

**GREEN  
CLIMATE  
FUND**

**Meeting of the Board**  
28 - 30 June 2016  
Songdo, Incheon, Republic of Korea  
Provisional agenda item 12(e)

**GCF/B.13/16/Add.02**

**8 June 2016**

---

# Consideration of funding proposals – Addendum

## Funding proposal package for FP010

---

### **Summary**

This addendum contains the following three parts:

- a) A funding proposal titled “De-risking and scaling-up investment in energy efficient building retrofits (in Armenia)” submitted by United Nations Development Programme (UNDP);
- b) A no-objection letter issued by the national designated authority or focal point; and
- c) Environmental and social report(s) disclosure.

The documents are presented as submitted by the accredited entity, and national designated authority or focal point, respectively.



## Table of Contents

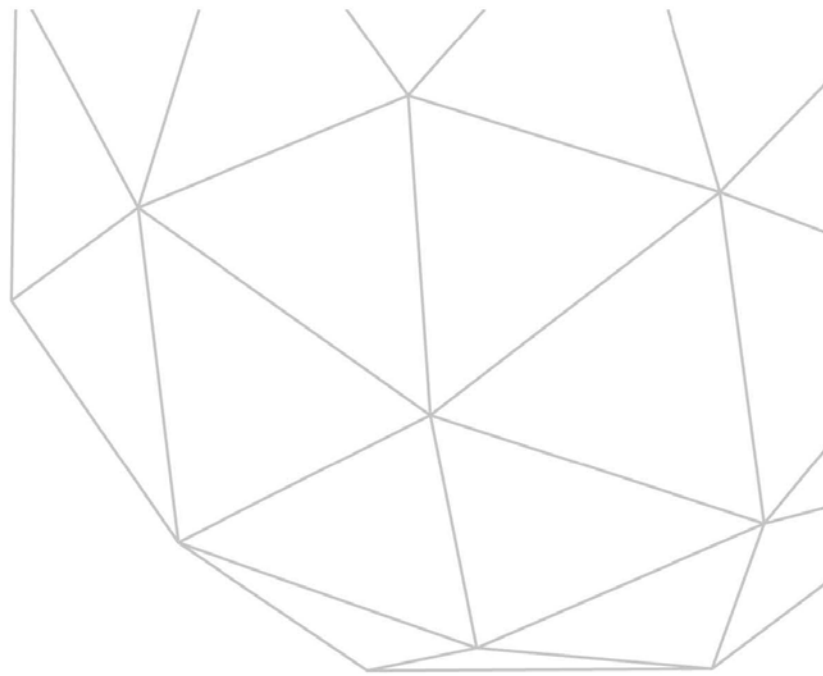
Funding proposal submitted by the accredited entity

No-objection letter issued by the national designated authority or focal point

Environmental and social report(s) disclosure



GREEN  
CLIMATE  
FUND



# Funding Proposal

Version 1.0

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

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

## Contents

Section A	<b>PROJECT / PROGRAMME SUMMARY</b>
Section B	<b>FINANCING / COST INFORMATION</b>
Section C	<b>DETAILED PROJECT / PROGRAMME DESCRIPTION</b>
Section D	<b>RATIONALE FOR GCF INVOLVEMENT</b>
Section E	<b>EXPECTED PERFORMANCE AGAINST INVESTMENT CRITERIA</b>
Section F	<b>APPRAISAL SUMMARY</b>
Section G	<b>RISK ASSESSMENT AND MANAGEMENT</b>
Section H	<b>RESULTS MONITORING AND REPORTING</b>
Section I	<b>ANNEXES</b>

### *Note to accredited entities on the use of the funding proposal template*

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

**Please submit the completed form to:**

[fundingproposal@gcfund.org](mailto:fundingproposal@gcfund.org)

Please use the following name convention for the file name:

“[FP]-[Agency Short Name]-[Date]-[Serial Number]”

**FP-UNDP-220316-5684**

A.1. Brief Project / Programme Information		
<b>A.1.1. Project / programme title</b>	De-Risking and Scaling-up Investment in Energy Efficient Building Retrofits	
<b>A.1.2. Project or programme</b>	Project	
<b>A.1.3. Country (ies) / region</b>	Armenia	
<b>A.1.4. National designated authority (ies)</b>	Ministry of Nature Protection	
<b>A.1.5. Accredited entity</b>	United Nations Development Programme	
<b>A.1.5.a. Access modality</b>	<input type="checkbox"/> Direct <input checked="" type="checkbox"/> International	
<b>A.1.6. Executing entity / beneficiary</b>	<p>Executing Entity: Ministry of Nature Protection</p> <p>Direct beneficiaries include            -30,000 people living in single-family individual buildings and 52,200 in multi-family apartment buildings, including at least 6,000 members of women-headed households; and            - 23,000 users of large public buildings and 105,000 users of small public buildings, including at least 90,000 women.</p>	
<b>A.1.7. Project size category (Total investment, million USD)</b>	<input type="checkbox"/> Micro ( $\leq 10$ ) <input checked="" type="checkbox"/> Small ( $10 < x \leq 50$ ) <input type="checkbox"/> Medium ( $50 < x \leq 250$ ) <input type="checkbox"/> Large ( $> 250$ )	
<b>A.1.8. Mitigation / adaptation focus</b>	<input checked="" type="checkbox"/> Mitigation	
<b>A.1.9. Date of first submission</b> Date of last submission	30 July 2015 8 April 2016	
<b>A.1.10. Project contact details</b>	Contact person, position	Robert Kelly, Technical Advisor
	Organization	UNDP
	Email address	<a href="mailto:robert.kelly@undp.org">robert.kelly@undp.org</a>
	Telephone number	+251 91250 3306
	Mailing address	UNDP – Global Environment Finance Bureau for Policy and Programme Support Kirkos Sub City; Kebele 01, House No. 119 P.O.Box 60130, Addis Ababa Ethiopia

#### A.1.11. Results areas (mark all that apply)

##### Reduced emissions from:

- Energy access and power generation  
(E.g. on-grid, micro-grid or off-grid solar, wind, geothermal, etc.)
- Low emission transport  
(E.g. on-grid, micro-grid or off-grid solar, wind, geothermal, etc.)
- Buildings, cities and industries and appliances  
(E.g. new and retrofitted energy-efficient buildings, energy-efficient equipment for companies and supply chain management, etc.)
- Forestry and land use  
(E.g. forest conservation and management, agroforestry, agricultural irrigation, water treatment and management, etc.)

##### Increased resilience of:

- Most vulnerable people and communities  
(E.g. mitigation of operational risk associated with climate change – diversification of supply sources and supply chain management, relocation of manufacturing facilities and warehouses, etc.)
- Health and well-being, and food and water security  
(E.g. climate-resilient crops, efficient irrigation systems, etc.)
- Infrastructure and built environment  
(E.g. sea walls, resilient road networks, etc.)
- Ecosystem and ecosystem services  
(E.g. ecosystem conservation and management, ecotourism, etc.)

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

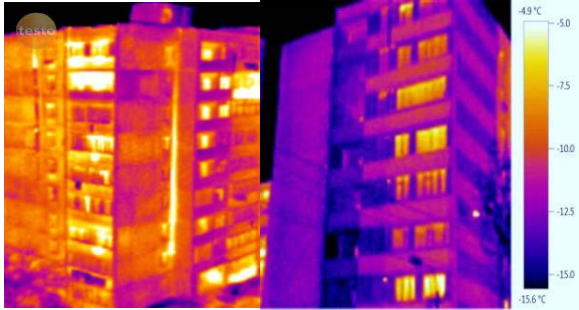
1. Armenia is a small, poor, land-locked country in the heart of Eurasia, and is highly vulnerable to the impacts of climate change. Unsustainable energy use in buildings underpins Armenia's closely intertwined development, security and climate-related challenges:
  - Approximately 30% of Armenian households are energy-poor, where energy poverty (often called 'fuel poverty') is defined as households spending more than 10% of their budgets on energy<sup>1</sup>.
  - 45% of apartments in multi-family buildings have indoor temperatures in winter below 19°C (i.e. below established international standards for human occupancy).<sup>2,3</sup>
  - 50% of energy use in buildings depends on imported fossil fuels.
  - 24% of CO<sub>2</sub> emissions come from energy use in buildings.
  - Over 50% of energy can be saved via energy efficient retrofits (Figure 1).
2. Improving energy efficiency (EE) in buildings has been assigned the highest priority in Armenia's housing, energy and climate strategies, including the country's Intended Nationally Determined Contribution (INDC), its Third National Communication to the UNFCCC and its UNFCCC Technology Needs Assessment.
3. The project aims at creating a favourable market environment and scalable business model for investment in EE building retrofits in Armenia, leading to sizeable energy savings and GHG emission reductions (up to 5.8 million tCO<sub>2</sub> of direct and indirect emission savings over the 20-year equipment lifetimes), green job creation and energy poverty reduction. It will directly benefit over 200,000 people and catalyse private and public sector investment of approximately US\$ 100 million.

<sup>1</sup> This definition of energy poverty, which focuses on energy expenditures relative to income, is sometimes also referred to as fuel poverty, to distinguish it from the broader concept of energy poverty that is also concerned with a lack of access to modern energy services, irrespective of their affordability.

<sup>2</sup> ANSI/ASHRAE Standard 55-2004: 'Thermal environmental conditions for human occupancy'

<sup>3</sup> [http://www.nature-ic.am/wp-content/uploads/2014/12/Analytical\\_Report\\_2014\\_ENG-VER-1.pdf](http://www.nature-ic.am/wp-content/uploads/2014/12/Analytical_Report_2014_ENG-VER-1.pdf), pp. 43-45

Figure 1. EE retrofit of a Typical Panel Multi-Apartment Building in Armenia (Before and After)



Source: [Summary of UNDP-GEF Pilot EE retrofit project in Yerevan, Armenia](#)

4. UNDP will work with the Government, city administrations, the European Investment Bank, private sector stakeholders, ESCOs and local banks to deploy the most cost-effective combination of policy and financial de-risking instruments and targeted financial incentives to address market barriers and achieve a risk-return profile for EE building retrofits that can attract private investments.
5. The project builds on UNDP's long experience supporting the Government of Armenia and on UNDP's de-risking framework for low-carbon investment.<sup>4</sup> It has the full backing of Armenia's National Designated Authority (NDA) for the GCF, the UNFCCC National Focal Point, and the Municipality of Yerevan (home to one-third of Armenia's population). The project is fully consistent with Armenia's INDC.

### A.3. Project/Programme Milestone

Expected approval from accredited entity's Board (if applicable)	The project was approved by UNDP Local Project Appraisal Committee (LPAC) on 27 July 2015. See Annex VII.
Expected financial close (if applicable)	Not applicable.
Estimated implementation start and end date	Start: 01/09/2016 (to be confirmed / not before the FAA becomes effective) End: 31/08/2022
Project/programme lifespan	20 years <sup>5</sup>

<sup>4</sup> UNDP (2013), *Derisking Renewable Energy Investment. A Framework to Support Policy-Makers in Selecting Public Instruments to Promote Renewable Energy Investment in Developing Countries*: [www.undp.org/drei](http://www.undp.org/drei)

<sup>5</sup> The lifespan of the programme, understood to be the period over which direct benefits take place, matches the estimated lifetime of the buildings retrofitted by the project. UNDP is open to supporting post-project implementation and/or monitoring of results during the project lifespan, provided there is more guidance from the GCF Board on what is expected, including details on how many years after project closure this support is to be carried out, and what form it will take. In the context of potential post-implementation project support, UNDP can develop a post-project implementation plan and budget in the fifth year of the project for discussion and approval by the GCF.

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

6. The project involves a combination of investment and technical assistance. For investment (Component 4), GCF financing in the amount of US\$ 14 million is being requested to address the needs of vulnerable households and remove financial barriers by making loans for EE building retrofits more affordable.<sup>6</sup> This will be complemented by US\$8 million in co-financing from the Municipality of Yerevan. For technical assistance (Components 1, 2 and 3, and for Project Management) the requested GCF funding is US\$ 6 million to remove market and policy barriers to EE building retrofits, and the co-financing will be provided by the Ministry of Nature Protection (MoNP) in the amount of US\$ 0.4 million and the accredited entity, UNDP - US\$ 1.42 million (See overview of project financing structure in the table below).

Component	Financiers	Required financing (MUSD)
Investment	GCF	14.000
	Yerevan Municipality	8.000
	<i>Sub-total</i>	<i>22.000</i>
Technical Assistance	GCF	6.000
	UNDP	1.420
	MoNP	0.400
	<i>Sub-total</i>	<i>7.820</i>
<b>Total Project Cost</b>		<b>29.820</b>

7. In addition, the project has a potential to leverage a sizeable volume of additional resources. To maximize this potential, UNDP is working closely with the European Investment Bank (EIB) on securing concessional loan for public and residential sector (See Annex IVb and IVe). The EIB is currently in the process of conducting the due diligence process on the potential first phase (EIB loan - US\$12 million) that would target public sector buildings. The loan resources for the first phase are expected to be provided upon appraisal in Q3 2016. The potential second phase is subject to further due diligence by EIB and the amount is up to US\$86 million. Overall, US\$ 20 million of GCF financing is expected to leverage over US\$ 80 million of private investment and US\$ 20 million of public investment in energy efficiency retrofits.

8. The technical assistance provided in Components 1, 2 and 3 need grants since they address and remove systemic risks and overcome market barriers<sup>7</sup>:

- Component 1 will establish building sector Measurement, Reporting and Verification (MRV) and knowledge management. One of the identified barriers is a lack of information and awareness: energy efficiency is not a major concern for most people in Armenia. There is a low level of awareness among building owners, real estate agencies and occupants about operational costs and potential energy- and money-saving opportunities. There is also a misinformed perception that full compliance with efficient building codes and energy-efficient buildings would be prohibitively expensive in Armenia. The market for EE products and services is immature. Robust MRV will build the investment case for energy efficiency retrofits and, together with the dissemination of information, will support the communication of the financial and development gains to be made from energy efficiency investments, thus improving information availability and awareness of the benefits of buildings with improved energy performance.
- Component 2 will support national, sub-national and local authorities to adopt and implement an enabling policy framework for energy efficiency retrofits. This will remove a number of policy, legal and institutional

<sup>6</sup> The US\$ 20 million GCF budget total includes project management costs but excludes the fee of the GCF Accredited Entity (see Section B.3). While not included in this proposal on the instructions by the GCF Secretariat, an additional cost of 9% of the value of the GCF project budget will be necessary to cover quality assurance and oversight services performed by UNDP as a GCF Accredited Entity over all phases of the project cycle. This includes: (i) oversight of proposal development; (ii) appraisal (pre- and final) and oversight of project start-up; (iii) supervision and oversight of project implementation; and (iv) oversee project closure. UNDP awaits confirmation from the GCF Board on this matter and expects that the AE fee, over and above the project cost, will be approved by the GCF Board prior to implementation.

<sup>7</sup> Detailed analysis of systemic risks and market barriers to EE investment in buildings in Armenia - please see Section 1.2 of the UNDP Project Document, pp. 7-17, presented in Annex II.



barriers through supporting legal reform, the introduction and implementation of regulation, and the modernisation and enforcement of standards. Component 2 will also remove technical and capacity barriers by providing technical assistance to selected market players, such as building owners / managers / owner associations and local government.

- Component 3 will provide access to affordable capital for energy efficiency retrofits. This will help remove financial barriers, such as the fact that home-owners and public sector entities lack the financial resources necessary to undertake EE building retrofits without loans and the reluctance of local commercial banks to provide loans for EE renovation.

9. In Component 4, grants from the GCF will be offered as a temporary targeted incentive. They will be targeted and will address the needs of the most vulnerable households. The financial analysis (Annex II<sup>8</sup> and Annex III) shows that, for those earning less than the median household income of US\$ 400 per month, building retrofits are not affordable. For middle- and higher-income households, grants are not needed from an affordability point of view, and will only be used at a low level to overcome early-mover barriers. The grants will support poor and vulnerable households to secure access to improved thermal comfort and cost / energy savings. Incentive grants for low-income households are also needed to unlock building-level investments, as these households might otherwise block building-level investment decisions in multi-apartment buildings.
10. Incentives in the form of grants are common in developed countries – both in the EU and USA, sizeable grants are common practice. KfW, for instance, provides loans together with incentive grants for energy efficiency retrofits in Germany of between 7.5 and 22.5%; consequently, the proposed incentive grants in Armenia (in the similar range of 7-22%) can be considered modest (given that median household income in Germany – US\$ 2,600 per month<sup>9</sup> – is 6.5 times higher than that of Armenian households). A total of US\$ 12.5 million in incentive grants will be used to support vulnerable households in the residential sector.
11. In the public sector, a small incentive (totalling around USD 1.5 million) is needed to provide necessary stimulus to support higher energy efficiency standards than required under ‘business as usual’. Also, the market and lending will likely increase much more rapidly with a small grant (up to 5% of investment cost) to incentivise first movers amongst municipalities. The funds will be applied as a grant towards the financing of measures alongside potential lending from EIB and cash investments from the municipality. In addition, the modest incentive will also serve to accelerate the renovation of buildings, thus improving the quality of public facilities such as hospitals and kindergartens servicing the population.
12. The breakdown by component of the GCF funding is given below. For further details on how the financial instruments will address barriers and achieve project objectives, please see Sections E.6 and F.1.
13. *Component 1: Establishment of Building Sector MRV (GCF grant funding US\$ 890,000).* Grant resources will be provided as technical assistance to the relevant national authorities to establish and operationalise MRV systems for the building sector
14. *Component 2: Policy De-Risking (GCF grant funding US\$ 890,000).* GCF grant funding will be used to cover the cost of developing enabling policies for EE retrofits.
15. *Component 3: Financial De-Risking (GCF grant funding US\$ 3,420,000).* GCF grant funding will be used for technical assistance to coordinate the design of financial de-risking instruments with UNDP’s partners, and to identify a cost-effective and harmonised set of instruments. GCF grant funding will also be required to support complementary activities that ensure take-up of the financial de-risking instruments by the domestic financial sector.

