



Global
Green Growth
Institute

Impact Pathway Review: Mongolia Program

ANNEXES

Impact & Evaluation Unit, 2019



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Acronyms

ADB	Asian Development Bank
BAU	Business as usual
CO	Carbon monoxide
CEO	Chief executive officer
CRM	Constituent Relationship Management
CPF	Country Planning Frameworks
DE	Designated entity
EoYR	End of Year Report
EE	Energy efficient / efficiency
EPC	Energy performance contracting
ERC	Energy Regulatory Commission
ESCO	Energy service companies
ESL	Energy standards and labeling
ERP	Enterprise resource planning
ECF	Environment and Climate Fund, Ministry of Environment and Tourism
GCal	Gigacalorie
GWh	Gigawatt hours
GoM	Government of Mongolia
GCF	Green Climate Fund
GDSAP	Green Development Strategic Action Plan
GG	Green growth
GTCK	Green Technology Center Korea
GHG	Greenhouse gas
GDP	Gross domestic product
HCA	Host Country Agreement
IEU	Impact & Evaluation Unit
IPR	Impact Pathway Review
IPPU	Industrial Processes and Product Use
IDI	Industry Development and Innovation
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
IEA	International Energy Agency
IMF	International Monetary Fund
IPSD	Investment and Policy Solutions Division
L&D	Learning and Development
ICLEI	Local Governments for Sustainability
MW	Megawatt
MoU	Memorandum of understanding
mcg	Microgram

MoE	Ministry of Energy
MoF	Ministry of Finance
MCUD	Ministry of Construction and Urban Development
MET	Ministry of Environment and Tourism
MGFC	Mongolia Green Finance Corporation
MBA	Mongolian Bankers Association
MSFA	Mongolian Sustainable Finance Association
MNT	Mongolian Tughrik
MRV	Monitoring, Reporting and Verification
NDC	Nationally Determined Contributions
NDC	National Dispatch Centre
NEEAP	National Energy Efficiency Action Plan
NFV	National Financial Vehicle
NGDP	National Green Development Policy
NAMA	Nationally Appropriate Mitigation Action
NOx	Nitrogen oxides
O&M	Operations & Maintenance
OED	Operations Enabling Division
PM	Particulate matter
PCM	Project Cycle Management
PIN	Project Idea Note
PPP	Public-private partnership
RE	Renewable energy
SO	Strategic Outcomes
SPC	Strategy, Partnership and Communications
SOx	Sulphur oxides
SDGs	Sustainable Development Goals
SDC	Swiss Agency for Development and Cooperation
BMZ	German Federal Ministry for Economic Cooperation and Development
GIZ	German Technical Cooperation Agency
LEAP	Long-range Energy Alternatives Planning System
NSO	National Statistics Office
NREL	US National Renewable Energy Lab
UB	Ulaanbaatar
UNFCCC	United Nations Framework Convention on Climate Change
UN PAGE	United Nations Partnership for Action on Green Economy
WTE	Waste to energy
WPB	Work Program and Budget

Annex 1 – List of projects reviewed

No.	Year	Project title	Funding
1	2015-16	Mongolia Transition to Green Development	Core
2	2015-16	Project Design and Preparation	Core
3	2015-16	Green Growth Readiness Assessment (later renamed to Green Growth Potential Assessment)	Core
4	2016	National Financing Vehicles	Core
5	2017-18	Mongolia Transition to Green Development - Ph2	Core
6	2017-18	National Financing Vehicles	Core
7	2017-18	Mongolia GCF readiness	Earmarked (GCF)
8	2017	Green Invest	Earmarked (BMZ)
9	2018	Development of GHG MRV	Core
10	2019	Low Carbon Heat Only Boilers in Public Buildings	Core
11	2019	Mongolia Green Finance Corporation	Core
12	2019	Mongolia Renewable Energy Absorption Project	Core
13	2019	Promoting Energy Efficiency and ESCO Development	Core
14	2019	Sectoral Analysis of NDC Update 2020 of Mongolia	Core

Annex 2 – List of documents reviewed

No.	Title	Source	Year
Outcome Area 1a – NDC update 2020			
1	PIN 2019 - Support to Mongolia NDC Update Process 2020 (Agriculture & IPPU Sectors)	GGGI	2019
2	Mongolia INDC submission	Mongolian Government	2015
Outcome Area 1b – MRV development			
3	EOY Report 2018 - Development of GHGs MRV	GGGI	2018
4	Rapid MRV situation assessment report: Mongolia	GGGI	2018
5	Development of a Transparent MRV System Mongolia	GGGI	2019
6	Development of a Transparent MRV System for Waste Sector Mongolia	GGGI	2018
Outcome Area 2a – NGDP Action Plan & Indicators			
7	EOY Report 2015 - Transition to Green Development	GGGI	2015
8	EOY Report 2016 - Transition to Green Development	GGGI	2016
9	EOY Report 2016 – Green Growth Potential Assessment	GGGI	2016
10	Action Plan for Green Buildings Mongolia	GGGI	2015
11	Strategies for Development of Green Energy Systems in Mongolia 2013-2035	GGGI	2015
12	Indicators for Mongolia’s National Green Development Policy	GGGI	2016
13	Action Plan, Green Development Policy of Mongolia	Mongolian Government	2014
Outcome Area 3a – Ulaanbaatar Green Growth Plans			
7	EOY Report 2015 - Transition to Green Development	GGGI	2015
8	EOY Report 2016 - Transition to Green Development	GGGI	2016
14	EOY Report 2017 - Transition to Green Development Ph 2	GGGI	2017
15	EOY Report 2018 - Transition to Green Development Ph 2	GGGI	2018
16	MOU between the GGGI and Deputy Governor in Charge of Green Development and Air Pollution Matters of the Capital City of Ulaanbaatar on Green Growth Cooperation	GGGI / Ulaanbaatar Government	2017
17	Green Development Strategic Action Plan for Ulaanbaatar 2020	Ulaanbaatar Government	2016
18	Ulaanbaatar City Determined Contribution to Mitigate Global Warming Baseline Survey Report	GGGI	2017
19	Ulaanbaatar City Climate Investment Strategy 2016-2030	GGGI	2017
Outcome Area 3b – Provincial Green Growth Plans			
7	EOY Report 2015 - Transition to Green Development	GGGI	2015
8	EOY Report 2016 - Transition to Green Development	GGGI	2016
20	Arkhangai Green Growth Strategy (Mongolian)	Arkhangai Government	2017
21	Bulgan Green Growth Strategy (Mongolian)	Bulgan Government	2016

No.	Title	Source	Year
22	Khovd Green Growth Strategy (Mongolian)	Khovd Government	2016
23	Desktop review for status of energy and district heating systems in Mongolia	GGGI	2016
24	Situation analysis of heating systems in Arkhangai, Bulgan and Khovd aimag centers	GGGI	2016
25	User handbook for heat planners at sub-national level on spreadsheet-based modeling tool and odel	GGGI	2016
26	Capacity building program for heating sector personnel	GGGI	2016
27	Investment analysis and prioritization of alternative options of heating systems	GGGI	2016
Outcome 4a – National Energy Efficiency Action Program			
7	EOY Report 2015 - Transition to Green Development	GGGI	2015
8	EOY Report 2016 - Transition to Green Development	GGGI	2016
28	National Energy Efficiency Action Program of Mongolia	Mongolian Government	2017
Outcome 4b – Energy Standards and Labeling			
14	EOY Report 2017 - Transition to Green Development Ph 2	GGGI	2017
15	EOY Report 2018 - Transition to Green Development Ph 2	GGGI	2018
29	Market scoping, program design and impact assessment for a Mongolian standards & labeling program	GGGI	2018
Outcome Area 5a – Mongolia Green Finance Corporation			
30	EOY Report 2016 – National Financing Vehicles	GGGI	2016
31	EOY Report 2017 – National Financing Vehicles	GGGI	2017
32	EOY Report 2018 – National Financing Vehicles	GGGI	2018
14	EOY Report 2017 - Transition to Green Development Ph 2	GGGI	2017
15	EOY Report 2018 - Transition to Green Development Ph 2	GGGI	2018
33	Completion Report – GCF readiness support for enhancing access to green finance in Mongolia	Mongolian Government / GGGI	2019
34	EOY Report 2017 – Green Invest BMZ	GGGI	2017
35	NFV design - Mongolia Green Credit Fund (<i>Output 1</i>)	GGGI	2016
36	Comments on the draft report/business plan – NFV design - Mongolia Green Credit Fund (<i>Output 1</i>)	GGGI	2016
37	Legal opinion on establishment and operation of the Mongolia Green Credit Fund (<i>Output 1</i>)	GGGI	2016
38	Mongolian Green Credit Fund business model and business plan (<i>Output 2</i>)	Mongolian Government / Mongolian Bankers Association / GGGI	2017
39	Mongolia Green Finance Corporation – Feasibility Study (<i>Output 3</i>)	Mongolian Government / Mongolian Bankers Association / GGGI	2018

No.	Title	Source	Year
40	Draft Charter of the Mongolia Green Finance Corporation (Output 4)	Mongolian Government / Mongolian Bankers Association / GGGI	2018
41	Shareholders Agreement between MGFC and Government of Mongolia and Green Climate Fund and Mongolian Sustainable Finance Association (Output 4)	Mongolian Government / Mongolian Bankers Association / GGGI	2018
42	Employment Contract between MGFC and Executive Management Team (Output 4)	Mongolian Government / Mongolian Bankers Association / GGGI	2018
43	MGFC Operations Manual (Output 4)	Mongolian Government / Mongolian Bankers Association / GGGI	2018
44	Participation Agreement between MGFC and Participating Financial Institutions (Output 4)	Mongolian Government / Mongolian Bankers Association / GGGI	2018
45	MGFC On-Lending Agreement (Output 4)	Mongolian Government / Mongolian Bankers Association / GGGI	2018
46	GCF Funding Proposal – Mongolia Green Finance Corporation (Output 5)	Xac Bank	2018
47	Ministry of Finance commitment letter	Mongolian Government	2018
48	Mongolia Sustainable Finance Association commitment letter	Mongolia Sustainable Finance Association	2018
49	Setting up the MGFC – Accelerating Mongolia’s green transition – Preliminary report	Green Investment Group	2019
Outcome Area 5b – Promoting ESCOs			
14	EOY Report 2017 - Transition to Green Development Ph 2	GGGI	2017
15	EOY Report 2018 - Transition to Green Development Ph 2	GGGI	2018
50	PIN 2019 – Promoting energy efficiency and ESCO development	GGGI	2019
51	Recommendations to improve the legal environment relevant to energy efficiency	GGGI	2018
Outcome Area 6a – Retrofit of residential buildings			
14	EOY Report 2017 - Transition to Green Development Ph 2	GGGI	2017
15	EOY Report 2018 - Transition to Green Development Ph 2	GGGI	2018
34	EOY Report 2017 – Green Invest BMZ	GGGI	2017
52	Building energy audit report - Precast concrete apartment buildings - 3 buildings with 5, 9, 12 floors	GGGI	2017
53	NAMA Facility Project Outline 6 th Call – Energy performance contracting for residential retrofitting in UB	Ulaanbaatar Government / GGGI	2019
Outcome Area 6b – Energy efficiency audits of designated entities			
14	EOY Report 2017 - Transition to Green Development Ph 2	GGGI	2017
15	EOY Report 2018 - Transition to Green Development Ph 2	GGGI	2018

No.	Title	Source	Year
54	Development of pilot energy efficiency projects in Mongolia – Final overall energy audit findings	GGGI	2017
Outcome Area 7a – Renewable energy storage			
14	EOY Report 2017 - Transition to Green Development Ph 2	GGGI	2017
15	EOY Report 2018 - Transition to Green Development Ph 2	GGGI	2018
55	PIN 2019 - Renewable energy absorption project	GGGI	2019
Outcome Area 8a – Clean heating solutions			
14	EOY Report 2017 - Transition to Green Development Ph 2	GGGI	2017
15	EOY Report 2018 - Transition to Green Development Ph 2	GGGI	2018
56	PIN 2019 – Low carbon heat only boilers in public buildings	GGGI	2019
57	Low carbon heating for off-grid buildings – Business case for public school 122	GGGI	2018
Outcome Area 8b – PPP waste to energy			
58	EOY Report 2016 – Project design and preparation	GGGI	2016
7	EOY Report 2015 - Transition to Green Development	GGGI	2015
8	EOY Report 2016 - Transition to Green Development	GGGI	2016
59	Prefeasibility assessment report – Waste to energy PPP	GGGI	2016
Outcome Area 9a – Revised Law on Urban Development / Green Materials Database			
14	EOY Report 2017 - Transition to Green Development Ph 2	GGGI	2017
15	EOY Report 2018 - Transition to Green Development Ph 2	GGGI	2018
60	Green Building Material Database Report	GGGI	2017
Outcome Area 10a – Green Kindergarten			
7	EOY Report 2015 - Transition to Green Development	GGGI	2015
8	EOY Report 2016 - Transition to Green Development	GGGI	2016
61	Greening public buildings in Mongolia	GGGI	2017
Outcome Area 10b – PPP Green Education Buildings			
58	EOY Report 2016 – Project design and preparation	GGGI	2016
7	EOY Report 2015 - Transition to Green Development	GGGI	2015
8	EOY Report 2016 - Transition to Green Development	GGGI	2016
14	EOY Report 2017 - Transition to Green Development Ph 2	GGGI	2017
15	EOY Report 2018 - Transition to Green Development Ph 2	GGGI	2018
34	EOY Report 2017 – Green Invest BMZ	GGGI	2017
62	Green PPPs for public infrastructure in Mongolia – PPP model and technical guidelines for green education buildings	GGGI	2016
63	Business Case - PPP pilot projects for 10 energy efficient education facilities in Ulaanbaatar	GGGI	2017
Other documents			
64	GGGI Mongolia Country Planning Framework 2016-2020	GGGI	2015

No.	Title	Source	Year
65	Evaluation of Energy Efficiency Policy Measures for Household Refrigeration in Australia – An assessment of energy savings since 1986	Energy Efficiency Strategies	2010
66	Phase 2: Exploring the relationship between environmental regulation and competitiveness	SQW Consulting	2007
67	An examination of the effectiveness of the EU minimum standard on cold appliances: the British case	P. Schiellerup	2002
68	Achievements of appliance energy efficiency standards and labelling programs – A global assessment	IEA	2015

Annex 3 – List of stakeholders interviewed

No.	Name	Role
1	Bulgan Tumendemberel	Director General, Green Development Policy and Planning, Ministry of Environment and Tourism
2	Tegshjargal Bumstend	Environment & Climate Fund, Ministry of Environment and Tourism
3	Atarjargal Tserendoo	Director, Energy Conservation Department, Energy Regulatory Commission
4	Enkhtur	Energy Market Research and Planning Department, Energy Regulatory Commission
5	Enkhtuvshin	Strategic Policy and Planning Department, Ministry of Construction and Urban Development
6	Battulga Erkhembayar	Environment Agency, Ulaanbaatar Government
7	Kherlen Turtogtokh	Manager, Ulaanbaatar Mayor's Office, Ulaanbaatar Government
8	Batbayar	Formerly with Industrial Development Innovation Agency, Ulaanbaatar Government
9	Naidaala Badrakh	CEO, Mongolia Sustainable Finance Association
10	Oyungerel Munkhbat	Mongolia Sustainable Finance Association
11	Nandin-Erdene Enkhtuvshin	Mongolia Sustainable Finance Association
12	Romain Brillie	Country Representative, Mongolia, GGGI
13	Tsolmon Namkhainyam	Energy Program Officer, Mongolia, GGGI
14	Batzaya Bayasgalan	Analyst, Green Investment Services, GGGI
15	Bayarmaa Enkhbayar	Senior Associate, Mongolia, GGGI
16	Siddhartha Nauduri	Senior Analyst, MRV, GGGI
17	Bolormaa Chimednamjil	Analyst, Sustainable Energy, GGGI
18	Seung Yeon (Stella) Lee	Specialist, Green Investment Services, GGGI

Annex 4 – Detailed information on the Mongolia Program

Introduction

This annex provides detailed information on the base material that has informed the development of the impact pathway diagram for the Mongolia Program (**Figure 1**) and IPR Main Report.

