor)	((395*(0.0000036)/ 50%)*(50%*101) = 0.1436
1.2	Baseline calculation of emissions (Coal Based)	0.135	tCO2e/m²	((Baseline energy consumption for heating * (3.6 / 1,000,000))/ Baseline energy conversion efficiency) *(Percentage coal in baseline fuel mix * coal CO2 emission factor)	((395*(0.0000036)/ 50%)*(50%*94.6) = 0.1345
1.3	Total Baseline Emissions per m² heated	0.278	tCO2e/m²	Baseline calculation of emissions (Lignite Based) + Baseline calculation of emissions (Coal Based)	0.1436 + 0.1345 = 0.2781
(2)	**Project emissions per m² heated**				
2.1	Project calculation of emissions (Lignite Based)	0.000	tCO2e/m²	((AHURP energy consumption for heating * (3.6 / 1,000,000)) / AHURP energy conversion efficiency) * (Percentage lignite in baseline fuel mix * Lignite CO2 emission factor)	((104.9*(0.0000036) /65%)*(0%*101) = 0.000
2.2	Project calculation of emissions (Coal Based)	0.055	tCO2e/m²	((AHURP energy consumption for heating * (3.6 / 1,000,000))/ AHURP energy conversion efficiency) *(Percentage coal in baseline fuel mix * coal CO2 emission factor)	((104.9*(0.0000036) /65%)*(100%*94.6) = 0.0550
2.3	Total Project Emissions per m² heated	0.055	tCO2e/m²	AHURP calculation of emissions (Lignite Based) + AHURP calculation of emissions (Coal Based)	0.000 + 0.0550 = 0.0550
(3)	**GHG emission reductions from passive and active strategies**				
3.1	Yearly GHG Emission Reduction from passive	48,713	tCO2e/year	(Total Baseline Emissions per m² heated - Total AHURP Emissions	(0.2781-0.055)*364,546=

	and active strategies			per m² heated)*Heated area	81,330
3.2	Lifetime GHG emission reductions are calculated assuming a lifetime of 40 years	1,948,504	tCO2e	Yearly GHG Emission Reduction from passive and active strategies*40	81,330*40 = 3,253,206

** All fuel mix percentages based on percentage in the total energy supply, not by weight.*
*** 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.*
**** This figure includes conversion efficiency in generation and transport and distribution losses.*
***** 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.*

Water conservation strategies - Estimates for the mitigation indicators

Estimates the carbon emissions based on potable water consumption. The derivatives of carbon emissions through water consumption are primarily based on electricity consumption and fuel consumption used for supply and transportation of water respectively. The primary data inputs were provided by the Project Management Office (PMO) team based on data availability for the project location.

Table 15. Calculation from GHG Emissions reduction from Water Conservation by using energy efficient measures

Name	2021	2022	Unit	Source
Year wise electricity consumption	66,500,000.0	66,900,000.0	kWh	USUG Calculation
Potable Water Consumption	56.9	57.4	million cubic meter	USUG Calculation
Water Water Generated	66.9	65.0	million cubic meter	USUG Calculation
Energy Consumption for Water Extraction	0.31	0.30	kWh/cubic meter	USUG Calculation
Energy Consumption for Water Distribution	0.39	0.39	kWh/cubic meter	USUG Calculation
Energy Consumption for Waste Water Collection & Treatment	0.31	0.33	kWh/cubic meter	USUG Calculation
Fuel for the 1 trip of water transportation truck to ger area	4.2	4.1	Litre	USUG Calculation
Total Diesel Consumption	380,288	327,961	Litre	USUG Calculation
Percentage share of vehicle - Diesel	62.5%		%	USUG Calculation

Total A-80 Benzene Consumption	228,173	196,777	Litre	USUG Calculation
Percentage share of vehicle - A-80 Benzene	37.50%		%	USUG Calculation
Electricity Emission Factor	0.884		tCO2e per MWh	https://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-20180718120947843/ASB0039-2018_PSB0041.pdf
Diesel Emission factor	2.67		kg/litre	https://ghgprotocol.org/sites/default/files/Emission_Factors_from_Cross_Sector_Tools_March_2017.xlsx
Gasoline Emission Factor	2.27		kg/litre	https://ghgprotocol.org/sites/default/files/Emission_Factors_from_Cross_Sector_Tools_March_2017.xlsx
Total Floor Area of Building ABCD as per Edge App	6,763.87		m2	from Edge App
Baseline Water Demand	1,490.00		cu. m. per month	from Edge App
Actual Water Demand	1,095.00		cu. m. per month	from Edge App
Heated area (baseline, AHURP scenario)	364,546		m^2	based on AHURP phase 1 design

Table 16. Calculation Methodology

S.No	Calculation Step	2021	2022	Unit	Description	Application	Application
1.1	Total Electrical Carbon Emission	58,786.00	59,139.60	tCO2e	(Yearwise electricity consumption*Electricity Emission Factor)/1000	(66,500,000*0.884)/1000 = 58,786	(66,900,000*0.884)/1000 = 59,139
1.2	Total Fuel Carbon Emission	1,533.32	1,322.34	tCO2e	((Total Diesel Consumption*Diesel Emission Factor)+(Total A-80 Benzene Consumption*Gasoline Emission Factor))/1000	((380,288*2.67)+(228,173*2.27))/1000 = 1533.32	((327,961*2.67)+(196,777*2.27))/1000 = 1322.34

1.3	Total Carbon Emissions	60,319.32	60,461.94	tCO2e	Total Electrical Carbon Emission + Total Fuel Carbon Emission	58,786+1,533.32 = 60,319.32	59,139.60+1322.34 = 60,461.94
1.4	Carbon Emission per cubic meter of water supplied	1.060	1.053	kgCO2e/cu.m.	(Total Carbon Emissions*1000)/(Potable Water Consumption*1000000)	(60,319.32*1000)/(56.9*1000000) = 1.060	(60,461.94*1000)/(57.4*1000000) = 1.053
1.5	Average Carbon Emission per cubic meter of water supplied	1.057		kgCO2e/cu.m.	(Carbon Emission per cubic meter of water supplied 2021 + Carbon Emission per cubic meter of water supplied 2022)/2	(1.060+1.053)/2 = 1.057	
1.6	Yearly Water Savings from Edge App	0.70		cu.m./m2/year	((Baseline Water Demand - Actual Water Demand) * 12)/Total Floor Area of Building ABCD as per Edge App	((1490-1095)*12)/6763.87=0.70	
1.7	Yearly Carbon Emission Reduction from Water Savings	162		tCO2e/year	(Average Carbon Emission per cubic meter of water supplied*Heated area (baseline, AHURP scenario*Yearly Water Savings from Edge App))/1000	(1.057*364,546*0.7)/1000 = 269.7	
1.8	Lifetime GHG emission reductions are calculated assuming a lifetime of 40 years	6,465		tCO2e	Yearly Carbon Emission Reduction from Water Savings*40	269.7*40 = 10,789	

LED lights

Table 17. LED lights estimates (source AHURP Phase 1 detailed engineering design)

	Outdoor lights per building	B15 site q'ty	Q'ty / A build	P, Watt	Total P, Wattage
1	LED road light h=6.5м	30	8	100	750
2	LED bicycle road light h=3.5м	27	7	50	337.5
3	LED street,	46	12	10	115
4	LED street,	33	8	12	99
	Indoor lights per building				
5	Indoor LED light	25	6	72	450
6	LED small light	55	14	60	825
TOTAL Installed power				**304**	**2,577**

Table 18. Calculation of GHG emission reductions from LED lights

LED outdoor lights	units		Output 1	Output 2	Total
Housing units	**5,014**	**unit**	826	4,188	5,014
Installed power	**2,577**	**Wattage**	2,128,189	10,790,382	12,918,571
Daily operation hours	**6**	**hr/day**	12,769,134	64,742,292	77,511,426
Electricity consumption / Year	**365**	**MWh/y**	4,661	23,631	28,292
LED efficiency over than HPS	**50%**	**MWh/y**	6,991	35,446	**42,438**
LED saving	**difference HPS-LED**	**MWh/y**	2,330	11,815	14,146
Electricity tC02e/ average emission	**1.103**	**tC02e/MWh**	2,570	13,032	15,603

Source:
https://www.academia.edu/106778999/LED_street_lighting_as_a_strategy_for_climate_change_mitigation_at_local_government_level

The formula for calculating the GHG emission reduction per year is:
LED lights GHG ER = Electricity consumption/y * Emission factor

Using the above input data, the greenhouse gas emission reductions from the LED lights can be calculated as follows
GHG ER/y =14,146 * 1.103 = 15,603 tCO2e/y

Lifetime emission reductions are calculated assuming a lifetime of 40 years: 40*15,603=16,440 tCO2e

Embodied

Table 19. Embodied energy estimate. (Source AHURP Phase 1 design)

Embodied Energy			
Embodied GHG factor	311 GHG factor	-	
Output 1	25 **building**	7,785	tCO2/25building
Output 2	110 **building**	34,320	tCO2/110 building
Total	**135 building**	42,105	**tCO2/135 build/y**

Embodied Energy GHG ER = Building number * Emission factor
Using the above input data, the greenhouse gas emission reductions from the Embodied Energy can be calculated as follows GHG ER/y =135 * 311 = 42,105 tCO2e/y (***Lifetime emission reductions are calculated assuming a lifetime of 1 year only***)

Total emission reductions (PV+Insulation + Water + LED lights + Embodied)

Total emission reductions are obtained by summing the estimate of CO2 emission reductions from solar PV panels, Insulation, water, LED lights, and Embodied energy of the buildings.

Original target		**Output 1**	**Output 2**	**TOTAL / 1 y**	**TOTAL lifetime**
		A	C	A+C	40 years
GHG emission reduction	Original tCO2e/y	tCO2 e/year		tCO2 e/year	tCO2 e/40 years
Housing units		826	4,188		5,014
Solar PV	**17,261**	1,328	1,968	**3,296**	82,400
Insulation	**187,149**	13,398	67,932	**81,330**	3,253,206
Embodied	**n/a**	7,785	34,320	**42,105**	42,105
LED lights	**n/a**	2,594	13,151	**15,745**	629,807
Water	**n/a**	44	225	**270**	10,789
Total	**204,410**	25,150	117,596	**142,746**	4,018,307

Using the numbers calculated above, the total emission reductions can be calculated as follows:
Total emission reductions = Emission reductions from PV + insulation + Water + LED lights + Embodied energy savings
Annual total emission reductions: 3,296 (PV)+ 81,330(insultation) + 270 (water) + 15,745 (LED lights)+ 42,105 (embodied energy) = 142,746 tCO2e/y.

Lifetime total emission reductions: 82,400 (PV 25y) + 3,253,206 (Insulation 40y)+10,789 (water 40y)+629,807 (LED 40y)+42,105 (embodied 1y)= 4,018,307 tCO2e

The original target for greenhouse gas (GHG) emissions was 17,261 tons of CO2 from solar PV modules and 187,149 tons of CO2 from insulation, was set at 204,410 tons of CO2 equivalent per year for 10,000 housing units. This averages 20 tons of CO2 equivalent per household annually.

With the number of housing units reduced from 10,000 to 5,014, the total GHG emissions reduction target is expected to decrease by 30% to 142,746 tons of CO2 equivalent per year. However, the GHG emissions per household will be reduced from 20 to 28 tons of CO2 equivalent per year due to the additional CO2 emission reducing active EE solutions from embodied energy, LED lights, as well as water savings, waste management and flood control. In addition to two major drainage channels of 3,570m that already exist at the Bayankhoshuu site, on-site anti-flooding channels are planned in Bayankhoshuu and Sharkhad under AHURP. The details of these are shown below:

- 1,408.08 m long on-site drainage channels connected to the main drainage channels are already planned in the project sites
  Detailed study for anti-flooding drainage channels in 30 ha area is ongoing for defining the need for the drainage systems to be developed under AHURP to ensure maximum anti-flooding characteristics.

Additionally, rooftop storm water collections and permeable car parking and pedestrian sidewalks are planned to be built inside the eco-districts. The details of these are shown below.
In parallel to the ample green space and extensive drainage systems inside and outside the eco-districts, the physical developments under AHURP maximize the use of low-environmental impact materials. As the AHURP buildings are complaint with international EDGE (Excellence in Design for Greater Efficiencies) certification requirements, construction materials with low-embodied energy are selected in the AHURP's housing units construction. Additionally, use of recycled materials is maximized for landscaping works.

Finally, comprehensive waste management approaches and solutions are to be implemented based on the 3Rs principle (Reduce, Reuse and Recycle). More specifically, dedicated space for segregation of domestic waste is planned in each eco-district along with required signage, instructions and trashbins. More importantly, the eco-district waste management system is linked to the existing municipal waste segregation and recycling system. Simultaneously, a comprehensive waste management program is to be implemented for raising awareness of occupants of eco-districts, including residents and business owners and for introducing special regulations and incentives inside the eco-districts to reduce waste at the source and to encourage reuse and recycling.

Thus, while the total emissions have decreased by 30% due to the reduction in housing units, the emissions reduction per household have risen due to the inclusion of the active EE solutions. Therefore, this shift highlights the importance of considering both total emissions and emissions per unit when evaluating the environmental impact.

The actual implementation of these climate change mitigation and environmental protection measures will be monitored through three layers of supervision including design supervision, construction supervision and EDGE auditing. Consequently, a detailed reporting during the implementation will be duly conducted and submitted to the relevant stakeholders including the financiers.

E.2. Any changes to Other investment criteria[5]? YES ☐ NO ☒ IF YES, PLEASE PROVIDE AGAINST EACH INVESTMENT CRITERION THAT IS AFFECTED BY THE CHANGE, AS APPLICABLE

[5] Besides impact potential, the other GCF investment criteria are paradigm shift potential; sustainable development potential; needs of the recipient; country ownership; and efficiency and effectiveness

Describe how the project/programme changes affect the investment criteria

E. 3. Engagement with NDAs, civil society organizations and other relevant stakeholders

Please provide a full description of the steps taken to ensure country ownership, including the engagement with NDAs on the proposed changes. Please also specify the multi-stakeholder engagement plan and the consultations that were conducted with respect to the proposed changes.