<sup>8</sup> Feasibility study including detailed technical, economic, financial and GHG analysis of the project is included in the Annex D of the UNDP Project Document on pp. 65-96, which is presented in Annex II to this GCF Funding Proposal. The integrated financial model which underpins this analysis is provided in Annex III to this GCF Funding Proposal.

<sup>9</sup> <http://www.oecdbetterlifeindex.org/countries/germany/>

16. *Component 4: Financial Incentives (GCF Grant funding US\$ 14,000,000).* GCF grant funding will be used for direct incentives to building owners (primarily residential home / apartment owners). This is necessary to jump-start the market and address the issues of affordability for the upfront cost of EE retrofits, in some cases to improve the IRR of EE retrofit projects and in other cases as a behavioural incentive to stimulate the initial demand from building owners.

Component	Sub-component	Financing institution* (MUS\$)			Total (MUSD)	Total /component (MUSD)
		GCF	Govt	UNDP		
<b>Component 1:</b> Establishment of Building Sector MRV	1.1 MRV systems for the buildings sector in Armenia	0,650	0,050	0,303	1,003	1,595
	1.2 Knowledge management and MRV information dissemination	0,240	0,050	0,303	0,593	
<b>Component 2:</b> Policy De-Risking	2.1 Public instruments for the promotion of investment in EE	0,140	0,040	0,121	0,301	1,695
	2.2 Support to ongoing legal reform in the field of energy efficiency	0,200	0,040	0,121	0,361	
	2.3 Support for the creation of an enabling policy framework for EE retrofits in multi-owner residential buildings	0,120	0,040	0,121	0,281	
	2.4 Support to building owners / managers / owner associations / ESCOs	0,280	0,040	0,121	0,441	
	2.5 Exit strategy	0,150	0,040	0,121	0,311	
<b>Component 3:</b> Financial De-Risking	3.1 Technical assistance to banks and other financial institutions	0,850			0,850	11,420
	3.2 Technical assistance to banks for Home-Owner Association (HOA) market facilitation	1,270			1,270	
	3.3 Technical assistance to local government to develop EE retrofit projects for publicly-owned buildings	0,870			0,870	
	3.4 Access to affordable capital for energy efficiency retrofits*		8,000		8,000	
	3.5 Marketing platform	0,430			0,430	
<b>Component 4:</b> Financial Incentives	4.1 Targeted financial incentives provided to vulnerable groups	14,000			14,000	14,000
<b>Project Management**</b>	Project Manager, assistant, travel, office running costs and office equipment, meetings of Project Board and Technical Advisory Committee, independent evaluation, financial audit and other project management costs.	0,800	0,100	0,210	1,110	1,110
<b>Total</b>		<b>20,000</b>	<b>8,400</b>	<b>1,420</b>	<b>29,820</b>	<b>29,820</b>

\* In addition to the confirmed co-financing from the Yerevan Municipality, the Ministry of Nature Protection and UNDP, potential parallel financing is expected to come: 1) after the appraisal by EIB – in the first stage: loan for public buildings – US\$ 12 million; in the second stage: loan for public and residential buildings – up to 86 million USD – to be appraised in 2016-2017); 2) along with

an additional US\$ 6.75 million from residents / building owners. The amounts for the two stages of EIB loans are subject to EIB's due diligence.

\*\* Project Management Cost will be incurred first by UNDP (under UNDP's NIM Direct Agency Implementation modality) and, later, by the PIU of the Municipality of Yerevan (once established and operational).

17. UNDP's currency hedging mechanism is based on matching cash flows (i.e. revenues and expenses) in non-US\$ currencies and bank account balances are targeted not to exceed approximately one month's disbursement requirements to minimise risk.

**B.2. Project Financing Information**

	Financial Instrument	Amount	Currency	Tenor	Pricing		
<b>(a) Total project financing</b>	<b>(a) = (b) + (c)</b>	29.82	million USD (\$)				
<b>(b) Requested GCF amount</b>	(i) Senior Loans .....	.....	<u>Options</u>	( ) years	( ) %		
	(ii) Subordinated Loans .....	.....	<u>Options</u>	( ) years	( ) %		
	(iii) Equity .....	.....	<u>Options</u>		( ) % IRR		
	(iv) Guarantees .....	.....	<u>Options</u>				
	(v) Reimbursable grants .....	.....	<u>Options</u>				
	(vi) Grants .....	20	million USD (\$)				
	Total requested (i+ii+iii+iv+v+vi)	20	million USD (\$)				
<b>(c) Co-financing</b>	<b>Financial Instrument</b>	<b>Amount</b>	<b>Currency</b>	<b>Name of Institution</b>	<b>Tenor</b>	<b>Pricing</b>	<b>Seniority</b>
	<u>Grant</u>	8.00	<u>million USD (\$)</u>	Municipality of Yerevan	( ) years	( ) % ( ) %	<u>Options</u> <u>Options</u>
	<u>Grant</u>	1.42	<u>million USD (\$)</u>	UNDP <sup>10</sup>	( ) years	( ) % IRR	<u>Options</u>
	<u>Grant</u>	0.40	<u>million USD (\$)</u>	Ministry of Nature Protection	( ) years		<u>Options</u>
	Lead financing institution: N/a						
	Confirmation letters from co-financing partners are provided in the Annex IV. The status of co-financing as of December 2015 is the following:						
	a) Yerevan municipality: co-financing confirmed (Annex IVc).						
	b) UNDP: co-financing has been confirmed, consisting of UNDP's TRAC (grant) resources in the amount of US\$ 240,000 and US\$ 1,000,000 of grant from the UNDP-GEF 'Sustainable Cities' project. This GEF project has been prioritized by the Government of Armenia to receive funding from the Armenian GEF-6 STAR allocation and is currently under development, with an expected starting date in July 2016.						
	c) Ministry of Natural Resources (MoNP): co-financing (grant) has been confirmed, see Annex IVd.						

**B.3. Fee Arrangement**

<sup>10</sup> UNDP's grant co-financing will be provided in cash.

18. The fee arrangement for the proposed project will be aligned with the GCF Board's decision on fees, taken at the 11<sup>th</sup> meeting of the Board.
19. The budget figures presented in this proposal exclude the fee: i.e. the resources required to cover quality assurance and oversight services performed by UNDP over all phases of the project cycle as follows: (i) oversight of proposal development; (ii) appraisal (pre and final) and oversight of project start-up; (iii) supervision and oversight of project implementation; and (iv) oversee project closure.

#### **B.4. Financial Market Overview (if applicable)**

Not applicable.

## C.1. Strategic Context

20. Armenia's Third National Communication to the UNFCCC (2015)<sup>11</sup> identifies public, residential and commercial buildings among the country's top priorities for climate change mitigation: GHG emissions from buildings grew five-fold between 2000 and 2010, from 345 ktCO<sub>2</sub> in 2000 up to 1,723 ktCO<sub>2</sub> in 2010. Armenia's UNFCCC Technology Needs Assessment<sup>12</sup> (2003) identifies heat supply to buildings as one of the main sources of GHG emissions and as having a large potential for energy saving and emission reduction.
21. Improving energy efficiency (EE) in the building sector has been assigned a high priority in Armenia's climate, energy and housing strategies. In particular, achieving thermal modernisation through energy efficiency retrofits is outlined as a national development priority, particularly for multi-apartment buildings. This is particularly clear in the provisions of the National EE Programme (2007), the National Security Strategy (2007), the Concept for Ensuring Energy Security (2013) and the Energy Security Strategy Action Plan (2014), which all identify the EE potential for the buildings sector and provide outlines of technical measures / solutions to be taken. In addition, the Covenant of Mayors (a 10-city joint agreement) outlines building EE goals. Since 2004, Armenia has been involved in the European Neighbourhood Policy (ENP). The ENP Action Plan was approved in 2006 and is supporting the harmonisation of Armenian legislation, norms and standards with EU EE criteria.
22. Last year, the Government of Armenia and UNDP prepared the 'Energy Efficient Public Buildings and Housing in Armenia NAMA' (2014)<sup>13</sup>. This Nationally Appropriate Mitigation Action (NAMA) will promote energy efficiency in public buildings and social housing, with a particular focus on energy efficiency measures in new construction, capital renovation and in management of public buildings.
23. The general legal-regulatory framework governing energy efficiency in buildings in Armenia was reviewed in 2013 in the report, 'Results of Analysis and Recommendations for Overcoming Barriers to Increased Energy Efficiency in Residential Buildings: Strategy Report, which was one of the outputs of EBRD's 'Armenia - Improving Energy Efficiency in Residential Buildings' Programme. The legal-regulatory framework includes the cross-cutting framework governing energy efficiency in buildings, as well as legislation on construction. The National Programme on Renewable Energy and Energy Efficiency identifies the sectors with the largest energy efficiency potential and proposes 16 categories of energy efficiency measures to be taken to reduce energy use, which includes the building sector<sup>14</sup>.
24. Analysis of the World Bank RISE indicators<sup>15</sup> shows that while Armenia has made good progress towards establishing enabling environments for investment in energy efficiency, there is still much room for improvement in the areas of planning and of policies and regulations in the buildings sector.
25. A number of initiatives have targeted energy efficiency retrofits in Armenia, but none of them offer targeted finance for building-level retrofits of multi-owner residential buildings. Furthermore, whilst there are several commercial banks with energy efficiency lending portfolios for SMEs and individual entrepreneurs, the building retrofit sector has not been addressed due to its perceived high risks, such as risks associated with collective decision-making / payment enforcement for multi-owner apartment buildings (detailed analysis of risks and barriers to EE investment in buildings in Armenia is provided in Section 1.2 of the UNDP Project Document, pp. 7-18, presented in Annex II).

## C.2. Project / Programme Objective against Baseline

26. **Market Overview.** Achieving thermal modernisation through energy efficiency retrofits in all building sectors is a national development priority, particularly for multi-apartment buildings. Energy efficiency retrofits are targeted by the first NAMA prepared by the country, and will assist cities of Armenia to meet their commitments presented in the INDC, as well as under the Covenant of Mayors initiative to reduce GHG emissions from energy consumption by 20% by 2020. Retrofits will also mitigate the negative social impact of future increases in energy tariffs and increasing

<sup>11</sup>[http://www.nature-ic.am/wp-content/uploads/2013/10/1.Armenias-TNC\\_2015\\_ENG.pdf](http://www.nature-ic.am/wp-content/uploads/2013/10/1.Armenias-TNC_2015_ENG.pdf), p. 21

<sup>12</sup>[http://unfccc.int/tclear/misc/StaticFiles/gnwoerk\\_static/TNR\\_CRE/e9067c6e3b97459989b2196f12155ad5/19789a07b4de493cb72e43c47fd4db1e.pdf](http://unfccc.int/tclear/misc/StaticFiles/gnwoerk_static/TNR_CRE/e9067c6e3b97459989b2196f12155ad5/19789a07b4de493cb72e43c47fd4db1e.pdf)

<sup>13</sup><http://www4.unfccc.int/sites/nama/SitePages/Country.aspx?CountryId=8>

<sup>14</sup> Detailed overview of governmental policies, legislation and by-laws on energy efficiency in building sector is presented in Annex II, pp. 12-15

<sup>15</sup> Armenian RISE Indicators are presented on pp. 52-53 (Table 6) in Annex II

energy demand as a result of climate change<sup>16</sup>. Average electricity tariffs for residential customers increased by a factor of 1.8 between 2008-2014, and natural gas tariffs by a factor of 2.6 between 2007-2014. A decision on 17 June 2015 by the Public Services Regulatory Commission to raise electricity prices further by 17-22% led to protests in Yerevan and other cities that are ongoing as of the date of writing (July 2015). The extensive unrest demonstrates the significance of fuel poverty and has raised the issue to the top of the Government's agenda.

27. The buildings sector is one of major energy consumers in Armenia. According to the 2010 GHG inventory, almost 28% of primary energy resources are consumed in buildings, mostly in the residential sector. Globally, GHG emissions from the building sector have more than doubled since 1970 and now represent 19% of all global GHG emissions. Middle-income countries in Eastern Europe & Central Asia (EECA), such as Armenia, account for almost 40% of all non-OECD GHG emissions in the buildings sector<sup>17</sup>.
28. Due to Armenia's continental climate, with a long heating season, average winter temperatures around -5°C and winter extremes as low as -42°C, energy consumption and GHG emissions in the Armenian building sector are primarily associated with space heating.
29. One sub-set of buildings with significant energy-saving potential in Armenia are concrete panel multi-storey buildings (Figure 1), of which there are approximately 4,300. In such buildings alone, the energy-saving potential of thermal modernisation is over 1.250 TWh/year, with a GHG reduction potential of 250 ktCO<sub>2</sub>eq/year, and annual savings of about US\$ 63 m (based on gas and electricity tariffs of 2014).
30. Previous projects in Armenia on energy efficiency in buildings have targeted new buildings and energy efficiency retrofits mainly in public sector buildings, whilst residential, commercial and industrial retrofits have been largely overlooked due to the higher levels of financial risk they pose. Furthermore, whilst there are several commercial banks with energy efficiency lending portfolios for SMEs and individual entrepreneurs, the building energy efficiency sector is not addressed. Interest rates for commercial loans are very high (up to 22% per year) and with short repayment periods.
31. **Barriers/Risks:** Due to the presence of policy, financial, market and technical / capacity barriers, the overall investment risk profile of EE building retrofits is prohibitive in Armenia, deterring private and public investment despite the vast potential for highly cost-effective energy-saving and GHG emission reduction opportunities. These barriers are explained in the Section 1.2 of the UNDP Project Document (Annex II to the Funding Proposal). By specifically targeting these barriers and investment risks, the project will contribute towards a commercially-driven EE building retrofit market.
32. **Main goal:** Scale-up investment in EE building retrofits in the cities of Armenia, and reduce the overall investment risk profile of EE building retrofits to encourage private sector investment and alleviate poverty.
33. **Anticipated outcomes:**
  - *Component 1 - Establishment of building sector MRV:* Robust MRV for the building sector established
  - *Component 2 – Policy de-risking:* National, sub-national and local authorities adopt and implement an enabling policy framework for EE retrofits
  - *Component 3 – Financial de-risking:* Access to affordable capital for EE retrofits provided
  - *Component 4 – Financial incentives:* Affordability of EE retrofits for the most vulnerable households ensured through targeted financial incentives to building / apartment owners (directly or via private-sector ESCOs)
34. **Expected Impacts:** The overall impacts of the GCF project have been estimated using the data from the technical and financial analysis. The overall impacts are summarised in the tables below and take into consideration a potential leverage.

<sup>16</sup> UNDP (2009), *The Socio-Economic Impact of Climate Change in Armenia*:  
<http://www.am.undp.org/content/dam/armenia/docs/Report%20SOI%20of%20CC.pdf>

<sup>17</sup> IPCC (2014), *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*: <http://mitigation2014.org>



	Average cost per retrofit (US\$)	Number of buildings	Total investment (US\$)
Single-family individual buildings	10,000	6,000	60,000,000
Multi-family apartment buildings	120,000	290	34,800,000
Public buildings (complex demand- and supply-side renovation, such as for a hospital)	250,000	23	5,750,000
Public buildings (simple demand-side measures, such as for a school)	95,000	150	14,250,000
<b>Total</b>		<b>6,463</b>	<b>114,800,000</b>

35. The energy savings (in GWh per year) and GHG emissions savings (in tonnes of CO<sub>2</sub>eq per year) are given in the table below:

	Energy savings (GWh) per year	Monthly financial savings (US\$/household or building)*	GHG savings (tonnes) per year	Lifetime GHG savings (20 years)
Single-family individual buildings	110.3	58	27,239	544,783
Multi-family apartment buildings	93.1	26	22,997	459,942
Public buildings (complex demand and supply side renovation, such as for a hospital)	7.7	2,578	5,005	100,093
Public buildings (simple demand side measures, such as for a school)	53.2	992	14,243	284,860
<b>Total</b>	<b>264.3</b>		<b>69,484</b>	<b>1,389,677</b>

\* The savings for residential buildings are **per household** and, for public buildings, **per building**. The full savings are only realised after repayment of loans. For a household living in an apartment, the saving of \$26 represents 6.5% of median income (\$400), and would reduce energy costs from 10.5% to 3.5% of median incomes

36. The project will undertake a number of activities beyond simple investments that will also stimulate the market for energy efficiency in the residential and public building sectors. Therefore, there will be indirect energy savings triggered by investments not within the direct control of the project. These are estimated using bottom-up and top-down approaches based on the GEF methodology. The overall GHG emission results are as follows:

	<b>Cumulative</b>		
	<b>Total</b>	<b>2016-2021</b>	<b>2022-2041</b>
Direct Total Energy Savings (GWh)	5,285	5,285	0
Direct GHG Emission Savings (tCO <sub>2</sub> )	1,389,677	1,389,677	0
Indirect Bottom-up Emission Savings (tCO <sub>2</sub> )	4,169,032		4,169,032
Indirect Top-down Emission Savings (tCO <sub>2</sub> )	4,437,382		4,437,382

37. Based upon a total GCF grant of US\$ 20 million, the cost per tonne of direct CO<sub>2</sub> reduction would be US\$ 14.4. Additionally, significant indirect emissions savings can be expected – between 4.2 and 4.4 million tonnes of CO<sub>2</sub> reduction due to the project interventions (5.6 – 5.8 MtCO<sub>2e</sub>, combining direct and indirect estimates) – yielding a total estimated cost per tonne of CO<sub>2</sub> reduced of between US \$3.43 and US \$3.60. Based on these calculations, the project is very cost-effective.