For all parts of the impact pathway, this annex describes:

- Background of program activities
- Outputs – planned and current status
- Outcomes – planned and current status
- Estimation of potential impacts

As such, the content in this IPR annex draws heavily from the logframes and results reports of the 14 projects that make up the Mongolia Program, as listed in **Annex 1**. However, this annex differs from this base material in a few important ways:

- The outputs/outcomes/impacts from the 14 projects have been broken down into their ‘basic building blocks’ and recombined into a single impact pathway at the country program level, in line with the IPR methodology developed by IEU. Along this pathway, the above material has been organized into the 10 outcome areas (white boxes) shown in **Figure 1**. Each area corresponds to a unique outcome (or related set of outcomes). Given this approach, it is important to note that the selection of outputs/outcomes contained in each outcome area may sometimes differ from what those contained in the original project logframes.
- Descriptions of the current status of outputs/outcomes/impacts reflects IEU’s independent views, based on its own review of key documents (Annex 2) and interviews with key stakeholders (Annex 3). Assessment results based on the assessment standards and methodology outlined in the IPR Guideline¹ developed by IEU. As such, judgements about whether a result has been achieved or not may sometimes differ from what has been previously reported by project teams.

The above material is organized according to 10 outcome areas (white boxes) shown in the impact pathway diagram. As the name suggests, each outcome area corresponds to a unique outcome (or related set of outcomes). The way these outcome areas has been organized for this review may differ from official project logframes for reasons further explained in Annex 1.

The 10 outcome areas are:

- **Multi-sectoral policies and plans:**
 - Outcome Area 1 - NDC implementation and monitoring
 - Outcome Area 2 - GDP implementation and monitoring
 - Outcome Area 3 – Subnational green growth plans
- **Energy efficiency:**
 - Outcome Area 4 – Energy efficiency policies
 - Outcome Area 5 – Energy efficiency financing
 - Outcome Area 6 – Energy efficiency project development
- **Renewable energy/Air quality**

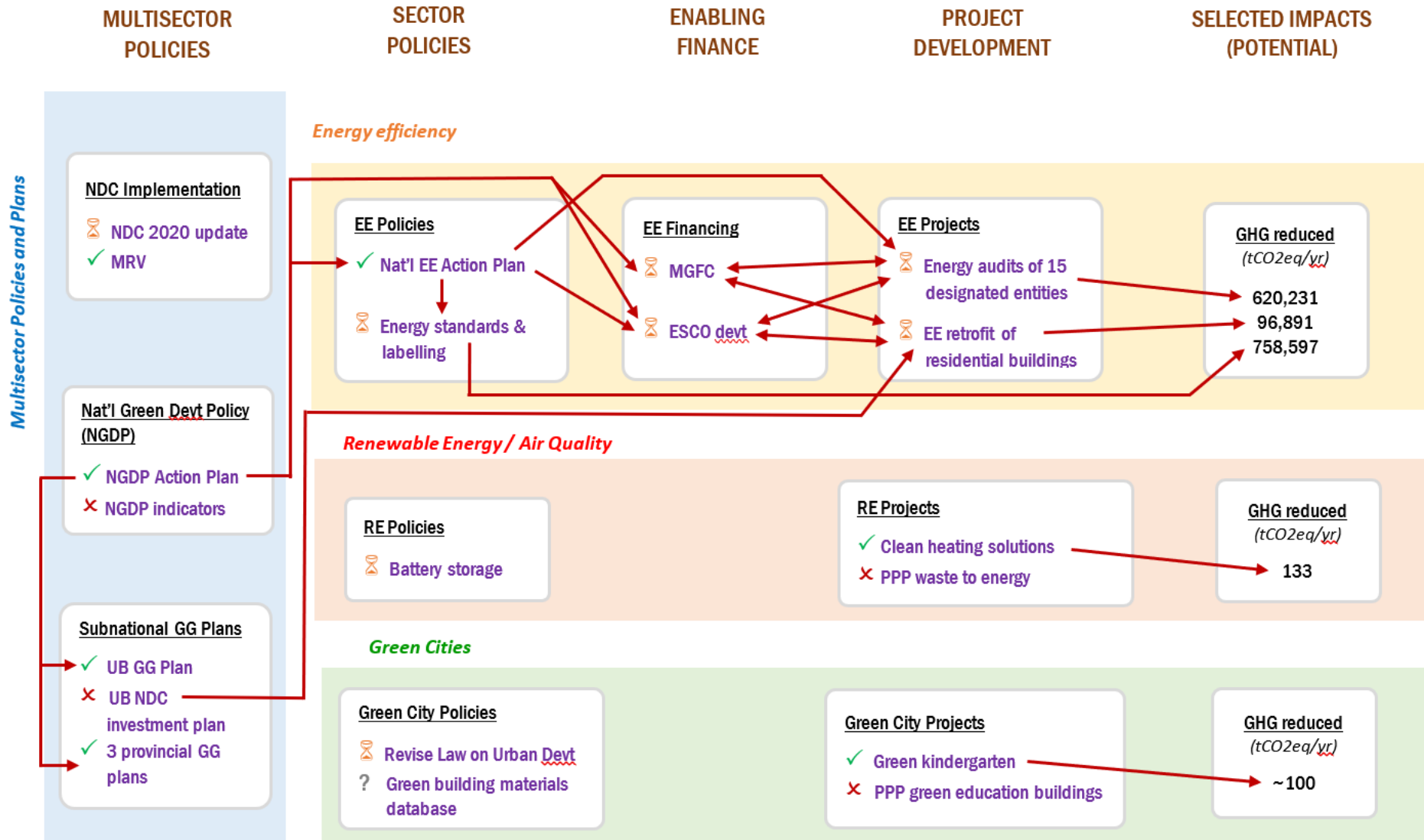
¹ Impact Pathway Review Guideline - Version 0.1, March 2019

- Outcome Area 7 – Renewable energy policies
- Outcome Area 8 – Renewable energy project development

- **Green cities**
 - Outcome Area 9 – Green cities policies
 - Outcome Area 10 – Green cities project development

The final section of this Annex collates and summarizes estimated potential impacts from all the outcome areas, based on the activities of the country program at the time the IPR was conducted (ie: these estimates may continue to change in future as program circumstances change).

FIGURE 1: Impact pathway diagram for GGGI's Mongolia program



MULTI-SECTORAL POLICIES

Outcome Area 1: NDC implementation and monitoring

a) NDC update 2020

BACKGROUND

All parties to the Paris Agreement are obliged to submit an updated NDC to the UNFCCC by 2020 and every 5 years thereafter. MET has sought assistance from development partners to update their NDC. For example, GIZ and the New Climate Institute are helping to update Mongolia's NDCs for the electricity and heating supply sectors, using a tool called PROSPECTS+ to help model GHG mitigation scenarios in these areas.

GGGI's entry into this area built on prior MRV work and relationship with MET's Environment and Climate Fund, the main counterpart for this program area and also the UNFCCC focal point and GCF NDA for Mongolia. Following an invitation from MET in 2018, GGGI agreed to support the NDC update for the waste and industrial processes and product use (IPPU) sectors. These sectors were initially chosen as they aligned with GGGI's prior MRV work in these sectors. This was seen by GGGI as a strategic opportunity to engage with Mongolia on its climate policies. At the request of MET, the waste sector was later changed to the agriculture sector.

OUTPUTS

Planned outputs

Work in this program area is being done under the *Sectoral analysis of NDC update 2020 for Mongolia's waste sector* project (2019) with core funding. Key outputs to be completed in 2019 include:

- **Output 1** - Establish sectoral working groups for the waste and IPPU sectors
- **Output 2** – Organize consultation events
- **Output 3** – Elaborate BAU projections and targets for the waste and IPPU sectors using the PROSPECTS+ model
- **Output 4** – Develop chapters of NDC update document for the waste and IPPU sectors

Actual outputs

These outputs are scheduled for delivery by the end of 2019. At the time of writing, output delivery was still in progress. A notable change from the original plan is that, at the GoM's request, GGGI will be working on the agriculture and IPPU sectors, instead of waste and IPPU as originally planned. The agriculture sector is the second highest in terms of GHG emissions behind energy, and the sector most affected by climate change.

OUTCOMES

Planned outcomes

The outcome expected is:

- **Outcome 1** - MET endorses and incorporates the proposed updates to Mongolia's NDCs for the agriculture and IPPU sectors. The draft NDC is expected to include mitigation and adaptation actions and/or targets that are more elaborated and ambitious than those in the current NDC.

Actual outcomes

At the time of writing, the outcome could not be assessed yet as outputs were still being delivered. Stakeholders interviewed noted that GGGI's support is likely to result in the NDC being expanded to cover a greater number of sectors than would otherwise been possible.

IPR ASSESSMENT

Applicable IPR standards	Assessment	Comments / Evidence
Outputs – Planned		
3.1 Outputs are clearly and measurably described		Based on review of project documents and logframe, and interviews with relevant stakeholders.
3.2 Outputs contribute causally to intermediate outcomes		Based on review of project documents and logframe, and interviews with relevant stakeholders.
Outputs – Actual		
4.1 Outputs have been successfully delivered		Too soon to assess. Outputs are in the process of being delivered in 2019.
Outcomes – Planned		
2.1 Intermediate outcomes are clearly and measurably expressed in terms of specific partners undertaking desired actions		Based on review of project documents and logframe, and interviews with relevant stakeholders.
2.2 Intermediate outcomes contribute causally to each other and to impact		Based on review of project proposal and logframe, and interviews with relevant stakeholders. Too soon to assess as actual causal links are not yet in place. However, in principle, the work in this program area can potentially contribute to other downstream outcomes along GGGI's value chain. For example, it could plausibly help identify more specific actions that GoM could take to mitigate GHG emissions in the IPPU sector, and in doing so, improve Mongolia's ability to develop more effective, convincing and attractive proposals for climate finance.
Outcomes - Actual		
5.1 Intermediate outcomes have been achieved.		Too soon to assess. Outputs are in the process of being delivered in 2019.

b) MRV development

BACKGROUND

To meet reporting obligations under the UNFCCC and the Paris Agreement (enhanced transparency framework), Mongolia is obliged to report GHG emissions data and track progress against their NDC targets. To do this, countries are required to develop and implement an effective MRV system. Accomplishing this is a technical, political and

resourcing challenge for many non-Annex 1 developing countries with limited experience in carbon measurement and reporting. For this reason, many countries (including GGGI members) are seeking external assistance in this area.

In recognition of this, GGGI initiated an MRV program in 2017 in a selected number of countries, one of which was Mongolia. In consultation with MET's Environment and Climate Fund (the UNFCCC focal point for Mongolia), it was agreed that GGGI would support MRV development in the waste and IPPU sectors. In addition to supporting a clear need from the GoM, this also provides an opportunity for GGGI to position itself more strategically in engaging Mongolia on their climate policies.

OUTPUTS

Planned outputs

Work on MRV has been undertaken under the *Development of GHG MRV* project (core funded, 2018). Key outputs include:

- **Output 1** – Undertake a review of Mongolia's current situation relating to MRV in the waste and IPPU sectors.
- **Output 2** – Develop a manual outlining the MRV development requirements needed in the IPPU and waste sectors to move from Tier 1 to Tier 2/3 of the UNFCCC's rankings of GHG estimation methodologies.²
- **Output 3** - Policy recommendations covering: data repository templates for collecting data (developed as per IPCC 2006 guidelines) needed to prepare GHG inventories at national level, sub-national or sectoral level; evaluation of data levels for Mongolia's existing GHG inventory arrangements; analysis of how Mongolia could progress towards higher-tier methods for estimating GHG emissions.
- **Output 4** - Masterplans for the development of Mongolia's national, sub-national and sectoral MRV framework. These cover the activities required to develop the MRV system, including requirements for stakeholder engagement.

Actual outputs

All outputs were delivered, although at the request of the MET Environment and Climate Fund (ECF), the content was integrated into 2 reports. The first report provided guidance on strengthening GHG inventories for the waste and IPPU sectors, in line with IPCC 2006 guidelines. The second report provided a description of the institutional and technical context for MRV in the waste sector.