Per the detailed assessment and discussions held during the ADB midterm review mission in October 2022 and the review mission in April 2023, the target numbers of housing units planned under the project need to be reduced to reflect the market realities, including substantial inflation and respective construction and land cost escalations, and the macroeconomic context governing the project. Since the prefeasibility study (PFS) that was completed in 2018 (with data provided from 2017), construction material costs have tripled, and the land prices have substantially increased. The COVID-19-related border crossing restrictions with the People's Republic of China (PRC) that lasted until February 2023 substantially affected both supply chains and access to consruction materials in Mongolia. For a landlocked country, this limited the availability of stock whilst simultaneously increasing construction costs. Whilst Mongolia has begun to experience some positive trends, such as an increase in the supply of goods, the inflated 2022 price of materials has remained constant. Additionally, the national currency devaluation by 1.9 times against USD since 2018, has substantially impacted the increase of construction material cost.

The ADB, MUB, and the MOF have assessed the above challenges and respective project implementation issues and agreed on the changes required in the project scope, implementation arrangements and targets to ensure effective and efficient implementation of the remaining project activities based on the available financial resources under the economic and financial limitations laid on the project.

The minor change of scope is needed to reflect the above economic realities and ensure the completion of the project activities. As listed in the table below, a series of communications, consultations and formal meeting events took place with the National Designated Authority (NDA), executing and implementing agencies, ADB and other stakeholders that culminated in the prescribed changes in the project, as described in Section A.2. A NDA no-objection letter is in **ANNEX *4***.

Table 20.Key events from -October 2022 which have determined the need to restructure AHURP

No	*Event and Key participants*	*Date*	*Remarks*
1	*ADB project midterm review*	*October 2022*	*Discussions held with ADB (Accredited Entity) and GCF about the challenges to meet prescribed housing unit targets given impacts of COVID-19 on the country's economy. The agreed objective was to focus on the pilot project. Request from ADB for EDAF to be established by February 2023.*

2	*Steering Committee Meeting*	*October 2022*	
3	*MOU signed by MOF, DBM, ADB, MUB on potential for proposed change*	*November 2022*	
4	*ADB/ GCF Mission*	*April 2023*	*Discussion on extended timeframes. Introduction of passive and active designs to reach targets.*
5	*Steering Committee Meeting*	*May 2023*	*Discuss the use of the vacated land sites owned by the National Housing Corporation (NOSK) for the project and the methods of applying the cost evaluation.* *Set and approved parameters for inclusion of additional components eligible for energy efficiency, and performance-based payment scheme.* *Discuss and recommend options for EDAF establishment or its replacement.* *Approving the concept of focusing on developing housing units in vacant land where possible, yet trying non-binding voluntary land swap (VLSP) within the neighbourhood. This will allow retaining VLSP and using it where applicable.*
6	*Presentation of Feasibility to MOF*	*April 2023*	*Discussion with EA on reduced numbers for the pilot and the need to establish EDAF*
7	*Signed MOU from ADB Mission*	*April 2023*	*Agreement on extended timeframes. Introduction of passive and active designs to reach targets. Agreement on acquisition of the vacated land to test the VLSP mechanism.*
8	*Special Review Mission (SRM)*	*6-10 November 2023*	*Discussion on project changes*
9	*Signed MOU (SRM)*	*December 2023*	*Agreement of minor change in project scope. Agreement on two options to move forward to establish EDAF.*
10	*Letter from MOF re EDAF*	*April 2024*	*MOF sent ADB a letter proposing to onlnend the funds allocated for EDAF to MUB and establish EDAF under MUB (***ANNEX *6**)*

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

F.1. Any changes in Economic and Financial Analysis? Yes ☐ No ☐ If yes, please elaborate

Please provide any changes to the originally submitted narrative and rationale for the detailed economic and financial analysis (including the financial model). Based on the above analysis, please provide economic and financial justification (both qualitative and quantitative) for the concessionality that GCF provides, with a reference to the financial structure proposed in section B.2.

Originally designed to deliver 10,000 units in 100 hectares in 20 subproject locations, planned development would be in 5 phases over the period 2019-2024. However, socioeconomic, and political factors aggravated by the COVID-19 outbreak impacted project implementation. Lockdowns and border closures drove fuel and transport costs to increase threefold with the same effect on contracted goods and services. Government finance managers introduced fiscal and monetary policies including currency depreciation/devaluation (2022) to prime up the economy, but with such measures falling short of their objectives. With construction costs increasing over 300% during the 2018-2023 period, the project requires rescoping to enable the project to yet attain the design outcomes of increased access to low-carbon and climate-resilient eco-districts and green affordable housing.

Based on the rescoping, the appraisal design target number of housing units at 10,000 is downsized to 5,014 at midterm (826 social housing units from original 1,500, and 4,188 affordable/market units from 8,500). Despite the limiting conditions above, the economic reevaluation at midterm shows that the project is economically viable with Phase 1 investment (comprising Outputs 1 and 3) resulting in base case EIRR at 10.1% and Phase 2 (Output 2) with EIRR at 11.3%, both exceeding the economic opportunity cost of capital (EOCC) at 9%. The combined outputs result in EIRR at 11.1% for project overall. The sensitivity analysis reflects that under adverse conditions (such as cost increases, benefits reduction, and implementation delay) the EIRRs range between 7.9% and 10.2%; on average, close to the minimum EOCC at 9%. Likewise, the financial reevaluation finds the project overall to be financially viable, with the combined FIRRs for Phase 1 (2.9%) and Phase 2 (13.9%) at 11.7%, higher than the recalculated weighted average cost of capital at 8.1%. The sensitivity analysis, which reflects negative to low financial returns under adverse changes would prepare project planners about the extent such changes impact the project outputs and that mitigating measures should thus be considered to avoid such conditions.

The project budget estimated at USD 570.1 million is also assessed at midterm to determine its sufficiency to cover all project expenditures that ensure construction of all 5,014 housing units and appurtenant components including green spaces and facilities and project management, engineering, consulting services and project staff training. The analysis shows that the estimated budget at MNT 1,285,392 million (net of financing charges at USD 34.5 million) would be enough to cover the total cost requirement at MNT 1,271,709 million. Should economic conditions remain steady as predicted, the budget would have a surplus available to build about 110 additional housing units. The detailed economic and financial analysis is in **ANNEX *7***.

F.2. Any changes in Technical Evaluation? Yes ☒ No ☐ If yes, please elaborate

Please provide an assessment from the technical perspective on any changes in the project design/activity. If a technological solution that is different from the original proposal has been chosen, describe why it is the most appropriate for this project/programme.

Passive Solar Design. This is based on the orientation of buildings (not thermal mass storage), 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.

Photo Voltaic (PV). The PV Panels are a common technology for rural herding families and mobile phone providers, notably in rural areas not served from the electrical grid. Conversely, solar PV is uncommon in urban Mongolia. The project

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.

Ancillary Infrastructure. The project will provide off-site infrastructure connections to eco-districts. This includes water, sewerage, heating, electricity, telecommunication, roads and drainage facilities. The connections between the city infrastructure networks need to be compatible with the ecodistrict. The project has assumed that connections to facility networks will be made at, or near the borders of the urban renewal unit blocks, for areas that will be located within the sub-centres covered by the ADB-funded Ger Area Development Invetment Program (GADIP). The proximity to existing infrastructure will be a major factor in the evaluation of proposed eco-districts to be included into the project model.

Greenhouses. The greenhouse model has been chosen as a three-season, rather than one-season greenhouse model as originally planned, as the three-season greenhouses will have tripple productivity.

F.3. Any changes in environmental, social assessment including gender considerations? Yes ☐ No ☒ If yes, please elaborate

Describe the main changes in expected outcome of the environment and social impact assessment for the restructured project. Specify the Environmental and Social Management Plan, and how the project/programme will avoid or mitigate negative impacts at each stage (e.g. preparation, implementation and operation), in accordance with the Fund's Environmental and Social Safeguard (ESS) standard. Also describe how the gender aspect is considered/addressed in the restructuring of the project, in accordance with the Fund's Gender Policy and Action Plan.

F.4. Any changes in Financial Management and Procurement? Yes ☐ No ☒ If yes, please elaborate

Describe any expected changes in the project/programme's financial management and procurement, including financial accounting, disbursement methods and auditing.

General. The financial accord between ADB and GCF remain that the 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 the project, 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. Compliance with ADB's policies and requirements will be monitored and reported by ADB's department responsible for compliance.

Financial management. No change

Procurement - No change

G.1. Any changes to the Risk Assessment Summary? Yes ☒ No ☐ If yes, please elaborate

Please provide a summary of main risk factors, including any newly identified risks from the restructuring of the project. Detailed description of risk factors and mitigation measures can be elaborated in G.2.

At the time of the funding proposal submission, only the so-called "core subprojects" of the sector loan were developed in detail. Risk assessment was to be conducted on the overall project and for individual subprojects under the project sector loan. Only subprojects were listed as having limited risks were accepted under the project by the ADB.

Many of the risks listed in the GCF Funding Activity Agreement (FAA) remain relevant, with a low probability of occurring. However, the probability of risk occurring due to "economic shocks" or "collapsing commodity prices" was ranked "low" (*see* selected risk factor 8 from FAA). Yet, this risk materialised, and the impact is high. The project costs have risen by more than 300%, well above the estimated 20% (the highest rating) provided in the FAA risk matrix. Therefore, this risk was not accurately assessed. Furthermore, institutional buy-in of the project was not listed as a risk. Yet, the willingness of MOF to establish EDAF under the operational guidance of AMC-DBM, as the institutional entity, has caused significant delay. Consequently, Output 2 has yet to become operational, despite the loan covenants in place to legally establish EDAF.

Otherwise, the level of risks from the FAA that affect project performance are generally moderate and remain unchanged. These are mitigated to a substantial degree by ADB's established operational tools and control mechanisms and additional mitigation measures. New key project risks and their specific additional mitigation measures are listed in Section G.2 below.

G.2. Any changes for Risk Factors and Mitigation Measures? Yes ☒ No ☐ If yes, please elaborate

Please describe additional (financial, technical and operational, social and environmental and other risks) that might prevent the project/programme objectives from being achieved. This section should also describe other potential issues which will be monitored as "emerging risks" during the life of the project (i.e., issues that have not yet raised to the level of "risk factor" but which will need monitoring). Also describe the proposed risk mitigation measures.

New key project risks and their specific additional mitigation measures are listed below.

Selected Risk Factor 1

Description	Risk category	Level of impact	Probability of risk occurring
The cost for offsite infrastructure could be more than anticipated in the FAA	Financial	Medium (20% of project value)	High

Mitigation Measure(s)

Please describe how the identified risk will be mitigated or managed. Do the mitigation measures lower the probability of risk occurring? If so, to what level?

This risk relates to Section F.2. Ancillary Infrastructure. Thorough due diligence of offsite infrastructure and costs is required before investment of subsector Eco districts takes place. Alignment with Ulaanbaatar Urban Services and Ger Areas Development Investment Program assumes new infrastructure has sufficient capacity for the residential units developed under the project. If not, this should be raised to PMO and Project Steering Committee to consider alternative sites. If alternative sites are not selected, and there is demand for the original site, contingency planning is needed, possibly using provisional sums. Also there is a need to ensure contractual protections are in place, such as fixed price contracts or cost escalation clauses to protect against cost overruns.

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

H.1. REVISED LOGIC FRAMEWORK.

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

[1] As per the relevant indicators established in the Funding Proposal and the Performance Measurement Framework, including all indicators approved by the Board and relevant updates agreed with GCF, if applicable.

[2] Midterm is throughout Section H defined as 2023, corresponding to the completion of the core subprojects. Due to the delays in the project implementation, no mid-term targets have been met at this stage.

[3] For this reporting, the final targets are presented as originally planned. The project is undergoing a restructuring process after which the final targets will be revised accordingly reflecting all changes.

[4] Related to the approved indicators and targets in the Logic Framework.

H.1.1. Paradigm Shift Objectives and Impacts at the Fund level[5]

Paradigm shift objectives	
Shift to low-emission sustainable development pathways	By focusing on addressing systemic barriers to low-carbon and climate resilient urban development, the proposed project 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 across Ulaanbaatar and other Mongolian cities. By providing incentivized financing, the project will overcome initial investment barriers and kickstart a 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 area 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 several energy efficient technologies into urban redevelopment projects. Overall, the project 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 1,9 million tCO2e. • Indirect economic lifetime GHG emission reductions of 9,19 million tCO2e (including direct emission reductions)
Increased climate-resilient sustainable development	***Adaptation*** • 17,500 primary direct beneficiaries from reduced climate change vulnerability • 157,500 primary indirect beneficiaries from reduced climate change vulnerability

Expected Result	**Indicator**		**Baseline**	**Target**	**Assumptions**

		Means of Verification (MoV)		Mid-term (if applicable) 826 units	Final 5,014 units	
Fund-level impacts						
M1.0 Reduced emission 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 energy access power generation sub-indicator	Project progress Municipality of Ulaanbaatar (MUB) reports Consultants' reports in line with AHURP Measurement Reporting and Verification system established according to the monitoring plan	17,261 tCO2e/y 431,525 tCO2e/25y over AHURP Lifetime 25y	1,328 tCO2e/y 33,200 tCO2e/25y over AHURP Lifetime (25y for solar)	3,296 tCO2e/y Lifetime (25y for solar) 82,394 tCO2e /25y	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
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	187,149 tCO2e/yr 7,485,960 tCO2e over AHURP lifetime	13,398 tCO2e/yr 535,929 tCO2e/40y over AHURP lifetime	81,330 tCO2e/y Lifetime (40y for building) 3,253,206 tCO2/40yr	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	Total number of primary, secondary and tertiary direct beneficiaries	Project progress Reports MUB reports	0	0	33,000	Buildings and facilities are constructed in line with designed technical specifications and

people, communities and regions.	Total number of primary, secondary and tertiary beneficiaries (direct and indirect)	Surveys Consultants' reports in line with AHURP MRV system established according to the monitoring plan in Appendix 19 of the	0	0	297,000	building performance and ger areas residents are kin to move and live in the project ecodistricts
	Number of primary, secondary and tertiary beneficiaries (direct and indirect) relative to total Mongolian population		0%	0%	3.1% (direct) 31.3% (total)	
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 monitoring plan in Annex 19	0	0	USD 421.8 million 5,014 units climate-resilient housing units built	The full scope of the project is implemented as design