38. In addition to these impacts, it is estimated that 1,700 jobs will be created through the project.

39. The impact analysis is presented in detail in Annex D (Section D.3) of the UNDP Project Document, which is provided in Annex II of this GCF funding proposal.

### C.3. Project / Programme Description

40. **Project Components, Outcomes and Outputs** (for detailed information at the activity-level, please refer to Annex II, UNDP Project Document).

41. The Project will use UNDP's de-risking methodology and framework for low-carbon energy investments. This methodology takes a systematic approach to identifying and quantifying investment risks, and then assembles packages of targeted public instruments to address these risks. Modelling is then performed to assess the impact of the instrument packages. The overall aim is to identify the most cost-effective package of public instruments to achieve a risk-return profile that catalyses private sector investment at scale. More information on the de-risking methodology can be found here: [www.undp.org/DREI](http://www.undp.org/DREI)

42. The de-risking methodology identifies three types of public instrument. Each of the three types of public instruments addresses the risk-return profiles of energy efficient investments in a different way, either *reducing*, *transferring* or *compensating* for risk. Components 2 to 4 are structured around these categories.

- **Policy de-risking instruments** refer to public interventions that *reduce* risk, by removing the underlying barriers that create investment risk. Policy de-risking measures are typically in the form of new government policies, regulations and/or programmes. An example of policy de-risking could be the introduction of standards in energy efficiency materials for building retrofits.
- **Financial de-risking instruments** refer to public interventions that *transfer* the financial impact of investment risks from the private sector to the public sector. These are typically financial products offered by development banks. An example could be a loan guarantee from a development bank, in order for the commercial bank to lend to building owners to perform energy efficient measures.
- Recognising that not all risks can be reduced through policy de-risking or transferred through financial de-risking, efforts to reduce risks can be supplemented by **financial incentives** to *compensate* for residual risks and thereby to increase returns. An example could be a targeted financial subsidy for certain household categories undergoing energy efficient upgrades.

43. Investments in energy efficiency building retrofits face different risks and barriers for each building category. The main building categories targeted in this project will be public buildings (schools, hospitals, municipal / government offices) and, in the residential sector, individual houses and multi-owner apartment buildings. These categories have been selected for this project due, on the one hand, to the specific barriers they face in investing in EE retrofits, the removal of which will increase the paradigm shift potential of the project; and, on the other hand, because the target population will include vulnerable groups such as low-income households. Technically, the measures for residential buildings are thermal cladding of outer walls, window replacement, roof insulation, and the use of thermostatic valves with hydraulic balancing; for public buildings, measures will include thermal insulation of walls, window replacement, roof insulation, new doors, efficient lighting (compact fluorescent or LED lighting), and the replacement of electrical heating systems with a natural gas heating systems (where demand-side measures are addressed)<sup>18</sup>. These measures reduce the need for heating or improve the efficiency of heating and lighting, thus saving energy and reducing GHG emissions by at least 50% compared to baseline. For each targeted building stock, a package of relevant policy and financial de-risking instruments will be implemented to address the specific circumstances and barriers in the country and in the targeted building sub-sector. This specificity will create an easily scalable model for subsequent replication of energy efficiency retrofits and market growth. The activities of the project will be structured around four main components.

44. **Component 1 – Establishment of building sector MRV and knowledge management.** Component 1 aims to establish robust MRV for the building sector to enable monitoring of energy use in buildings, prioritisation of buildings for energy efficiency retrofits, and quantification and monetisation of the resulting energy savings. Robust MRV is necessary to build the investment case for energy efficiency retrofits. The project will support the development of an

<sup>18</sup> Detailed description of proposed energy efficient retrofit measures and their technical, economic and environmental analysis is provided in the Annex IIa pp. 64-95



MRV framework, including guidelines and methodologies and building on UNDP's extensive experience with establishing Energy Management Information Systems (EMIS)<sup>19</sup> for buildings.<sup>20</sup> The project will then disseminate information on the cost-saving potential of energy efficiency retrofits to commercial banks and potential borrowers via the project website and stakeholder workshops. This aim is strongly supported by stakeholders in the field of energy efficiency in Armenia, who concluded recently at a roundtable meeting on models for supporting energy efficiency approaches in Armenia that finding and using a common set of strategic and powerful metrics for measuring results will be critical, both to communicating broadly on the financial and development gains to be made from energy efficiency investments, and to mobilising additional resources and support. The GCF project will contribute to the creation of knowledge and collective learning processes through promoting better information dissemination to stakeholders, including the private sector, and sharing lessons learned. Activities will be implemented / supported by private sector consulting companies and individual experts. The potential role of women in implementation of Component 1 is significant. Women can be agents of change in creating awareness on the benefits of EE investments. According to the Armenia Country Gender Assessment (July 2015) of the Asian Development Bank, many women are interested in energy-efficient and renewable energy projects, and know examples of pilot projects that they thought successful<sup>21</sup>. Indicators of women participation in this area will be monitored during implementation. The desired outcome of Component 1 is *Outcome 1: Robust MRV of GHG emissions from the building sector established*. The outputs and activities that will contribute to achieving this outcome are described below.

45. **Output 1.1 MRV systems for the buildings sector in Armenia established.** Under Component 1, technical assistance will be provided to market stakeholders in order to undertake MRV and report on energy savings. This technical assistance will include the following Activities:

1.1.1 Development of the MRV framework, including guidelines and monitoring methodologies for the various categories of buildings.

1.1.2 Support to full implementation of building EMIS in selected buildings for demonstration and capacity building purposes.

**Results:**

Indicator: Development and coverage of MRV system and database

Baseline: N/A

Mid-term target: Developed & in use for renovated buildings: full coverage of buildings retrofitted in this project

Final target: Developed & in use for renovated buildings: full coverages of buildings retrofitted in this project

46. **Output 1.2 Knowledge management and MRV information disseminated.** Dissemination of information, including that gained from EMIS for buildings, will help to establish the business case for energy efficiency building retrofits: i.e. monitor building energy use, spot the immediate and most cost-effective opportunities, and effectively monitor performance and improvement. Without a good EMIS it is impossible to advance with any market-based instruments, because savings need to be objectively monitored in order to be monetised. The knowledge management plan will be detailed at project inception, according to the most up-to-date local context and the experience of project managers and other contributors. A communication and dissemination strategy will be developed (based on scoping, consultation with local stakeholders, understanding the baseline of awareness and the types of information needs) and will include the following Activities:

1.2.1 Identify appropriate formats for reaching the relevant stakeholders:

- The general public (this will be through a nationwide media campaign on building energy efficiency retrofits in which selected retrofit case-studies will be featured).
- Municipal staff in charge of the allocation of resources in areas of urban planning and development, energy services, as well as municipal procurement.
- National Government officials.
- Companies in the buildings, renovation and energy services sectors.

<sup>19</sup> An Energy Management Information System (EMIS) refers to a computer-based system for collecting, storing and analysing information on the energy performance of the monitored objects. Energy use data for individual objects (buildings) can be aggregated and monitored at sectoral, regional and national level, depending on the eventual set-up of the system.

<sup>20</sup> UNDP first piloted and scaled-up EMIS in public sector in [Croatia](#) where the project freed up US\$18 million of public budget annually as a result of nation-wide introduction of EMIS.

<sup>21</sup> <http://www.adb.org/sites/default/files/institutional-document/162152/arm-country-gender-assessment.pdf>

- Financial institutions.

1.2.2 Establish a website that will provide information and a platform for communication between the different stakeholders, thus enhancing cooperation and learning through the exchange of knowledge and skills.

Information about the project, activities and outputs will be made available and linked to building energy efficiency retrofit efforts in other countries. It will be updated regularly to reflect content created, developments during project implementation and case-studies. The site will collect resources relating to EE building renovation and make it possible to keep up to date with developments. The site will be regularly updated on activities, best practices and latest thinking.

1.2.3 Information dissemination to maximize the impact potential of the project in Armenia and beyond. Appropriate formats for information presentation and sharing will be developed based on their likely effectiveness for raising awareness, facilitating information access and providing actionable guidance and support to the sector. The following formats will be considered:

- *Seminars*, including themed national workshops focusing on best practice in building energy efficiency retrofits, potentially on an annual basis.
- *Tours of buildings* in which energy efficiency retrofits have been conducted. Presentations will be given by relevant project promoters to provide a powerful example of how these investments were achieved, and open up discussion regarding replication in other buildings.
- *Municipal EE corners* to provide information to the general public about the newest EE systems, products and materials available in Armenia
- *Promotional material* – e.g. case studies, brochures and briefings.
- *Harvesting lessons learned* – including through after-action reviews across project activities.

In addition, to maximise the impact potential of project results internationally, in particular in countries from the region with similar policy and market environment and barriers, the project will communicate and make publicly available related knowledge and best practices (e.g. examples of legislation and frameworks for building codes, procedures for home owner associations, legislation regarding multi-owner buildings, business models for EE investments, etc.) via the following channels:

- The existing portal, 'Energy Efficient Buildings in Central Asia and Armenia' at [www.beeca.net](http://www.beeca.net) (in English and Russian), will present and share all relevant materials and case studies with EE practitioners in Armenia and other transition countries with similar climate and policy conditions. In particular, the potential for EE market transformation in building sectors in Central Asia is vast and barriers are similar – hence GCF-supported work will be of high relevance to those countries as well;
- Presentation of project work and results at the annual Sustainable Energy Forum organised jointly by UNECE, UNDP and other international partners on a regular basis, as well as at other relevant international fora and initiatives, such as those of SE4ALL.

1.2.4 Provision of information to consumers: Economically attractive measures for energy efficiency are often left unimplemented because stakeholders are simply unaware that such measures exist. If they are aware, they may have unreliable information. Hence, the availability of information on the availability and features of energy efficiency measures is an important precondition to enabling them to act on these opportunities. In Armenia, consumers currently do not receive information on ways to use electricity more efficiently<sup>22</sup>. Provision of such information is common practice in many countries and the project will work to develop such a mechanism with the national energy utility, Electric Networks of Armenia, and work with this counterpart to develop modalities for the provision of information on energy efficiency to customers.

**Results:**

Indicator:	Existence and implementation of a plan for sharing lessons learned
Baseline:	N/A
Mid-term target:	Created and implemented
Final target:	Number of beneficiaries: 250,000, including at least 50% women

<sup>22</sup> World Bank Group (2013). *Pilot Report: RISE Readiness for Investment in Sustainable Energy - A Tool for Policymakers*

47. **Component 2 – Policy de-risking.** The policy de-risking component will support national, sub-national and local authorities to adopt and implement an enabling policy framework for energy efficiency retrofits. De-risking instruments will directly and indirectly address investment risks for commercial lenders of energy efficiency retrofit finance. This Component will support on-going legal reform in the field of energy efficiency. It will also support the gradual introduction of binding legislation on energy auditing, energy passports / certificates and labelling for existing buildings. This work will leverage the results of the UNDP-implemented, GEF-financed 'Improving Energy Efficiency in Buildings' project<sup>23</sup> (see Annex VII for more on this project). Policy de-risking tools will include the modernisation and enforcement of energy efficiency standards and mandatory energy performance standards for retrofitted buildings, as well as monitoring and enforcement of associated construction norms and standards; development, introduction and enforcement of adequate secondary legislation for providing a clear and effective set of functional models and a standard set of rules for all multi-apartment building management bodies to undertake energy efficiency retrofits; implementation and improvement of existing legislation and formulation of secondary legislation that will assist management of energy efficiency building retrofits for different types of building; and assistance to residents and common-share building organisations on collective decision-making on the complex issues of energy efficiency retrofit investment. Significant capacity building will take place through this component. UNDP's approach to capacity building addresses capacity at the individual, organisational and systemic levels. At the individual level, capacity building takes place through imparting knowledge and skills. At the organisational level, UNDP focuses on supporting organisations to develop mandates, tools, guidelines and information management systems that allow organisations to adopt best practice and adapt to change. At the systemic level, UNDP supports the creation of enabling environments through policy, economic, regulatory and accountability frameworks within which organisations and individuals operate. For all three levels of capacity building, UNDP will identify and hire international and local specialists that will work along-side local legislators providing on-the-job training on best practices. Specialists, working together with the national and municipal legislators, will prepare studies and reviews that underpin the creation of knowledge and the building of skills. In some cases, training courses may be provided to communicate knowledge to wider audiences.
48. The policy component will also include elements of market de-risking (removing technical and capacity barriers) by providing technical assistance to selected market players, mostly from the private sector, such as building owners / managers / owner associations and local government, in order to help identify, develop and aggregate technically and financially feasible energy efficiency retrofit projects. Activities will be implemented / supported by private sector consulting companies and individual experts. The desired outcome of Component 2 is *Outcome 2: National, sub-national and local authorities adopt and implement an enabling policy framework for EE retrofits*. The Outputs that will contribute to achieving this Outcome are described below.
49. **Output 2.1 Public instruments for the promotion of investment in EE selected**
- 2.1.1 The project will make use of UNDP's framework to support policy-makers in selecting public instruments to promote energy efficiency investment in developing countries<sup>24</sup>.
- The framework is organised into four stages.
- Stage 1: *Risk Environment* identifies the set of investment barriers and associated risks relevant to the technology, and analyses how the existence of investment risks can increase financing costs.
- Step 1: Determine a multi-stakeholder barrier and risk table for the energy efficiency investment.  
Step 2: Quantify the impact of risk categories on increased financing costs.
- Stage 2: *Public Instruments* selects a mix of public de-risking instruments to address the investor risks and quantifies how they, in turn, can reduce financing costs. This stage also determines the cost of the selected public de-risking instruments.
- Step 1: Select one or more public de-risking instruments to mitigate the identified risk categories.  
Step 2: Quantify the impact and the public costs of the public de-risking instruments.

<sup>23</sup> [https://www.thegef.org/gef/project\\_detail?projID=3935](https://www.thegef.org/gef/project_detail?projID=3935)

<sup>24</sup> Waissbein, O., Glemarec, Y. et al. (2013), *Derisking Renewable Energy Investment. A Framework to Support Policy-makers in Selecting Public Instruments to Promote Renewable Energy Investment in Developing Countries*: [www.undp.org/drei](http://www.undp.org/drei)

Stage 3: *Cost* determines the degree to which the reduced financing costs impact the investment's life-cycle cost.

Stage 4: *Evaluation* assesses the selected public de-risking instrument mix using four performance metrics, as well as through the use of sensitivity analyses. The four metrics are: (i) investment leverage ratio, (ii) savings leverage ratio, (iii) end-user affordability and (iv) carbon abatement.

The instruments for the promotion of investment in EE to be considered include:

- Assist at the national and sub-national level in developing on-going funding sources for energy efficiency improvements.
- Assist in developing fiscal policies that will improve the financial attractiveness of energy efficiency (e.g. reduced VAT rate specifically for energy efficiency measures), particularly as they address the needs of very low income households currently receiving state benefits.
- Assist in tariff reform where necessary for specific heating sources (notably electricity and district heating) to reflect actual costs of production – potentially including environmental externalities<sup>25</sup>.
- Assist at the national and sub-national level in developing incentive programmes to encourage energy efficiency measures and/or building stock renewal (e.g. concessional loans, grant programmes, etc. particularly for low-income households).
- Assist in developing utility-run programmes for energy efficiency – especially via large electrical utilities and district heating companies.

**Results:**

Indicator:	UNDP's framework to support policy-makers in selecting public instruments to promote energy efficiency investment in developing countries used, adapted as necessary
Baseline:	Framework not used for EE in Armenia
Mid-term target:	Number of public instruments selected: 3
Final target:	Number of public instruments selected: 3

50. **Output 2.2 Support provided to on-going legal reform in the field of energy efficiency.** Technical assistance on legislative reform, including binding legislation on building codes, adequate secondary legislation on multi-owner building management, and retained savings in public buildings. In the UNDP-implemented, GEF-financed 'Improving Energy Efficiency in Buildings' project (2010 – ongoing), a component aims at achieving the design and enforcement of new energy efficiency building codes and/or standards for **new buildings**. This project has resulted in legal reform in housing legislation, including various upcoming legislative amendments to the law "On energy efficiency and renewable energy", the law "On urban development", and the law "On developing the smaller centre of Yerevan". In addition, standards for **new buildings** were successfully developed including National Standard AST 362-2013 "Energy efficiency. Building energy passport. Main provisions. Typical forms" (enacted 1 January 2014), and Standard N40-V enacted on 1 November 2014, a direct result of UNDP's project<sup>26</sup>. This project has reinforced UNDP's working relationship with key stakeholders in the national, regional and municipal building sectors, and provides a solid platform for the GCF project. UNDP's approach to supporting legislation has been proven to be effective. Noting that the number of existing buildings far exceeds the number of buildings being constructed (See Section C.5 for building market overview), the potential for energy use reduction in existing buildings is much larger than the potential in new buildings. It is, however, much more complicated to create an enabling environment for large-scale EE retrofits than it is to implement higher standards in building construction. Activities will include:

2.2.1 Support to national, sub-national and local authorities to adopt and implement an enabling policy framework for energy efficiency retrofits. In view of the recommendations developed in Activity 2.1.1, and if needed, support

<sup>25</sup> The energy regulator is responsible for tariff setting within the policy / regulatory framework set by the Government, and the Ministry of Energy and Nature Resources is leading on energy efficiency policies. Both will be closely involved in the project work under this Output.