OUTCOMES

Planned outcomes

The intermediate outcome expected from the outputs is:

- **Outcome 1** – MRV recommendations adopted by MET for implementation

Actual outcomes

Discussions with stakeholders indicated that the outputs produced by GGGI are being used to guide ongoing implementation and improvement of Mongolia's MRV system. Although there are relevant IPCC guidelines available, the materials developed by GGGI are more useful as they have been tailored to the Mongolian context. In addition, by providing a solid description of how the GHG inventory for the waste and IPPU sectors is currently done, it helps protect retention of corporate knowledge within ECF in the event of staff turnover.

² https://unfccc.int/resource/docs/publications/09_resource_guide3.pdf

IPR ASSESSMENT

Applicable IPR standards	Assessment	Comments / Evidence
Outputs – Planned		
3.1 Outputs are clearly and measurably described		Based on review of project documents and logframe, and interviews with relevant stakeholders.
3.2 Outputs contribute causally to intermediate outcomes		Based on review of project documents and logframe, and interviews with relevant stakeholders.
Outputs – Actual		
4.1 Outputs have been successfully delivered		Based on review of project documents and logframe, and interviews with relevant stakeholders.
Outcomes – Planned		
2.1 Intermediate outcomes are clearly and measurably expressed in terms of specific partners undertaking desired actions		Based on review of project documents and logframe, and interviews with relevant stakeholders.
2.2 Intermediate outcomes contribute causally to each other and to impact		At this stage, there are no realized causal links from the MRV development work to other parts of the impact pathway. There is however potential for such links to be realized in future – eg: between the MRV work and NDC implementation and reporting.
Outcomes - Actual		
5.1 Intermediate outcomes have been achieved		Stakeholders confirmed the outputs were useful and being used on the ongoing implementation and refinement of GoM's MRV system.

Outcome Area 2: Multi-sectoral policies – NGDP Implementation & Monitoring

a) NGDP Action Plan & Indicators

BACKGROUND

In 2012, the GoM announced its intention to pursue a green growth model of development. The MET³ was assigned responsibility for leading this transition and was elevated to the status of a 'core' ministry. An overarching strategy – the National Green Development Policy (NGDP) – was subsequently developed and adopted by Mongolia's parliament in June 2014. The NGDP set out 6 high-level strategic objectives, along with a series of broad approaches to deliver them.

To help improve implementation of the NGDP, the GoM later decided to develop a more detailed Action Plan for the GDP. Assistance was requested from various development partners, including GGGI. At the request of the National Statistics Office (NSO) and MET, GGGI also supported the development of national outcome indicators to enable the results of the NGDP to be monitored.

OUTPUTS

Planned outputs

There were 3 key outputs planned for delivery:

- **Output 1** - Support MET with the process of preparing the NGDP Action Plan.
- **Output 2** - Develop detailed actions in the areas of green energy and green buildings to help advance implementation of the NGDP.
- **Output 3** - Recommend proposed indicators to monitor the outcomes of the NGDP.

These outputs were specified in the WPB 2015-16 under the following projects:

- *Mongolia Transition to Green Development* (2015-16, GGPI, core funded)
- *Green Growth Potential Assessment* (2015-16, IPSD, core funded)

Actual outputs

- **Output 1** - Support MET with the process of preparing the NGDP Action Plan

GGGI supported MET with various aspects of preparing the Action Plan, including:

- Coordinating the overall process of preparing the NGDP Action Plan
- Leading sub-working groups on the topics of green energy and green buildings, relating to Strategic Objective 1 of the NGDP⁴
- Contributing to and reviewing several drafts of the NGDP Action Plan
- Supporting preparation of a Cabinet submission to seek approval of the NGDP Action Plan

The NGDP Action Plan was completed and submitted to Cabinet in late 2015. The final document outlined over 250 activities to achieve the GDP's strategic objectives, as well as specifying lead implementation actors and timeframes.

³ At the time, the Ministry of Environment, Green Development and Tourism

⁴ Strategic Objective 1: Promote a sustainable consumption and production pattern with efficient use of natural resources, low GHG emissions and reduced waste.

- **Output 2** - Develop detailed actions in the areas of green energy and green buildings to help advance implementation of the NGDP

To support the MET to develop these sections of the NGDP action plan, GGGI prepared 2 reports:

- **Strategies for development of green energy systems in Mongolia 2013-2035:** Published in February 2015, this report explored the potential to reduce fossil fuel consumption, energy costs, GHG emissions and pollution through renewable energy and energy efficiency measures in Mongolia. This was done through comparative analysis of BAU versus 3 alternate scenarios (including various 'green' scenarios) in several sectors: power and heat supply; buildings; transport; industry; and agriculture. The report concludes by identifying various policy and program measures that could be implemented to achieve the 'greener' scenarios, for consideration by GoM. This report was also a foundational piece of diagnostic work in the sense that it subsequently guided GGGI programming in several energy-related areas.
- **Action plan for green buildings:** Submitted to MET in November 2015, this report identified 9 priority actions to reduce heat loss and improve energy efficiency in residential and commercial buildings. The 9 actions were developed as part of the broader process of preparing the NGDP Action Plan and were included in the final NGDP Action Plan submitted to Cabinet.

- **Output 3** - Recommend proposed indicators to monitor the outcomes of the NGDP

This output sought to address several issues:

- Gaps in the structure, consistency, comprehensiveness, representativeness, validity and measurability of the 14 outcome indicators included in the NGDP;
- The need for GoM to align national monitoring arrangements to the Sustainable Development Goals passed in 2015, of which Mongolia is a signatory;
- Opportunity to build on initial work done by UN PAGE on a list of 108 output indicators to track implementation of the GDP.

GGGI prepared a report – *Indicators for Mongolia's National Green Development Policy* – which was completed in May 2016. GGGI applied a systematic methodology to identify and recommend a final set of improved indicators to monitor the outcomes of the NGDP. Consultation activities were also conducted with key stakeholders, including MET and the NSO. The report proposed a final set of 34 indicators which aligned to the needs of the GDP and SDGs, as well as existing statistical operations of the NSO.

OUTCOMES

Planned outcomes

The intermediate outcomes expected from the outputs were:

- **Outcome 2.1** - GoM adopts the NGDP Action Plan for implementation
- **Outcome 2.2** – GoM adopts the proposed indicators to monitor and report on the outcomes of the NGDP

Actual outcomes

- **Outcome 2.1** - GoM adopts the NGDP Action Plan for implementation

The NGDP Action Plan was passed by the Mongolian parliament on 11 January 2016.⁵ The resolution also committed government members and governors of Ulaanbaatar and all aimags to implement the activities in the Action Plan, allocate funds from central and local budgets, and mobilize funds from donors and private sources.

- **Outcome 2.2** – GoM adopts the proposed indicators to monitor and report on the outcomes of the NGDP

In November 2016, MET endorsed a set of outcome-level green development indicators, largely consistent with GGGI’s recommendations, and submitted to NSO. However, discussion with key stakeholders indicated that the indicators are not currently being used for reporting on the progress of the NGDP, due to issues with alignment between some GoM entities on some indicators.

IPR ASSESSMENT

Applicable IPR standards	Assessment	Comments / Evidence
Outputs – Planned		
3.1 Outputs are clearly and measurably described		Based on review of project documents and logframe, and interviews with relevant stakeholders.
3.2 Outputs contribute causally to intermediate outcomes		Based on review of project documents and logframe, and interviews with relevant stakeholders.
Outputs – Actual		
4.1 Outputs have been successfully delivered		Copies of final outputs were shared with IEU.
Outcomes – Planned		
2.1 Intermediate outcomes are clearly and measurably expressed in terms of specific partners undertaking desired actions		Based on review of project documents and logframe, and interviews with relevant stakeholders.
2.2 Intermediate outcomes contribute causally to each other and to impact		<p>Links to Ulaanbaatar and provincial green growth strategies: To support implementation of the NGDP Action Plan at subnational levels, the MET selected facilitate the development of green growth strategies at provincial level. This led to Ulaanbaatar, Arkhangai, Bulgan and Khovd being selected as pilots to develop provincial level green growth strategies.</p> <p>Links to National Energy Efficiency Action Plan, promoting ESCOs and the MGFC: Under the NGDP Action Plan, GoM commitments included: establishing an enabling legal environment and implementation schemes for energy efficiency; developing policies for repayment from energy savings arising from ESCO investments; and establishing a green credit fund. These commitments provided the mandate that enabled GGGI to move</p>

⁵ Available online at: <http://www.greengrowthknowledge.org/sites/default/files/downloads/policy-database/MONGOLIA%29%20Action%20Plan%2C%20Green%20Development%20Policy%20of%20Mongolia.pdf>

Applicable IPR standards	Assessment	Comments / Evidence
		into downstream work relating to the NEEAP, ESCO promotion and MGFC.
Outcomes – Actual		
5.1 Intermediate outcomes have been achieved		<i>GDP Action Plan:</i> A copy of the final NGDP Action Plan (including a translated version of the parliamentary resolution to adopt it) was shared with IEU.
		<i>GDP indicators:</i> Proposed indicators for monitoring the NGDP are not being used due to issues with alignment between some GoM entities on some indicators.

Outcome Area 3: Multi-sectoral policies - Subnational Green Growth Plans

a) Ulaanbaatar Green Growth Plans

BACKGROUND

Subnational actors have an important contribution to make in achieving the objectives of the NGDP, SDGs and NDCs. In recognition of this, MET requested GGGI's support to develop 4 subnational green growth strategies during 2015-16. Ulaanbaatar was one of the subnational jurisdictions nominated, along with 3 other aimags (see Outcome Area 3b).

Separate to this, in June 2015, the Governor and Mayor of Ulaanbaatar initiated a process to develop a *Green Development Strategic Action Plan (GDSAP)*. In March 2017, building on the good collaboration on GDSAP, GGGI and Ulaanbaatar City Council signed an MOU to further collaborate in a range of other areas, including NDC implementation. These two events provided the entry points for GGGI to support Ulaanbaatar with its green growth agenda.

OUTPUTS

Planned outputs

The key outputs were:

- **Output 1** - Support preparation of the *Green Development Strategic Action Plan (GDSAP)* for Ulaanbaatar.
- **Output 2** – Assess Ulaanbaatar's potential contribution to the NDC and a develop a related investment plan.

Work in these outputs were undertaken as part of the following projects in the WPB 2015-16 and 2017-18:

- *Transition to Green Development* project (2015-16, GGPI, core funded)
- *Transition to Green Development Phase 2* project (2017-18, GGPI, core funded)

Actual outputs

- **Output 1** – Support preparation of the GDSAP for Ulaanbaatar

As part of this output, GGGI undertook and completed the following activities in 2015:

- Contribute to drafting of the GDSAP document
- Support working group meetings established to facilitate consultations on the GDSAP
- Help coordinate amongst relevant ministries to ensure alignment with the national *GDP Action Plan*, which was under development around the same time
- Mainstream green development into the Mayor's Action Plan 2016-20

The GDSAP identifies goals and actions in 7 areas: (1) cleaner air; (2) sustainable transport; (3) solid waste management; (4) water security; (5) cleaner soil; (6) participation in environmental sustainability; and (7) climate change resilience.

- **Output 2** – Assess Ulaanbaatar's potential contribution to the NDC and a develop a related investment plan

Output 2 was comprised of two deliverables, prepared during 2017-18.

- A report assessing the potential contribution UB could make to Mongolia's NDC, which found that that UB could deliver around 50% of the overall GHG mitigation target.⁶
- An NDC investment plan, including a prioritized list of 18 projects (narrowed down from around 90) drawn from the city masterplan and the GDSAP, with a total GHG mitigation potential of 2.2 MtCO₂eq and a total cost of USD 1.6 billion.⁷

OUTCOMES

Planned outcomes

The intended intermediate outcomes for the above outputs were:

- **Outcome 1** – Ulaanbaatar City Council adopts the GDSAP for implementation
- **Outcome 2** – Ulaanbaatar City Council commits to invest in and implement a climate change program to support the achievement of Mongolia's NDCs

Actual outcomes

- **Outcome 1** - Ulaanbaatar City Council adopts the GDSAP for implementation

The GDSAP was formally adopted by the City Council in March 2016. Prior to this, the (draft) plan was also showcased at COP21 in Paris in November 2015, a positive sign of the municipality's support for the green development agenda. Stakeholders noted that some actions within the GDSAP were being implemented by, with examples cited in relation to waste management, electric vehicles and public transport.

- **Outcome 2** – Ulaanbaatar City Council commits to invest in and implement a climate change program to support the achievement of Mongolia's NDCs

The intention was to persuade the Ulaanbaatar City Council to commit to investing in and implementing a city-wide climate change program, which could include the priority projects identified from GGGI's work. Unfortunately, this outcome did not eventuate. Based on stakeholder interviews, there were various reasons for this, including:

- Challenges in coordinating and getting buy in across government departments for the program, which was essential since such a program would be multi-sectoral by nature.

⁶ Estimated reduction potential 3.07 MtCO₂eq annually in 2030.

⁷ This equates to around 30% of Mongolia's target of reducing annual emissions by 7.3 MtCO₂eq by 2030 from BAU levels.

- Other development partners working on similar initiatives with different parts of the UB government, which created internal competition within the government.
- The limited influence of GGGI's counterpart (the Environment Department) over municipal budget allocation decisions.

Although the investment program hoped for did not proceed, GGGI did reach agreement with the UB government to take forward at least 1 of the 18 projects – the energy efficiency retrofitting of residential buildings (see Outcome Area 6).