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

Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
Project/program outcomes	**Outcomes that contribute to Fund-level impacts**					
M5.0 Strengthened institutional and regulatory systems.	5.1 Institutional and regulatory systems that	Project progress reports MUB' reports	0	0	2	No change. Regulatory agencies adopt the regulatory and institutional

	improve incentives for low-emission planning and building and their effective implementation	Project progress reports MUB reports				recommended by the project
	5.2 Number and level of effective coordination mechanisms		0	0	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	0	2.3 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%	0%	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) /m2/yr	NA	151 kWh/m^2/y	No change. Buildings and facilities in the ecodistricts are fully occupied
A5.0 Strengthened institutional and	5.1 Institutional and	Project progress reports	0	0	2	No change.

regulatory systems for climate-responsive planning and development.	regulatory systems that improve incentives for climate resilience and their effective implementation	MUB' reports				Financial and institutional mechanisms for the project are established
A7.0 Strengthened adaptive capacity and reduced exposure to climate risks.	At least 3,000 families move to climate resilient housing connected to climate proofed urban environmental infrastructure and roads	Project progress reports MUB reports Surveys	0	0	3,000	Households are kin to move and live in the ecodistricts
Project 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 0	4 4,000	No change. Project visibility is high High quality of dissemination material
Project Performance Measurements						
1. Resilient and low carbon urban infrastructure, public facilities, and social housing units built in ger areas	Number of social housing built	Construction records Construction records Project progress reports	0	0	826	Good coordination between with MUB and GADIP projects for infrastructures extension in ger areas Adequate technology available to supply energy efficient
	Average building annual heat load in kW/square meter		0	0	150	

	Area of PV solar panels installed (m2 panels)	(MUB reports) Consultants' reports Energy Monitoring Program	0	0	9,528	building and solar panel
	Area of greenhouses (m2)		0	0	1,230	
	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)		0 0 0 0 0 0	0 0 0 0 0 0	**Output 1:** (826 units) 2,700 (WS) 1,900 (SN) 2,800 (HS) 23,300 (EL) 447 (lights) 2,500 (roads)	
	1.f Area of public green parks in target areas (ha)		0	0	2.5	
	1.g Area of public facilities such as but not limited to kindergarten, community center, and sport complex (m2)		0	0	6,400	
	1.h Percentage of		0	0	100%	

	new buildings in project area with meters installed for water and heating supplies in all new buildings					
	1.e Percentage of buildings constructed by the project with air filter and heating regulation system installed		0	0	100%	
	Percentage of new buildings by the project with energy efficiency monitoring system installed		0	0	100%	
	1.k Percentage of building constructed equipped with high energy efficiency isolation system		0	0	100%	
	1.l Smart monitoring system and sensors for building performance and renewable energy control		0	0	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	0 and 0	15,000 and 3,000	
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 housing units built	Private developers Sales documents Project progress reports MUB reports Consultants' reports	0	0	4,188 **(Output 2 only)**	Developers and commercial banks interest to the project remain high Construction cost do not raise exponentially Developer build residential areas in conformity with technical specifications and building performance criteria
	2.b m2 of commercial facilities, workshops		0	0	16,019	
	2.c Km of pedestrian lane		0	0	32.9	
	2.d Area of greenhouses built		0	0	1,800m^2	
	2.e Percentage of building constructed by the project equipped with high energy efficiency isolation system		0	0	100%	

	2.f Percentage of buildings constructed by the project with air filter and heating regulation system installed		0	0	100%	
	2.g Percent age of new buildings by the project with energy efficiency monitoring system installed		0	0	100%	
	g 2.h Percent age of building construc ted equippe d with high energy efficienc y isolation system		0	0	100%	
	2.i Sex-disaggregat ed data collected on beneficiary households		0	100	100%	
	i 2.j At least 10% of housing units are co-titled under women's		0	NA	100	

	names;					
	2.k At least 30% of female-headed households who applied to participate in project's improved houses and utility services are approved		0	0	100	
3. Policy environment and capacity strengthened.	3.1 Project implementation and management	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				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 framework and Ulaanbaatar Electricity Distribution Network (UBEDN) implement net metering regulations or a power sales agreement with the project.
	3.1a PMO positions filled with trained staff, of which at least 40% are women		PMO not established	PMO established	PMO established	
	3.1b Sex disaggregated program performance and monitoring system operational		Not operational	Operational	Operational	
	3.2 Eco-district feasibility and development					
	3.2a Communication and awareness		No awareness	Awareness campaign implemented	Awareness campaign implemented	

	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		campaign			MUB adopt a modify condominium scheme suitable for operation and maintenance of the project areas. Community participation and awareness is high. Master plan remain fully supportive of AHURP principles and objectives The private sector interest to expend their operation in the Eco districts. Government and DBM commitment in green banking is high. Green development remains a high priority for the government Private sector, commercial bank and Developers interest in green business/ banking
	3.2b Program is launched for a new tariff system based on actual consumption.		No program	No program	Program launched.	
	3.2c Utility tariffs linked to direct cost recovery of O&M, including asset depreciation		No cost-recovery tariffs	No cost-recovery tariffs	Cost-recovery tariff in place	
	3.2d Revised performance contract between MUB and service providers in place		Old contract	Old contract	New contract	
	3.2e Organizational agreement		No agreement	No agreement	Agreement in place	

	for building and utilities operation and maintenance within 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	No conducive P&R	Conducive P&R	
	3.2g Efficient supply chains for renewable energy systems and energy efficient construction technologies and material in effect		No efficient supply chains	No efficient supply chains	Efficient supply chains in place	
	3.2h Gendered impact assessment conducted		Not conducted	Not conducted	Conducted	
	3.2i Organizational agreement for building and utility		No agreement	No agreement	Agreement in place	

	O&M within the project areas in place[85]					
	3.2j Green building standards and code approved		No Standard	Standard developed	Standard approved	
	3.2k Urban development regulatory framework integrates principles and standards set by the project local zoning and		Urban regulatory framework not updated	Urban regulatory framework updated	Urban regulatory framework updated	
	3.2l Affordable housing mechanisms and policies in effect		Mechanism not in effect	Mechanism developed	Mechanism in effect	
	3.2m kg/ m^2 annual average of vegetables produce		0	0	8	

	d in greenhouses					
	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	no	yes	
	3.2o At least 30% of businesses located in the commercial facilities in the eco-districts are led by women		no	no	yes	
	3.3 Detailed design and supervision					
	3.3a Communities involve		0	yes	yes	

	d 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					
	3.3b Number of gender-sensitive outreach and awareness campaigns implemented promoting women's housing property ownership		0	0	10	
	3.3c		no	no	yes	

	Infrastructure and architectural detailed design completed in phases					
	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-		0	5	5	

	district					
	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	Developed	Established	
	3.4cGreen banking systems and mechanisms formulated and implemented under the project		Not implemented	Not implemented	Implemented	
	3.4d Green banking		Not developed	Not developed	Developed	

	financial products and services for climate resilient housing developed and availed by developers and target end-buyers					
	3.4e Women are at least 25% of those approved for green mortgages as principal / co-lender		0	0	25	

Activities	Description	Sub activities	Deliverables
1.Construction of resilient and low carbon urban infrastructure, public facilities, and social housing units built in ger areas	Preparation and submission of DD Completion of resettlement Prepare bidding documents and guide bidding process Bidding process of developers Construction and supervision	1.1 Infrastructure and architectural detailed design 1.2 Land acquisition and resettlement process 1.3 Procurement of goods and works 1.4 Select developers 1.5 Infrastructure	Detailed engineering design LARP Bidding documents Construction contract with Contractors State commissioning act

		and facilities constructed, commissioned, and operating	
2. Construction resilient and Low carbon affordable and market housing units and economic facilities built in ger areas	Preparation and submission of DD Prepare bidding documents and guide bidding process Bidding process of developers Construction and supervision	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	Detailed engineering design Bidding documents Construction contract with Contractors State commissioning act
3. Policy environment and sector capacity strengthened	Procurement of consulting services Stakeholder consultations, training, guideline, regulation, policy dialogue, reporting	3.1 Project implementation and management 3.1.a 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	Project reports Employment contracts with PMO staffs Capacity development consultancy contract Capacity development plan and report Approved feasibility studies Contract with capacity development consultants Detailed engineering design Guidelines and regulations for green building, social and affordable housing Approved feasibility study Guidelines, standards, and

		regulations	regulations
		3.2c Complete feasibility study for the 5 implementation phases	
		3.2 d Implement policy and sector reforms related to climate change adaptation and mitigation, improved supply and access to green social and affordable housing	Contract with capacity development consultants Detailed engineering designs for phase 1 Land swapping agreement. Construction work supervision report
		3.3 Detailed design and supervision	
		3.3a Hire capacity development consultants	Contract with capacity development consultants.
		3.3b Complete detailed design and final land swapping agreement for each phase: core subprojects and phase 2, phase 3, phase 4, and phase 5	EDAF guidelines and regulations Implementation reports of green finance policy and sector reforms
		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	

H.2. Any changes to arrangements for Monitoring, Reporting and Evaluation? YES ☐ NO ☒
IF YES, PLEASE ELABORATE

Besides the arrangements (e.g. semi-annual performance reports) laid out in AMA, please provide project/programme specific institutional setting and implementation arrangements for monitoring and reporting and evaluation. Please provide methodologies for monitoring and reporting of key outcomes of the restructured project/programme, and how data/evidence will be collected to substantiate the results reported and the proposed changes.

No changes.

I. UPDATED Supporting Documents for Restructuring Paper

- ☐ Summary of Changes
- ☐ Details of Cost Increases
- ☐ Note of meeting with commercial banks
- ☐ NDA No-objection Letter
- ☐ Updated Project Design and Monitoring Framework
- ☐ Letter from the Ministry of Finance on EDAF and Onlending of Output 2 Funds
- ☐ Updated Project Midterm Economic and Financial Analysis
- ☐ Updated FAA schedule 3

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

ANNEX 1: SUMMARY OF CHANGES

	AHURP Minor Change of Scope Recommendations (November 2023)		
	Outputs	**Appraisal (2018)**	**SRM (November 2023) & GCF Restructuring Proposal (April 2024)**
1	Output1. Social Housing	1,500	826
2	Output 2. Affordable/Market Housing	8,500	4,188
3	Output 3. Policy Reform	Policy Reform	Policy Reform
4	**Total** Housing Units	10,000	5,014
	Overall Project Financing		
5	Output 1	71.66	$71.69m
6	Output 2	106	$119.05m
7	Output 3	28.17	$24.08m
8	**Total**	205.83	$214.8m available
	Output 1 (ADB)		
9	Solar PV area	72,000m2	3,836 m2
10	Energy Efficiency Grant	$4.02	$6.7m
11	Greenhouse (type)	1 season	3 seasons
12	Greenhouse (Area)	2,000 m2	1,230 m2

13	Greenhouse (Grant)	$200,000 Output 1 (summer greenhouse)	$950,000 (3-season greenhouse) & reallocate $750,000 from GCF grant for output 2 greenhouse)
14	Coverage for Housing	Social (Income Decile 1-3)	Social (Income decile 1-3) & Affordable (decile 4-7)
	Output 2. Green Components (GCF)		
15	Solar PV area	72,000 m2	9,528 m2
16	Energy Efficiency '*approach*' to achieve 150 kW hr/m^2 target	Passive strategies only	Passive & active strategies
17	Energy Efficiency '*Grants*' to achieve 150 kW hr/m^2 target	Passive strategies only	Passive & active strategies
18	Greenhouse (type)	1 season ($117 sqm)	3 seasons ($640 sqm)
19	Greenhouse (Area)	79,000 m2 / 10% coverage of eco district	1,800 m2 / 1% coverage of eco district
20	Greenhouse (Grant)	$9.3m	$1.5m
21	Costs to add energy efficient components to construction of buildings (*building, electrical, telecommunications', HVAC, water supply and sanitation*	Not estimated	13% of total building construction cost m2
22	Performance Based Funding: *Payment terms to developers and contractors to achieve EDGE certification*	1 year after construction complete: Based on the thermal energy bills and heating meter readings of the unit.	60% payment on receipt of Preliminary Certification and 40% payment on receipt of Construction Certification.
	Output 2. **Reallocation of Funds (GCF Loan & Grant)**		

23	(a) GCF loan	$15.58m for solar PV	$15.58m for EDAF fund
24	(b) GCF Grant	$5.34m (for solar PV)	$5.34m (for solar PV)
25	(c) MUB contribution	$4.62m (cash and tax exemption)	$0.54 (tax exemption)
26	(d) GCF grant	$9.3m (greenhouse)	$1.53m (greenhouse grant)
27	(e) GCF grant for energy efficiency	$21m (grant EE)	$25.37m (EE grant)
	Output 2. EDAF (GCF)		
28	FIL Total Amount	$75.7m (EDAF)	$91.28 (Reallocation of GCF loan $15.58m from solar PV)
29a	Investment Mechanism	MoF to EDAF, established by DBM AMC	MoF on-lend to MUB and EDAF through UBIM
29b		DBM AMC manage EDAF	DBM AMC manage EDAF
29c		Participant banks provide developer loans (EDAF 35%, Commercial bank 35%, Developers 30%)	Participant banks provide developer loans (EDAF 35%, Commercial bank 35%, Developers 30%)
29d		Participant banks issue green mortgages	Participant banks issue green mortgages
29e		Participant banks issue Mortgage Backed Securities (MBS) to EDAF	Participant banks issue Mortgage Backed Securities (MBS) to EDAF
29f		30 % debt to income ratio for mortgage loan	45 % debt to income ratio for mortgage loan
	Output 1 and 2 Definitions (ADB and GCF Loan)		

30a	Project financing of Social and Affordable Housing	Social (Decile 1-3)	Social (Decile 1-3) and Affordable (decile 4-7)
30b		Monthly Rental (Decile 1-3)	Monthly Rental (Decile 1-3)
30c		Rent-to-own (NOSK scheme) (Decile 1-3)	Rent-to-own (NOSK scheme) (Decile 1-3)
30d		Swap land and assets for apartment units or purchase (Decile 4-7)	Swap land and assets for apartment units or purchase (decile 1-3) & (decile 4-7)
31a	Minimum Apartment size	35 m2	35 m2
31b		35 m2 guaranteed without mortgage	35 m2 guaranteed with possible mortgage (Decile 4-7) or rent-to-own scheme (Decile 1-3)
32	Land acquisition mechanism	Voluntary Land Swapping (VLS)	VLS (subject to pilot Q3 2024) + negotiated land acquisition
33	Apartment type	Townhouses or low-rise building of a maximum of five to six floors	Low to mid-rise building of a maximum six to nine floors with the exception of high-rise buildings up to sixteen floors in the business area

ANNEX 2: DETAILS OF COST INCREASES

Policy Paper on Housing Units (Target A)

Ulaanbaatar Green Housing and Resilient Urban Renewal Project (AHURP)

Project Number: 49169
Policy Discussion Paper: Rescoping of number of housing units

Submitted November 2023

Proposal

1. PMO propose to reduce the number of housing units under Output 1 from 1,500 to 826.

2. PMO propose to reduce the number of housing units under Output 2 from 8,500 to 2,200.
3. Rescope the project and all its relevant components accordingly.