<sup>26</sup> In addition to the legislative results of the UNDP-GEF project, other results include construction of an energy efficient 3-story social building of 950m<sup>2</sup> in the city of Goris (resulting in 60% energy savings over the baseline), renovation of an apartment building in Avan district of Yerevan with 58% savings, work with the Al Hamra Real Estate Armenia LLC in a new residential complex in Yerevan leading to energy savings over baseline of 35%, ongoing design of the first LEED-certified building in Aremnia (in the Malatia-Sebastia district of Yerevan) with 30% savings. A laboratory for testing thermal and physical characteristics of construction materials has also been created. Further information about the results of UNDP-GEF project is provided in the Annex IIb "Energy Efficiency Upgrade of Multi-apartment Panel Building in the Republic of Armenia", Annex VIII "Mid-term evaluation of UNDP-GEF Improving Energy Efficiency in Buildings in Armenia Project", as well as in Annexes XIIIa, XIIIb, XIIIc, XIIId.



will be provided for the adoption of additional by-laws applicable to building retrofits. Adoption and enforcement of the new Building Code in relation to building retrofits will be ensured.

2.2.2 Support to the gradual introduction, according to an explicit and transparent timetable, of binding legislation on energy auditing, energy passports / certificates and labelling for existing buildings.

2.2.3 Support to the introduction of legislation specific to EE retrofits in public buildings, including required amendments in the public procurement rules.

**Results:**

Indicator: Binding legislation on building codes and adequate secondary legislation adopted.

Baseline: Level 3. Policies proposed and consultation ongoing.<sup>27</sup>

Mid-term target: Level 4. Strong policy adopted

Final target: Developed & in use for renovated buildings: full coverages of buildings retrofitted in this project

51. **Output 2.3 Support provided for the creation of an enabling policy framework for EE retrofits in multi-owner residential buildings: Legal status of Home-Owner Associations (HOAs), payment enforcement, professional management and consensus levels.** The project will support the development, introduction and enforcement of adequate secondary legislation to provide a clear and effective set of functional models and a standard set of rules for multi-owner building management bodies to undertake energy efficiency retrofits. Activities will include:

2.3.1 Support to policy-makers in developing policy relating to HOA legal status, payment enforcement, professional management and consensus levels:

- Support the establishment of a proper regulatory system (including secondary legislation) to address multi-family buildings. This will include establishing mechanisms for enforcement via “carrots” and “sticks”<sup>28</sup>.
- Consensus levels to be made consistent with international best practices.
- Ensure all multi-owner buildings have HOAs that collect appropriate minimum payments from owners and enforce sufficiently clear, timely and effective mechanisms to enforce payment discipline.
- Introduction of a mechanism to assist poor households in covering payment obligations for the improvement (and, in some cases, ongoing maintenance) of buildings.
- Work with municipalities and Housing Management Companies to carry out awareness campaigns to encourage – and, where necessary, require – the engagement of professional building management services.

**Results:**

Indicator: Adequate secondary legislation providing a clear and effective set of functional models and a standard set of rules for multi-owner building management bodies to undertake EE retrofits developed, introduced and enforced

Baseline: Secondary legislation lacking

Mid-term target: Level 6. Sub-sector plans reflect key policy targets

Final target: Level 7. Regulatory frame-work developed

52. **Output 2.4 Support provided to building owners / managers / owner associations / ESCOs on legal matters related to energy efficiency retrofit projects.** The absence of business models for repayment of energy efficiency investment is considered the major barrier to private sector investment in energy efficiency retrofits in the public and residential sectors. The project will roll-out aggregative models for energy efficiency retrofits through ESCOs and through innovative legal structures for owner associations in multi-owner buildings. Private sector entities or Public-Private Partnerships (PPPs – ESCOs in this context) will be supported in establishing robust repayment schemes for their services (through, for example, legal and financial advice on structuring Energy Performance Contracts (EPCs) with building owners / owner associations). The main Activities under this Output will be:

2.4.1 Provide support on legal matters related to energy efficiency retrofit projects for multi-owner buildings:

- Collective decision-making processes.

<sup>27</sup> The indicators for 2.2, 2.3 and 2.4 use GEF definitions (as defined in Annex II of the Climate Change Mitigation Focal Area Strategy in the GEF-6 Programming Directions) for the baseline and targets.

<sup>28</sup> A stick could include setting up a mandatory payment scheme for all apartment owners to be administrated by a municipality. A carrot could include Government support for HOAs (with conditions that they would have to prove 3 months or more of payment discipline to a combined bank account).

- Clarification of ownership and responsibility for all parts of the building, including commonly-owned areas.
- Business models and payment mechanisms.
- Available solutions for helping poorer households to pay for energy efficiency retrofits.
- How to deal with absentee owners and empty apartments.

For HOAs specifically, the following legal and mediation support will be provided:

- Support municipalities in setting up resource centres for information provision on starting/managing an HOA.
- Work with municipalities and HMCs to motivate existing and functioning HOAs to take decisions regarding investments and loans via awareness-raising, education activities and technical analysis of potential investments.
- For large investments, work with HMCs to support HOAs in identifying their investment requirements through consultations and the preparation of Energy Audits, and/or Rational Energy Utilisation Plans, and/or Energy Performance Assessments, and/or Energy Performance Certificates.
- Assist in preparing building-level projects based on standard requirements for Conceptual Design documentation of each eligible building-level measure.
- Answer information requests and provide technical advice to prospective HOAs.

2.4.2 Provide support for establishing ESCOs: Current energy efficiency legislation does not fully support the ESCO modality and there are no fully operating energy service companies in Armenia<sup>29</sup>. An example of an ESCO-type arrangement that is currently being set up in Yerevan with UNDP support is the special account (fund) that will receive funds from savings generated by investments in energy efficiency lighting improvements and will use these funds for further target financing of new energy efficiency projects. Lessons will be learned from the operation of this fund, and the possibility of setting up a similar fund for energy efficiency building retrofits will be examined. Ultimately, the project aims to introduce the ESCO model, where appropriate, to Armenia in partnership with existing building sector stakeholders, public and private companies providing EE services and/or building management services.

**Results:**

Indicator:	Business models for repayment of EE investments implemented
Baseline:	Level 1. No business models for repayment of EE investments in buildings in place
Mid-term target:	Level 3. Strong proposal defined with buy-in from stakeholders confirmed
Final target:	Level 5. Financial mechanism in operation with evidence of stability

53. **Output 2.5 Exit strategy measures implemented.** The GCF project will overcome systemic barriers to energy efficient retrofits of public and residential buildings in Armenia and this catalyse impacts beyond the end of GCF's funding. The approach taken of policy and financial derisking will provide a lasting impact and lies at the heart of the project's exit strategy as outlined in section D.2. Furthermore, the financial incentives for public buildings address first-mover barriers, but since investments in energy retrofits in public buildings are generally already financially viable further incentives are not likely to be needed. On the other hand, for residential buildings where financial viability is not the main driver of building renovation, and where household poverty is a significant barrier, ongoing funding, targeted at poor households, is likely to be needed beyond the end of the project. The strategy of working via the existing social support mechanisms aims to ensure that ownership of this support shifts to internal Armenian social security funding.

All these core elements supporting long-term sustainability have been built into the project design. Nevertheless, since the project is 6 years long and not all needs can be fully anticipated at this state, this output has been included to take into account any remaining needs for the creation of a sustainable market. Activities that will contribute to achieving this Output are:

<sup>29</sup> *Final Report: Energy Efficiency Orbits for Transition Economies*, Prepared for: Copenhagen Centre on Energy Efficiency (C2E2), 2015.

2.5.1 Development and implementation of exit strategy: Arrangements providing for long-term and financially sustainable continuation of project outcomes and results beyond completion of the project will be identified, discussed with stakeholders and implemented before the end of the project's lifetime. Components 1 and 2 of the project are designed to have a lasting impact by overcoming the existing barriers to investment in EE retrofits in buildings in Armenia. During project implementation, Components 3 and 4 offer additional financial de-risking and financial incentives. It is expected that private and public sector financing will be attracted to the sector as a result of the implementation of these de-risking instruments, resulting in the development of a market for EE building retrofits in Armenia. As a Government institution, the project's Executing Entity – the Ministry of Nature Protection of Armenia – will remain involved in the sector. An analysis of the remaining needs for financial de-risking and financial incentives beyond the scope of the project will be performed and recommendations made for how this need might be met. For residential buildings, where the incentive will be targeted at vulnerable households, the project will work through the existing Family Benefit Scheme of the Republic of Armenia. By following this approach, the project will demonstrate how the funding that the Government currently uses to compensate vulnerable households against past energy price increases can be redirected to energy savings. To close the loop, the policy de-risking activities will aim to establish sustainable Government funding wherever such incentives will continue to be needed as a long-term way to address the needs of households living in poverty.

**Results:**

Indicator:	Additional exit strategy measures designed and implemented
Baseline:	N/A
Mid-term target:	Additional exit strategy measures designed
Final target:	Additional exit strategy measures implemented

54. **Component 3 – Financial de-risking.** A financial de-risking component will work in partnership with EIB, the Renewable Resources and Energy Efficiency Fund of Armenia (the R2E2 Fund), local commercial (private sector) banks and other relevant national and international financial institutions to provide access to affordable capital for energy efficiency retrofits. These financial de-risking instruments will take several forms, including credit lines from financial institutions and/or loan guarantees to stimulate local private sector commercial banks to lend to private ESCOs and/or building owners. Where existing lending rates are prohibitive (current commercial lending rates are around 22% per year, with repayment periods of 5 years), such loans may be at concessional rates. In the context of the proposed GCF project, UNDP works closely with the European Investment Bank (EIB) on the provision of soft loans for public and residential energy efficiency retrofits. For these loans to be taken up successfully, GCF finance for the other Outputs and Components of the project are critical. In Component 3, technical assistance will also be supplied to local commercial banks to develop their products, appraise investments and develop a pipeline of EE retrofit investment projects. Finally, information will be disseminated to market stakeholders on the availability of energy efficiency building retrofit finance packages on a project website. Building retrofits will be performed by competitively-selected private sector engineering companies. Activities will be implemented / supported by private sector consulting companies and individual experts. The desired outcome of Component 3 is *Outcome 3: Access to affordable capital for energy efficiency retrofits provided*. The Outputs that will contribute to achieving this Outcome are described below.

55. **Output 3.1 Technical assistance provided to banks and other financial institutions for market facilitation for individual residences**

3.1.1 Provide support to banks to develop and market products for energy efficiency in individual residences. This will include training and knowledge transfer for banks on appraising investments (including risk assessment) and developing a pipeline of projects.

**Results:**

Indicator:	Capacity of banks to develop and market products for energy efficiency retrofits in individual houses
Baseline:	Banks do not have the capacity to develop and market products for energy efficiency retrofits in individual houses
Mid-term target:	2 Armenian banks have the capacity to develop and market products for energy efficiency retrofits in individual houses

Final target: 4 Armenian banks have the capacity to develop and market products for energy efficiency retrofits in individual houses

**56. Output 3.2 Technical assistance provided to banks for Home-Owner Association (HOA) market facilitation.**

Since there is no real market for lending to HOAs in Armenia, technical support will be offered for establishing standard operating procedures for banks' introduction of credit offerings for multi-owner buildings, and an in-depth package of support will be provided for developing lending products for HOAs. The project will also work with Housing Management Companies (HMCs) and installers / suppliers who can act as facilitators for connecting HOAs with lending products. The focus will be on developing lending to existing HOAs and not on developing new HOAs. Activities that will contribute to achieving this Output are:

**3.2.1 Support to development of bank products for HOAs:**

- Demonstrating to senior management the market potential for investment – including demonstrating what similar banks are doing in EU countries.
- Providing technical assistance in developing the products.
- Site visits to places where such lending is taking place.
- Liaison with those organisations that can undertake direct outreach to HOAs (e.g. HMCs and suppliers/installers of technologies).
- Assistance in understanding the legislative and regulatory framework related to lending to HOAs.

**Results:**

Indicator: Capacity of banks to develop and market products for energy efficiency retrofits in multi-owner residential buildings

Baseline: Banks do not have the capacity to develop and market products for energy efficiency retrofits in multi-owner residential buildings

Mid-term target: 2 Armenian banks have the capacity to develop and market products for energy efficiency retrofits in multi-owner residential buildings

Final target: 4 Armenian banks have the capacity to develop and market products for energy efficiency retrofits in multi-owner residential buildings

**57. Output 3.3 Technical assistance provided to local government to develop EE retrofit projects for publicly-owned buildings.** Activities that will contribute to achieving this Output are:

**3.3.1 Support to the process of identification, development and aggregation of technically- and financially-feasible EE retrofit projects in publicly-owned buildings.** Since energy costs constitute a large share of annual expenses incurred by public buildings<sup>30</sup>, those managing such buildings will be strongly motivated to invest in EE retrofits given information on the technical possibilities and financing options.

The model for the mechanism that will support such projects is the special purpose fund for improving energy efficiency of lighting systems in Yerevan city Municipality. This fund is being set up as one of the outputs of the UNDP-GEF 'Green Urban Lighting' project.

Across the project as a whole, extensive energy savings will be achieved. It is, however, worth noting that, in view of the extreme fuel poverty currently existing in some cases (some schools maintain indoor temperatures below 8 °C in winter), the improvement of energy efficiency in such buildings will result in increased comfort levels of the occupants of such buildings but may not necessarily lead to a reduction in energy use, as energy use will be maintained at previous levels but will result in more acceptable indoor temperatures being maintained. This effect, which is the result of what is termed 'suppressed demand', has been dealt with in climate change mitigation projects. CDM guidelines, for example, recognise that in cases where, prior to the implementation of the project, the energy services being provided to end-users were too low to meet basic

<sup>30</sup> The C2E2 report referred to in footnote 9, p. 47, states that: "In a survey of educational, municipal, and healthcare buildings, 35% of those surveyed admitted that electricity bills amount to 11-20% of their total annual spending. Electricity costs were particularly high for educational buildings, where 38% of respondents reported their electricity bills at 11-20% of the total annual spending, whereas 27% of respondents reported the share of electricity costs above 20%. Many schools close down in winter, because they cannot provide adequate space heating. When they do operate, they often maintain indoor air temperatures way below adequate levels." Schools often operate at less than 8 °C.



human needs, a baseline can be constructed in which future emissions are projected to rise above current levels<sup>31</sup>.

**Results:**

Indicator: Capacity of local government to develop EE retrofit projects for publicly-owned buildings  
 Baseline: Local government does not have the capacity to develop EE retrofit projects for publicly-owned buildings  
 Mid-term target: 50% of local government employees believe local government has the capacity to develop EE retrofit projects for publicly-owned buildings  
 Final target: 80% of local government employees believe local government has the capacity to develop EE retrofit projects for publicly-owned buildings

58. **Output 3.4 Access to affordable capital for energy efficiency retrofits provided.** GCF funding for the other Outputs and Components will be critical in terms of the needed technical assistance and capacity building for the financial institutions to step in and the loans to be successfully taken up. UNDP will partner with national and international financial institutions, which may then, in turn, offer financial de-risking instruments such as credit lines, loan guarantees and public equity for investments in EE building retrofits to local financial institutions such as banks.

59. Activities will include:

3.4.1 Establishment and maintenance of the technical structure for the financial de-risking instruments offered. This will include:

- Validate the technical parameters of the de-risking instruments, including technologies, eligibility requirements and criteria for selection.
- Update the technical parameters regularly to ensure that they are clear, unambiguous and ambitious.
- Develop, update and maintain standard templates, forms and lists to allow for streamlined investment processes.
- Development of simple models and brochures for banks to present to customers outlining the typical costs and savings associated with energy efficiency investments.
- Draft an operations manual for bank personnel involved in implementation.

3.4.2 Verification of funded investments by independent audit companies to be contracted by the Project (PIU under Municipality of Yerevan). This will include:

- Carry out a verification of investment proposals. Confirm eligibility of technology / installers, reasonable, market-level costs and justifiable technology, delivery and installation.
- Carry out spot checks of selected investments before, during and after investment, as needed.

**Results:**

Indicator: Amount and number of loans for building renovation provided  
 Baseline: No lending provided  
 Mid-term target: US\$ 22 million  
 Final target: US\$ 86.25 million

60. **Output 3.5 Marketing platform created.** Develop marketing materials and a common brand / market platform on the advantages of energy efficiency retrofits, including publicising the results and the availability of energy efficiency building retrofit finance packages. Activities that will contribute to achieving this Output include:

3.5.1 Provide marketing support to banks (including SEF International, ACBA Bank, Ameria, Byblos Bank, Ararat Bank, and Ineco Bank<sup>32</sup>):

- Support the banks' marketing activities and enhance their broad implementation.

<sup>31</sup> UNFCCC CDM - Executive Board, 2012, EB 68 Report Annex 2, *Guidelines on the Consideration of Suppressed Demand in CDM Methodologies (Version 02.0)*.