IPR ASSESSMENT

Applicable IPR standards	Assessment	Comments / Evidence
Outputs – Planned		
3.1 Outputs are clearly and measurably described		Based on review of project documents and logframe, and interviews with relevant stakeholders.
3.2 Outputs contribute causally to intermediate outcomes		Based on review of project documents and logframe, and interviews with relevant stakeholders.
Outputs – Actual		
4.1 Outputs have been successfully delivered		Copies of final outputs were shared with IEU.
Outcomes – Planned		
2.1 Intermediate outcomes are clearly and measurably expressed in terms of specific partners undertaking desired actions		Based on review of project documents and logframe, and interviews with relevant stakeholders.
2.2 Intermediate outcomes contribute causally to each other and to impact		At the time of the IPR, there were no realized causal linkages between the GDSAP and any other part of the impact pathway, though there is potential for such links to emerge in future.
Outcomes – Actual		
5.1 Intermediate outcomes have been achieved		<i>GDSAP</i> : The GDSAP was formally adopted by the UB City Council in 2016.
		<i>NDC investment program</i> : This was ultimately not adopted for reasons cited above.

b) Provincial Green Growth Plans

BACKGROUND

To support the mainstreaming of green growth in Mongolia in line with the National Green Development Policy (see Outcome Area 2a), MET requested GGGI's support to develop 4 subnational green growth strategies in 2015. Along with Ulaanbaatar (see above), the provinces (aimags) of Arkhangai, Bulgan and Khovd were selected.

OUTPUTS

Planned outputs

The key outputs were:

- **Output 1** - Support 3 provinces to develop green development strategies
- **Output 2** - Undertake an assessment of alternative heating systems for secondary cities

Work in this area was done under the *Transition to Green Development* project (GGPI, core funded) under the WPB 2015-16.

Actual outputs

- **Output 1** - Support 3 provinces to develop green development strategies

Working closely with MET and the 3 provincial governments, GGGI undertook the following activities as part of Output 1:

- Preliminary rapid assessment of green development issues in each province (Q4 2015 – Q2 2016)
- Workshops in each provincial capital to build capacity of representatives of 10 rural settlements in each province to prepare a green development strategy (Q2 2016)
- Support provincial governments to form working groups to draft their green development strategies
- Train 3 lead authors from each group to draft the provincial green development strategies (April 2016)

As a result, green development strategies were prepared and submitted to the Citizen's Representative Councils in the Arkhangai, Bulgan and Khovd provinces in Q2 2016.

- **Output 2** - Undertake assessments of alternative heating systems for secondary cities

To deliver Output 2, GGGI contracted a team of Mongolian experts in Q4 2015, and together with a multi-ministerial working group led by MET, undertook the following:

- Desktop review of status of energy and district heating systems in Mongolia (June 2016)
- Situation analysis of heating systems in Arkhangai, Bulgan and Khovd provinces (March 2016)
- Develop a guidebook on heating systems planning tools (March 2016)
- Delivered a capacity building program and materials for heating sector personnel (June 2016)
- Undertake an investment gap analysis and prioritization of alternative options for heating systems (September 2016)

All deliverables were completed during 2016. It delivered useful baseline information on the state of city heating systems in Akhangai, Bulgan and Khovd provinces, and helped identify options for improving the efficiency of heating systems and potentially switching to renewable energy sources.

OUTCOMES

Planned outcomes

The intended outcomes for this program area were:

- **Outcome 1** - Provincial governments adopt green development strategies for implementation

Actual outcomes

- **Outcome 1** - Provincial governments adopt green development strategies for implementation

The Citizen’s Representative Councils of Bulgan and Khovd adopted their green growth strategies in September and October 2016 respectively, and these were subsequently incorporated into the Governor’s Action Plans. Similarly, the green growth strategy for Arkhangai was adopted in February 2017. The experience of provincial stakeholders in this initiative was showcased in November 2016 at an event organized by GGGI as part of Mongolia’s *Sustainable Development 2030 Forum*.

IPR ASSESSMENT

Applicable IPR standards	Assessment	Comments / Evidence
Outputs – Planned		
3.1 Outputs are clearly and measurably described		Based on review of project documents and logframe, and interviews with relevant stakeholders.
3.2 Outputs contribute causally to intermediate outcomes		Based on review of project documents and logframe, and interviews with relevant stakeholders.
Outputs – Actual		
4.1 Outputs have been successfully delivered		Copies of all outputs were received and verified. The green growth strategies for the 3 provinces were only available in Mongolian.
Outcomes – Planned		
2.1 Intermediate outcomes are clearly and measurably expressed in terms of specific partners undertaking desired actions		Based on review of project documents and logframe, and interviews with relevant stakeholders.
2.2 Intermediate outcomes contribute causally to each other and to impact		By intention, GGGI has not subsequently undertaken further programmatic work in the 3 selected provinces. As a result, there are no realized causal links from the 3 provincial green growth strategies to any other part of the impact pathway.
Outcomes - Actual		
5.1 Intermediate outcomes have been achieved		The green growth strategies for all 3 provinces were all officially adopted. Supporting documents on this have been shared.

ENERGY EFFICIENCY

Outcome Area 4: Energy efficiency – Policies

a) National Energy Efficiency Action Program

BACKGROUND

In 2017, GGGI signed an MOU with the Mongolian Energy Regulatory Commission (ERC) to work together in a range of areas relating to energy efficiency. One of these areas was to support the ERC to develop a National Energy Efficiency Action Program (NEEAP), which they are mandated to prepare under Mongolia's Law on Energy Conservation.⁸ The purpose of the NEEAP is to facilitate smooth and coordinated implementation of all state policies and laws relating to energy conservation and energy efficiency at the national level.

OUTPUTS

Planned outputs

The intended output of this work can be summarized as:

- **Output 1** – Support ERC to develop the NEEAP

This was undertaken under the *Mongolia Transition to Green Development - Phase 2* project (core funded) under the WPB 2017-18.

Actual outputs

GGGI provided a range of support services to ERC to develop the NEEAP during 2017. This included:

- Developing a proposed outline/framework for the NEEAP
- Providing feedback and recommendations on drafts of the NEEAP
- Developing a template for description of NEEAP measures
- Participating in meetings of the NEEAP working group

OUTCOMES

Planned outcomes

The intended outcome for this program was for the NEEAP to be successfully adopted by the GoM.

Actual outcomes

The NEEAP was formally adopted in September 2017. It reaffirms the purpose and objectives of the NEEAP, outlines detailed actions in 18 different areas, describes management arrangements for implementation, and specifies outcomes and target indicators to be used to monitor and report on NEEAP's results. Stakeholders noted that GGGI's work played an influential role in convincing the decision makers to broaden the focus of the NEEAP to cover multiple sectors, instead of just the energy sector. Since the NEEAP was adopted, GGGI has continued to serve as a member of the working group for the implementation of NEEAP.

⁸ An English translation of the Law on Energy Conservation is available on the ERC website: <http://erc.gov.mn/web/en/files?tag=15>

IPR ASSESSMENT

Applicable IPR standards	Assessment	Comments / Evidence
Outputs – Planned		
3.1 Outputs are clearly and measurably described		Based on review of project documents and logframe, and interviews with relevant stakeholders.
3.2 Outputs contribute causally to intermediate outcomes		Based on review of project documents and logframe, and interviews with relevant stakeholders.
Outputs – Actual		
4.1 Outputs have been successfully delivered		Based on review of project documents and logframe, and interviews with relevant stakeholders.
Outcomes – Planned		
2.1 Intermediate outcomes are clearly and measurably expressed in terms of specific partners undertaking desired actions		Based on review of project documents and logframe, and interviews with relevant stakeholders.
2.2 Intermediate outcomes contribute causally to each other and to impact		Links to promotion of energy standards and labeling, ESCOs, energy efficiency audits: The NEEAP includes commitments to: regulate the labeling of energy consumption; create the legal environment to regulate organizations providing services related to energy efficiency; and to improve the energy efficiency of designated entities identified under the Energy Conservation Law. This provided a mandate for GGGI to subsequently engage in work related to energy standards and labeling, promotion of ESCOs and energy efficiency audits of the 15 designated entities.
Outcomes – Actual		
5.1 Intermediate outcomes have been achieved		Based on review of project documents and logframe, and interviews with relevant stakeholders.

b) Energy Standards & Labeling

BACKGROUND

Under the National Energy Efficiency Action Program (NEEAP) adopted in 2017, one of the commitments is to undertake legal reforms to enhance promotion of energy efficient machinery, equipment, goods and materials and demonstrate energy conservation.

In 2017, GGGI initiated work to support the ERC to develop an energy standards and labeling program in Mongolia. No such scheme currently exists in Mongolia. This collaboration falls under the MOU signed between GGGI and ERC in 2017 to work together on a range of areas relating to energy efficiency.

OUTPUTS

Planned outputs

The primary output planned was:

- **Output 1** – Prepare a study for ERC with recommendations for an energy standards & labeling program

Work on this was undertaken as part of the *Mongolia Transition to Green Development – Phase 2* project (core funded) under the WPB 2017-18.

Actual outputs

The study was completed in February 2018 and presented to officials from ERC and other relevant ministries via a workshop in Ulaanbaatar. It covered a range of issues including: overview of the electricity sector; policy and institutional context; assessment of consumer behavior; assessment of potential impacts of a standards and labeling program; and relevant lessons from similar programs in other countries.

Overall, it was found that by 2030, an energy standards and labeling program covering a variety of appliances could generate annual electricity consumption savings of 618 GWh and reduce annual GHG emissions by around 758,597 tCO₂eq. Of the various appliances analyzed, improving the efficiency of refrigerators was identified as having particularly beneficial impacts. The study also provided suggestions on institutional and operational issues to ensure successful implementation of the program.

OUTCOMES

Planned and actual outcomes

The intended outcome for this area was for the ERC to adopt an energy standards & labeling program in Mongolia. At the time of writing, the proposed program is understood to have been submitted to the Minister of Energy to propose to Cabinet for approval. Stakeholders interviewed were optimistic that this could happen sometime within the next year.

IPR ASSESSMENT

Applicable IPR standards	Assessment	Comments / Evidence
Outputs – Planned		
3.1 Outputs are clearly and measurably described		Outputs are clear, based on a review of project documents and discussion with key stakeholders.
3.2 Outputs contribute causally to intermediate outcomes		Clear, based on a review of project documents and discussion with key stakeholders.
Outputs – Actual		
4.1 Outputs have been successfully delivered		A copy of the final report was shared with IEU for review.
Outcomes – Planned		

2.1 Intermediate outcomes are clearly and measurably expressed in terms of specific partners undertaking desired actions		Clear, based on a review of project documents and discussion with key stakeholders.
2.2 Intermediate outcomes contribute causally to each other and to impact		At the time of the IPR, there were no realized causal links between the energy standards and labeling work and any other part of the impact pathway. However, there is potential for such links to be realized in future, eg: standards and labelling could provide incentives that increase demand for energy efficient products that could be financed by the MGFC.
Outcomes – Actual		
5.1 Intermediate outcomes have been achieved		Still in progress at time of writing.

Outcome Area 5: Energy efficiency - Financing

a) Mongolia Green Finance Corporation

BACKGROUND

A key challenge for developing countries is to attract, pool, manage and disburse multiple sources of green finance (international and domestic, public and private) strategically, efficiently and at scale. To help address such challenges, GGGI supports partner governments to develop, capitalize and operationalize national financing vehicles (NFVs).

In 2016, following consultations with various GoM stakeholders and the Mongolian Banker's Association, GGGI identified an opportunity to develop an NFV – the Mongolia Green Finance Corporation (MGFC)⁹. Within the Mongolian context, the MGFC had the potential to help address the high cost of credit and lack of long-term financing, both key barriers to financing of mitigation and adaptation projects. This could be achieved particularly by mobilizing concessional finance and blending this with private finance to improve the financial attractiveness of green investments.

The move to establish a green financing facility aligns well with GoM policies, including the National Green Development Policy (see Outcome Area 2) which proposes the formation of a green credit fund to promote environmentally and socially beneficial investments and provide soft loans for green businesses.¹⁰

OUTPUTS

Planned outputs

Work on the MGFC has taken place through multiple projects under the WPBs for 2015-16, 2017-18 and 2019-20, funded from core and earmarked sources:

- National Financing Vehicles project (2016 and 2017-18, core funding)
- Transition to Green Development – Phase 2 project (2017-18, core funding)
- GCF Readiness support for enhancing access to green finance in Mongolia project (2017-18, GCF funding)
- Mongolia Green Finance Corporation project (2019, core funding)
- Green Invest (2017-18, IPSD, earmarked funded from BMZ)

The key outputs include:

- **Output 1** – Develop design for the MGFC
- **Output 2** – Business model and business plan
- **Output 2** – Market demand and investment potential studies
- **Output 3** - Preparation of legal and contractual documents to support incorporation and operation of the MGFC
- **Output 4** - Developing a proposal to GCF to finance the MGFC
- **Output 5** – Engagement with additional potential co-financers for the MGFC

To ensure strong partner participation and support for the MGFC, a steering committee was set up in 2016, led by MET and the Mongolia Bankers Association. Members of the group included representatives from all 15 banks in Mongolia, Ministry of Finance, Bank of Mongolia, Ulaanbaatar City Council, ERC and National Chamber of Commerce

⁹ Formerly the *Mongolia Green Credit Fund*.

¹⁰ Action 3.4, Activity Number 2, p.34, [Green Development Policy Action Plan](#) (2016)

and Industry. Partnerships were further strengthened via the signing of an MOU between MET, MOF, MBA and GGGI on the roles and responsibilities for establish the MGFC in September 2017.

Actual outputs

- **Output 1** – Develop design for the MGFC

A design for the MGFC was completed and submitted to the steering committee in August 2016. The design considered issues including: economic, legal and regulatory context; preliminary assessment of potential markets for green finance; possible institutional arrangements for the MGFC; and potential financial products to be offered by the fund.

- **Output 2** – Business model and business plan

In May 2017, GGGI completed a proposed business model and business plan for the MGFC. This built on the MGFC design and but elaborated further on: the proposed legal form of the MGFC; governance arrangements including shareholder composition; financial operational model of the MGFC; and proposed investment criteria and approval processes.

- **Output 3** - Market demand and investment potential studies

The delivery of this output involved the preparation of market demand and investment potential studies between August 2017 and March 2018 in various areas: (1) alternative heating solutions (2) waste management and sanitation (3) green residential buildings (4) energy efficiency. Energy efficiency measures in large energy consumers and buildings were identified as key target markets for the MGFC. Part of the studies comprised energy efficiency audits of 15 so-called designated entities¹¹, which are discussed further under Outcome Area 6.