Rationale for decreasing numbers of housing units:

1. **Currency devaluation. The** actual local currency devaluation is 44% compared to 2018 USD exchange rate and it is 20.5% higher than the estimated devaluation of 23.5% as stipulated in PAM (p.33, para 54, table 3). It results in the increased cost of imported materials, namely construction materials.

Table-1: Currency devaluation after 2017

Currency	2018 (April)	Estimated (2023)	Actual (2023)
USD/MNT	₮ 2,400	₮ 2,964	**₮ 3,450**

2. **Consumer price inflation.** The price inflation rate was estimated at 7.0 (PAM, p.33, para 54, table 3) for each year of project duration. However, the actual consumer price inflation rate fluctuated as shown in the table below. The inflation rate continues to remain high in the post-epidemic years of economic recovery.

Table-2: Annual consumer price inflation rate (variation) after 2017

ANNUAL INFLATION LEVEL (CONSUMER PRICE INDEX)		
Year	Mongolia	Ulaanbaatar
2017	6.4	4.6
2018	8.1	7.7
2019	5.2	5.0
*2020	2.3	1.9
2021	13.4	14.8
2022	13.2	12.9
2023-09	10.2	10.2

**Due to the government intervention and border closures, the inflation rate in 2020 was forcefully stabilized.*

It results in drastic increases in (i) labor cost, and (ii) consumer good prices.

i. The decree No 217 of Minister of Construction and Urban Development, dated 30 December 2019, increased the benchmark wage by 30% for construction workers[1].
ii. The table below shows the price increase of essential commodity goods such as fuel, flour, and beef over the course of last 6 years between 2018 and 2023[2].

Table-3: Price increase of essential commodity goods

Commodity goods	2018 (MNT)	2023 (MNT)
Fuel AI 92 (1l)	1,730	2,390
Flour (1kg)	1,345	2,751
Beef (1kg)	8,525	15,414

3. **Cost escalation in the construction sector in Mongolia.** Compared to the project estimation of 2017, the residential building construction unit cost increased 2.56 times in 2022. Current official index of the unit cost for residential building construction is 1.81 times higher than the index of 2016[3].

Table-4: Comparative price of unit construction cost for residential building

Currency	Estimated unit cost (*PPTA 9030, 2017)	Official unit cost (*MCUD index 2022)	AHURP State expertised unit cost (Bayankhoshuu *DED, 2022)
MNT	862,500 (minimum)	2,209,320 (minimum)	2,506,710 (minimum)
USD	250 (minimum)	640 (minimum)	727 (minimum)

Exchange rate: 1USD =3450MNT
**PPTA: Project Pre-feasibility Study*
**MCUD: Ministry of Construction and Urban Development*
**DED: Detailed Engineering Design*

4. **Increase of land and asset cost.** The table below shows the comparative land and asset valuation cost for 2 similar areas in Bayankhoshuu sub-center. The cost of resettlement has significantly increased for a period of 2 years.

Year	Land size (ha)	Number of plots	Resettlement cost	Location
2020	5.6	94	MNT 5.6 billion	B15 (vacated by NOSK)
2022	5.4	71	MNT 8.4 billion	N4 (under VLSP principle of AHURP)

[1] Order No 217 of Minister of Construction and Urban Development that sets the benchmark wage for construction sector workers: https://legalinfo.mn/mn/detail?lawId=14930.
[2] Comparative price of fuel AI 92: https://nso.mn/mn/statistic/statcate/573063/table-view/DT_NSO_0600_001V4
[3] Order No 74 of March 31, 2022 by Ministry of Urban development and Construction

5. The tables below show the comparative price of the main construction materials and land in the ger area between 2016 and 2024 based on the State expertized sample detailed engineering drawings and land and asset valuation by independent appraisers.

Price changes in construction materials (2016 and 2024)

№	Material name	Unit	Unit price, MNT-2016	Unit price, MNT-2024 Q1	2016 USD FX	2024Q1 USD FX	Unit price, USD - 2016	Unit price, USD-2024Q1	Difference 2016vs2024, MNT	Difference 2016vs2024, USD
1	Panel forms	м2	6,500	21,500	2,147.10	3,386.20	3.03	6.35	331%	210%
2	Concrete form oil, black	kg	1,800	3,833	2,147.10	3,386.20	0.84	1.13	213%	135%
3	Metal wire d 5mm	м2	1,300	2,818	2,147.10	3,386.20	0.61	0.83	217%	137%
4	Fastening metal	kg	1,400	3,181	2,147.10	3,386.20	0.65	0.94	227%	144%
5	Styrofoam EPS	м3	81,000	299,200	2,147.10	3,386.20	37.73	88.36	369%	234%
6	Cement m-300	tn	147,000	374,242	2,147.10	3,386.20	68.46	110.52	255%	161%
7	1-4027 Cement m-400	tn	152,000	374,242	2,147.10	3,386.20	70.79	110.52	246%	156%
8	1-0212 Emulsion painting	kg	4,200	7,128	2,147.10	3,386.20	1.96	2.11	170%	108%
9	Wood Plank 1st grade 25mm	м3	247,000	575,700	2,147.10	3,386.20	115.04	170.01	233%	148%
10	Concrete mix M150 grade	м3	114,000	270,000	2,147.10	3,386.20	53.09	79.74	237%	150%
11	Steel Rebar	tn	1,190,000	2,522,727	2,147.10	3,386.20	554.24	745	212%	134%
12	Steel structure	kg	1,200	2,842	2,147.10	3,386.20	0.56	0.84	237%	150%
13	Brick m-100	1000 p	220,000	367,000	2,147.10	3,386.20	102.46	108.38	167%	106%
14	Gypsum, grade I	kg	300	524	2,147.10	3,386.20	0.14	0.15	175%	111%
15	Wooden interior door	м2	76,000	342,425	2,147.10	3,386.20	35.4	101.12	451%	286%
16	Parquet flooring	м2	13,000.00	40,429	2,147.10	3,386.20	6.05	11.94	311%	197%
17	Earth soil	м3	2,500	8,000	2,147.10	3,386.20	1.16	2.36	320%	203%
18	Triple glazed vacuum windows	м2	178,000.00	495,418	2,147.10	3,386.20	82.9	146.31	278%	176%
								AVG %	258%	164%

Land price change (2016 and 2024)

№	Item	Unit	Unit price, MNT	Unit price, MNT	2016 USD FX	2024Q1 USD FX	Unit price, USD	Unit price, USD	Difference 2016vs2024, MNT	Difference 2016vs2024, USD
1	Land price in Bayankhoshuu	м2	48,000	100,000	2,147.10	3,386.20	22.36	29.53	108%	32%

ANNEX 3: MINUTES OF THE MEETING WITH COMMERCIAL BANKS

Meeting Topic: Co-financing Opportunities for the Ulaanbaatar Green Affordable Housing Project

Date: June 26, 2024

Time: 10:00 AM

Location: ADB Mongolia Resident Mission Office, Ulaanbaatar

Attendees:

- **Asian Development Bank (ADB):** Raushan Mamatkulov (Principal Urban Development Specialist)
- **Project Management Office (PMO):** Enkhbayar Batsukh (Monitoring and Evaluation Specialist), B. Khishigsuren (Finance Specialist)
- **Project Implementation Management Support (PIMS):** L.Chantsalnyam (Deputy Team Leader)
- **EFDP:** Gantulga.n (Deputy Team Leader)
- **Project Implementing Unit (PIU):** Javkhlan Munkhtur (Fund Manager), Zolboo Ganbold (Procurement Specialist)
- **Mongolian Mortgage Corporation:** Ts. Batbayar (Deputy Director of Business Development) E.Bold-Erdene (Senior Securities Officer)
- **Trade & Development Bank of Mongolia (TDB):** S. Enkhbold (Head of Retail Cooperation Department), G.Anar (Head of Retail Product Development Department), J.Aminaa (Senior Manager, Retail Product Development Department), E.Enkhtsolmon (Relationship Manager, Green Finance Office)
- **The State Bank:** P. Tur-Enkh (Credit Policy Specialist, Department of Business Policy and Planning), G.Saranzaya (Senior Specialist, Credit Department), D.Bayanjargal (Sustainable Finance Specialist, Sustainable Development Office)
- **Khan Bank:** B.Suvd (Manager, Credit Product Development and Green Credit Department), E.Bulganchimeg (Manager, Green Finance)
- **Golomt Bank:** E. Arvijikh (Corporate Manager), E.Munkhtuul (Sustainable Financing Manager), T.Uyanga (Credit Research Manager)

Discussion Points:

- **Government Policy and Mortgage Financing:**
    - The meeting acknowledged Mongolian government Resolution No. 483 (December, 2023) promoting mortgage financing for ger area residents. However, a lack of corresponding policy changes at the Bank of Mongolia was identified. The Ulaanbaatar green affordable housing project could potentially leverage this resolution.
- **Challenges for Home Buyers:**
    - The significant down payment requirement (30%) was highlighted as a possible major obstacle for potential home buyers. Exploring options with the Mongolian Credit Guarantee Fund to guarantee portion of the down payment was suggested.

- **Project Success and Affordability:**
    - Emphasizing the need to align government mortgage policies with community needs was crucial. Misalignment could lead to unaffordable housing prices for ger area residents. Addressing this issue would mitigate risks for banks by potentially reducing unsold units.
- **Green Financing and GCF Support:**
    - The project's success was recognized as essential for securing future concessional loan assistance from the Green Climate Fund (GCF). Resolving the sales issue was seen as the most critical factor for GCF approval, as the funding scheme itself resembled existing models.
- **EDGE Certification:**
    - Only single-family homes are currently EDGE certificated, was noted. Khan Bank's collaboration with IFC to train EDGE experts was offered, and a potential joint meeting was discussed.
- **Construction Financing and Green financing:**
    - The availability of dedicated construction financing departments at some banks, was highlighted. Banks expressed their willingness and experience in financing construction projects from both from the supply and demand side similar to EDAF financing structure. It was noted that banks are interested in energy efficient and green project financing.
- **Location as a Key Factor:**
    - Location was identified as critical, potentially even more important than initial financing. Addressing the mortgage issue was seen as directly impacting sales based on the project's location. The project should maintain the initial eco-district concept of green spaces and social infrastructure to ensure success.
- **Lessons Learned from Past Redevelopment Programs:**
    - Challenges from previous redevelopment programs were discussed. Delays in infrastructure financing by the Municipality and Government caused financial strain for developers, contributing to project failure. Timely project financing was emphasized as a major element for success in construction projects.

Next Steps:

- Explore ways to leverage Government Resolution No. 483 for the project.
- Discuss options with the Mongolian Credit Guarantee Fund to reduce the down payment requirement.
- Advocate for government policies aligned with community needs for affordable housing under Output 3.