<sup>32</sup> There are 6 local banks in Armenia that already offer financing for EE projects in collaboration with various IFIs (outside of the building sector), namely SEF International, ACBA Bank, Ameria, Byblos Bank, Ararat Bank and Ineco Bank. These banks will be the first ones to be targeted to receive technical assistance from the project for design of EE financing products for the residential building sector. Other interested banks, including from the list of EIB's financial intermediaries in Armenia, will also be invited through the open call for expression of interest.

- o In coordination with banks, develop and produce marketing materials (flyers, ad banners, brochures, etc.).
- o In cooperation with the banks' staff, produce a 'Handbook on Financing Residential Energy Efficiency Investments' for the bank to incorporate in its lending procedures.
- o Assistance to banks in making their voice heard as stakeholders in the process of regulatory reform.

**Results:**

Indicator:	Marketing materials developed and platform created
Baseline:	No marketing materials exist
Mid-term target:	Marketing materials created and disseminated to at least 5,000 stakeholders
Final target:	Marketing platform created and disseminated to at least 25,000 stakeholders

61. **Component 4 – Financial incentives.** The desired outcome of Component 4 is *Outcome 4: Affordability of energy efficiency retrofits for the most vulnerable households ensured through targeted financial incentives to building / apartment owners / ESCOs.* The Outputs that will contribute to achieving this Outcome are described below. Targeted financial incentives will be provided and offered to building / apartment owners, or the ESCOs serving these clients, to ensure that the most vulnerable households can afford the costs of energy efficiency retrofits. The financial analysis (Annex II<sup>33</sup> and Annex III) shows that, for those earning less than the median household income of US\$ 400 per month, building retrofits are not affordable. Despite the fact that, ultimately, the retrofits will reduce energy bills, such households will certainly not be able to afford the upfront costs of energy efficiency retrofits and, therefore, targeted subsidies to vulnerable groups are required to help address the affordability gap and stimulate the demand for these retrofits. Such incentives are common even in developed countries – both in the EU and in the USA, sizeable grants are common practice. In selecting appropriate financial incentives, UNDP has considered partial credit guarantees (first loss cover), partial performance guarantees, blended co-financing and grants. **Credit enhancement facilities** such as guarantees serve to de-risk lending for local banks. Under this arrangement, donor funds would be placed in a reserve account held by a trustee to cover a portion of the loan, with a portion of the sub-lending covered by funds in the reserve account. Such facilities could have an impact on the risk-assessment of local banks, but, at 50% cover, experience in the region has not shown any effect on interest rates. In addition, there is no effect on the risk-perception of sub-borrowers. **Blended co-financing** serves to reduce interest rates for sub-borrowers. If the donor funds are subordinated to the bank lending then this approach can combine a below market interest rate to sub-borrowers with credit enhancement measures. A clear disadvantage of blended co-financing is that the grant is ex-ante, and thus paid under all circumstances, and since the funds are blended with commercial finance it is also less transparent. In our consideration, the use of ex-post **capital grants**, with verification of work, is an effective way to ensure benefits accrue to sub-borrowers rather than being captured by the banks, and absorbed in interest rates (making it more transparent than the blended co-financing approach). A grant is also potentially performance-based, in contrast to blended co-financing approaches since the grant is only paid on successful completion and verification of the work undertaken. Considering the two sectors that will be addressed in this project, modifications to the grant approach will be taken for each:

- For public buildings, the ex-post capital grant paid to the relevant municipality or ESCO will be most appropriate. Systemic de-risking through the project – components 1 to 3 – will permanently remove the market barriers, resulting in ongoing post-project market growth without incentives
- For the residential sector, the incentives will be targeted at low-income households, so a different approach has been proposed. Due to widespread poverty and inequality prevalent across urban areas in Armenia, at least one-fifth of households cannot afford to keep adequately warm at reasonable cost, given their income<sup>34</sup>. Recognising this, the Government of Armenia has used its main social safety net programme, the Family Benefit Scheme, to provide compensation to vulnerable households against past energy price increases. The scheme uses a scoring system for household vulnerability and allocates state family benefits via Social Service Centres in each region/district. The project's approach will be to use these existing Armenian social support schemes to provide the incentives directly to vulnerable households. The incentives would be paid after verification of results for each loan, following approval, in-principal, at the time the loan is given. Local

<sup>33</sup> A feasibility study, including detailed technical, economic, financial and GHG analysis of the project, is included in Annex D of the UNDP Project Document on pp. 65-96, which is presented in Annex II of this GCF Funding Proposal. The integrated financial model which underpins this analysis is provided in Annex III of this GCF Funding Proposal.

<sup>34</sup> World Bank (2012), *Poverty and Distribution Impact of Gas Price Hike in Armenia*:

<https://openknowledge.worldbank.org/bitstream/handle/10986/11988/WPS6150.pdf?sequence=1>

private sector commercial banks will participate in this activity, and local engineering companies will provide services. Activities will be supported by private sector consulting companies and individual experts.

- The selection criteria for allocation of incentives will be those already established by the Law on Social Protection. The municipality will be responsible for applying those criteria to identify eligible recipients of the GCF-funded incentives. Final approval of the list of eligible households will be made by the Project Board based on proposal received from the municipality.
- The overall process to be followed for provision of incentives for households and public buildings is given below.

**Overall scheme for ex-post provision of incentives for households**

	<b>Step</b>	<b>Main responsible</b>	<b>Support</b>
1	Specification of buildings and packages of eligible measures	PIU/Municipality	Ministry
2	Preparation of information packages for households, private sector, and banks	PIU/Municipality	Technical experts Ministry
4	PR campaign, marketing and advocacy	Project experts Banks ESCOs	
5	Decision in principle by households to retrofit building	Households / Housing Management Companies	PIU
6	Identification of eligible vulnerable households to receive incentive	Municipality (Social Department)	PIU
7	Approval of eligible households	Project Board	PIU
8	Preparation of investment application	Private companies Households / Housing Management Companies / ESCOs	Project experts (legal & technical support)
9	Application for loan	Households / Housing Management Companies / ESCOs	Private sector experts and companies
10	Approval and provision of loan – banks check measures match approved package	Banks	Project experts
11	Arrangement of works	Households / Housing Management Companies / ESCOs	Private sector experts and companies
12	Carrying out of works	Private companies	Private sector experts and companies
13	Verification of results – municipalities check that the money was spent on the promised measures	Independent evaluator (contracted by PIU/Municipality)	PIU
14	Payment of incentive directly to households / ESCOs (see Annex XIIIj)	PIU/Municipality	

**Overall scheme for ex-post provision of incentives for public buildings**

	<b>Step</b>	<b>Main responsible</b>	<b>Support</b>
1	Specification of packages of eligible measures	PIU/Municipality	Ministry
2	Preparation of priority investment plans	PIU/Municipality	Engineering companies Technical experts
3	Decision on buildings to be retrofitted and levels of incentives	Project board	PIU

5	Approval and provision of loan	Partner bank (EIB – to be confirmed)	
6	Arrangement of works	PIU/Municipality	Private sector experts and companies
7	Carrying out of works	Private companies	Private sector experts and companies
8	Verification of results	Independent evaluator	PIU
9	Payment of incentive (Annex XIIIj)	PIU/Municipality	

**62. Output 4.1 Targeted financial incentives provided to vulnerable groups to help address the affordability gap**

4.1.1 Targeted financial incentives provided to building / apartment owners, or the ESCOs serving these clients. The incentives will initially come from GCF, but during the course of the project, as a result of the policy work under Output 2.1, will increasingly be replaced by local incentives.

**Results:**

Indicator: Financial mechanism to provide targeted financial incentives in place and incentives provided  
 Baseline: No incentives in place  
 Mid-term target: Incentives provided to 15,000 beneficiaries  
 Final target: Incentives provided to 50,000 beneficiaries

**C.4. Background Information on Project / Programme Sponsor**

63. The executing entity for the Project is the Ministry of Nature Protection of the Republic of Armenia (MoNP). For background information on MoNP, see Section C.7 and Section E.5.2.

64. The individual investments funded by the project will be renovations of private residences and public buildings. Hence, a very large number of small individual investments, each with different sponsors, will be funded.

**C.5. Market Overview (if applicable)**

65. **Overview of buildings market in Armenia:** There has been growth in the residential building stock, particularly in the single-dwellings in rural areas. Between 2010-2013, the residential sector remained the highest in terms of final energy consumption, ahead of the public and commercial buildings sectors.

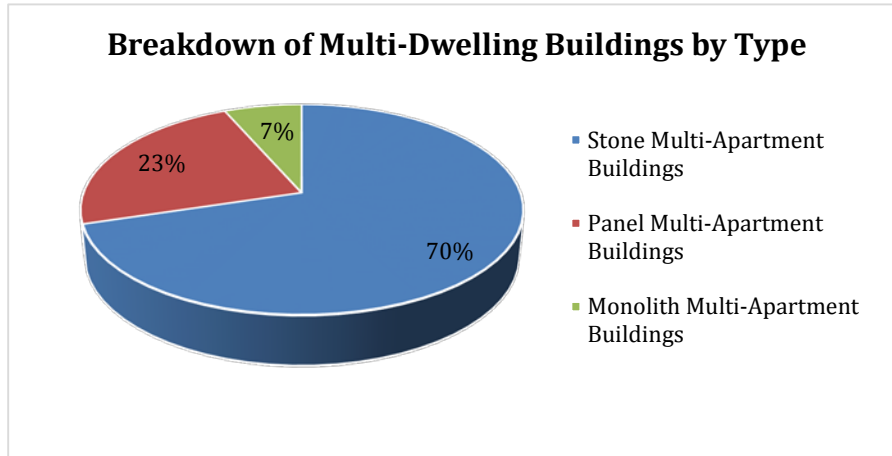
66. **Number of buildings - Residential:** The total number of residential buildings in Armenia is 445,567 (2013, ArmStat). 100% of residential apartments / houses are privately owned. The following tables provide a breakdown of multiple dwellings and single-dwelling households. As shown below, there is a skew towards multiple-dwelling buildings in urban settlements and a skew towards single-dwelling houses in rural settlements.

Multiple dwelling buildings by location	Units (2013)
Urban settlements	12,036
Rural settlements	6,938
<b>Total buildings</b>	<b>18,974</b>
<b>Total number of apartments in multiple dwellings</b>	<b>435,427</b>

Source: ArmStatBank 2015<sup>35</sup>

<sup>35</sup>Please see: [http://armstatbank.am/Menu.aspx?rxid=002cc9e9-1bc8-4ae6-aaa3-40c0e377450a&px\\_language=en&px\\_db=ArmStatbank&px\\_type=PX](http://armstatbank.am/Menu.aspx?rxid=002cc9e9-1bc8-4ae6-aaa3-40c0e377450a&px_language=en&px_db=ArmStatbank&px_type=PX)

*Multi-Dwelling Buildings by Type:*



Source: ArmStatBank 2015

Single-dwelling houses by location	Units (2013)
Urban settlements	157,809
Rural settlements	268,784
<b>Total buildings</b>	<b>426,593</b>

Source: ArmStatBank 2015

67. **Population by area:** The population of Armenia is predominantly urban.

Location	Population	%
Urban settlements	1,873,591	62.7%
Rural settlements	1,115,876	37.2%
<b>Total</b>	<b>2,989,467</b>	

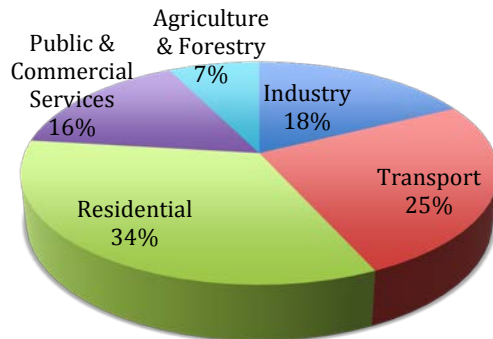
Source: United Nations, Department of Economic and Social Affairs, Population Division (2014)

68. **Growth in building stock:** Between 2001-2013, the total area of multiple-dwelling units increased by 5%; this type of building stock remains dominated by old stock, predominantly in urban areas. In the same period, Armenia experienced a 65% increase in the floor area of single-dwelling buildings (90,133 buildings), predominantly in rural areas. Approximately two-thirds of single-dwelling homes are older building stock. This context frames the rationale of the project: that there is a clear need to improve the energy efficiency of the existing building stock.

Housing stock by location and type	km <sup>2</sup> in 2001	km <sup>2</sup> in 2013
Total area of apartments of multiple dwellings	26,296	27,534
Total area of single dwelling houses	40,451	66,806
<b>Total area of housing stock</b>	<b>67,242</b>	<b>94,656</b>

69. **Residential Energy Consumption:** The residential sector in Armenia is the highest user of energy.

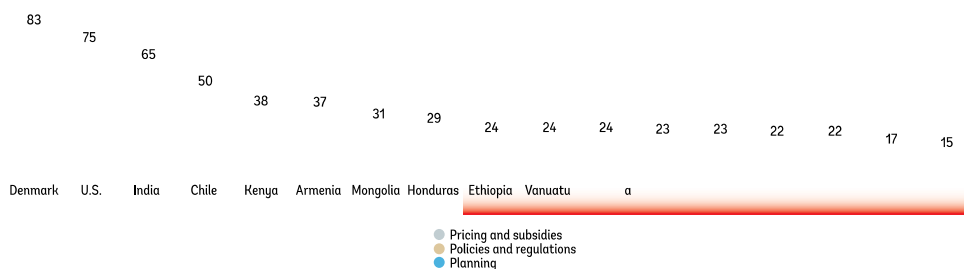
### Final Energy Consumption per sector (% ktoe) 2014



Source: ArmStatBank 2015

70. **Energy prices:** Average electricity tariffs for residential customers increased by a factor of 1.8 times between 2008-2014, and natural gas tariffs by a factor of 2.6 between 2007-2014. A decision on 17 June 2015 by the Public Services Regulatory Commission to raise electricity prices by a further 17-22% led to large protests in Yerevan and other cities. The extensive unrest demonstrates the significance of fuel poverty and has raised the issue to the top of the Government's agenda.
71. **Status of EE market and related infrastructure:** Armenia has a number (12) of quasi-ESCO companies<sup>36</sup>, but their operations in building sector have, to date, been limited and focus mainly on public and commercial buildings, due to deficiencies in the regulations regarding performance-based contracting models in the residential building sub-sectors. There is also an Association of Armenian ESCOs (ArmESCO), established in 2005, which engages in strategic planning, capacity building, partnership creation and other activities to support and promote the ESCO market in Armenia. The Association has also promoted joint projects in which several ESCOs work together on larger projects.
72. The World Bank's 'Readiness for Investment in Sustainable Energy' (RISE) indicators present useful metrics capturing the strength of policies in promoting enabling environments and the readiness for attracting private sector participation and investment in energy efficiency. A RISE assessment conducted by the World Bank in 2014 puts Armenia in the "medium-performance" category of countries, with a score of 37 out of 100 (with the highest scores, 75-83, assigned to developed countries, e.g. Denmark and the USA). See the figure below and full details and discussion regarding Armenia's ranking in Annex A, Table 6, of Annex IIa of the Funding Proposal. Armenia's score indicates that initial market conditions and the fundamental policy and regulatory infrastructure are in place in Armenia, but that certain shortcomings exist and need to be addressed before full market potential can be realised.

Figure 5: RISE energy efficiency scores



<sup>36</sup> USAID 2007. *Armenia: Building Energy Efficiency Market Assessment*. Available at [https://www.ase.org/sites/ase.org/files/armenia\\_ee\\_market\\_assessment\\_en.pdf](https://www.ase.org/sites/ase.org/files/armenia_ee_market_assessment_en.pdf)



Source: World Bank, 2014. *Pilot Report: RISE – Readiness for Investment in Sustainable Energy: A Tool for Policymakers*. For information about RISE see: <http://rise.worldbank.org/>

## C.6. Regulation, Taxation and Insurance

73. In Armenia, to build a new building or to perform a major reconstruction (such as enveloping) it is necessary to apply for and obtain an architectural-constructional assignment from the community / municipality. Any construction / intervention to the building that requires an architectural-constructional assignment also requires the design to be developed by a licensed architectural company followed by an independent assessment of the design by another licenced expert / company. Construction and technical oversight of construction must be conducted by licensed companies. The Ministry of Urban Development is the national authority for licensing in the construction sector. Construction permits are issued by local authorities.<sup>37</sup> The procedure described above will be followed for all buildings retrofitted under the GCF project. It is the responsibility of sub-contractors, i.e. companies undertaking building retrofits, to be in a procession of appropriate licences, as well as to secure building reconstruction permits in line with the above requirements. All licences and permits will have to be obtained prior to commencement of EE retrofits. Works on EE retrofits under the project will be phased, starting with Q3 Year 1 for public buildings and Year 2 for residential buildings (See Annex X). Only companies with appropriate licences will be allowed to bid for EE retrofit contracts with the Municipality and/or Building Owners. It will then be responsibility of selected contractors to secure appropriate permits for retrofit of specific buildings covered under the contracts. GCF-funded incentives will be released upon completion of EE retrofits and independent verification of the quality of works, including compliance with all relevant requirements.
74. For activities related to procurement of goods and services through UNDP, according to the Standard Basic Assistance Agreement (SBAA) signed with the Government, taxes are not applicable. Section 7 of the Convention on the Privileges and Immunities of the United Nations provides, inter alia, that the United Nations, including its subsidiary organs, is exempt from all direct taxes, except charges for utilities services, and is exempt from customs duties and charges of a similar nature in respect of articles imported or exported for its official use. If the services are procured directly by the Government implementing partners, then the national procedures apply, which entail the payment of Value Added Tax (VAT) amounting to 20% of the turnover of taxable goods and services, which is equal to 16.67% of VAT-inclusive prices.