- **Output 4** - Preparation of legal and contractual documents to support incorporation and operation of the MGFC

Documents for the incorporation and operation of the MGFC were completed and provided to the MGFC Steering Committee. These included a draft shareholder agreement, draft term sheet, draft operations manual, and a draft CEO contract.

- **Output 5** - Developing a proposal to GCF to finance the MGFC

A GCF funding proposal for the MGFC was completed in March 2018 and submitted to GCF in July 2018. GGGI played a major role in preparing the proposal, though it was submitted under the name of Xac Bank, as they are a GCF accredited entity. Several workshops to consult with key government and private sector stakeholders were undertaken as part of the proposal preparation.

The proposal sought \$27m from GCF, comprised of \$5m in equity, \$20m in loans and \$2m in grants. A further \$23m was committed by other partners, namely \$5m each from the Ministry of Finance and the Mongolian Sustainable Finance Association, and \$13m in loans from MET.

The initial focus of the MGFC was on energy efficiency markets, with a focus on thermal insulation of existing buildings, energy efficiency improvements for large energy users, and mortgages for green affordable housing. Estimated impacts include GHG reductions of 3,386,335 tCO₂eq, 2000 jobs created and 104,602 people benefited over a 15 year period.

¹¹ Designated entities are organizations identified as having exceeding energy use thresholds set by GoM under the Law of Energy Conservation, which then triggers obligations for them to report on and reduce energy use.

- **Output 6** – Engagement with additional potential co-financers for the MGFC

This output is being delivered under a 2019 PIN and is presently ongoing. The primary activity here is engagement with the AIIB to raise interest and secure commitment to co-finance the MGFC, arising from feedback from GCF on the proposal delivered under Output 5.

OUTCOMES

Planned outcomes

The intended outcome is for the MGFC to be established, capitalized and operational to provide finance to green projects that contribute to Mongolia’s NDCs and GDP.

Actual outcomes

At the time of writing, the outcome was still in progress. Establishment of the MGFC as a legal entity, and capitalization of the fund, depends on approval by the GCF Board to finance the MGFC (as per the proposal submitted to GCF under Output 5). Although other partners have committed to provide finance to the MGFC, success is not yet assured, and without securing GCF support, it is unlikely that MGFC would proceed.

The MGFC proposal was submitted to GCF in 2018 and since then has been undergoing discussions between GCF and various partners (including GGGI) to address issues raised by GCF’s internal assessment processes. The issues raised include:

- Request for equity partners to raise their equity from \$3m to \$5m each – this was agreed to.
- Recommendation to seek other co-financers in addition to GCF – as noted under output 6, GGGI has initiated discussions with AIIB about this possibility. However, the prospects of success here looked uncertain as the costs of AIIB finance are understood to be too high for the MGFC.
- Assessment of ways to strengthen the proposed MGFC governance arrangements, pre-selection of the management team and stakeholder engagement - this assessment has been conducted by an external firm engaged via a separate GCF Project Preparation Facility proposal.¹² The preliminary report found that *“the MGFC is indeed the right answer in addressing the market gap for green finance in Mongolia”* and *“has the potential to become a transformative institution”*.¹³

Pending resolution of some/all of these issues, GCF will then need to decide whether to initiate a formal technical assessment of the proposal before then submitting it to the GCF Board for decision, which is anticipated to happen in March 2020. Irrespective of the outcome, several stakeholders indicated that the MGFC would not have progressed to its current point without GGGI’s involvement.

IPR ASSESSMENT

Applicable IPR standards	Assessment	Comments / Evidence
Outputs – Planned		
3.1 Outputs are clearly and measurably described		Based on review of project documents and logframes, and interviews with relevant stakeholders.

¹² This PPF proposal was prepared by GGGI as part of its GCF Readiness Project and delivered to Xac Bank, as a contingency in case the GCF Full Proposal submission were unable to secure internal GCF endorsement. This proved an effective strategy as the MGFC remains in GCF’s pipeline.

¹³ Setting up the Mongolian Green Finance Corporation: Preliminary Report, Green Investment Group, July 2019

Applicable IPR standards	Assessment	Comments / Evidence
3.2 Outputs contribute causally to intermediate outcomes		Based on review of project documents and logframe, and interviews with relevant stakeholders.
Outputs – Actual		
4.1 Outputs have been successfully delivered		With the exception of the final output, which is still in progress in 2019, the remainder of the outputs have been delivered. Copies of output reports have been shared with IEU for review.
Outcomes – Planned		
2.1 Intermediate outcomes are clearly and measurably expressed in terms of specific partners undertaking desired actions		Based on review of project documents and logframe, and interviews with relevant stakeholders.
2.2 Intermediate outcomes contribute causally to each other and to impact		Links to entities designated as high energy users and retrofitting of residential buildings: If successfully established, initial target markets for MGFC financing (as described in the GCF funding proposal) include: (1) entities designated as high energy users under the Law on Energy Conservation and (2) thermal insulation of existing residential buildings.
Outcomes - Actual		
5.1 Intermediate outcomes have been achieved		Although investor commitment has been obtained from some partners, successful establishment and capitalization of MGFC appears to rest at this point on a positive decision by GCF to finance the MGFC. At time of writing, this decision is still in progress, and it remains too soon to judge the outcome.

b) Promoting ESCOs

BACKGROUND

Energy efficiency represents a cost-effective and greener option for Mongolia to meet growing energy demands than expanding coal fired power generation. Through measures such as the National Green Development Policy (2014), Energy Conservation Law (2015) and NEEAP (2017), the GoM has sought to develop a policy and regulatory environment that both mandates and incentivizes efficient use of energy. Given the fiscal constraints currently faced in Mongolia, there is significant interest by GoM to build a market for ESCOs to help finance and deliver energy efficiency gains.

Presently, an ESCO market does not yet exist in Mongolia and many challenges remain to establishing one, due to factors such as heavily subsidized energy tariff. Only 1 entity has been issued an ESCO license by ERC, and no ESCO projects have yet been signed in the country. Despite progress in creating a supportive policy environment, further work is needed to generate credible, high quality ESCO projects that can deliver the desired economic and environmental benefits for all parties involved. Reform of energy tariffs also requires attention to ensure the financial viability of ESCO projects. And as ESCOs are new in Mongolia, further effort is also needed to build the understanding and capacity of stakeholders to develop, finance and implement ESCO projects.

Against this backdrop, GGGI has been supporting the ERC and other stakeholders in efforts to create the enabling conditions required for an ESCO market to take hold and scale in Mongolia.

OUTPUTS

Planned outputs

Key outputs planned for delivery include:

- **Output 1** – Study of energy efficiency incentive mechanisms (ERC)
- **Output 2** – Knowledge sharing between Mongolia stakeholders and ESCOs in China and Slovakia (ERC, MoE)
- **Output 3** – Develop national roadmap for energy efficiency of buildings (UB City and MCUD)
- **Output 4** – Mobilize resources for a capacity building program on energy tariff reform (ERC)
- **Output 5** – Deliver workshops on implementing the National Energy Efficiency Action Plan (ERC and UB City)
- **Output 6** – Develop calculation methodologies for energy performance contracts (ERC)
- **Output 7** – Develop standard requirements for energy performance contracts (ERC)
- **Output 8** – Legal review of draft ESCO contract between Mongolia and Chinese ESCO companies (ERC)

Work in this area was / is being implemented under various projects under the 2017-18 and 2019-20 WPBs:

- *Transition to Green Development Phase 2* project (2017-18, core funded)
- *Promoting energy efficiency and ESCO development* project (2019, core funded)

Actual outputs

At the present time, most of these outputs are in the process of being delivered in 2019-20, so it remains too early to comment on their status. Output 3 was cancelled due to a lack of sufficient interest from MCUD. Some initial deliverables relating to Outputs 1 and 2 were completed in 2018. They included:

- **Output 1** - A legal review of energy efficiency incentives, which analyzed existing laws and regulations and identified opportunities for reforms that could further incentivize energy saving behaviors and the growth of a healthy ESCO market in Mongolia.
- **Output 2:** Three knowledge sharing events/study visits for GoM stakeholders to learn from ESCO experiences in other similar countries. Two visits were to China, focusing on linking Chinese ESCOs with potential projects in the Mongolian energy sector. The other visit was to Slovakia, to learn about how the ESCO model could be applied to residential and public building retrofits. As a result of the visit to China, GGGI facilitated signing of MoU between the ERC and Chinese National Institute of Standardization and the National Energy Conversation Center of China in 2018 and 2019, respectively.

OUTCOMES

Planned outcomes

Collectively, the outputs aim to create an attractive and enabling environment in Mongolia for an ESCO market to develop. The intended outcome is:

- **Outcome 1** - At least 1 ESCO project signed and financed in Mongolia

Actual outcomes

It remains too soon to assess this at present, noting that most of the outputs are not expected to be delivered until 2020.

Based on discussions with stakeholders, it is understood that, ideally, an ESCO project would be originated based on one of the 15 Designated Entities that GGGI undertook energy efficiency audits for (see Outcome Area 6). These

entities – particularly those in the power sector – are viewed as potentially viable projects for ESCOs to invest in, given the high levels and/or intensities of their energy use.

IPR ASSESSMENT

Applicable IPR standards	Assessment	Comments / Evidence
Outputs – Planned		
3.1 Outputs are clearly and measurably described		Based on review of project documents and logframe, and interviews with relevant stakeholders.
3.2 Outputs contribute causally to intermediate outcomes		The outputs will likely contribute to the intended outcome of an ESCO project being financed, although the contribution is of a distal rather than proximate nature. There appear to be other factors outside of GGGI's control that could significantly influence the achievement of the intended outcome (eg: tariff levels, presence of an interested and willing ESCO, ERC readiness to approve ESCO licences/projects).
Outputs – Actual		
4.1 Outputs have been successfully delivered		Still in progress at time of writing. Discussions with stakeholders suggests that GGGI's work may be evolving beyond ESCOs to include more diverse range of mechanisms for financing energy efficiency. It may be advisable for the Mongolia Program to consider updating relevant logframes/other information in <i>GGGI Online</i> at some point, to ensure this is clearly understood more broadly within GGGI.
Outcomes – Planned		
2.1 Intermediate outcomes are clearly and measurably expressed in terms of specific partners undertaking desired actions		Based on review of project documents and logframe, and interviews with relevant stakeholders.
2.2 Intermediate outcomes contribute causally to each other and to impact		<p>Links to entities designated as high energy users: GGGI has been supporting the GoM to establish relationships with Chinese ESCOs and explore their interest in investing in energy efficiency opportunities in Mongolia. The results of energy efficiency audits conducted for an initial 15 designated entities are designed to present some initial investment opportunities for consideration by ESCOs.</p> <p>Links to retrofitting of residential buildings: Under the concept note submitted to the NAMA Facility, the project (if funded) proposes to establish a first-ever energy performance contracting model (including a blended finance fund, a standard offer program and on-bill repayments) to help unlock ESCO financing in Mongolia. If successful, ESCO financing would then be mobilized to help retrofit the remaining stock of 702 pre-cast residential buildings in Ulaanbaatar.</p>
Outcomes - Actual		

Applicable IPR standards	Assessment	Comments / Evidence
5.1 Intermediate outcomes have been achieved		Too soon to assess as output delivery is still in progress.

Outcome Area 6: Energy efficiency - Project development

a) Retrofit of buildings

BACKGROUND

In Mongolia, low energy efficiency of Soviet-era precast buildings contributes significantly to energy consumption, air quality issues, GHG emissions and the comfort/wellbeing of residents during extremely cold winters. This is particularly the case in Ulaanbaatar, where such buildings make up 30% of the building stock. Mongolia's NDC thus includes a commitment to reduce building heat lost by 40% by 2030 from baseline (2014) levels.

The origins of GGGI's work in this area stem from its support to Ulaanbaatar (UB) City Council to help determine its contribution to Mongolia NDCs and formulate a climate investment program (see Outcome Area 3). As part of this work, GGGI identified 18 priority projects that met the development needs of the city whilst also delivering significant GHG reductions. While efforts to persuade the UB government to proceed with this program were ultimately unsuccessful, the government did agree to collaborate with GGGI to advance 1 of the 18 projects: energy efficient retrofitting of public residential buildings.

OUTPUTS

Planned outputs

Outputs identified for delivery under this program area include:

- **Output 1** – Undertake an energy audit of 3 precast residential buildings in Ulaanbaatar
- **Output 2** – Develop a program on energy performance contracting for residential retrofitting in Ulaanbaatar

This work has been carried out under the following projects under the WPB 2017-18 and WPB 2019-20:

- *Mongolia Transition to Green Development – Phase 2* project (2017-18, core funded)
- *Green Invest* project (2017-18, earmarked funding from BMZ)

Actual outputs

- **Output 1** – Undertake an energy audit of 3 precast residential buildings in Ulaanbaatar

GGGI, in partnership with Ulaanbaatar Mayor's Office and the ERC, initiated an energy audit of 3 residential buildings. Three pre-cast concrete buildings were selected and underwent heat metering to model the potential energy (heat) efficiency and financial gains from retrofitting. This work was completed in 2017 and an energy audit report was completed.

The audit aimed to fill a key gap in the literature, which was the lack of data on how much energy could be saved from retrofits. The buildings selected for audits reflected 3 types of standardized building designs (5, 9 and 12 stories) that make up the total stock of such buildings in Ulaanbaatar. Thus, the data generated from these audits could be used to help build a larger-scale business case for retrofitting of not just 3 buildings but the total 1077 pre-cast residential buildings.

- **Output 2** – Develop a program on energy performance contracting for residential retrofitting in Ulaanbaatar

Drawing on key data obtained from the audits conducted in Output 1 above, as well as lessons from several other studies, GGGI has developed a larger program to retrofit residential buildings at scale in Ulaanbaatar using an energy performance contracting (EPC) model.

The first phase of the program, lasting 5-years, has 3 components:

- *Component 1* - seeks to retrofit 375 buildings, representing 35% of the total stock of 1077 buildings. It is estimated that this could deliver 1,351 MWh/year of energy savings and reduce 96,891 tCO₂e per year. Around 68,000 residents (14,766 households) would benefit and 1068 new jobs created in local construction and manufacturing firms.
- *Component 2* – operationalize the EPC model in Mongolia for the retrofits, supported and facilitated by: a blended fund to provide grants and concessional loans to ESCOs/construction firms; a Standard Offer Program as the basis for payments to ESCOs; and on-bill repayments to better enable households to pay for energy efficiency investments.
- *Component 3* – develop enabling policies and standardized EPC documents and processes, reform heat tariffs and build capacity of key stakeholders.