ANNEX 4: NO-OBJECTION LETTER FROM THE NDA

Choikhand Janchivlamdan

National focal point of Mongolia for the GCF

DIRECTOR CHOIKHAND JANCHIVLAMDAN

ANNEX 5: UPDATED DESIGN AND MONITORING FRAMWORK (DMF)

Project Results Chain	Performance Indicators with Targets and Baselines	Refined/Updated Performance Indicators	Data Sources and Reporting Mechanisms	Assumptions and Risks
Impacts	Living conditions in Mongolia improved (Mongolia Sustainable Development Vision 2030)[a] Ulaanbaatar is a safe, healthy, and green city that is resilient to climate change, and provides a livable environment for its residents (Priorities 1 and 2 of Adjustments to the Ulaanbaatar City Urban Development Master Plan 2020 and Development Directions 2030)b	**No change in impacts**		
Outcome Access to low-carbon and climate-resilient eco-districts and green affordable housing in Ulaanbaatar *ger* areas increased	**By 2028:** a. At least 7,000 households, of which 30% are headed by women, relocated into, or have ownership and/or rental titles for social and affordable housing units in the 100 ha of eco- districts in ger areas (2017 baseline: 0) b. Energy consumption per housing unit built in targeted areas reduced to 150 kWh/m2/year (2017 baseline: 395 kWh/m2/year) c. 200,000 tons of carbon dioxide emission per year avoided (2017 baseline: 0) d. 6,000 person-months per year of employment	**By 2028:** a. At least 3,000 households, relocated into, or have ownership and/or rental titles for social and affordable housing units in the eco- districts in ger areas, of which 30% of women-headed households who applied to participate in the project are approved (2017 baseline: 0) b. Energy consumption per housing unit built in targeted areas reduced to 150 kWh/m2/year (2017 baseline: 395 kWh/m2/year) c. 142,000 tons of carbon dioxide emission per year avoided (2017 baseline: 0) d. 3,000 person-months of employment opportunities	a. MUB annual report on urban construction and district records b. MUB and NOSK annual report on urban construction and social housing c. –d. MUB record on urban construction, and eco-districts' records on business and eployment	Continued tight fiscal conditions and changed government priorities shift resources away from affordable housing programs.

	opportunities for operation and maintenance of facilities and infrastructure created, of which 40% are filled by women (2017 baseline: 0)	for operation and maintenance of facilities and infrastructure created, of which 30% are filled by women (2017 baseline: 0)		
Outputs 1. Resilient urban infrastructure, public facilities, and social housing units in *ger* areas constructed (public sector component)	**By 2026:** 1a. 1,500 social housing units constructed (2017 baseline: 0) 1b. 13.7 km of road, 5.5 km of water supply pipes, 6.1 km of sewerage network, 5.5 km of district heating pipes, and 450 low-consumption street lights constructed (2017 baselines: 0) 1c. 15 ha of public space and green areas, and 36,000 m² of public facilities constructed (2017 baselines: 0) 1d. 72,000 m² of photovoltaic solar panels installed (2017 baseline: 0) 1e. 100% of constructed buildings equipped with energy-efficient insulation, utility metering, and heating regulation systems (2017 baseline: 0) 1f. 2,000 m2 of greenhouses in targeted areas built (2017 baseline: 0)	**By 2027:** 1a. 826 social housing units constructed (2017 baseline: 0) 1b. 2.4 km of road, 2.7 km of water supply pipes,1.9 km of sewerage network, 2.6 km of district heating pipes, 3 electric distribution substations, 1 enclosed indoor switchgear, 21.8 km of 10kV cable lines, 4.9 km 110mm PVC conduits and 1.8 km of fiber optic cables, and 450 low-consumption street lights are constructed (2017 baselines: 0) 1c. 2.3 ha of public space and green areas, and 3,200 m2 of public commercial facilities constructed (2017 baselines: 0) 1d. 3,800 m² of photovoltaic solar panels along with building energy performance sensors are installed (2017 baseline: 0) 1e. 100% of constructed buildings equipped with energy-efficient insulation, supporting heat reduction strategies, utility metering, and heating regulation systems (2017 baseline: 0)	1a.–g. MUB and eco-districts' annual report on urban construction 1h. Contractors annual employment records	Changed government and/or MUB leadership leads to lower support for the project. Rising world prices of energy and construction materials significantly increase the project's investment and operation and maintenance costs. Rising world prices of energy and construction materials significantly increase the project's investment and operation and maintenance costs.

	1g. Smart monitoring system and sensors for building performance and renewable energy control installed, including energy storage pilot of 0.5-megawatt capacity (2017 baseline:0) 1h. 100,000 person-months of employment opportunities during project construction created, of which 30% are filled by women (2017 baseline: 0)	1f. 1,220 m^2 of greenhouses (with different types including three-season, attached) in targeted areas built (2017 baseline: 0) 1g. Central Smart Building Performance and Renewable Energy Monitoring and Control Center (SCADA Center) is built and operationalized, including energy storage pilot of 0.5-megawatt capacity 1h. 15,000 person-months of employment opportunities during project construction created, of which 20% are filled by women (2017 baseline: 0)		
2. Long-term financing to developers for low-carbon affordable housing, market-rate housing, and economic facilities in *ger* areas and to households for green mortgages increased (financial intermediation loan component)	**By 2026** 2a. At least 20 developer subloans approved and released by EDAF (2017 baseline: 0) These subloans will produce: (i) 5,500 affordable housing and 3,000 market-rate housing units built (2017 baseline: 0) (ii) 204,000 m2 of commercial facilities, shops, and parking; and 22 km of pedestrian and bike lanes built (2017 baseline: 0) (iii) 79,000 m2 of greenhouses	**By 2027** 2a. Up to 10 developer subloans approved and released by EDAF (2017 baseline: 0) These subloans will produce: (i) 4188 affordable and market- rate housing units built (2017 baseline: 0) (ii) 23,000 m2 of commercial facilities, shops, and parking; and 17 km of pedestrian and bike lanes built (2017 baseline: 0) (iii) 1,800 m2 of three-season greenhouses is built (2017 baseline: 0)	2a. EDAF and commercial banks' financial records 2a.(i)–(iv) MUB and eco-districts' annual report on business development and urban construction 2b. Commercial banks' mortgage records 2c–2d. MUB and eco-districts' annual report on business development and urban construction	Unexpected labor and materials price escalations Implementation of land acquisition and resettlement plans faces unforeseen delays and cost escalation

	installed (2017 baseline: 0) (iv) 100% of constructed buildings equipped with energy efficient insulation, utility metering, and heating regulation systems (2017 baseline: 0) 2b. At least 5,500 green mortgages approved and released, with at least 30% of households headed by women provided with access to affordable housing units (2017 baseline: 0) 2c. At least 40% of businesses located in the commercial facilities in the eco-districts are led by women (2017 baseline: 0) 2d. 200,000 person-months of employment opportunities during project construction created, of which 30% are filled by women (2017 baseline: 0)	(iv) 100% of constructed buildings equipped with energy efficient insulation, supporting heat reduction strategies, utility metering, and heating regulation systems (2017 baseline: 0) (v) 5,600 m² of photovoltaic solar panels along with building energy performance sensors are installed (2017 baseline: 0) 2b. More than 1,000 green mortgages or equivalent financial arrangement for housing access provided, and women are at least 25% of those approved as principal/co-lender (2017 baseline: 0) 2c. At least 40% of businesses located in the commercial facilities in the eco-districts are led by women (2017 baseline: 0) 2d. 60,000 person-months of employment opportunities during project construction created, of which 20% are filled by women (2017 baseline: 0)		
3. Sector policy reforms implemented and capacity strengthened	**Project implementation and management** 3.1 a. By 2019, gender disaggregated project performance and management system	**Project implementation and management** 3.1 a. By 2021, gender-disaggregated project performance and management system	3.1a. PMO monitoring report 3.2a.–d. Policy and regulation	Unexpected labor and materials price escalations Implementation of land

	established (2017 baseline: 0) **Eco-district feasibility and development** 3.2 a. By 2020, a green building and eco-district norm and standards are in place (2017 baseline: 0) 3.2b. By 2021, regulations for grid-connected electricity generation from small-scale renewable sources are in place (2017 baseline: 0) 3.2c. By 2020, regulation to enable viability gap funding of subprojects through eco-district utilities tariff cross-subsidy mechanism approved 3.2 d. By 2026, 40% of the overall jobs created within the perimeter of each eco-district benefit local communities, at least 40% of job holders are women, and 15% vulnerable people (2017 baseline: 0) **Sustainable green housing finance** 3.3 a. By 2020, the EDAF is established and structured in accordance with the applicable Mongolian law and requirements (2017 baseline: 0)	established (2017 baseline: 0) **Eco-district feasibility and development** 3.2 a. By 2025, a green building and eco-district norm and standards are in place (2017 baseline: 0) 3.2b. By 2022, regulations for grid-connected electricity generation from small-scale renewable sources are in place (2017 baseline: 0) 3.2c. By 2025, recommendations to enable viability gap funding of subprojects through eco-district utilities tariff cross-subsidy submitted to relevant authorities (2017 baseline: 0) 3.2 d. By 2027, 40% of the overall businesses located in the eco-district are supported with capacity-building training/ livelihood program, with at least 40% of the businesses run by women and 15% by vulnerable people (2017 baseline: 0) **Sustainable green housing finance** 3.3 a. By 2025, the EDAF is established and structured in accordance with the applicable Mongolian law and requirements (2017 baseline: 0)	orders from related agency or ministry (Ministry of Construction and Urban Development, Ministry of Energy, Energy Regulation Commission, MUB) 3.3a. Policy and regulation orders from the MOF and the Financial Regulation Commission	acquisition and resettlement plans faces unforeseen delays and cost escalation

ANNEX 6: LETTER FROM THE MINISTRY OF FINANCE OF MONGOLIA ON EDAF

MINISTER OF FINANCE OF MONGOLIA
Goverment building II, S.Danzan street 5/1,
Chingeltei district, Ulaanbaatar 15160, MONGOLIA
Tel/Fax:(976-51) 26 74 68, E-mail: info@mof.gov.mn,
Web: www.mof.gov.mn

MRS. SHANNON COWLIN
COUNTRY DIRECTOR
ASIAN DEVELOPMENT BANK

Date April 26th, 2024
Ref. 01/3154

Dear Country Director,

The Ministry of Finance presents its compliments to the Asian Development Bank and is inviting reference to the implementation of the "Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal Sector Project" and the successful establishment of the "Eco-District Affordable Housing Fund".

The administration of the Eco-District Affordable Housing Fund cannot be transferred to the Ulaanbaatar Investment Management company as the Article 3.01.b of the Loan agreement signed between the Green Climate Fund and Mongolia, which was ratified by the Parliament of Mongolia on September 12th, 2019, states the following:

The Borrower shall cause the proceeds of the Loan to be applied exclusively to the financing of expenditures on the Project in accordance with the provisions of Schedule 5 to the Ordinary Operations [Concessional] Loan Agreement and the provisions of this Loan Agreement, Ordinafry Operations Loan Agreement, the GC Grant Agreement, the HLT Grant Agreement, the MUB Project Agreement and the DBM Project Agreement.

Thus, we propose to establish the Eco-District Affordable Housing Fund under the Municipality of Ulaanbaatar and to have the Development Bank of Mongolia Asset Management Corporation manage the EDAF fund in agreement with Municipality of Ulaanbaatar, which is in line with the Loan Agreement.

Sincerely,

B. JAVKHLAN

9764000236

ANNEX 7: UPDATED MIDTERM PROJECT ECONOMIC AND FINANCIAL ANALYSIS

I. Economic Re-evaluation

A. Introduction

1. The economic slowdown that eroded the country's fiscal position since 2012 led to government economic recovery plan that sought to restore stability and sustained, rapid and inclusive growth. The plan included important safeguards to protect the most vulnerable, particularly residents of the ger settlements along Ulaanbaatar's periphery. Unplanned, these areas lack urban infrastructure and adequate public and commercial services exposing the ger residents to impacts of climate change. Constituting 60% of Ulaanbaatar's or 30% of the country's population, these residents live in traditional tents and wooden houses with poor insulation and inefficient heating. Their use of coal- and biomass-fed stoves heavily pollute the periurban areas, posing grave public health risks including respiratory and cardiovascular diseases, while inadequate urban services are causing environmental degradation. The lack of affordable housing and economic opportunities exacerbate the poor livability in the ger areas. The project is designed to improve livability by redeveloping ger areas into eco-districts that blend public and private investments to construct green and low-carbon social, affordable and market-rate housing units while maximizing use of renewable energy. Originally it was designed to deliver 10,000 units in 100 hectares in 20 subproject locations, planned development would be in 5 phases over the period 2019-2024. However, socio-economic and political factors aggravated by the COVID-19 outbreak impacted project implementation. Lockdowns and border closures drove fuel and transport costs to increase threefold with the same effect on contracted goods and services. Government finance managers introduced fiscal and monetary policies including currency depreciation/devaluation (2022) to prime up the economy, but with such measures falling short of their objectives. During the period, construction cost index shows a 249% (base year 2017=100) price increase in construction materials, machines and equipment, and labor costs. Review of project civil works contracts reflects construction cost per m^2 rising from MNT 1.3 million in 2019 to over MNT 3.9 million by end-2023. With the total project budget at $570 million, but post-pandemic purchasing power now down to a third, the target units need to be proportionately reduced to about 5,014 (826 social housing, and 4,188 affordable/market units) based on initial estimates. As every day the currency is rising from 5 to 15 tugriks against other currencies, further delays in implementation would result in even less funds available to complete the works and expected outputs associated with the new target. Hence, the project requires rescoping to enable the project to yet attain the design outcomes of increased access to low-carbon and climate-resilient eco-districts and green affordable housing despite the above limiting conditions. The economic analysis for the midterm review (MTR) evaluates the economic viability of the investments considering the rescoping and corresponding costs, demands and implementation schedules.

B. Economic Rationale

2. The MTR reaffirms the economic rationale established at appraisal. The lower number of housing units and pertinent infrastructure initiating from this development stage should not deter the attainment of project outcomes, albeit at a reduced scale and slightly slower pace. Regardless, the rescoping mitigates this with more focused support of the project objectives -- facilitating access to cheaper and longer-term finance in the sector by blending grants with debt and equity financing from international and domestic investments. As intended, Output 2 onlending mechanism through EDAF, partnering with commercial banks, developers, and homeowners as direct buyers, would close barriers constraining private sector-led and climate-responsive urban development and affordable green housing in *ger* areas. Likewise, policy and institutional reforms under Output 3 continue to be directed toward (i) climate responsive urban planning, (ii) energy efficient building materials and technologies, (iii) low-carbon affordable housing, (iv) private sector participation in green financing; and (v) eco-efficient urban services. For example, the rescoping continues to support more intensive application of climate proofing and energy efficient building technologies to diminish the disparity between greenhouse gas (GHG) emissions based on design area coverage at 100 ha and that based on downsized 30-50 ha coverage.

C. Methodology

3. As at appraisal, the MTR economic analysis complies with ADB Guidelines on Standard Cost-Benefit Analysis (CBA) for project components with quantifiable benefits to determine economic viability. The main viability indicators are the economic internal rate of return (EIRR), which would exceed the minimum 9% economic opportunity cost of capital (EOCC); and the economic net present value (ENPV), which would be positive.[6] At appraisal, economic analysis was prepared for two core subprojects for piloting during Phase 1 and covering 1,115 sample units (204 social, 584 affordable and 327 market, closely following the 15-55-30% distribution originally envisaged). The resulting EIRRs pass the minimum EOCC at 9% -- Bayankhoshuu private and public investments at 12.5% and 11.6%, respectively, and Selbe at 15.5% and 11.3%, respectively. For the MTR, the analysis approach deviates from appraisal methodology considering the proposed rescoping. At appraisal, only a sample number of housing units are analyzed (i.e., 204 of 1,500 total social units, and 911 of 8,500 total affordable/market units). At MTR, the re-evaluation covers all 826 social units (from 800 initially estimated) under Output 1 and implemented as Phase 1, and 4,188 affordable/market units (from 2,200 initially, later to 3,658) under Output 2, implemented as Phase 2. Due to the delays caused by COVID-19, Phase 1 implementation is cut from original 5 years (2019-2023) to 3 years (2023/24-2026), with construction at 6 sites in 2 subprojects – Bayankhoshuu and Sharkhad (replacing Selbe). Phase 1 development also includes public space and facilities, greenhouses, utilities pipelines and metering, while Phase 2, commercial facilities, eco-district climate adaptation features and green mortgages for implementation during 2025-2027, possibly extending until 2029. Phase 2 subprojects selection is yet to be completed, and feasibility studies conducted to appraise investment requirements. For MTR purposes, the analysis considers the whole of Output 2 as one project to give an indication of Phase 2 viability.