## C.7. Institutional / Implementation Arrangements

*For more detailed description of the governance structure of the project/programme and operational arrangements, please refer to Section 5 (Implementation and Institutional Arrangements) of the UNDP Project Document in Annex II.*

75. The project will be implemented following UNDP's National Implementation Modality (NIM)<sup>38</sup>, according to the Standard Basic Assistance Agreement (SBAA - see Annex XIII) between UNDP and the Government of Armenia, the UNDP Country Programme Document (CPD – see Annex XIII) and the Armenia – United Nations Development Assistance Framework for 2016-2020 (UNDAF – see Annex XIII), and as per the policies and procedures outlined in the UNDP Programme and Operations Policies and Procedures (POPP)<sup>39</sup>. The national executing entity - also referred to as the national “**Implementing Partner**” in UNDP terminology - is required to implement the project in compliance with UNDP rules and regulations, policies and procedures (including the NIM Guidelines). According to the UNDP POPP, an Implementing Partner is “the entity to which the Administrator has entrusted the implementation of UNDP assistance specified in a signed document along with the assumption of full responsibility and accountability for the effective use of UNDP resources and the delivery of outputs, as set forth in such document.” By signing a project document, an implementing partner enters into an agreement with UNDP to manage the project and achieve the results defined in the relevant documents. In addition, an implementing partner may enter into agreements with other organisations or entities, known as “**Responsible Parties**”, which may carry out project activities and produce project outputs on behalf of the Implementing Partner. Responsible Parties are accountable directly to the Implementing Partner.

<sup>37</sup> For a detailed description of the procedure to obtain construction permits see:

<http://www.doingbusiness.org/data/exploreconomies/armenia#dealing-with-construction-permits>

<sup>38</sup> NIM fully complies with the financial management and procurement guidelines of UNDP.

<sup>39</sup> <https://info.undp.org/global/popp/ppm/Pages/Defining-a-Project.aspx>

76. In legal terms, project implementation will be governed by the national Government's signature of the UNDP SBAA<sup>40</sup> (See Annex XIII) together with a UNDP project document provided in Annex II, which will be signed by the UNDP Country Office in Armenia, the Implementing Partner (the Ministry of Nature Protection) and the Responsible Party (the Municipality of Yerevan) to govern the use of the funds (once the funds are secured)
77. The **Implementing Partner** (UNDP terminology) – Executing Partner (GCF terminology) – for this project is the Ministry of Nature Protection (MoNP) of the Republic of Armenia (RA), as the national authorised body for UNFCCC implementation in Armenia. MoNP is accountable to UNDP for managing the project, including the monitoring and evaluation of project interventions, achieving project outcomes and for the effective use of UNDP resources. The following parties will assist MoNP in successfully delivering project outcomes: MoNP's Environmental Project Implementation Unit (EPIU) and the Municipality of Yerevan (through its Project Implementation Unit (PIU) – to be established), as the Responsible Party acting on behalf of MoNP. EPIU will lead the implementation of Component 1, while the Municipality of Yerevan will be responsible for delivering envisaged outputs under Components 2, 3 and 4.
78. UNDP's overall role as an Accredited Entity is to provide oversight and quality assurance through its Headquarters and Country Office units. This role includes: (i) project preparation oversight; (ii) project implementation oversight and supervision, including financial management; and (iii) project completion and evaluation oversight. It also includes oversight roles in relation to reporting and knowledge-management. The 'project assurance' function of UNDP is to support the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed. Project assurance has to be independent of the Project Manager; therefore, the Project Board cannot delegate any of its assurance responsibilities to the Project Manager. A UNDP Programme Officer, or M&E Officer, typically holds the Project Assurance role on behalf of UNDP. The 'senior supplier' role of UNDP is to represent the interests of the parties that which provide funding and/or technical expertise to the project (designing, developing, facilitating, procuring, implementing). The senior supplier's primary function within the Board is to provide guidance regarding the technical feasibility of the project.
79. MoNP will be responsible for the overall supervision of the project to ensure synergy with other GHG mitigation policies and measures in the country. UNDP has a long track-record of successful collaboration with MoNP, dating from 1997. MoNP has the capacity and knowledge to guide and oversee the conceptual aspect of project implementation, including professional guidance on achieving the climate change mitigation objectives and overseeing the GHG emissions reduction impacts. MoNP has been the implementing agency for the full-size UNDP-GEF 'Improving Energy Efficiency of Municipal Heat and Hot Water Supply' project<sup>41</sup>, and the UNDP-GEF 'Improving Energy Efficiency in Buildings' project, and has a proven track-record in successful implementation and cooperation with different ministries and stakeholders. The day-to-day implementation of the project will be carried out through the well-established UNDP Climate Change Programme Unit coordinated by MoNP. GCF funds will not be used to pay the salaries of Government personnel, whose costs will be fully covered by the Government. The management arrangements for this project are summarised in Figure 3 below.
80. In addition, MoNP's **Environmental Project Implementation Unit (EPIU)** will be closely involved in project implementation (in particular, it will lead the Component 1 on MRV) and will also receive assistance and capacity building from the project to prepare for its subsequent accreditation under the GCF as a National Accredited Entity. EPIU is currently undergoing the accreditation process for the Adaptation Fund (please see EPIU's application request to Adaptation Fund (AF) attached under Annex XIII), and the support to GCF accreditation will build on this AF baseline.
81. The Municipality of the City of Yerevan will act as the Responsible Party for components 2-4 of the Project. The Municipality is approving and managing the city budget on annual base. The 2015 budget approved on December 23 by Council decision #265-N involves income of approximately US\$ 149.73 million and expenditures of approximately US\$ 150.25 million. Yerevan Municipality has a special procurement department responsible for all procurements, including services and works executed through open and competitive tenders in compliance with the Law on Procurement of the Republic of Armenia. Yerevan Municipality has long track-record of successful collaboration and implementation of international projects. Some of the most recent examples include

<sup>40</sup> SBAA was signed with the Government of Armenia on March 8<sup>th</sup> 1995.

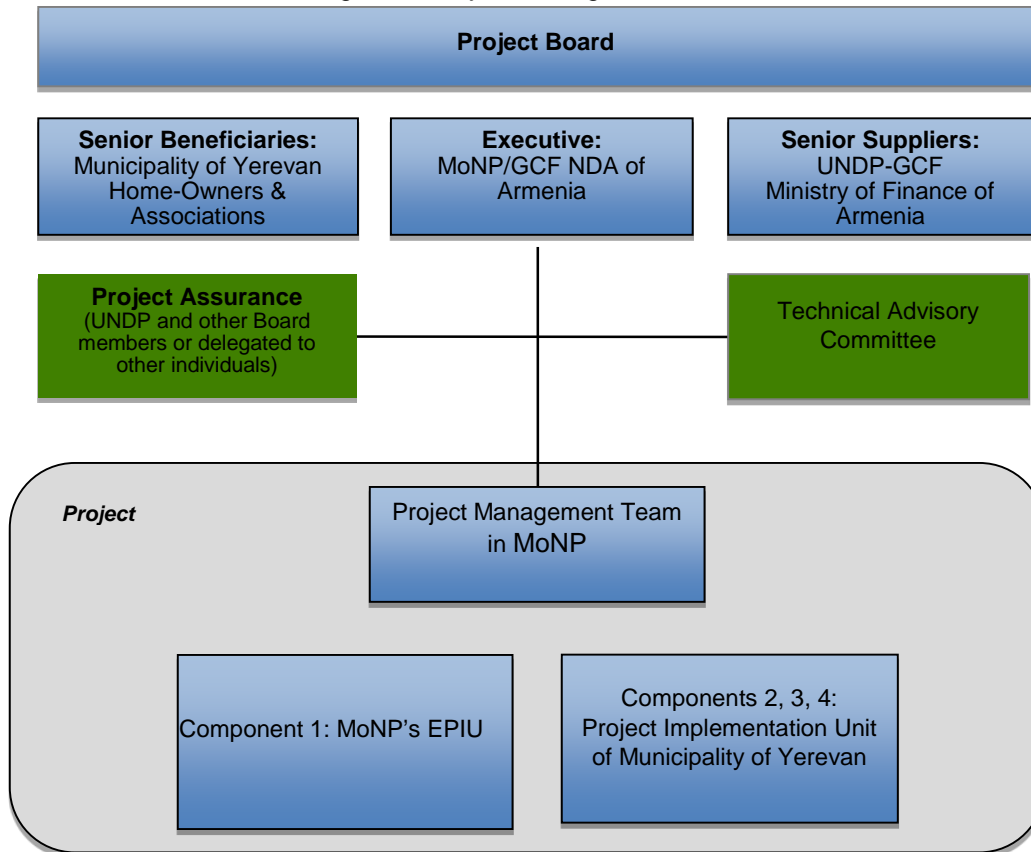
<sup>41</sup> <http://erc.undp.org/evaluationadmin/downloaddocument.html?docid=6769>



the implementation of the ‘Sustainable Transport Development Investment Programme’ under a loan agreement between the Armenian Republic and the Asian Development Bank. The project, with a total value of US\$ 48 million, is implemented by the Municipality through the ‘Yerevan Construction Investment Project Implementation Unit (PIU)’. The Municipality is also an implementing agency of the EBRD US\$ 4.0 million loan and EURO 1.9 million grant project aimed at energy efficient upgrades of the street lighting system in the city. Before the project starts, a Harmonised Approach to Cash Transfer (HACT) assessment will be undertaken by UNDP to ascertain the Municipality’s financial management capacity. The **Project Implementation Unit (PIU)** will be established at the Municipality of Yerevan and will be composed of staff selected on a competitive basis with a track-record of working on housing and building quality issues. Project management responsibilities that the PIU will take on will include the day-to-day management and decision-making over Components 2-4 of the Project.

- 82. The Municipality’s PIU will be responsible for delivering all envisaged outputs under Components 2, 3 and 4, whereas the MoNP’s Environmental Project Implementation Unit (EPIU) will be responsible for delivering all outputs under Component 1 (See Annex XIIIk). Detailed execution responsibilities are provided in Annex XIIIk and in the Figure below.
- 83. UNDP will be the GCF Accredited Entity and its Country Office (UNDP CO) in Armenia will be responsible for the management of the grant, ensuring transparency, appropriate conduct and financial responsibility. The UNDP CO will gradually hand over project management functions to the Project Implementation Unit (PIU) to be established under Yerevan Municipality. UNDP will continue to act as the financial delivery mechanism for the GCF grant and will continue technical assistance and assurance of quality control for the full duration of the project.

Figure 3. Project Management Structure



- 84. Terms of reference (including selection, membership, and accountability) will be established for each function in the structure. Signed conflict of interest declarations will be required from members of the Project Board, Executive, Project Management Team and Project Implementation Unit.

85. The **Project Board** is comprised of the following organisations: the Ministry of Nature Protection of RA, Yerevan Municipality, the Ministry of Urban Development of RA, the Ministry of Energy and Natural Resources of RA, UNDP and potential parallel financing partners (EIB). The Project Board is responsible for making, by consensus, management decisions when guidance is required by the Project Manager. Project Board decisions will be made in accordance with standards that shall ensure management for development results, best value for money, fairness, integrity, transparency and effective international competition. In case a consensus cannot be reached within the Board, the final decision shall rest with the UNDP Programme Manager. The Project Board will meet twice a year, unless an ad hoc meeting is requested in writing by a Board member.
86. The **Technical Advisory Committee** will comprise representatives of interested public and private agencies. The Ministry of Energy and Natural Resources, the Ministry of Urban Development, the Ministry of Territorial Administration, the Ministry of Economy, the Ministry of Nature Protection, the R2E2 Fund, the National Institute for Standards of the Republic of Armenia, and the National University of Architecture and Construction will be invited to nominate representatives to the Technical Advisory Committee. This group will meet annually, with periodic consultation as needed throughout the year. The Board will actively seek and take into account the input from the Technical Advisory Committee. Once a year, Board meetings will be timed to occur immediately after the annual meetings of the Technical Advisory Committee.
87. The **Project Manager** will run the project on a day-to-day basis on behalf of MoNP within the constraints laid down by the Project Board. The Project Manager function will end when the final project terminal evaluation report, and other documentation required by the GCF and UNDP, has been completed and submitted to UNDP. The Project Manager is responsible for day-to-day management and decision-making for the project and for the establishment of internal control processes in the project. The Project Manager's prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost.
88. For UNDP to ensure that cash transfers are properly managed, Harmonised Approach to Cash Transfer (HACT) assessments will be undertaken on the following relevant institutions: PIU of the Municipality of Yerevan (when established and operational) and the EPIU of the MoNP. The project will also establish a purchasing review committee for the project as per UNDP Financial Regulation and Rule 121.01.
89. Specific responsibilities will include:
90. *Overall project management:*
- Manage the realisation of project outputs through activities;
  - Liaise with the Project Board to assure the overall direction and integrity of the project;
  - Identify and obtain any support and advice required for the management, planning and control of the project;
  - Responsibility for project administration;
  - Liaise with any suppliers;
91. *Running the project:*
- Plan the activities of the project and monitor progress against the quality criteria.
  - Mobilise goods and services to initiative activities, including drafting TORs and work specifications;
  - Monitor financial resources and accounting to ensure accuracy and reliability of financial reports;
  - Manage and monitor the project risks
  - Be responsible for managing issues and requests for change by maintaining an Issues Log.
92. Engineering companies and other service providers hired by UNDP, EPIU or the PIU will be procured using GCF-approved UNDP procurement practices with competitive and open tendering. The energy efficiency retrofits themselves will be performed by private-sector engineering companies. For public buildings, procurement will take place according to the national public procurement rules. For residential beneficiaries, procurement requirement may be specified by the banks that are providing loans. The approach will be competitive / private sector-oriented, with the aim of creating a competitive sustainable market for energy efficiency retrofits in the country.
93. The approach to funding the four project components are as follows:

- Component 1: Competitive and open tendering for individual and company services (see Annex Vb – Procurement Plan)
  - Component 2: Competitive and open tendering for individual and company services (see Annex Vb – Procurement Plan)
  - Component 3: Competitive and open tendering for individual and company services (see Annex Vb – Procurement Plan)
  - Component 4: For investments that meet eligibility requirements, incentives funds will be provided by UNDP via PIU/Municipality of Yerevan, as follows:
    - For public buildings the ex-post capital grant will be paid directly by UNDP to Municipality.
    - For the residential sector, the incentives will be targeted at low-income households, so a different approach has been proposed. Due to widespread poverty and inequality prevalent across urban areas in Armenia, at least one-fifth of households cannot afford to keep adequately warm at reasonable cost, given their income<sup>42</sup>. Recognising this, the Government of Armenia has used its main social safety net programme, the Family Benefit Scheme, to provide compensation to vulnerable households against past energy price increases. The scheme uses a scoring system for household vulnerability and allocates state family benefits via Social Service Centres in each region/district. The project's approach will aim to use these existing Armenian social support schemes to provide the incentives directly to vulnerable households. The incentives would be paid by PIU/Municipality of Yerevan after verification of results for each loan, following approval, in-principal, at the time the loan is given (See Annex XIIIj).
94. Implementation of Component 4 will be conditional on the successful delivery of Output 2.3, 'Support provided for the creation of an enabling policy framework for EE retrofits in multi-owner residential buildings', which is a prerequisite for successful implementation of the incentive scheme.

---

<sup>42</sup> World Bank (2012), *Poverty and Distribution Impact of Gas Price Hike in Armenia*:  
<https://openknowledge.worldbank.org/bitstream/handle/10986/11988/WPS6150.pdf?sequence=1>

### **C.8. Timetable of Project/Programme Implementation**

The timetable is provided Annex X.

### D.1. Value Added for GCF Involvement

95. In the absence of the GCF contribution, the market barriers outlined in Section C.2 will limit investments in energy savings and restrict the participation of private sector capital. GCF involvement will help to overcome the barriers and create a self-sustaining market for private and public investment in low-carbon building renovation.
96. While achieving thermal modernisation through energy efficiency retrofits in all building sectors is a national development and climate change mitigation priority, the overall investment risk profile of such retrofits is prohibitive, deterring private and public investment despite the vast potential for highly cost-effective energy-saving and GHG emission reduction opportunities. While there are scattered donor efforts to improve the energy efficiency of the Armenian economy, in the absence of GCF support a comprehensive removal of the barriers limiting investment in EE building retrofits will not occur. As a result, existing buildings in Armenia will continue to consume high amounts of energy, incurring high costs for residents and organisations operating public buildings. Significant potential energy savings (and corresponding GHG emission reductions) will go unrealised.
97. The following barriers in particular will be removed as a result of GCF involvement:
- Policy barriers - Component 2 will employ the GCF grant to build on the work begun in an earlier GEF project and lead to Armenian authorities adopting and implementing an enabling policy framework for EE retrofits.
  - Financial barriers - Components 3 and 4 will employ the GCF grant along with co-financing to initiate the development of a market in which loans are available at rates and tenors that encourage investment in EE solutions and additional financial incentives are provided to poor and vulnerable households. The GCF contribution is particularly critical for Component 4 because, in the absence of financial incentives, EE retrofits have negative NPV and do not present a viable investment opportunity (see results of financial analysis in Annex II, pp. 65-96, and Annex III). Also, incentives for low-income households are needed to unlock building-level investments, otherwise these households would block building-level investment decisions in multi-apartment buildings.
  - Market barriers - Component 2 will employ the GCF grant to build capacity, particularly in multi-owner residential buildings, to enable residents to invest in EE retrofits in these buildings.
  - Technical / capacity barriers - Components 1 and 2 will employ the GCF grant to build the required knowledge base for implementing EE retrofits in the country.
98. The GCF involvement will lead to energy efficiency retrofits with a significantly higher energy-saving performance than is common practice in Armenia. This additionality will provide a lasting transformation of the market and result in long-term climate change benefits.