As part of the development of the program, GGGI supported the Mayor’s Office of Ulaanbaatar to undertake stakeholder consultations across government and private sector to raise awareness and build support for the program.

GGGI, in partnership with ICLEI, Mayor’s Office of Ulaanbaatar, MET and MCUD, prepared and submitted a concept note to the NAMA Facility 6th call in March 2019. The concept note ultimately seeks to secure investment of EUR 18m for the first phase.

If successful in setting up the EPC model and tariff reform, it is expected that the remaining 702 buildings could be retrofitted in later phases of the program, through financing from the private sector and ESCOs without the need for significant government/donor funding support.

OUTCOMES

Planned outcomes

The intended outcome of this work was:

- **Outcome 1** – mobilize financing for energy efficiency retrofits of residential buildings

Actual outcomes

As a result of the work undertaken above, the Mayor’s Office of Ulaanbaatar successfully secured an allocation of MNT 12.8b (USD 4.8m) in the state budget to finance retrofitting for an initial 24 residential buildings. Stakeholders noted that GGGI’s support, which included technical work on energy efficiency audits and household willingness to pay surveys, was instrumental in assisting the Mayor’s Office to persuade decision makers to commit this allocation.

Depending on the outcome of the NAMA Facility process, additional investment of EUR 18m may be secured to finance the retrofit of a further 375 buildings. A technical team from the NAMA Facility conducted an in-country assessment in July 2019, and in early September, GGGI was given approval and earmarked funding of EUR 380,000 to prepare a detailed proposal for the first phase of the program. This is due to be submitted in 2020. If successful, the program is expected to be implemented by GIZ, as GGGI is not an accredited implementer under the NAMA Facility and generally does not get directly involved in delivery of construction works.

IPR ASSESSMENT

Applicable IPR standards	Assessment	Comments / Evidence
Outputs – Planned		
3.1 Outputs are clearly and measurably described		Based on review of project documents and logframe, and interviews with relevant stakeholders.
3.2 Outputs contribute causally to intermediate outcomes		Based on review of project documents and logframe, and interviews with relevant stakeholders.
Outputs – Actual		
4.1 Outputs have been successfully delivered		Output 1 – Final report on the energy audit of 3 buildings was shared with IEU for review.
		Output 2 – Final concept note submitted to NAMA Facility was shared and approval has recently been given to proceed to the detailed proposal preparation stage. Thus, the output is considered still in progress overall.
Outcomes – Planned		
2.1 Intermediate outcomes are clearly and measurably expressed in terms of specific partners undertaking desired actions		Based on review of project documents and logframe, and interviews with relevant stakeholders.
2.2 Intermediate outcomes contribute causally to each other and to impact		<p>Links to the MGFC: Energy audits of pre-cast concrete residential buildings conducted by GGGI helped inform assessments of market potential for the MGFC and the development of the GCF funding proposal.</p> <p>Links to retrofits of residential buildings: The proposed retrofitting program submitted to the NAMA Facility includes components designed to incentivize and enable ESCOs to finance further building retrofits in future.</p>
Outcomes – Actual		
5.1 Intermediate outcomes have been achieved		Mobilization of investment for the 375 residential buildings is in progress and will depend on the outcome of the detailed proposal being submitted to the NAMA Facility in 2020. In the meantime, state budget allocation of around USD 4.8m has been mobilized for an initial 24 buildings.

b) Energy efficiency audits

BACKGROUND

Under the Law of Energy Conservation and related regulations, consumers identified and designated as large energy users (based on thresholds set by the ERC) are subject to a range of obligations including but not limited to:¹⁴

¹⁴ As outlined in regulations to the Law on Energy Conservation <http://erc.gov.mn/web/en/files?tag=18>

- Monitor and report their annual energy consumption
- Appoint an energy conservation manager
- Complete a detailed energy audit within the first 18 months
- Develop an energy conservation program and annual plan for its implementation

As of December 2018, around 135 organizations had been designated by the ERC as large energy consumers under the law/regulations.¹⁵ Under the MOU signed with the ERC in 2017, GGGI committed to support ERC with developing energy efficiency projects for financing, focused on these designated entities.

OUTPUTS

Planned outputs

The planned output in this program area was to undertake energy audits for 15 designated entities to identify opportunities for financing and implementation of energy conservation measures. From ERC's perspective, the audits would also help generate concrete examples to demonstrate to potential financiers that there were sound investment opportunities in energy efficiency area.

This work was undertaken as part of the following projects under the WPB 2017-18:

- *Mongolia Transition to Green Development – Phase 2* project (core funded)

Actual outputs

A firm was engaged and energy audits of the 15 designated entities were conducted during May and July 2017. A final report summarizing the findings of the audit was completed in October 2017. In total, the audits identified energy conservation measures estimated to generate the following impacts:

- *Energy savings:*
 - 259,770,378 kWh/yr in electricity savings
 - 701,295 GCal/yr in thermal energy savings
 - 78,033 tonnes/yr in reduced coal consumption
- *Monetary savings:*
 - MNT 50,818m/year (around USD 19m at time of writing)
- *GHG reductions:*
 - 620,230 tCO₂eq/yr

The total investment value of the measures was estimated at MNT 143,431m (around USD 53m at time of writing).

OUTCOMES

Planned outcomes

The intended outcome was to mobilize financing to implement the energy efficiency measures identified through the audits of the 15 designated entities.

Actual outcomes

¹⁵ As reported in the UB Post on 3 December 2018 - <https://theubposts.com/mongolia-targets-escos-to-achieve-sdgs/>

One of the entities – Chingis Hotel – secured USD 10k from GIZ and installed 2 variable frequency drives to air handling units, resulting in a 20% increase in energy efficiency.

For other entities, no financing has been mobilized yet at the time of writing, although efforts were being made to facilitate this. These included:

- Attempted establishment of the MGFC which could provide a source of financing for these (and other future) designated entities (see Outcome Area 5)
- Brokering of relationships with ESCOs in China who have demonstrated interest in some of the 15 designated entities (see Outcome Area 4)
- Reaching out to providers of concessional green financing (eg: Xac Bank) to explore financing potential
- Exploring financing opportunities under Japan’s Joint Crediting Mechanism

IPR ASSESSMENT

Applicable IPR standards	Assessment	Comments / Evidence
Outputs – Planned		
3.1 Outputs are clearly and measurably described		Based on review of project documents and logframe, and interviews with relevant stakeholders.
3.2 Outputs contribute causally to intermediate outcomes		Based on review of project documents and logframe, and interviews with relevant stakeholders.
Outputs – Actual		
4.1 Outputs have been successfully delivered		A copy of the final report was shared with IEU for review.
Outcomes – Planned		
2.1 Intermediate outcomes are clearly and measurably expressed in terms of specific partners undertaking desired actions		Based on review of project documents and logframe, and interviews with relevant stakeholders.
2.2 Intermediate outcomes contribute causally to each other and to impact		<p>Links to MGFC: The energy audits of the 15 designated entities was used to inform assessments of market potential for the MGFC and the development of a full proposal for GCF funding.</p> <p>Links to ESCO promotion: The energy audits of the 15 designated entities provided concrete investment opportunities which were shared with ESCOs in China to attract them to invest in the Mongolian energy efficiency market.</p>
Outcomes - Actual		
5.1 Intermediate outcomes have been achieved		Still in progress at time of writing.

RENEWABLE ENERGY / AIR QUALITY

Outcome Area 7: Renewable energy – Policies

a) Renewable energy storage

BACKGROUND

To achieve its NDC target of reducing GHG emissions by 14% against BAU by 2030, Mongolia aims to increase the proportion of renewable energy in total installed capacity of the energy system to 30% by 2030 (from 7% in 2014). Steps to achieve this have been taken, with several solar and wind power plants coming online in recent years.

Solar and wind are not available on demand but vary in their ability to produce power on a seasonal, daily and even momentary basis. Energy storage solutions are therefore essential if countries are to increase renewable energy absorption and grid stability of the energy system. In addition to addressing the variability challenge of renewables, energy storage can also provide ancillary services that help grids function more efficiently and reliably. Globally, energy storage solutions are maturing - costs are declining, technologies are improving, and installed capacity is increasing.

The GoM is interested in exploring battery storage solutions, particularly given the lack of options for pumped-storage hydropower which has traditionally been the main form of energy storage relied on. However, energy storage technologies remain new to Mongolia and significant policy, financial and technical barriers remain. As part of its MOU with ERC, GGGI initiated work in 2018 to help GoM strengthen its technical capacities and undertake regulatory reform to promote energy storage solutions – particularly in areas of developing power purchase agreements for stand-alone and embedded storage projects and their ancillary services.

OUTPUTS

Planned outputs

Key outputs include:

- Output 1 – Deliver capacity building activities on battery storage technologies with US National Renewable Energy Lab (2018 and 2019)
- Output 2 – Support development of regulations and specifications for battery storage and ancillary services (2019)
- Output 3 – Develop a power purchase agreement template for battery storage projects (2019)
- Output 4 – Prepare draft tender and/or auction documents for battery storage projects (2019)

Work in this program area has been and continues to be undertaken via the following projects:

- *Transition to Green Development Phase 2* project (2017-18, core funded)
- *Mongolia Renewable Energy Absorption* project (2019, core funded)

A working group comprised of ERC, National Dispatch Centre (NDC), Ministry of Energy, the US National Renewable Energy Lab (NREL) and GGGI was established to guide the project.

Actual outputs

At the time of writing, only Output 1 had been delivered, while the rest were still in progress. For Output 1, an initial workshop was delivered in November 2018 by GGGI and NREL to strengthen GoM understanding on utility scale battery technologies and their ancillary services.

For 2019, further capacity building activities were expected to be carried out by NREL, however they have decided to withdraw from further involvement in the project. Within framework of the MoU signed with ERC, GGGI consulted with the National Dispatch Center to deliver technical assistance on contract management in addition to assessment of current energy infrastructure and analysis of existing regulatory frameworks for energy storage applications.

OUTCOMES

Planned and actual outcomes

The intended outcome is to contribute to at least 1 energy storage project being financed for implementation. Currently, it is too soon to assess the outcome, since all outputs are still in progress.

IPR ASSESSMENT

Applicable IPR standards	Assessment	Comments / Evidence
Outputs – Planned		
3.1 Outputs are clearly and measurably described		Based on review of project documents and logframe, and interviews with relevant stakeholders.
3.2 Outputs contribute causally to intermediate outcomes		The outputs are focused capacity building and development of Power Purchase Agreements. No project preparation work is being undertaken at this time due resource constraints. GGGI's outputs will contribute but are insufficient on their own to achieve the desired outcome.
Outputs – Actual		
4.1 Outputs have been successfully delivered		Delivery of most outputs are still in progress.
Outcomes – Planned		
2.1 Intermediate outcomes are clearly and measurably expressed in terms of specific partners undertaking desired actions		Based on project documents, the intended outcome is clear.
2.2 Intermediate outcomes contribute causally to each other and to impact		Not applicable at this stage, as there is no downstream work/outcomes currently being undertaken or planned in relation to energy storage.
Outcomes - Actual		
5.1 Intermediate outcomes have been achieved		Delivery of most outputs are still in progress. But as noted above, GGGI's work alone is probably insufficient on its own to achieve the desired outcome.

Outcome Area 8: Renewable energy – Project Development

a) Clean heating solutions

BACKGROUND

Air quality is an issue where the GoM and GGGI share overlapping priorities. Mongolia experiences some of the most severe air pollution in the world, particularly in Ulaanbaatar, and there is strong political commitment to urgently tackle this issue. At the same time, GGGI adopted 6 new strategic outcomes in its Refreshed Strategic Plan in 2017, one of which was to reduce air pollution in partner countries.

In 2018, GGGI thus assessing opportunities to contribute more explicitly to tackling this issue, without duplicating work already being done by other development partners. One possible niche identified was the issue of switching from coal-fired heat only boilers to cleaner heating technologies. Some 3,200 boilers are estimated to be in use in Ulaanbaatar alone, primarily in peri-urban (ger) areas not connected to district heating systems. Together with household coal stoves, they contribute to around 80% of the PM2.5 pollution in in the city. Similar systems are also prevalent in several secondary cities.

As first step into this area, in 2018 GGGI initiated a small project to identify and assess various clean alternatives to heat-only boilers for a single pilot school (School #122) on the outskirts of Ulaanbaatar.

OUTPUTS

Planned outputs

The following outputs have been planned so far in this program area:

- **Output 1** – Develop a project on low carbon boilers for financing at a pilot site
- **Output 2** – Scale up financing and implementation of low carbon decentralized heating technologies

These outputs have been carried out as part of the following projects under the WPBs 2017-18 and 2019-20:

- *Mongolia Transition to Green Development – Phase 2* project (2017-18, core funded)
- *Low Carbon Heat Only Boilers in Public Buildings* project (2019, core funded)

Actual outputs

- **Output 1** – Develop a project on low carbon boilers for financing at a pilot site

In 2018, GGGI supported the MET and Ulaanbaatar city education department to undertake a study into cleaner and low-carbon alternatives to coal fired boilers for a pilot school, School #122 in the Songinokhairkhan district. Three different alternatives were assessed and compared with existing heat only boilers. Options considered included ground source heat pumps, electrode boilers and natural gas boilers.

The study concluded that replacing coal-fired heating systems with ground source heat pumps was the optimal solution. It was assessed as technically feasible and financially viable if total lifecycle costs are considered¹⁶, with the potential to reduce GHG emissions by 133 tCO₂eq and air pollutants (NO_x, SO_x, CO, ash) by 42 tons per year.

¹⁶ Ground source heat pumps have higher upfront investment costs but lower ongoing O&M costs.

The study was completed and shared with MET and National Committee on Air Pollution.