4. The downsizing of units may affect the 15-55-30% housing type distribution within the subprojects. Nonetheless, the updated numbers show the 826 social housing units comprising 16% of the revised total target, reflecting project compliance with the objective of targeting the vulnerable groups among the population, while the remaining 84% satisfying the middle- to mid-high-income demand. As latest contract data reflect, the price differences are insignificant between housing types and so the analysis applies uniform unit rental and selling prices to facilitate calculations. The MTR examines the affordability of the unit prices based on the monthly income deciles set at appraisal.[7] Sensitivity analysis is performed to assess the impact of adverse conditions including cost increases and further delays in project implementation and/or benefits realization on project viability.

D. Economic Cost-Benefit Analysis

1) Project Costs

5. Project costs comprise capital investment and operating and maintenance (O&M) costs. Capital costs are based on the concept design at appraisal and are updated at MTR using actual contract prices (Q4 2023) for awarded contracts, and on latest bid prices for contracts yet to be awarded and as reflected in the updated project procurement plan. The ongoing Phase 1 development includes 6 sites in subprojects Bayankhoshuu and Sharkhad. Construction at the pilot areas started in 2023, with all subproject works expected to conclude by end-2026 and homeowners moving in starting 2027. Investment is highest in site SKD 27-2 at MNT 61,657 million with 228 units to be built. On subproject basis, 60% of investments is in Bayankhoshuu. Phase 1 investments include other infrastructure works and goods, including project management, consulting for detailed engineering design and supervision. Total cost is at MNT 224,134 million as given in Table A1.

Table A.1: Project Cost - Phase 1 (in MNT million)

Components	BKH B15	SKD 27-5	BKH B13-1	SKD 27-2	BKH B13-2	BKH N4	Total
1. Construction cost	24,560	19,647	25,016	43,246	13,877	28,578	154,923
a. Social housing	19,062	17,787	24,117	34,822	11,999	24,378	132,165
b. Commercial space	1,390	1,859	899	3,020	190	638	7,996

[6] ADB. 2017. Guidelines for the Economic Analysis of Projects. ADB. Multitranche Financing Facility, OM Section D14 Issued on 1 January 2018

[7] Affordability of selling and market rental prices viz. monthly income deciles – 1st to 3rd deciles for social housing; 4th to 7th deciles for affordable/market units (ref. NSO; 2022 market study).

c. Garage	3,375	-	-	5,404	1,688	3,563	14,030
d. Greenhouse	732	-	-	-	-	-	732
2. Infrastructure, utilities[a]	1,840	1,327	1,770	2,655	885	2,655	11,132
3. Landscaping	1,250	937	937	1,874	937	1,406	7,341
4. Land cost	1,663	1,851	1,464	3,364	1,313	2,196	11,852
5. PMO, EFDP, PIMS[b]	2,240	2,249	3,099	4,913	2,602	3,406	18,509
Total Baseline Costs	**31,554**	**26,011**	**32,286**	**56,052**	**19,614**	**38,241**	**203,758**
6. Physical contingency[c]	3,155	2,601	3,229	5,605	1,961	3,824	20,376
Total Project Cost	**34,709**	**28,612**	**35,514**	**61,657**	**21,576**	**42,065**	**224,134**
Number of units	110	110	150	228	76	152	826

[a] Infrastructure includes utility piping network, public spaces and green areas, climate adaptation and mitigation features, resilient infrastructure.

[b] Project management and consultants costs partly comprise output 3 costs.

[c] 10% of base cost.

Source: PMO; ADB Consultant

6. For Phase 2, detailed cost estimates will be prepared during the feasibility studies and detailed engineering design. Subprojects are yet to be identified and established. Construction is expected to commence in second semester of 2024 and continue until end-2027, with possible extension until 2029 should budget constraints and safeguard issues arise during implementation causing delays.[8] Some units now undergoing construction will be piloted to demonstrate the mortgage mechanisms for affordable and market housing types under the project revolving fund. To provide an indication of the total cost requirement of Phase 2 at mid-term, Phase 1 unit costs are extrapolated and applied to unit quantities for Phase 2. In effect, the 4,188 units to be built under Phase 2, based on the average 50 m^2 per unit, would require 209,400 m^2 (or 20 hectares). The unit cost per m^2, at MNT 2.56 million in Phase 1, is applied to the 20 hectares to arrive at MNT 536,887 million needed to construct all 4,188 units. The same costing approach is followed for the other Phase 2 components for a total estimated MNT 910,557 million. Table A2 presents the project cost estimates for phases 1 and 2 amounting to MNT 1,134,690 million.

Table A.2: Project Costs – Phases 1 and 2 (in MNT million)

Components	Phase 1			Phase 2		Phases 1 & 2	
	Quantity m2	Unit cost MNT mill	Total Cost MNT mill	Quantity m2	Total Cost MNT mill	Quantity m2	Total Cost MNT mill
1. Construction cost			154,923		629,336	-	784,259
a. Housing units [a]	51,548	2.56	132,165	209,400	536,887	260,948	669,052
b. Commercial space	2,870	2.79	7,996	11,660	32,482	14,530	40,478
c. Garage	7,532	1.86	14,030	30,597	56,991	38,129	71,021
d. Green house	320	2.29	732	1,300	2,975	1,620	3,708
2. Infrastructure, utilities [b]			11,132		45,222	-	56,354
3. Landscaping			7,341		29,823	-	37,164
4. Land cost			11,852		48,146	-	59,998
5. PMO, EFDP, PIMS [c]			18,509		75,253	-	93,762
Total Baseline Costs			203,758		827,779	-	1,031,537
6. Physical contingency [d]			20,376		82,778	-	103,154
Total Project Cost			224,134		910,557	-	1,134,690
Equivalent USD million			63.67		258.68		322.36
Number of units			826		4,188		5,014

[a] Phase 1 includes all social housing; Phase 2 includes affordable and market units. Phase 2 cost per m2 is based on actual phase 1 contract and bid prices. Assumes average unit size at 50 m2, no distinction between housing types.

[8] The COVID-19 pandemic set back construction schedules of outputs 1 and 2 at least 2 years, and the probability of further delays is not being discounted.

[b] Infrastructure includes utility piping network, public spaces and green areas, climate adaptation and mitigation features, resilient infrastructure.
[c] Project management and consultants costs partly comprise output 3 costs.
[d] 10% of base cost.
Source: PMO; ADB Consultant.

7. O&M cost is assumed at 1% of base cost to cover annual regular building maintenance, and 2% for major maintenance every 5 years. In the analysis, O&M cost starts the year after subproject completion, which for SKD 27-5 and BKH B15 would be in 2024/25; for SKD 27-2, BHK B13-1 and BKH 13-2 in 2025/26; and for BKH N4 in 2026/27. For phase 2, O&M starts in 2028.

2) Conversion of Financial to Economic Cost

8. The project costs in financial terms (Tables A1 and A2) are converted to their economic equivalent to remove effects of inflation, financing and transfers (i.e., taxes, subsidies) using domestic price numeraire.[9] The shadow exchange rate factor (SERF) at 1.02 is applied to tradable goods, and shadow wage rate factor (SWRF) at 0.8 to unskilled labor.[10] Nontraded goods and skilled labor components remain unchanged with a factor of 1.0. The ratio of economic to financial cost is at 0.89. The same conversion factors are applied to O&M costs and in benefits valuation. The economic project cost conversion is presented Table A3.

Table A.3: Economic Project Costs (in MNT million)

Components	Phase 1		Phase 2		Total	
	Financial	Economic	Financial	Economic	Financial	Economic
A. Green housing						
1. Social housing	132,165	118,411	-	-	132,165	118,411
2. Affordable/Market housing	-	-	536,887	481,017	536,887	481,017
Subtotal (A)	132,165	118,411	536,887	481,017	669,052	599,428
B. Infrastructure, utilities	11,132	9,974	45,222	40,516	56,354	50,490
C. Commercial space	7,996	7,164	32,482	29,102	40,478	36,266
D. Land cost and landscape	19,193	17,196	77,968	69,855	97,162	87,051
E. Garage	14,030	12,570	56,991	51,061	71,021	63,630
F. Green House	732	656	2,975	2,666	3,708	3,322
Subtotal (A-F) Base Cost	185,248	165,971	752,526	674,216	937,775	840,187
G. Implementation Support	18,509	16,999	75,253	69,054	93,762	86,053
Total Base Cost (A-H)	203,758	182,970	827,779	743,270	1,031,537	926,240
Physical contingencies	20,376	16,824	82,778	68,342	103,154	85,166
Total Investment Cost	**224,134**	**199,794**	**910,557**	**811,612**	**1,134,691**	**1,011,406**

Source: PMO; ADB Consultant.

3) Project Benefits Valuation

9. Benefits valuation follows the approach at appraisal using updated demand and project beneficiary population at MTR. The quantifiable subproject economic benefits are derived mainly from three sources -- (i) green housing units with average size of 50 m^2 valued at their construction cost, (ii) avoided global warming damage from reduced GHG emissions, and (iii) health benefits from reduced environmental pollution mainly from use of coal for heating *ger* households.

[9] Conversion uses shadow pricing to include only real value or opportunity cost to society. Analysis assumes – taxes at 10%; cost breakdown of major components at 10% unskilled labor, 20% skilled labor, 43% nontradeables, 27% tradeables; and unskilled labor times SWRF, tradeables times SERF, and nontradeables and skilled labor times 1.0.
[10] The conversion factors at MTR are updated using 2023 import and export trade and labor data from the Mongolia National Statistics Office (https://www.nso.mn/en/statistic).

10. The average cost per green housing unit is estimated from actual contract and bid prices at MNT 2.29 million per m^2 (in economic terms, or 0.89 of financial cost at MNT 2.56 million).[11] Following the approach at appraisal, the valuation of Output 1 social and Output 2 affordable/market housing units is based on the annualized market rental or amortization (30-year tenor) of a green housing unit at MNT 9.06 million per year (MNT 755,187 per month), estimated by applying the prevailing price-to-rent ratio of 12.61[12] on the average cost of a 50 m^2 housing unit at MNT 114.27 million.[13] A real increase of 5% annually is applied to the market rental/amortization. The benefit from avoided global warming damage is valued using the updated GHG emissions estimated at MTR. The value of annual reduction of GHG emissions is based on ADB prescribed rate at USD 36.30 per ton. For Phase 1 subprojects, the annual reduction in GHG emissions amount to 25,108 tons. For Phase 2, the total annual reduction is at 120,022 tons. The guidelines provide for a 2% annual increase in the prescribed rate. The health benefits are quantified through savings in disability adjusted life years (DALY) arising from improved access to clear atmosphere. Estimates prepared by the World Health Organization of the environmental burden of respiratory diseases in Ulaanbaatar, measured in DALYs per 1,000 people per year, are converted into economic benefits by assuming each DALY is equivalent to the annual per capita gross domestic product of Ulaanbaatar (at MNT 22,709 million). The project would result in savings of 115.4 DALYs per 1,000 people (updated from 63.2 at appraisal). A real increase in DALY of 3% annually is assumed.

11. The project will also produce nonquantifiable benefits including reduced incidence of flooding, energy savings from reduced consumption because of the switch to climate-mitigating technology, and incremental income and employment from new business investments in micro-, small- and medium-sized enterprises, and from business expansion induced by green housing and eco-district development. There will also be savings in medical costs arising from improved health for minimum 25% of the population seen participating in physical activity and relaxation provided by the project through health and sport facilities and green open spaces.

3) EIRR and Sensitivity Analysis

12. At appraisal, the analysis of core subprojects included 168 social housing units under Output 1 and 911 affordable/market housing under Output 2, for a total 1,079 samples analyzed (about 10% of design target 10,000 units). At MTR re-evaluation, the analysis approach deviates from that at appraisal due to the proposed rescoping that reduced the target to 826 social housing units under Output 1 and 4,188 affordable/market units under Output 2, for a combined 5,014 units. Output 1 will be implemented as Phase 1, with Output 2 as Phase 2.

13. The economic analysis at appraisal finds all the core subproject samples to be economically viable. The EIRRs at base case for Outputs 1 and 2, and for the combined outputs exceed the standard EOCC at 9% (Note: ADB Guidelines allow the lower EOCC at 6% for projects with high environmental and social content). Likewise, EIRRs under all sensitivity parameters are higher than the minimum standard. At MTR, Outputs 1 and 2 base case and combined EIRRs confirm the appraisal findings even with the rescoping changes. The project investments remain economically viable using updated costs, demand, and benefits assumptions. Table A.4 compares the economic analysis results at appraisal and at midterm. Tables A.4.1 and A.4.2 present the detailed analysis for Output 1 (Phase 1) and Output 2 (Phase 2), respectively.

Table A.4: EIRR and Sensitivity Analysis Results – at Appraisal and MTR

Items	Appraisal[a]			Midterm review[b]		
	Output 1	Output 2	Combined	Output 1	Output 2	Combined
Base Case	11.4%	14.2%	13.7%	10.1%	11.3%	11.1%
Capital Cost + 10%	10.4%	13.1%	12.7%	9.1%	10.2%	10.0%
O&M Cost + 10%	11.4%	14.1%	13.7%	10.0%	11.2%	10.9%

[11] At appraisal, the citywide survey of real estate transactions in Ulaanbaatar indicated prices from MNT 2.52 million to MNT 3.48 million per m2.
[12] The price-to-rent ratio is updated from appraisal value at 14.15 [Ref. Number. Property Prices in Ulaanbaatar, Mongolia].
[13] The average unit size at 50 m^2 is based on appraisal estimates of 37 m2 for social housing and 65 m2 for affordable/market housing.