### D.2. Exit Strategy

99. Long-term sustainability of the project is embedded in the project design, which aims at overcoming systemic barriers and creating market conditions for energy efficiency investment thus catalysing impacts beyond the end of the GCF funding. Sustainable market opportunities for EE investment will be created by:
- Addressing policy needs within Component 2: the legislative barriers to public and private sector investment will be addressed at national, sub-national and local authority levels, and technical and capacity barriers will be addressed.
  - Addressing financing needs within Component 3: The project will put in place arrangements for long-term sustainable provision of affordable finance for EE building renovation, which matches the risk-return profile of such investment. It will do this by building the knowledge and experience of local banks and ESCOs.
  - Catalysing initial investment through financial incentives provided under Component 4, which will serve to kick-start the market, addressing first-mover barriers at both local bank and borrower levels. By seeding a critical mass of investment, practical experience and know-how will be created, thus addressing these systemic barriers. For residential buildings, where the incentive will be targeted at vulnerable households, the project will work through the existing Family Benefit Scheme of the Republic of Armenia. By following this approach, the project will demonstrate how the funding that the Government currently uses to compensate vulnerable households against past energy price increases can be redirected to energy savings. To close the loop, the policy de-risking activities will aim to

establish sustainable Government funding wherever such incentives will continue to be needed as a long-term way to address the needs of households living in poverty.

100. Output 2.5 will take into account any remaining needs for the creation of a sustainable market and will put in place any necessary additional measures needed to ensure the market created will continue developing after the GCF intervention. These measures will be discussed with stakeholders and implemented before the end of the project's lifetime. Components 1 and 2 of the project are designed to have a lasting impact by overcoming the existing barriers to investment in EE retrofits in buildings in Armenia. During project implementation, Components 3 and 4 offer additional financial de-risking and financial incentives. It is expected that private and public sector financing will be attracted to the sector as a result of the implementation of these de-risking instruments, resulting in the development of a market for EE building retrofits in Armenia. As a Government institution, the project's Executing Entity – the Ministry of Nature Protection of Armenia – will remain involved in the sector.

## E.1. Impact Potential

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

### E.1.1. Mitigation / adaptation impact potential

101. The Project will achieve high greenhouse gas (GHG) emission reductions from improved EE and lower energy-intensity buildings. Based on experience and evidence from energy audits of UNDP's pilot project in Yerevan<sup>43</sup> (Annex IIa describes this pilot project on EE upgrading of a multi-apartment residential building and its results), up to 60% of energy consumption / GHG emissions in buildings can be reduced cost-effectively.
- Total tonnes of direct CO<sub>2</sub> eq reduced per annum: an estimated 69,484 tCO<sub>2</sub> per year or 1.4 million tCO<sub>2</sub> over the 20-year lifetime of the EE interventions.
  - Including direct and estimated indirect emission savings, a total of 5.6 to 5.8 million tCO<sub>2</sub> over the 20-year lifetime of the EE interventions will be achieved.
  - Expected total number of direct beneficiaries: 210,000.
102. The overall impacts of the GCF project have been estimated using the data from the technical and financial analysis (presented in Annex II). The overall impacts are summarised in the tables below:

	Average cost per retrofit (US\$)	Average level of grant (%)	Energy savings (GWh/year)	GHG savings (tCO <sub>2</sub> eq / year)	Number of buildings	Total amount of grant (US\$)	Total investment (US\$)	Lifetime GHG savings (CO <sub>2</sub> eq, 20 years)
Single-family individual buildings	10,000	9%	110.3	27,239	6,000	5,400,000	60,000,000	544,783
Multi-family apartment buildings	120,000	22%	93.1	22,997	290	7,656,000	34,800,000	459,942
Public buildings (large, such as hospitals)	250,000	5%	7.7	5,005	23	287,500	5,750,000	100,093
Public buildings (small, such as schools)	95,000	8%	53.2	14,243	150	1,140,000	14,250,000	284,860
<b>Total</b>			<b>264.3</b>	<b>69,484</b>	<b>6,463</b>	<b>14,483,500</b>	<b>114,800,000</b>	<b>1,389,677</b>

### E.1.2. Key impact potential indicator

<sup>43</sup> In 2013-2014, UNDP, with GEF financial support, implemented the first large-scale thermal modernisation project in the Republic of Armenia in a typical panel multi-apartment residential building in Yerevan. Full results of the project, including technical, economic and environmental feasibility, are presented in Annex IIa to this proposal. Also, the results of a social survey of the residents are presented in Annex XIIIa (pp. 43-45).



Provide specific numerical values for the indicators below.

GCF core indicators	Expected tonnes of carbon dioxide equivalent (t CO <sub>2</sub> eq) to be reduced or avoided (Mitigation only)	Annual	69,484 (direct)
		Lifetime	1,389,677 (direct) 4.2-4.4 million (indirect)
	Expected total number of direct and indirect beneficiaries (reduced vulnerability or increased resilience); number of beneficiaries relative to total population (adaptation only)	Total	210,000
		Percentage (%)	N/A
Other relevant indicators	Regulatory systems: Level 5.1 – Institutional and regulatory systems that improve incentives for low-emission planning and development and their effective implementation.  Number of vulnerable people (lowest quintile of household income) with improved building EE: 50,000		

Describe the detailed methodology used for calculating the indicators above.

Expected tonnes of carbon dioxide equivalent (tCO<sub>2</sub> eq) to be reduced or avoided (mitigation only)

103. A detailed bottom-up analysis of model buildings in Armenia has been conducted. Four models have been developed, two in the residential sector (one for an individual single-family house and one for a multi-family apartment building) and two in the public sector (a hospital and a school). Building parameters and energy characteristics were determined for each type of building. A set of efficiency measures was then applied and the energy needs and potential savings for these measures calculated. Total energy savings were estimated taking into account a rebound factor. Using the model buildings as a guide to potential energy and GHG reductions, the estimated total emission reductions from the project investments were calculated. The GHG emissions analysis makes use of the Global Environment Facility (GEF) methodology for energy efficiency projects<sup>44</sup>. GHG emission coefficients were taken from the GEF GHG calculation worksheets for natural gas and electricity (data for Armenia).<sup>45</sup> For electricity, the grid emission factor for Armenia, given in the GEF worksheets, is taken from the IGES database<sup>46</sup> and is based on the CDM combined margin approach. Total direct emission reductions are the sum of the reductions achieved in the four building categories evaluated.
104. The project will undertake a number of activities beyond simple investments that will also stimulate the market for energy efficiency in the residential and public building sectors. Therefore, there will be indirect energy savings triggered by investments not within the direct control of the project. These are estimated using bottom-up and top-down approaches based on the GEF methodology. For bottom-up emission estimates, the estimated direct reductions are multiplied by a replication factor – with the expectation that the volume of investments and GHG emissions reductions will increase by a factor of 3 over a 10-year period after project completion due to the project intervention. This is a modest replication factor according to GEF practice. To estimate the indirect GHG emission reductions using a top-down methodology, total 10-year market size was estimated.
105. A detailed description of the methodology used to calculate the expected tCO<sub>2</sub> eq reduced is provided in Annex H of the UNDP Project Document (Annex II).

Expected total number of direct and indirect beneficiaries (reduced vulnerability or increased resilience)

<sup>44</sup> See <https://www.thegef.org/gef/pubs/STAP/Methodology-for-Calculating-GHG-Benefits-of-GEF-Energy-Efficiency-Projects-v.1> under "Financial Instruments"

<sup>45</sup> see <https://www.thegef.org/gef/pubs/STAP/Methodology-for-Calculating-GHG-Benefits-of-GEF-Energy-Efficiency-Projects-v.1> under "Financial Instruments"

<sup>46</sup> To be found at <http://pub.iges.or.jp/modules/envirolib/view.php?docid=2136>

106. Direct beneficiaries of the project (who continue to benefit after the project for the lifetime of the investments) are calculated using an average household size of 5, and an average number of dwellings per apartment building of 36<sup>47</sup>. For public buildings, beneficiaries are taken as the average number of permanent building residents. For a hospital, this is the hospital staff, not the number of short-term users (patients).
107. Jobs created by the project are based on data in Ürge-Vorsatz *et al.* (2010): *Employment Impacts of a Large-Scale Deep Building Energy Retrofit Programme in Hungary*<sup>48</sup>. This detailed study takes into account jobs created in the construction sector, from the supply chain and from additional spending of additional disposable income as a result of financial savings. It also accounts for job losses in the energy supply sector resulting from reduced energy demand. The study finds that, on average, 17 jobs are created per million Euros invested (approximately 15 jobs per million US\$). This employment factor is used here to estimate the number of jobs created as a result of the investments facilitated by the project. In order for the job creation to be sustained, there is an implicit assumption that lending will continue at the same rate in the future. If the retrofit investment market were to shrink after the project comes to an end, many of the jobs created would be lost.
108. The detailed numbers are shown in Annex D of the UNDP Project Document

*Describe how the indicator values compare to the appropriate benchmarks established in a comparable context.*

109. One sub-set of buildings with significant energy-saving potential in Armenia is concrete panel buildings, of which there are approximately 4,300. In such buildings alone, the energy-saving potential from thermal modernisation is over 1.250 TWh/year with a GHG reduction potential of 250,000 tonnes per year CO<sub>2</sub>eq, and annual savings of about US\$ 63 million (based on gas and electricity tariffs of 2014).

## E.2. Paradigm Shift Potential

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

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

*Describe expected contributions to global low-carbon and/or climate-resilient development pathways through a theory of change for scaling up and replication (e.g. in terms of multiples of initial impact of the proposed project/programme).*

110. The paradigm shift potential for the proposed project lies in the project's focus on the private sector as the driving force for investment and implementation of EE retrofits, as opposed to current models which are primarily based on (scarce) public finance and lack repayment mechanisms (i.e. accumulated energy savings are not monetised and stay with building owners). The project will lead to a paradigm shift in the perception of investment in EE retrofits by investors, which are currently viewed as too risky and unattractive for private sector.
111. The theory of change for the project is illustrated in Annex XII. The project's results chain is based on UNDP's approach to market transformation for energy efficiency. This approach is based on the fact that, due to the high upfront capital intensity of energy efficient investments, access to large quantities of low-cost financing is critical to cost-effectively transform energy efficient markets. The main elements of the theory of change are support to governments to put together public instrument packages that: (i) address the non-financial barriers that block demand for investment; and (ii) create attractive risk-return profiles by *reducing, transferring or compensating* for risk.

*Activity-specific sub-criteria and assessment factors:*

112. *Innovation: Opportunities for targeting new market segments.* Project Outputs 2.3, 2.4 and 3.2 will create the enabling policy framework for EE retrofits in multi-owner residential buildings, provide technical assistance to banks to enable them to finance EE retrofits in such buildings, and support HOAs in accessing such finance.

<sup>47</sup> These assumptions are based on the characteristics of the pilot building in Yerevan, which is a typical multi-apartment residential building in Armenia (i.e. there are 4,300 similar buildings across the country).

<sup>48</sup> <http://zbr.kormany.hu/download/8/82/00000/Study%20Deep%20Building%20Energy%20Retrofit%20Prog.pdf>



This will create a market for EE retrofits in the market segment of multi-owner buildings in Armenia, a market which is non-existent at the moment

113. *Innovation: Opportunities for adopting new business models.* The project will encourage the development of an enabling environment for ESCOs in Armenia and, in Output 2.4, includes activities that will provide support to establishing ESCO models based on Energy Performance Contracting (EPCs) for implementation of EE retrofits in multi-apartment residential buildings. Such models are currently only at an early stage of development in the country.
114. *Level of contributions to global low-carbon development pathways:* The project's contribution to the shift to low-emission sustainable development pathways is described in Section E.1. The buildings sector worldwide is a major energy consumer. As described in Section C.2, GHG emissions from the building sector now represent 19% of global GHG emissions. Reduction of emissions from existing building stock will be an essential element of a global low-carbon development pathway, but there are numerous barriers to achieving such reductions. This project will provide a replicable, scalable model for the creation of an enabling environment for EE retrofits that will be particularly relevant for the transition economies of the former Soviet Union, in which there is huge potential for improvement of energy efficiency in the built environment<sup>49</sup>.
115. *Potential for expanding the scale and impact of the proposed project (scalability). A theory of change for scaling-up the scope and impact of the intended project without commensurately increasing the total costs of implementation.* The project has the potential to be highly scalable: Armenia has approximately 4,300 panel buildings. Once a working model for financing retrofits of this type of buildings has been established and the skills for performing such retrofits have been built with direct support from the GCF project targeting an initial sub-set of 290 panel buildings, it will be relatively straightforward to scale-up the project to the rest of this market segment. The potential for energy savings from EE retrofits of this building stock is about 1,250 million kWh/year or 250,000 tCO<sub>2</sub>/year. The leveraged investment ratio is expected to be US\$ 20 for every US\$ 1 invested by the GCF (See Section E.6.2. for estimated scope and impacts induced by the project for each building category and the total leveraging ratio).
116. The project will undertake a number of activities beyond simple investments, which will stimulate the market for energy efficiency in the residential and public building sectors. Therefore, there will be indirect energy savings triggered by investments not within the direct control of the project. These are estimated using bottom-up and top-down approaches based on the GEF methodology. Indirect emission savings are estimated to be between 4.2-4.4 million tCO<sub>2</sub>.
117. *Replicability. A theory of change for replication of the proposed activities in the project.* Replicability of the project is also high. Neighbouring countries have large numbers of similar buildings to those in Armenia as well as similar barriers and risks to EE investments and may benefit by learning from successful projects in Armenia.<sup>50</sup>
118. In summary, the potential to scale-up the project is incorporated into the project design: first, through the establishment of robust MRV for the building sector that will enable further investment decisions to be made on the basis of sound data; second, through supporting the creation of an enabling policy framework; and, third, through the establishment of a financial mechanism and a system for the provision of financial incentives to vulnerable households that can be expanded as needed. Beyond the direct project scale-up measures, the potential for replication is large – not just in Armenia, but also in the development of best-practice financing mechanisms that could be copied in neighbouring countries.

<sup>49</sup> Centre for Energy Efficiency (2015), *Final Report: Energy Efficiency Orbits for Transition Economies*  
[http://www.cenef.ru/file/Final%20Report\\_C2E2\\_CENEF\\_June2\\_2015.pdf](http://www.cenef.ru/file/Final%20Report_C2E2_CENEF_June2_2015.pdf)

<sup>50</sup> See Centre for Energy Efficiency (2015), *Final Report: Energy Efficiency Orbits for Transition Economies*  
[http://www.cenef.ru/file/Final%20Report\\_C2E2\\_CENEF\\_June2\\_2015.pdf](http://www.cenef.ru/file/Final%20Report_C2E2_CENEF_June2_2015.pdf) for an overview of potential and barriers to EE in building sector in former Soviet economies.

E.2.2. Contribution to the creation of an enabling environment

119. The key to achieving a true paradigm shift is through the creation of an enabling market-based environment through policy, finance, technical / capacity de-risking and barrier removal.
120. *Arrangements that provide for long-term and financially sustainable continuation of relevant outcomes and key relevant activities:* The project will strengthen the institutional and regulatory systems relevant to EE retrofits in Armenia. It will do this through working with national, sub-national and local authorities towards the adoption and implementation of an enabling policy framework for EE retrofits. This will be supported by the development of an MRV framework that will provide data for planning of further investments. The capacity that will be built in Government and in financial institutions for encouraging and financing EE retrofits will enable the development of a market that will continue to exist beyond completion of the intervention.
121. *Extent to which the project creates new markets:* The market for EE building retrofits in Armenia is currently extremely limited. For multi-owner buildings and public buildings in particular, no financial products exist that can fund such investments. HOAs lack the knowledge to engage in such projects and ESCO models have not yet been applied in these sectors. The project will create a functioning market for the different sub-segments of the buildings sector and create the market, which, once established, will develop further as a result of the improved risk environment for such investments that the project will create.
122. *Degree to which the activity will change incentives for market participants by reducing costs and risks, eliminating barriers to the deployment of a low-carbon solution:* project activities are designed to address the market barriers to energy efficient building renovation via a combination of policy and financial de-risking instruments and targeted financial incentives for key market players. By targeting the barriers, the project will reduce the overall investment risk profile of EE building retrofits and thus achieve a risk-return profile for EE building retrofits that will incentivise market participants to invest in such projects.
123. *Degree to which the proposed activities help to overcome systematic barriers to low-carbon development to catalyse impact beyond the scope of the project:* The project will systematically target the barriers and investment risks that currently result in a prohibitive overall investment risk profile of EE building retrofits in Armenia. The barriers (described in Section C.2) fall under the general categories of policy, financial, market and technical / capacity barriers. The project is designed to ensure that each of these barrier categories will be eliminated or reduced as far as possible in Activities specifically designed for that purpose, resulting in the creation of a favourable market environment for investment in EE retrofits in buildings that will be sustained beyond the scope of the project.