- **Output 2** – Identify and implement actions to scale up financing and implementation of low carbon decentralized heating technologies

There is potential to scale up clean alternatives to heat only boilers. The study undertaken in Output 1 found that around 3,200 low-pressure heat only boilers are currently used to heat buildings in peri-urban areas in Ulaanbaatar. Together they emit an estimated 39,260 tCO₂eq, 876 tons of CO, 39 tons NO_x, 17 tons of SO_x and 5,670 tons of ash.

This output is still in progress in 2019 and involves scoping out ways to potentially scale up financing and implementation of cleaner heating solutions to replace heat only boilers, drawing on lessons from the experience of School #122.

OUTCOMES

Planned outcomes

- **Outcome 1** – Mobilize financing for pilot project

At the time of writing, it is understood that MET and the National Committee on Air Pollution have decided to finance the replacement of one of the two coal-fired heat boilers at School #122. The financing comprises public funds only. MET allocated state budget to implement the business case developed by GGGI as a demonstration project. Construction work is expected to begin in late 2019.

- **Outcome 2** – Scale up financing and implementation of clean alternatives to coal-fired heat only boilers

At the time of writing, it remained too soon to assess this outcome as Output 2 was still in progress. Although the pilot at School #122 was successful in securing financing, the solution applied there is not easily scaled for reasons including limits in suitable sites, technical complexity and affordability. As a result, GGGI is investigating other alternative solutions that have greater scaling potential, building on lessons from the pilot.

IPR ASSESSMENTS

Applicable IPR standards	Assessment	Comments / Evidence
Outputs – Planned		
3.1 Outputs are clearly and measurably described		Based on project documents and discussion with stakeholders, noting that output 2 is still in the process of being scoped.
3.2 Outputs contribute causally to intermediate outcomes		Based on project documents and discussion with stakeholders, noting that output 2 is still in the process of being scoped.
Outputs – Actual		
4.1 Outputs have been successfully delivered		Output 1 delivered in 2018. Report has been shared with IEU for review.
		Delivery of output 2 still in progress.
Outcomes – Planned		

Applicable IPR standards	Assessment	Comments / Evidence
2.1 Intermediate outcomes are clearly and measurably expressed in terms of specific partners undertaking desired actions		Outcome 1 is clear.
		Outcome 2 is clear.
2.2 Intermediate outcomes contribute causally to each other and to impact		Based on project documents and discussion with stakeholders, it is clear this work can contribute measurably to downstream impacts, including reduced GHG emissions and improved air quality.
Outcomes – Actual		
5.1 Intermediate outcomes have been achieved		Outcome 1 – MET has allocated state budget to replace the heat only boiler at School #122, based on the business case developed by GGGI.
		Outcome 2 – too soon to assess as output 2 is still being delivered.

b) PPP waste to energy project

BACKGROUND

This work originated from an IPSD-led project in 2015 focused on piloting some investment projects based on a public-private partnership (PPP) model. PPPs have attracted interest as a way for governments to mobilize private finance to help meet growing infrastructure demands in the face of fiscal constraints. Moreover, PPPs bring numerous innovative features that potentially help deliver public services faster, at lower cost and higher quality, if developed and implemented well.

At the time of origination, the GoM had been interested in adopting PPPs for some time. A Concession Law was passed in 2010, and followed soon after by supporting regulations, the establishment of a PPP unit and creation of a concessions list. Despite this progress, PPPs remain a new concept overall in Mongolia and numerous challenges remain. These include low capacity to prepare and implement high quality PPP projects, institutional instability, constrained public finances and weak oversight of the fiscal implications of PPPs.

GGGI's engagement in this area commenced in 2015. Following a period of consultation and scoping work, GGGI and Invest Mongolia Agency (which housed Mongolia's PPP unit) reached agreement to work together to develop and advance PPP projects in two areas: (1) green education buildings (2) waste to energy (WTE). This section covers the WTE project, while green education buildings is covered under Outcome Area 10.

OUTPUTS

Planned outputs

The planned output was to develop a pre-feasibility study for a waste to energy project in Ulaanbaatar. Work on this took place under the WPB 2015-16 via the following projects:

- Project Design & Preparation (2015-16, IPSD, core funded)
- Mongolia Transition to Green Development (2015-16, GGPI, core funded)

Actual outputs

This WTE project had been dormant on Invest Mongolia’s concession list for some time. GGGI’s role was to help develop the project further and advance it towards financing and implementation. Although WTE projects are typically seen as viable PPP projects because of their capacity to generate revenues from energy generation, no WTE projects had been implemented in Mongolia before, let alone via a PPP model.

A consulting firm was engaged to help prepare the study. Data was gathered on the baseline energy and waste management situation, and an analysis conducted on the economic, financial, social, environmental and legal assessment aspects of a potential PPP project. In preparing the study, GGGI worked closely with the UB municipal government, as the management of waste flows in Ulaanbaatar falls within their jurisdiction.

The pre-feasibility study was completed in April 2016 and presented to working group of GoM stakeholders during workshops hosted by Invest Mongolia. The study examined various scenarios for a potential WTE facility with a capacity of 65MW, capital requirement of USD 181m and 30-year contract period. It concluded that significant government support would be required to make the project viable as a PPP, including increases to waste gate fees and feed in tariffs, supply contracts to guarantee waste inputs, subsidies for construction and/or operation.

OUTCOMES

Planned and actual outcomes

The original intended outcome was for the project to be approved to proceed to the feasibility stage.

In practice, the GoM never reached the point of making this decision, due to external factors beyond GGGI’s control. Following legislative elections in 2016, Invest Mongolia was disbanded and replaced with the National Development Agency, causing a loss of key counterparts that had been working with GGGI up to that point.

At the same time, a deterioration in Mongolia’s fiscal situation led the GoM to temporarily suspend work on concession-listed projects as part of an effort to rein in public expenditures. As a result, GGGI discontinued work on this project at the end of the WPB 2015-16 period.

Had these events not occurred, it is uncertain whether the project would have advanced further, given the challenging conditions that needed to be met for the project to be viable as a PPP. The study also noted other non-PPP WTE projects being developed by private actors at the time, which were potentially competing for government support.

IPR ASSESSMENTS

Applicable IPR standards	Assessment	Comments / Evidence
Outputs – Planned		
3.1 Outputs are clearly and measurably described		Based on project documents and discussions with key stakeholders.
3.2 Outputs contribute causally to intermediate outcomes		Based on project documents and discussions with key stakeholders.
Outputs – Actual		
4.1 Outputs have been successfully delivered		Copies of all outputs completed were shared with IEU for review.

Applicable IPR standards	Assessment	Comments / Evidence
Outcomes – Planned		
2.1 Intermediate outcomes are clearly and measurably expressed in terms of specific partners undertaking desired actions		Based on project documents and discussions with key stakeholders.
2.2 Intermediate outcomes contribute causally to each other and to impact		The WTE prefeasibility study identified measurable benefits in terms of energy consumption savings and reductions in GHG emissions.
Outcomes - Actual		
5.1 Intermediate outcomes have been achieved		The intended outcomes were not achieved, due to a combination of reasons including a disbanding of the PPP unit following a change of government, fiscal challenges which precipitated an IMF bailout package, and mixed conclusions arising from the WTE pre-feasibility study.

GREEN CITIES

Outcome Area 9: Green urban development – Policies

a) Revised Law on Urban Development and Green Materials Database

BACKGROUND

Under the WPB 2017-18, GGGI agreed to collaborate with the Ministry of Construction and Urban Development (MCUD) to improve urban planning and promotion of green buildings.¹⁷ This sought to address various recognized challenges in Mongolia:

- Rapid growth of informal settlements driven by urbanization and poor urban planning
- Heating of buildings being a major consumer of energy and poorly designed buildings leading to significant heat losses

The need to improve and promote greener urban planning and green buildings were both identified as priorities in Mongolia's National Green Development Policy. In addition, Mongolia's NDC included a target of reducing building heat loss by 40% by 2030, compared to 2014 levels. Similarly, on GGGI's side, these selected areas of cooperation were also aligned to areas of priority under Mongolia CPF 2016-20.

OUTPUTS

Planned outputs

Work in this program area was undertaken as part of the *Transition to Green Development Phase 2* project (2017-18, core funded). Key outputs undertaken included:

- **Output 1** - Revision of Law on Urban Development
- **Output 2** - Development of a database on green building construction materials

Actual outputs

- **Output 1** - Revision of Law on Urban Development

The aim of this output was to support MCUD to amend the Law on Urban Development. The MCUD was obliged by a parliamentary decree to revise the law by the end of 2018. A team of legal experts was contracted to support the delivery of this work. A Needs Assessment Report was prepared, which identified the issues needing revision and provided recommended to address these. Issues covered included:

- Effectiveness of the law in achieving its stated goals and objectives
- Problems affecting implementation of the law
- Inconsistencies between the Law on Urban Development and other related laws
- Budgetary and institutional issues relating to implementation of the law

The assessment also involved several rounds of consultations with urban development officials/experts within MCUD and other stakeholder groups. This work was completed and shared with MCUD in 2017.

¹⁷ <https://gggi.org/press-release/mainstreaming-green-growth-underway-in-mongolias-urban-development-and-construction-sector/>

- **Output 2** – Development of a database on green construction building materials

The output was made up of 3 parts:

- To identify specifications for green building materials
- Assess the baseline state of market demand and supply for such green building materials in Mongolia
- Develop a database of green building materials and promote this to the private sector

A report addressing the first and second parts was completed in 2017 and submitted to MCUD. An online database for green building materials (Mongolian language only) has also been released:

<http://www.greenbuilding.mn>

OUTCOMES

There are two separate outcomes that existed for this work, reflecting the fact that there are no substantive causal relationships linking outputs 1 and 2 together.

Revision of the Law on Urban Development

- **Planned outcome:** The intended outcome of this work was to support the MCUD to meet its obligation to amend the Law on Urban Development by 2018. The main purpose of amending the law appears to be periodic general maintenance and improvement of the law, rather than anything specifically to do with promoting greener urban planning.
- **Actual outcome:** At the time of writing, it is understood that the amended law has not yet been submitted to parliament for approval. In any case, GGGI has discontinued further work on progressing the revision of this law, given its low relevance to its green growth mandate.

Green building materials database

- **Planned outcome:** The intended outcome was to facilitate greater use of green building materials by construction companies in Mongolia, by making it easier for them to access information on what green materials are available on the market.
- **Actual outcome:** The database has been released but, it is beyond the scope/capacity of this review to evaluate the extent to which this has changed the types of materials being used by construction companies.

Following the completion of work in this area, GGGI decided to prioritize work in other program areas and no follow up work with MCUD is currently planned for now.

IPR ASSESSMENT

Applicable IPR standards	Assessment	Comments / Evidence
Outputs – Planned		
3.1 Outputs are clearly and measurably described		Based on project documents and discussions with key stakeholders.
3.2 Outputs contribute causally to intermediate outcomes		<i>Revision of Law on Urban Development:</i> The link from the output to the outcome is clear.
		<i>Database on green building materials:</i> A database would contribute to uptake of green building materials in the

Applicable IPR standards	Assessment	Comments / Evidence
		construction sector, but on its own is likely insufficient to trigger the outcome. Other incentives would likely be required.
Outputs – Actual		
4.1 Outputs have been successfully delivered		Based on project documents and discussions with key stakeholders.
Outcomes – Planned		
2.1 Intermediate outcomes are clearly and measurably expressed in terms of specific partners undertaking desired actions		Based on project documents and discussions with key stakeholders.
		Based on project documents and discussions with key stakeholders. This is rated amber because the outcome, although clear, is not easily measurable.
2.2 Intermediate outcomes contribute causally to each other and to impact		<i>Revision of Law on Urban Development:</i> The revision of the law was not driven by particular purpose related to greening Mongolia’s approach to urban development. There is thus no causal linkage between this work and any downstream outcomes or final impacts in Mongolia’s impact pathway.
		<i>Database on green building materials:</i> Greater use of building materials by construction companies could potentially contribute to tangible environmental and social benefits, particularly if they were used as part of efforts to meet recognized green building standards. However it was not possible to check if such causal links had been realized as part of this IPR.
Outcomes – Actual		
5.1 Intermediate outcomes have been achieved		<i>Revision of Law on Urban Development:</i> Too soon to assess at the time of writing.
		<i>Database on green building materials:</i> Not within capacity of this review to assess.

Outcome Area 10: Green urban development - Project development

a) Green kindergarten

BACKGROUND

There is a significant need to increase the stock of education buildings in Mongolia to meet growing needs in the education sector. At the same time, education buildings have historically been quite poorly designed in terms of energy and resource efficiency. Around 10% of education budget is reportedly spent on electricity, heating, water, sanitation and fuel, and 76% of this is spent on coal-based heating which is a major contributor to air pollution.

In line with the priorities of the National Green Development Policy (see Outcome Area 2), the MET prioritized the promotion of green buildings for the economic, social and environmental benefits they can potentially deliver. In 2014, they committed to constructing a green kindergarten in Ulaanbaatar as a demonstration site and requested GGGI's assistance to help design the facility.

OUTPUTS

Planned outputs

The intended output was to develop a design for a pilot green kindergarten. This work was delivered under the *Mongolia Transition to Green Development – Phase 1* project (core funded) under the WPB 2015-16.

Actual outputs

GGGI supported the design of a green kindergarten building for a designated ger area site in the 25th khoroo of Songino-Khairkhan district. Several activities were carried during 2015-16:

- Design concept developed in cooperation with Green Technology Center Korea (GTCK)
- Identification and allocation of suitable public land for the green kindergarten building
- Additional design work and technology options analysis based on local market availability
- Cost benefit analysis
- Preparation of construction plans
- Preparation of documents and guidance on engineering, procurement and construction phases

The completed building design improved by the national experts was handed over to MET in a ceremony on May 2017. The green kindergarten is expected to reduce GHG emissions by 92-120 tCO₂eq per year compared to conventional designs. While the initial costs are 26% higher, operation and maintenance costs are around half of the costs of conventional buildings.

OUTCOMES

Planned outcomes

Whilst it was intended that GGGI would always exit following the completion of the design work, to be considered successful, the eventual intended outcome was to see a design for a green kindergarten gain approval from key stakeholders to proceed to financing and construction stages.