Items	Appraisal[a]			Midterm review[b]		
	Output 1	Output 2	Combined	Output 1	Output 2	Combined
Benefits - 10%	10.5%	12.9%	12.5%	8.9%	10.0%	9.8%
Cost + 10%, Revenues - 10%	9.2%	11.7%	11.3%	7.9%	9.0%	8.8%
1-year Benefits Delay	10.5%	12.5%	12.2%	8.8%	9.9%	9.6%

[a] Covers core subprojects Bayankhoshuu and Selbe. Output 1 covers social housing; output 2, affordable and market housing.

[b] Covers 826 social housing under output 1 (implemented as phase 1) and 4,188 affordable/market housing under output 2 (implemented as phase 2).

Note: EOCC at standard ADB guideline rate at 9%; at 6% for projects with high social and environmental content as with AHURP.

Table A.4.1: Detailed EIRR and Sensitivity Analysis – Phase 1 Social Housing (in MNT million)

Year	Economic cost		Economic benefit			Net Benefit					
	Capital cost	Incremental O&M cost	Market rental	Reduced global warming	Reduced pollution	Base case	Capital + 10%	O&M + 10%	Benefit - 10%	Cost+ Bene- 10%	1-year Bene delay
2023	18,809	-	-	-	-	(18,809)	(20,690)	(18,809)	(18,809)	(20,690)	(18,809)
2024	85,323	-	-	-	-	(85,323)	(93,856)	(85,323)	(85,323)	(93,856)	(85,323)
2025	76,008	517	2,023	1,035	2,018	(71,449)	(79,050)	(71,501)	(71,957)	(79,610)	(76,525)
2026	16,070	1,487	6,217	3,191	6,244	(1,905)	(3,512)	(2,054)	(3,470)	(5,226)	(12,480)
2027	-	1,830	7,897	3,970	7,826	17,863	17,863	17,680	15,893	15,710	13,821
2028	-	1,830	8,292	4,049	8,060	18,572	18,572	18,389	16,531	16,348	17,863
2029	-	2,347	8,707	4,130	8,302	18,792	18,792	18,557	16,678	16,443	18,054
2030	-	2,800	9,142	4,213	8,551	19,106	19,106	18,826	16,916	16,636	18,339
2031	-	2,174	9,599	4,297	8,808	20,530	20,530	20,313	18,260	18,043	19,732
2032	-	1,830	10,079	4,383	9,072	21,704	21,704	21,521	19,351	19,168	20,874
2033	-	1,830	10,583	4,471	9,344	22,568	22,568	22,385	20,128	19,945	21,704
2034	-	2,347	11,112	4,560	9,625	22,950	22,950	22,715	20,420	20,185	22,051
2035	-	2,800	11,668	4,652	9,913	23,433	23,433	23,153	20,809	20,529	22,497
2036	-	2,174	12,251	4,745	10,211	25,033	25,033	24,815	22,312	22,095	24,059
2037	-	1,830	12,864	4,839	10,517	26,390	26,390	26,207	23,568	23,385	25,376
2038	-	1,830	13,507	4,936	10,832	27,445	27,445	27,262	24,518	24,335	26,390
2039	-	2,347	14,182	5,035	11,157	28,027	28,027	27,793	24,990	24,755	26,928
2040	-	2,800	14,892	5,136	11,492	28,719	28,719	28,439	25,567	25,287	27,575
2041	-	2,174	15,636	5,238	11,837	30,537	30,537	30,320	27,266	27,049	29,345
2042	-	1,830	16,418	5,343	12,192	32,123	32,123	31,940	28,727	28,544	30,881
2043	-	1,830	17,239	5,450	12,558	33,416	33,416	33,233	29,892	29,709	32,123
2044	-	2,347	18,101	5,559	12,935	34,247	34,247	34,012	30,587	30,353	32,899
2045	-	2,800	19,006	5,670	13,323	35,198	35,198	34,918	31,399	31,119	33,794
2046	-	2,174	19,956	5,784	13,722	37,288	37,288	37,071	33,342	33,124	35,825
2047	(53,429)	1,830	20,954	5,899	14,134	92,586	97,929	92,403	88,487	93,647	91,061
				EIRR		10.1%	9.1%	10.0%	8.9%	7.9%	8.8%
				ENPV		16,926	1,631	15,358	(1,630)	(18,493)	(2,756)

SV	10.98	108.93	9.10	
SI	9.11	0.92	10.99	

EIRR = economic internal rate of return; ENPV = economic net present value; SV = switching value; SI = sensitivity indicator.

Table A.4.2: Detailed EIRR and Sensitivity Analysis – Phase 2 Affordable/Market Housing (in MNT million)

Year	Economic cost		Economic benefit			Net Benefit					
	Capital cost	Incremental O&M cost	Market rental	Reduced global warming	Reduced pollution	Base case	Capital + 10%	O&M + 10%	Benefit - 10%	Cost+ Bene- 10%	1-year Bene delay
2023	-					-	-	-	-	-	-
2024	36,072					(36,072)	(39,679)	(36,072)	(36,072)	(39,679)	(36,072)
2025	189,376					(189,376)	(208,314)	(189,376)	(189,376)	(208,314)	(189,376)
2026	360,717					(360,717)	(396,788)	(360,717)	(360,717)	(396,788)	(360,717)
2027	225,448					(225,448)	(247,993)	(225,448)	(225,448)	(247,993)	(225,448)
2028	-	7,435	37,953	18,573	39,029	88,119	88,119	87,376	78,564	77,820	(7,435)
2029	-	7,435	39,850	18,945	40,200	91,559	91,559	90,816	81,660	80,916	88,119
2030	-	7,435	41,843	19,324	41,406	95,137	95,137	94,393	84,880	84,136	91,559
2031	-	7,435	43,935	19,710	42,648	98,858	98,858	98,114	88,228	87,485	95,137
2032	-	14,871	46,132	20,105	43,927	95,293	95,293	93,805	84,276	82,789	91,422
2033	-	7,435	48,438	20,507	45,245	106,754	106,754	106,011	95,335	94,592	102,728
2034	-	7,435	50,860	20,917	46,602	110,944	110,944	110,200	99,106	98,362	106,754
2035	-	7,435	53,403	21,335	48,000	115,303	115,303	114,560	103,029	102,286	110,944
2036	-	7,435	56,073	21,762	49,440	119,840	119,840	119,097	107,113	106,369	115,303
2037	-	14,871	58,877	22,197	50,924	117,127	117,127	115,640	103,927	102,440	112,405
2038	-	7,435	61,821	22,641	52,451	129,478	129,478	128,734	115,786	115,043	124,562
2039	-	7,435	64,912	23,094	54,025	134,595	134,595	133,852	120,392	119,649	129,478
2040	-	7,435	68,158	23,556	55,646	139,923	139,923	139,180	125,188	124,444	134,595
2041	-	7,435	71,565	24,027	57,315	145,472	145,472	144,728	130,181	129,438	139,923
2042	-	14,871	75,144	24,507	59,034	143,815	143,815	142,327	127,946	126,459	138,036
2043	-	7,435	78,901	24,997	60,806	157,268	157,268	156,525	140,798	140,054	151,250
2044	-	7,435	82,846	25,497	62,630	163,538	163,538	162,794	146,440	145,697	157,268
2045	-	7,435	86,988	26,007	64,509	170,069	170,069	169,325	152,318	151,575	163,538
2046	-	7,435	91,338	26,528	66,444	176,874	176,874	176,130	158,443	157,699	170,069
2047	(217,042)	14,871	95,905	27,058	68,437	393,571	415,275	392,084	374,431	394,648	386,480
				EIRR		11.3%	10.2%	11.2%	10.0%	9.0%	9.9%
				ENPV		132,992	77,643	127,844	59,195	(1,302)	51,696

	SV	21.90	266.59	18.43
	SI	4.57	0.38	5.43

EIRR = economic internal rate of return; ENPV = economic net present value; SV = switching value; SI = sensitivity indicator.

II. Financial Re-evaluation

A. Methodology and basic assumptions

14. The MTR financial analysis follows relevant ADB Guidelines[14] and adopts the appraisal methodology using CBA format to determine project financial viability measured by the financial internal rate of return (FIRR) and financial net present value (FNPV)[15]. The implementation plan at appraisal covers five phases during the period 2018-2026 to construct 10,000 housing units at the estimated project budget of $570.1 million under ADB sector loan modality. Although the budget amount remains the same at MTR, socioeconomic and political factors from project approval in 2018 until 2023, worsened by the COVID-19 pandemic, substantially reduced the purchasing power of the Mongolian tugrik so that only about 50% or 5,000 housing units can be built.[16] The reduced targets led to the proposed rescoping where project implementation will be carried out in two phases – Phase 1 covering the period 2023/24-2026 for 826 social housing under output 1, and Phase 2 in 2025-2027 (with possible extension until 2029) for 4,188 affordable housing units under Output 2.

B. Financial Cost-Benefit Analysis

1) Project Financing and Investment Costs

15. The total project fund is at USD 570.1 million. ADB provided a loan at USD 80.0 million -- USD 20.0 million in concessional loan and USD 60.0 million in ordinary capital resources (OCR) regular loan. The Green Climate Fund (GCF) provided the funds administered by ADB in a total of USD 145.0 million, including USD 50.0 million in grant equivalent, and USD 95.0 million as a loan. The High-Level Technology Fund provided a USD 3.0 million grant from the Government of Japan, also administered by ADB. The other financiers include participating commercial banks with estimated USD 111.4 million, selected developers with USD 131.8 million (in the form of equity participation), beneficiary homebuyers with $63.9 million (from own resources) and the Municipality of Ulaanbaatar (MUB) with USD 35.0 million (as government counterpart contribution).

16. From Table A.2, the total project cost amounts to MNT 1,134,690 million, with Phase 1 (Output 1, including Output 3) at MNT 224,134 million, and Phase 2 (output 2) at MNT 910,555 million. As inflation impacts upon purchasing power, funding the construction of all 5,014 green housing units and all appurtenant cost components becomes a challenge. The project budget at USD 570.1 million is thus assessed for sufficiency in Table A..5.

[14] ADB. 2019. Financial Analysis and Evaluation, Technical Guidance Note; ADB. 2009. Financial Due Diligence: A Methodology Note. Manila; ADB. 2005. Guidelines for the Financial Management of Projects. Manila; ADB. 2002. Guidelines for the Financial Governance and Management of Investment Projects Financed by ADB. Manila.

[15] The project is deemed financially viable with FIRR greater than the weighted average cost of capital (WACC) and FNPV, positive.

[16] During the period-2018-2023, MNT devaluation/depreciation resulted in construction costs increasing over 300% based on actual contract and bid prices evaluated at MTR. A review of the EDAF model in March 2024 reassessed the number of affordable/market housing units at 4,188, from earlier estimated 2,200, based on the capacity of the proposed EDAF revolving fund mechanism, also considering the contributions by commercial banks, developers, and private homebuyers.

Table A.5: Project Budget Analysis

Items	Unit	Phase 1 Outputs 1&3	Phase2 Output 2	Phases 1&2 Total
A. Total Budget at Appraisal	USD mill	157.0	413.1	570.1
B. Less: Fin Cost During Implementation	USD mill	6.5	28.0	34.5
C. Base Cost incl Contingency (A - B)	USD mill	150.5	385.1	535.6
D. Forex at 2018 Appraisal	MNT:USD	2,400	2,400	2,400
E. Base Cost at 2018 Appraisal (C x D)	MNT mill	361,152	924,240	1,285,392
F. Project Cost at 2023/24 Rescoping	MNT mill	361,152	910,557	1,271,709
G. Balance available (E - F)	MNT mill	-	13,683	13,683
H. Cost per unit in 2024	MNT mill		128.20	128.20
I. Additional units may be funded (G / H)	no.		107	107

Source: ADB Consultant.

17. The total project budget available for construction would exclude financing charges at USD 34.5 million.[17] With Phase 1 implementation ongoing, it is projected that the full amount of USD 150.5 million (MNT 361,152 million valued at appraisal exchange rate) would be used up as this also covers Output 3 expenditures for project management, detailed engineering design, and project staff training. Phase 2 budget at USD 385.1 million (net of financing charges at USD 28.0 million) is equivalent to MNT 924,240 million, which is sufficient to cover the cost of building 4,188 units at MNT 910,557 million. Table A.5 reflects an excess fund at MNT 13,683 million, which may be used to build 107 additional units at MNT 128.2 million per unit.

2) Estimation of Financial Revenues

18. Financial revenues from the investments may be generated from market rental of the social housing units and from eco-district fees to be charged by MUB for overall maintenance and administration of public infrastructure and facilities. Social housing rental fee assumed for 2024 is at MNT 16,944 per m^2 or MNT 847,189 per month for a 50 m^2 average size unit. This is 2.6 times more expensive than what would be the allowable rent based on 25% of the third income decile distribution of households in the subproject areas at MNT 325,000. However, the current rental prices acceptable in the market is estimated at 45% of household average income. Further, the 2023 real estate research on the housing market in Ulaanbaatar reports the average rental price at MNT 31,327 per m^2, which is 1.9 times higher than that used in the analysis for social housing (at MNT 16,944).

19. For affordable/market housing units, the analysis is based on funding of subprojects from the GCF loan passed on as a subloan to the developers by participating commercial banks through the EDAF (35%), commercial bank financing (35%), and the developers' equity participation (30%). The sale of affordable and market housing units and commercial lots would be initiated prior to subproject completion, normally within 18 months. The selling price is assumed at between MNT 2.56 million and MNT 3.2 million per m^2 for average unit size between 50 m2 and 65 m^2. The selling price of garages is MNT 4.9 million per m^2, and commercial space (for shops) at MNT 5.01 million per m^2. The prices are based on a citywide survey conducted under the technical assistance in 2017 and updated to current rates. Additionally, it is assumed that developers will receive performance-based reimbursements from MUB equivalent to the costs of the climate change adaptation and mitigation measures incurred in developing the eco-district subprojects.

20. The results of the analysis at appraisal and at MTR show that investments in affordable/market housing units (including commercial spaces) are economically viable with base case FIRRs at 9.8% at appraisal and 13.9% at MTR, surpassing the WACC (8.1% at appraisal and updated to 8.1% at MTR). Option 1 investments

[17] For analysis purposes, the exchange rate at appraisal at MNT 2,400 to USD 1.00 is used to compare with the project cost valued in 2023/24 prices. This keeps in check the real value of the project budget that can produce in current period 2023/24 only 50% of the 10,000 target units at appraisal.

in social housing at MTR result in base case FIRR below the WACC. However, combined with Option 2, the project overall base case FIRR is above the WACC, rendering the sector project financially viable at MTR reevaluation. Table A.6 compares the results of financial analysis at appraisal and at MTR. Detailed financial analysis of Outputs 1 and 2 (for phases 1 and 2, respectively) are given in Tables A.6.1 and A.6.2.

Table A.6: FIRR and Sensitivity Analysis Results – at Appraisal and MTR

	Appraisal[a]			Midterm review[a]		
Items	**Output 1**	**Output 2**	**Combined**	**Option 1**	**Option 2**	**Combined**
Base Case	n.a	9.8%	9.8%	2.9%	13.9%	11.7%
Capital Cost + 10%	n.a	6.2%	6.2%	2.3%	6.1%	5.3%
O&M Cost + 10%	n.a	9.6%	9.6%	2.8%	10.2%	8.8%
Revenues - 10%	n.a	3.1%	3.1%	2.1%	-0.4%	0.1%
Cost + 10%, Revenues - 10%	n.a	2.5%	2.5%	1.5%	-9.1%	-7.0%
1-year Revenue Delay	n.a	-5.0%	-5.0%	2.3%	5.4%	4.8%

[a] Output 1 (implemented under phase 1) covers social housing; output 2 (implemented under phase 2), affordable and market housing.
Note: Weighted average cost of capital (WACC) is at 8.0% at appraisal; 8.1% at midterm.
n.a. = not available

Table A.6.1: Detailed FIRR and Sensitivity Analysis – Phase 1 Social Housing (in MNT million)

Year	Costs		Revenues			Net Revenues					
	Capital cost	Incrementl O&M cost	Rental	Garage Units	Comml Shops	Base case	Capital + 10%	O&M + 10%	Revenue - 10%	Cost+ Revenue- 10%	1-year Revenue delay
2023	21,690	-	-	-		(21,690)	(23,859)	(21,690)	(21,690)	(23,859)	(21,690)
2024	93,991	197	853	226	86	(93,024)	(102,423)	(93,043)	(93,140)	(102,559)	(94,189)
2025	86,761	1,052	4,551	248	95	(82,919)	(91,595)	(83,024)	(83,409)	(92,190)	(86,648)
2026	21,690	1,840	7,964	273	104	(15,190)	(17,359)	(15,374)	(16,024)	(18,377)	(18,637)
2027	-	2,038	8,817	300	114	7,194	7,194	6,991	6,271	6,068	6,303
2028	-	4,075	8,817	330	126	5,198	5,198	4,791	4,271	3,864	5,157
2029	-	2,038	9,258	363	139	7,722	7,722	7,519	6,746	6,543	7,236
2030	-	2,038	9,721	400	152	8,236	8,236	8,032	7,208	7,004	7,722
2031	-	2,038	10,207	440	168	8,777	8,777	8,573	7,695	7,492	8,236
2032	-	2,038	10,717	484	184	9,348	9,348	9,144	8,209	8,006	8,777
2033	-	4,075	11,253	532	203	7,913	7,913	7,506	6,714	6,307	7,310
2034	-	2,038	11,816	585	223	10,587	10,587	10,383	9,324	9,121	9,951
2035	-	2,038	12,407	644	245	11,258	11,258	11,055	9,929	9,725	10,587
2036	-	2,038	13,027	708	270	11,968	11,968	11,764	10,567	10,363	11,258
2037	-	2,038	13,678	779	297	12,717	12,717	12,513	11,241	11,038	11,968
2038	-	4,075	14,362	857	327	11,471	11,471	11,063	9,916	9,509	10,679
2039	-	2,038	15,080	943	359	14,345	14,345	14,141	12,707	12,503	13,508
2040	-	2,038	15,834	1,037	395	15,229	15,229	15,025	13,502	13,299	14,345
2041	-	2,038	16,626	1,141	435	16,164	16,164	15,960	14,344	14,140	15,229
2042	-	2,038	17,457	1,255	478	17,153	17,153	16,949	15,234	15,030	16,164
2043	-	4,075	18,330	1,380	526	16,161	16,161	15,754	14,138	13,730	15,115
2044	-	2,038	19,247	1,518	579	19,306	19,306	19,102	17,172	16,968	18,199
2045	-	2,038	20,209	1,670	636	20,478	20,478	20,274	18,227	18,023	19,306
2046	-	2,038	21,220	1,837	700	21,719	21,719	21,516	19,344	19,140	20,478
2047	(55,706)	2,038	22,281	2,021	770	78,740	84,311	78,536	76,233	81,600	77,425
				FIRR		2.9%	2.31%	2.76%	2.11%	1.45%	2.27%
	185,082			FNPV		(88,367)	(106,079)	(90,398)	(99,274)	(119,018)	(99,848)
				SV			(89.85)	(411.56)	(67.66)		
				SI			(1.11)	(0.24)	(1.48)		

FIRR = financial internal rate of return; FNPV = financial net present value; SV = switching value; SI = sensitivity indicator.

Table A.6.2: Detailed FIRR and Sensitivity Analysis – Phase 2 Affordable/Market Housing (in MNT million)

Year	Capital cost	Incremental O&M cost	Revenue net of tax	Base case	Capital + 10%	O&M + 10%	Revenue - 10%	Cost+ Revenue- 10%	1-year Revenue delay
2023									
2024	40,466	-	-	(40,466)	(44,513)	(40,466)	(40,466)	(44,513)	(40,466)
2025	212,447	27,315	61,258	(178,504)	(189,126)	(181,235)	(184,629)	(205,874)	(239,762)
2026	404,661	27,315	261,313	(170,662)	(190,895)	(173,394)	(196,794)	(237,260)	(370,718)
2027	252,913	27,315	481,047	200,820	188,174	198,088	152,715	127,424	(18,914)
2028	-	27,315	324,830	324,830	297,516	294,784	265,033	265,033	453,733
2029	-			-	-	-	-	-	324,830
2030	-			-	-	-	-	-	-
FIRR				13.93%	6.10%	10.23%	-0.43%	-9.12%	5.37%
NPV				41,859	(14,763)	15,001	(59,821)	(132,308)	(38,943)
SV					7.45	15.76	4.06		
SI					13.43	6.34	24.63		

FIRR = financial internal rate of return; FNPV = financial net present value; SV = switching value; SI = sensitivity indicator.

ANNEX 8: FAA Schedule 3. Updated Implementation Arrangements

Outputs	Executing Entities in Charge
1. Resilient urban infrastructure, public facilities, and social housing units in ger areas constructed (public sector component)	MUB
2. Long-term financing to developers for low-carbon affordable housing, market rate housing, and economic facilities in ger areas and to households for green mortgages increased (financial intermediation loan (FIL) component)	MUB/DBMs
3. Sector policy reforms implemented, and capacity strengthened	MUB/DBM

Detailed implementation arrangement

Project Implementation Organizations	Management Roles and Responsibilities
Executing Agency MUB	MUB, headed by the Governor of Ulaanbaatar, will be responsible for identifying, prioritizing, formulating, appraising, approving, and overseeing the implementation of subprojects in accordance with technical, financial, and economic appraisal criteria, including social and environmental criteria, as agreed with ADB. Its main responsibilities are: overall project oversight and administration; set up of a multisectoral coordination committee and monitoring of the action plan; oversee the implementation of project policy improvement; submit progress reports to the steering committee for decision making; prepare the redevelopment sites components and urban redevelopment unit; be accountable and responsible for the proper use of advance accounts and funds from ADB loans, GCF loan/grant, and HLTF grant; endorse and submit withdrawal applications; ensure compliance with project covenants; hold quarterly meetings with multisectoral coordination committee and the project management office (PMO); and monitor cooperation among related official development assistance-funded projects.

	act as a major shareholder of EDAF; provide necessary guidance to DBM Asset Management SC LLC on the management of EDAF; enter into an asset management agreement with DBM Asset Management SC LLC.
Project Steering Committee	A project steering committee headed by the MUB, will comprise government officials from the Ministry of Finance (MOF), Ministry of Environment and Tourism, MUB departments and agencies, Ministry of Construction and Urban Development, DBM, and Capital City Housing Corporation will be established to oversee the project implementation and provide strategic and policy guidance. The steering committee will, among others: provide 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 the project midterm implementation plan, detailed annual implementation plan, as well as procurement and financial plans; review and evaluate, on a semiannual basis, the implementation plans and related monitoring and evaluation reports, review and evaluate 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 MUB, PMO, and DBM Asset Management SC LLC, if required, and oversee implementation of such recommendations; and if implementation of recommendations is considered not satisfactory, advise MUB to impose disciplinary measures on responsible staff.
PMO under MUB	The PMO will be established under the Mayor of Ulaanbaatar and will be responsible for the overall implementation of the project and closely coordinate with DBM Asset Management SC LLC regarding project implementation. Its main responsibilities are: 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; prepare the project completion report; engage project management consulting services; engage external resettlement, environmental, and social monitors; prepare and submit bidding documents, lead the bidding process, prepare bid evaluation reports, sign the contract with the winning firm, and other necessary documentation for ADB approval;

	submit withdrawal applications to MOF; submit required annual audit reports and financial statements of project account to ADB complying with international accounting standards; identify subprojects and selection; be responsible for community engagement, land valuation, and voluntary 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 all works and equipment under the public sector component such as infrastructure, social housing, and public space under output 1; evaluate the technical proposal of the real estate developer's proposals under output 2; undertake construction supervision and performance audit of buildings; and manage the Green Building Facility
Project implementing agency DBM	DBM will act as the project implementing agency, providing overall support to DBM Asset Management SC LLC in its establishment and management of the eco-district and affordable housing fund (EDAF). Its main responsibilities are: provide support 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; provide technical and financial support to the project implementation unit and ensure that DBM Asset Management SC LLC has sufficient capacity to manage the EDAF; ensure that the project is implemented in accordance with the detailed arrangements set forth in the project administration manual (PAM); ensure that DBM Asset Management SC LLC receives capacity building support by facilitating training of DBM Asset Management SC LLC staff on ADB's disbursement policies and procedures, and project administration and accounting to manage the EDAF; ensure compliance with project covenants; ensure project policies and guidelines affecting the structure and operations of the EDAF are formulated and approved by the Project Steering Committee promptly; and ensure DBM Asset Management SC LLC is compliant at all times with the prudential regulations of Mongolia's Financial Regulatory Commission including the requirements against anti-corruption, anti-money laundering and counter financing of terrorism.
Project Implementation Unit DBM Asset Management SC LLC	DBM Asset Management SC LLC will serve as the project implementation unit to manage EDAF and will directly report to the executing agency and MOF on the status of the EDAF. Its main responsibilities are:

	develop and secure approval from the ~~MOF~~MUB/shareholder~~s~~ 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; responsible for the financial evaluation and the final selection of the real estate developer's proposals under output; in coordination with MUB and PMO, conduct preliminary due diligence of real estate developers for the project; undertake financial and integrity due diligence of commercial banks borrowing from EDAF, and recommend approval by MOF of their proposed EDAF loans; provide relevant input for preparing the project completion report; enter into a debt financing agreement with the respective commercial banks and sub-borrowers with cross default provisions to the subproject agreement between commercial banks and sub-borrowers and to the co-financing loan, where applicable; manage EDAF's on lending activities to qualified commercial banks in accordance with the project's approved guidelines, criteria, and procedures; manage the EDAF 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 MOF; prepare financial management reports on the EDAF and other reports required by MUB~~MOF~~ and the project; facilitate the preparation and timely submission of EDAF audit reports; and under the project, prepare and implement a strategic plan for sector capacity development and institutional strengthening in green banking for climate resilient housing.
Participating Commercial Banks	A commercial bank deemed eligible for the project and subsequently selected to develop an eco-district subproject in partnership with a proponent real estate property developer will be referred to in the project as a participating commercial bank. A participating commercial bank will: submit to the EDAF all necessary documents and reports to be considered eligible for the project, initially, and periodically as required to maintain project accreditation; enter into a sub-loan agreement with the EDAF to provide debt financing to its partner real estate developer for the development of an eco-district subproject, and to convert proportionate shares of this debt financing into individual green mortgages upon purchase of the housing units built by qualified household beneficiaries, in accordance with the approved project relending and on lending guidelines; and prepare and submit financial management reports to the EDAF on its sub-borrowing(s) for the project in accordance with the project requirements.

Capital City Housing Corporation (NOSK)	NOSK will be in-charge of operating and maintaining the social housing built by the project. More specifically NOSK will: screen the eligibility criteria of the household to access to social housing, collect the rent, maintain the facilities, manage the rent-to-own scheme, and manage the public sector homeowner associations.
MOF~~MOF~~	MOF will act as the borrower and will oversee and support the overall implementation of the project. More specifically, MOF will:
ADB	ADB will oversee the project administration, monitor the project implementation, and will ensure project compliance with ADB safeguards and relevant policies. ADB will review the execution of subprojects, monitor the capability and performance of MUB, and assess 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 PAM; monitor the procurement of goods, works, and consulting services; monitor implementation and development performance, using the elements of the project performance management system, design monitoring framework, and the PAM; analyze progress reports; { disburse loan proceeds, and monitor project cash flows, both from ADB and other financing sources; review audited project accounts and agency financial statements; monitor the government's compliance with applicable ADB policies as set out in the legal agreements; monitor 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 MUB's compliance with covenants; strengthen MUB's and implementing agencies' financial management and develop their capacity; prepare project completion reports; and assess the achievement of the project outcome and outputs, and the contribution to achieving the development impact.