Actual outcomes

Following the handover of the design, MET took over responsibility for finding a financier for the project and succeeded in doing so. In April 2018, the GoM signed a \$50m loan agreement with the ADB for the *Sustaining Access*

to and Quality of Education During Economic Difficulties Project. The loan included USD 600,000 to construct the green kindergarten. It is understood that procurement for construction works is taking place in 2019.

IPR ASSESSMENT

Applicable IPR standards	Assessment	Comments / Evidence
Outputs – Planned		
3.1 Outputs are clearly and measurably described		Based on project documents and discussions with key stakeholders.
3.2 Outputs contribute causally to intermediate outcomes		Based on project documents and discussions with key stakeholders.
Outputs – Actual		
4.1 Outputs have been successfully delivered		Copies of completed outputs were shared with IEU for review.
Outcomes – Planned		
2.1 Intermediate outcomes are clearly and measurably expressed in terms of specific partners undertaking desired actions		Based on project documents and discussions with key stakeholders.
2.2 Intermediate outcomes contribute causally to each other and to impact		The design of the green kindergarten identified measurable benefits including energy consumption savings and reductions in GHG emissions.
Outcomes - Actual		
5.1 Intermediate outcomes have been achieved		MET succeeded in securing ADB financing for the green kindergarten and the project is now reportedly entering the construction phase.

b) PPP green education buildings

BACKGROUND

This work originated from an IPSD-led project in 2015 focused on piloting some investment projects based on a public-private partnership (PPP) model. PPPs have attracted interest as a way for governments to mobilize private finance to help meet growing infrastructure demands in the face of fiscal constraints. Moreover, PPPs bring numerous innovative features that potentially help deliver public services faster, at lower cost and higher quality, if developed and implemented well.

At the time of origination, the GoM had been interested in adopting PPPs for some time. A Concession Law was passed in 2010, and followed soon after by supporting regulations, the establishment of a PPP unit and creation of a concessions list. Despite this progress, PPPs remain a new concept overall in Mongolia and numerous challenges remain. These include low capacity to prepare and implement high quality PPP projects, institutional instability, constrained public finances and weak oversight of the fiscal implications of PPPs.

GGGI's engagement in this area commenced in 2015. Following a period of consultation and scoping work, GGGI and Invest Mongolia Agency (which housed Mongolia's PPP unit) reached agreement to work together to develop and

advance PPP projects in two areas: (1) green education buildings (2) waste to energy (WTE). This section covers the green education buildings project, while the WTE project is covered under Outcome Area 8.

OUTPUTS

Planned outputs

- **Output 1** - Provide advice on suitable PPP models and technical designs for green education buildings
- **Output 2** – Prepare business cases for 10 green education buildings in Ulaanbaatar

Work on these outputs took place under the WPB 2015-16 and WPB 2017-18 via the following GGGI projects:

- Project Design & Preparation (2015-16, IPSD, core funded)
- Mongolia Transition to Green Development (2015-16, GGPI, core funded)
- Mongolia Transition to Green Development - Phase 2 (2017-18, GGPI/IPSD, core funded)
- Green Invest (2017-18, IPSD, earmarked funded from BMZ)

Actual outputs

- **Output 1** - Provide advice on suitable PPP models and technical designs for green education buildings

The original intent was for GGGI to work immediately on project preparation. However, it soon became apparent that GoM partners had questions about how PPP models could be applied to education facilities, as revenue generation mechanisms are less clear. GGGI therefore decided to take a step back and first provide technical advice on suitable PPP models and technical designs for how green education buildings could be delivered via PPPs. This was intended to strengthen GoM understanding and support to proceed to the project preparation stage.

GGGI engaged a consulting firm and worked closely with Invest Mongolia, Ministry of Education and the UB Municipal Government to deliver this work. A report was completed and delivered to GoM partners in April 2016. It provided technical advice on 3 issues:

- Comparison and review of PPP models used in the education sector in other countries, leading to a recommendation of performance-based PPP model as most suitable for Mongolia.
 - Guidance on technical specification options for the design of green education buildings, and analysis of the potential energy efficiency gains and cost savings over the full life cycle¹⁸, which could inform the development of performance standards for performance-based PPP contracts.
 - Recommendations on complementary policy and institutional reforms to improve the enabling environment for PPP projects in Mongolia.
- **Output 2** - Prepare business cases for 10 green education buildings in Ulaanbaatar

Following the delivery of output 1, GGGI had intended to continue working with Invest Mongolia to prepare PPP projects for green education facilities for potential inclusion on their concessions list. However, the disbanding of Invest Mongolia following elections in 2016, along with other external factors, led GGGI to adjust course and try to advance this work through the UB government instead. UB government are functionally separate from the central government, with its own responsibilities for public service delivery, a

¹⁸ The analysis showed that despite higher upfront costs, green buildings could potentially generate energy efficiency savings of +40% while reducing O&M costs by 34-70% over the full asset life, depending on the level of ambition of the 'greenness' of the building design.

separate budget, PPP unit and concessions list, and was thus seen as a good alternate counterpart for this work.

An MOU was signed in 2016 between GGGI, UB government and the ADB¹⁹ to collaborate on a range of PPP-related activities, including the preparation of PPP projects for green education buildings. A working group was established, including the UB Industry Development and Innovation Department (IDI) where the PPP unit was housed, as well as the Education Department. With these partners, 10 education facilities in need of replacement/upgrading were identified as having the potential to be bundled as a single PPP project.

GGGI prepared a PPP business case for the 10 facilities, which were submitted to the working group in 2017. The business case analyzed the costs and benefits of various options and found that compared to the BAU option, the preferred PPP option offered 13% higher value for money, and energy consumption savings of 51-63% and GHG emission reductions of 55%. A proposed structure for financing and implementation of the project with a private partner was also put forward. The total cost of the project was estimated to be USD 8.4m.

OUTCOMES

Planned outcomes

The intended outcome was to secure approval for a PPP project for green education buildings to be included in a concessions list of the UB municipality.

Actual outcomes

Unfortunately, this approval was not given and the project was thus unable to advance any further. This was due a combination of factors including: perceived complexity and riskiness of the PPP model making it a less attractive option compared to other options on the concessions list; changed political attitudes towards PPPs following elections in 2016; and changes in the Concessions Law which prevented local governments from signing new PPP projects. Following this outcome, GGGI decided to discontinue further work on this matter in 2018.

IPR ASSESSMENT

Applicable IPR standards	Assessment	Comments / Evidence
Outputs – Planned		
3.1 Outputs are clearly and measurably described		Based on project documents and discussions with key stakeholders.
3.2 Outputs contribute causally to intermediate outcomes		Based on project documents and discussions with key stakeholders.
Outputs – Actual		
4.1 Outputs have been successfully delivered		Copies of completed outputs were shared with IEU for review.
Outcomes – Planned		

¹⁹ The ADB had been highly active in promoting PPPs in Mongolia up to that point. Internal changes to ADB’s priorities and personnel meant that their commitments under the MOU were not taken forward. Nevertheless, GGGI and UB municipal government continued to work together on its respective areas of the MOU.

Applicable IPR standards	Assessment	Comments / Evidence
2.1 Intermediate outcomes are clearly and measurably expressed in terms of specific partners undertaking desired actions		Based on project documents and discussions with key stakeholders.
2.2 Intermediate outcomes contribute causally to each other and to impact		The business cases for green education buildings identified measurable benefits including energy consumption savings and reductions in GHG emissions.
Outcomes - Actual		
5.1 Intermediate outcomes have been achieved		The intended outcomes were not achieved for the reasons noted above.

IMPACTS

Based on all the country program activities described in the preceding sections, all quantified impact-level results (SOs and selected non-SOs) available at the time of the review have been collated in a single table.

	Program area contributing to impact	Source of impact data	Investor Commitment mobilized	POTENTIAL IMPACTS					
				Monetary savings	Reduced energy consumption	SO1: GHG reduced	SO2: Green jobs created	SO4: Improved air quality	Other impacts
1	ENERGY EFFICIENCY: Energy audits of 15 designated entities (DEs)	Development of pilot energy efficiency projects in Mongolia – Final overall energy audit findings (Annex 2, Document #54, p.16)	GIZ: One of the DEs, Chingis Hotel, secured USD 10k from GIZ to install 2 variable frequency drives to air handling units, resulting in a 20% increase in energy efficiency	MNT 50,819m/yr, equal to around 19m USD/yr at time of writing (p.16)	Electricity: 259,770,378 kWh/yr (p.16) Thermal: 701,295 GCal/yr (p.16) Coal: 78,033 tonnes/yr (p.16)	620,231 tCO ₂ eq/yr (p.16)			
2	ENERGY EFFICIENCY: Energy efficiency retrofits of 375 residential buildings	NAMA Facility Project Outline 6 th Call – Energy performance contracting for residential retrofitting in Ulaanbaatar (Annex 2, Document 53, specific page references are indicated for each impact)	NAMA Facility: EUR 18m (around USD 19.8m) being sought to retrofit 375 buildings (currently preparing detailed proposal to secure investor commitment) GoM: Based on earlier technical work, GoM committed USD		Electricity: 1,351 MWh/yr (p.5)	96,891 tCO ₂ eq/yr (p.5, 24)	1,068 new jobs created (p.19)		68,000 residents (14,766 households) benefit from more energy efficient housing (p.9)

	Program area contributing to impact	Source of impact data	Investor Commitment mobilized	POTENTIAL IMPACTS					
				Monetary savings	Reduced energy consumption	SO1: GHG reduced	SO2: Green jobs created	SO4: Improved air quality	Other impacts
			4.8m (MNT 12.8b) to an initial retrofit of 24 buildings (separate from 375 buildings proposed to NAMA Facility)						
3	ENERGY EFFICIENCY: Mongolia Green Finance Corporation	GCF Funding Proposal – Mongolia Green Finance Corporation (Annex 2, Document #46, specific page references are indicated for each impact)	GoM: USD 5m equity, USD 13m loans (committed) (p.28) MSFA: USD 5m equity (committed) (p.28) GCF: USD 5m equity, USD 20m loans, USD 2m grants (not yet committed) (p.28)		Coal: 657,706 tons over 15 years saved from green affordable houses and thermal insulation of existing houses (p.31)	3,386,335 tCO ₂ eq over 15 yrs (p.1, 50)	2,000 jobs created (40% for women) (p.3, 41)	PM10 in Ulaanbaatar reduced by 24 tons in first year and 769 tons over 15 yrs (p.31) PM2.5 in Ulaanbaatar reduced by 17 tons in first year and 535 tons over 15 yrs (p.31)	104,602 people (50% women) directly benefit from access affordable green financial products (p.3)
4	ENERGY EFFICIENCY: Energy Standards and Labelling program	Market scoping, program design and impact assessment for a Mongolian S&L program (Annex 2, Document #29, p.61, table 5.21)			Electricity: 618 GWh/yr by 2030 (p.61, table 5.21)	758,597 tCO ₂ eq/yr by 2030 (p.61, table 5.21)			

	Program area contributing to impact	Source of impact data	Investor Commitment mobilized	POTENTIAL IMPACTS					
				Monetary savings	Reduced energy consumption	SO1: GHG reduced	SO2: Green jobs created	SO4: Improved air quality	Other impacts
5	RENEWABLE ENERGY: Low carbon boiler for School #122	Low carbon heating for off grid buildings - Business case for 122 public school (Annex 2, Document #57, p.45)	GoM: MET has committed USD (TBC) / MNT (TBC) to replace heat only boiler at School 122 with ground-source heat pump			133 tCO ₂ eq/yr (p.45)		42 t/yr of NO _x /SO _x /CO reduced (p.45)	
6	GREEN URBAN DEVT: Green kindergarten building in 25 th khoroo, Songino-Khairkhan district	Greening Public Buildings in Mongolia (Annex 2, Document #61, p.13)	ADB: USD 600,000 committed (as part of a USD 50m loan package) to construct the green kindergarten, mobilized by GoM (not GGGI)	MNT 1,192m in estimated lifetime benefits, including O&M cost savings, and public health and environmental benefits, equal to around USD 446k at time of writing (p.13)	Coal: 68-89 tons/yr (p.13)	92-120 tCO ₂ eq/yr (p.13)			
	TOTAL GGGI IMPACTS QUANTIFIED (Unless otherwise indicated, totals include all individual impacts listed above)		USD 28.41m mobilized (Chingis Hotel - \$10k, Retrofit of 24 buildings - \$4.8m, MGFC - GoM \$18m and MSFA \$5m, Green kindergarten - \$600k)	USD 19.4m saved, mainly from improved energy efficiency	Electricity: 879 GWh/yr Thermal: 701,295 GCal/yr Coal: 78,101 tonnes	1,475,944 tCO₂eq/yr (Includes 15 DEs, retrofit of 375 residential buildings, ES&L program, HOB replacement for School 122, and the green kindergarten. This potential impact equals around 20% of the annual GHG reductions Mongolia aims to achieve in	3,068 new jobs created	83 t/yr of air pollutants (NO_x, SO_x, CO, PM10, PM2.5) reduced	68,000 residents gain access to more energy efficient housing

Program area contributing to impact	Source of impact data	Investor Commitment mobilized	POTENTIAL IMPACTS					
			Monetary savings	Reduced energy consumption	SO1: GHG reduced	SO2: Green jobs created	SO4: Improved air quality	Other impacts
					2030 under its NDC. (Note: MGFC excluded as its potential impacts are based on broad market assessments, and will likely change depending actual projects that MGFC finances.)			
GOM TARGETS	Mongolia NDC (for SO1, SO3) National Program for Reducing Air and Environmental Pollution, as reported by GGGI (for SO4)				Reduce GHG emissions by 7,168,000 tCO₂eq/yr by 2030 from BAU levels		Reduce PM2.5 to 70 mcg/m3 by 2025 (from 256 mcg/m3 in 2016) Reduce PM10 to 100 mcg/m3 by 2025 (from 279 mcg/m3 in 2016) Reduce SOx to 50 mcg/m3 by 2025 (from 89 mcg/m3 in 2016)	Reduce building heat loss by 40% by 2030 (from 2014 levels) Increase renewable capacity from 7.6% in 2014 to 30% in 2030