E.2.3. Contribution to regulatory framework and policies

124. The project will provide technical assistance to strengthen existing policies and formulate secondary legislation that support EE building retrofits in different building sectors.
125. Under Component 1, which will introduce robust MRV, improved data for decision-makers will allow policy-makers to set priorities for energy efficiency programmes within the buildings sector. The existence of the MRV system will allow decision-makers to formulate policies and programmes based on actual consumption and performance data from the building sector.
126. Component 2 will support national and local authorities to adopt and implement an enabling policy framework for EE retrofits. This Component will support on-going legal reform in the field of energy efficiency, such as introduction of binding legislation on energy auditing, energy passports/certificates and labelling for existing buildings. Measures will include: the modernisation and enforcement of EE standards and mandatory energy performance standards for retrofitted buildings; the development, introduction and enforcement of adequate secondary legislation for providing a clear and effective set of functional models and rules for multi-apartment building management bodies to undertake EE retrofits; legislation that will assist the management of energy efficiency building retrofits for different types of building; and assistance to residents and common-share building organisations on collective decision-making in the context of EE retrofit investment.

#### E.2.4. Potential for knowledge and learning

127. The project will contribute to knowledge creation and sharing by all market players. To ensure that the strengthening of knowledge will be a focus throughout the project's life, the project includes an output, Output 1.2, which deals specifically with the existence and implementation of a plan for sharing lessons learned. In addition, the provision of technical assistance to the construction sector, Government (national and sub-national) and HOAs will result in collective learning in those target groups. Energy and financial savings information will be collected, analysed and disseminated via the project website and through various other channels and activities such as workshops and advertising.
128. The project will support the implementation of building Energy Management Information Systems (EMIS) in retrofitted buildings. The information gained from these systems will be disseminated, helping to establish the business case for energy efficiency building retrofits, inform better policy-making and providing information for national documents on climate change such as future National Communications to the UNFCCC.
129. The monitoring and evaluation plan is described in Section H.2. The planned knowledge management activities, including the sharing of lessons learned, are described in Output 1.2

### E.3. Sustainable Development Potential

#### Wider benefits and priorities

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

130. Delivering a large-scale retrofit initiative in the form of the proposed GCF project will deliver large and important development benefits whose impacts will increase over time as energy prices rise<sup>51</sup>.
131. *Economic co-benefits:*
- Major economic savings (up to 5% of household incomes) due to reduced spending on energy and, as a result, reduction of energy (fuel) poverty among at least 5,000 households.
  - Job creation through direct employment in retrofit activities, which would result in approximately 50,000 person-months of paid labour.
  - Reduction in Government expenditures on energy (and improved budgetary position of national and sub-sovereign entities) and freeing-up Government budget to be reallocated to other important areas of expenditure such as education, healthcare or reinvestment in EE-related activities. Energy costs constitute a large share of annual expenses incurred by public buildings. In a survey of educational, municipal and healthcare buildings, 35% of those surveyed state that electricity bills amount to 11-20% of their total annual spending. Electricity costs are particularly high for educational buildings, where 27% of respondents report the share of electricity costs to be above 20%. In large public buildings such as hospitals, the total energy savings possible as a result of changing the heating system and better insulating the building is 43%, with an improvement in lighting electricity needs of 80%. In smaller public buildings such as schools, the total energy saving possible as a result of better insulating the building is 49%. This means that retrofits could potentially save public buildings 10% or more of their budget.<sup>52</sup>
  - Government's budget deficits reduced.
132. *Social and health co-benefits:*
- Poverty reduction through reduced energy bills: over 30% of Armenian households are considered energy poor, where energy poverty is defined as households spending more than 10% of their budgets on energy.<sup>53</sup>
  - Improving occupancy conditions and thermal comfort for tenants and building users

<sup>51</sup> Multiple socio-economic development benefits of EE are documents by IEA (2014), *Capturing the Multiple Benefits of Energy Efficiency*: <http://www.iea.org/topics/energyefficiency/energyefficiencyiea/multiplebenefitsofenergyefficiency/> and Copenhagen Economics (2012), *Multiple Benefits of Investing in Energy Efficient Renovation of Buildings*: <http://www.renovate-europe.eu/uploads/Multiple%20benefits%20of%20EE%20renovations%20in%20buildings%20-%20Full%20report%20and%20appendix.pdf>

<sup>52</sup> Centre for Energy Efficiency (2015), *Final Report: Energy Efficiency Orbits for Transition Economies* [http://www.cenef.ru/file/Final%20Report\\_C2E2\\_CENEF\\_June2\\_2015.pdf](http://www.cenef.ru/file/Final%20Report_C2E2_CENEF_June2_2015.pdf)

<sup>53</sup> <http://r2e2.am/wp-content/uploads/2013/09/SREP-09.16.pdf>

- Improved access to educational facilities with suitable thermal environments: currently, many schools close down during the winter because they cannot provide adequate space heating.
- Improved conditions for home-owners, including improved health due to reduced exposure to cold, improved indoor air quality and a healthier indoor environment from the absence of moulds. The World Health Organisation (WHO) estimates that, in 2012, 1,123 deaths in Armenia were attributable to household air pollution from solid fuel use.<sup>54</sup>
- Increase of the lifetime of the buildings;
- Creation of jobs in the construction sector (estimated as 1,700 – see Section E.1.2 and Annex II).

133. Environmental co-benefits

- Improved air quality due to the reduction in use of solid fuel heating: In 2010, 19% of the population of Armenia still used solid fuels in the home (UN MDG Database<sup>55</sup>).
- Noise reduction due to sound insulation: this is beneficial in multi-family apartment buildings, where noise levels can be a major issue and can cause friction between neighbours.
- Reduced need for cooling in summer.

134. *Gender-sensitive development impact (See Annex VIc for Gender Assessment and Action Plan) :*

- Positive impact of EE retrofits on women through improved conditions in the home.
- Improved access of women to investments on energy efficiency building retrofits and to information about building energy efficiency.
- Broader participation of women in opportunities: setting-up of building sector MRV, where users will be trained on data collection and analysis and use of EMIS; training and awareness-raising for commercial banks on performing due diligence of EE retrofit opportunities; development of energy performance standards and a mechanism for continuous update and systematic enforcement
- Out of the 82,200 residents of the single and multi-family buildings that will be directly impacted by the project, an estimated 6,000 people would be female-head of households and their dependents based on the 37% percentage of the female-headed households in 2010 (WB data)<sup>56</sup>. Out of the 128,000 users of public buildings, at least 90,000 will be women, reflecting the much higher share of female employment in the public sector. When targeting vulnerable households, the project will work with the main Armenian social safety net programme, the Family Benefit Scheme. The scheme already prioritizes vulnerable women, such as single mothers, in allocation of state support. Additional indicators and targets will be added to ensure equal access to financial incentives for women during implementation of Component 4.

## E.4. Needs of the Recipient

Vulnerability and financing needs of the beneficiary country and population

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

135. Climate change is predicted to result in growing energy demand in buildings, predominantly for cooling in summer, and, in parallel, will lead to a rise in energy tariffs<sup>57</sup>. Taken together, these climate change impacts will lead to exacerbation of energy poverty and worsening of health and living conditions, in particular for urban dwellers.

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

136. **Residential buildings and fuel poverty.** Poverty levels in Armenia have increased since 2007, which is primarily a result of the energy crisis, caused by high dependence on imported energy, and hikes in prices of household energy. Armenia exhibits high energy expenditures relative to income, which results in fuel poverty. About 32% of the population lives below the poverty line against the average national poverty index.<sup>58</sup>

<sup>54</sup> <http://apps.who.int/gho/data/node.main.HAPBYCAUSEBYCOUNTRY?lang=en>

<sup>55</sup> <http://mdgs.un.org/unsd/mdg/Default.aspx>

<sup>56</sup> <http://data.worldbank.org/data-catalog/gender-statistics>

<sup>57</sup> UNDP (2009), *The Socio-Economic Impact of Climate Change in Armenia*:  
<http://www.am.undp.org/content/dam/armenia/docs/Report%20SOI%20of%20CC.pdf>

<sup>58</sup> <http://data.worldbank.org/country/armenia>

137. The World Bank classifies Armenia as a lower middle-income country. In 2014, Gross National Income per capita was US\$ 3,810, slightly above the average of other lower middle-income countries. The adverse impacts of the financial crisis, which hit the Armenian economy hard between 2008-2011, was a key factor in the marked increase in the level of poverty in the country, reaching 14.1 per cent in 2009. Poverty in 2011 became deeper and more severe as extreme poverty incidence increased, growing by a factor of 2.3 (or by 2.1 percentage points) relative to the 2008 level; for the very poor, it increased by a factor of 1.6 (or by 7.3 percentage points); and total poverty grew by 26.8% (or by 7.4 percentage points).<sup>59</sup>
138. High energy expenditures relative to income result in energy poverty and, in some cases, electricity poverty. Rising fuel costs and the need for investments in new energy assets and rehabilitation of existing assets will increase the cost of providing electricity. Thus, households currently facing fuel poverty and/or electricity poverty are likely to continue to experience significant pressures on their budgets as energy tariffs continue to rise. On average, Armenian households spend about 8% of their budget on energy, with slightly more than half of this on gas. The poorest quintile spend 7% and 6.5% of their budget on energy overall and heating, respectively.<sup>60</sup> In 2010, there was a tariff increase on gas imports from Russia which led to a nearly 40% increase in the retail gas price for residential consumers. In an analysis of the impacts of this increase, the World Bank estimates that it led to an additional 1.9% of Armenian households being classified as poor. The increase in gas price also led to an increase in the proportion of households using fuelwood for heating, which served to increase indoor air pollution.
139. Due to widespread poverty and inequality prevalent across urban areas in Armenia, at least one-fifth of households are not able to afford the upfront costs of EE retrofits. The project directly targets these groups through focused subsidies to help address the affordability gap and stimulate the demand for EE retrofits.
140. **Public buildings.** Energy costs constitute a large share of annual expenses incurred by public buildings. See Section E.3.1.
141. The Government of Armenia and municipalities are fiscally constrained in terms of available budgets necessary to invest in public building EE retrofits. Whilst some local banks provide credit lines for building EE investments, there is an overall lack of depth and history in the local capital market for finance products in EE building retrofit finance for the range of potential stakeholders, including single-dwelling residential, multi-owner apartments and public buildings.

## E.5. Country Ownership

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

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

142. Improving energy efficiency in the building sector has been assigned a high priority in Armenia's climate, energy, and housing strategies. In particular, achieving thermal modernisation through energy efficiency retrofits is outlined as a national development priority, particularly for multi-apartment buildings. This is particularly clear in the provisions of the National EE Programme (2007), the National Security Strategy (2007), the Concept for Ensuring Energy Security (2013) and the Energy Security Strategy Action Plan (2014), which all identify the EE potential for the buildings sector and provide outlines of technical measures/solutions to be taken. The 10-city Covenant of Mayors agreement also emphasises the critical importance of energy efficiency in the building sector<sup>61</sup>.
143. Armenia's Third National Communication to the UNFCCC (2015) provides an up-to-date overview of policies and measures for mitigation of GHG emissions in the country. It identifies public, residential and commercial buildings among the country's top priorities for climate change mitigation: GHG emissions from buildings grew five-fold from 345 ktCO<sub>2</sub> in 2000 to 1,723 ktCO<sub>2</sub> in 2010. Armenia's UNFCCC Technology Needs Assessment

<sup>59</sup> <http://data.worldbank.org/country/armenia>

<sup>60</sup> World Bank (2012). *Poverty and Distribution Impact of Gas Price Hike in Armenia*.  
<https://openknowledge.worldbank.org/bitstream/handle/10986/11988/WPS6150.pdf?sequence=1>

<sup>61</sup> Please see pp. 12-15 in Annex II for a detailed description of existing plans and policies on climate change and energy efficiency.



(2003) identified heat supply to buildings as one of the main sources of GHG emissions and as having a large potential for energy saving and emission reductions.

144. The project is fully consistent with the Intended Nationally Determined Contribution (INDC) of Armenia approved by the Government in September 2015. Specifically, the INDC identifies “Energy (renewable energy and energy efficiency)” and “Urban Development (building and construction)” among the main sectors included in the national mitigation contributions of the Republic of Armenia. The INDC also identifies “Energy” and “Human Settlements” as being among the most vulnerable sectors to climate change. Further, the INDC emphasises that “the climate change mitigation actions should not reverse the social and economic trends of Armenia, but contribute to the socioeconomic development of the country”, which is precisely what this project intends to achieve in the context of climate change mitigation measures in Armenia’s building sector. Finally, the INDC recognises that the achievement of the national climate change mitigation target will require “the support of adequate (necessary and sufficient) international financial, technological and capacity building assistance”, including from the Green Climate Fund (GCF).
145. This project will promote application of EE principles in Armenia through implementation of corresponding policies and practices in line with the identified priorities for low-emission and climate-resilient development, in particular the following:
- The National Programme for Energy Saving and Renewable Energy (2007) prioritises the alignment of state policy on development, and directs finance and credit policy of the country to energy saving and establishing and maintaining an active market structure for energy efficiency benefits and providing an effective mechanism for market participants.
  - Two laws governing energy efficiency: the Law of the Republic of Armenia on Energy (2001) and the Law on Energy Saving and Renewable Energy (2004). These laws define the main terms and principles for the energy sector, including ensuring efficient use of energy; ensuring the energy independence of Armenia; and creating new industries and organising new services, implementing targeted national programmes and applying new technologies in order to promote the development of renewable energy and energy saving.
146. The project and its interventions are strongly aligned with the recently-prepared Government of Armenia and UNDP ‘Energy Efficient Public Buildings and Housing in Armenia NAMA’ (2014). This NAMA will promote energy efficiency in public buildings and social housing, with a particular focus on energy efficiency measures in new construction, capital renovation and in management of public buildings. The NAMA will assist the cities of Armenia to meet their commitments to reduce GHG emissions from energy consumption by 20% by 2020. The GCF project is specifically designed to support the NAMA in achieving transformational change by targeting the following NAMA objectives:
- Support policy, regulatory, institutional and market transformation, leading to a higher level of energy efficiency of structures and reduced GHG emissions from the building sector.
  - Contribute to improved energy performance of public buildings in health, educational, cultural and other sectors, improving comfort levels and cutting public budget allocations for energy bills while improving the overall quality of public services.
  - Support the provision of adequate and affordable housing in Armenia using the integrated building design concept, and contribute to reducing the total operational costs of buildings, reducing public costs and costs for the users / clients.
  - Contribute to the development objectives of Armenia (environment, economic, and social) related to the construction and building sector.
  - Support transformational change to a low-emission development pathway in the longer term.
  - Contribute to improving Armenia’s energy security.
147. Above all, the project builds on a strategic sequencing of interventions to scale-up its baseline support by extending support to ESCO-based market approaches and financial de-risking, as well as broadening the scope, stringency and enforcement of EE standards for buildings (such as standards for low-energy and nearly zero-energy buildings).



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

148. UNDP is one of the world's largest brokers of climate change grants for developing countries, with a current portfolio of US\$ 1.34 billion in mitigation and adaptation grant-financed projects in over 140 countries, supported by co-financing of \$6.7 billion. Since 1992, UNDP, in conjunction with government and non-government partners from more than 40 countries, including Armenia, has been developing and implementing projects on EE in buildings. The Global Environment Facility (GEF) has provided over US \$161 million in support to 55 projects, supplementing US\$ 1 billion in co-financing contributions from national and international partners. The focus of UNDP's work is on removing barriers, creating enabling market environments and catalysing financing for increased investment in energy efficient buildings.
149. UNDP in Armenia was established in 1993 and supports the Government to reach national development priorities and the Millennium Development Goals. UNDP has extensive experience and expertise in climate change mitigation, located in the Armenia Country Office and in regional (Istanbul) and global (New York) UNDP centres.
150. In Armenia, policy and market de-risking support provided by the UNDP-GEF 'Improving Energy Efficiency of Municipal Heating and Hot Water Supply' project has mobilised significant private investment in modernisation of the municipal district heating sector. As a direct consequence of the technical assistance provided, the project was able to leverage US\$ 17 million in foreign direct investment for the heat supply sector, US\$ 12 million of which had been invested by 2014, for reconstruction (and expansion) of heat supply systems.
151. UNDP has been selected as the implementing partner by the NDA due to UNDP's major contributions in the EE sector of Armenia, including the following:
- Development of the first Armenian NAMA – “Energy efficient public buildings and housing in Armenia”, submitted to UNFCCC NAMA Registry in 2014<sup>62</sup>.
  - Assistance in conducting a needs assessment in the context of the Sustainable Energy for All Initiative (SE4ALL).
  - Proven country experience with designing and implementing EE projects in the building sector.
  - Implementing a UNDP-GEF project on 'Improving Energy Efficiency of Municipal Heating and Hot Water Supply' that successfully mobilised significant private sector investment (see above for more details).
  - Implementing a UNDP-GEF project aimed at 'Improving Energy Efficiency in Buildings', including support to the Armenian Government in development of energy building codes and secondary legislation for EE in buildings.
  - Implementing the first-ever Armenian full thermal modernisation of an existing residential multi-apartment building (in Avan district of Yerevan – Figure 1, Annex IIa), as well as social housing in the towns of Goris and Akhouryan (Annex XIII).
  - Contribution to mainstreaming innovative legislative changes: amendments to the Laws 'On Energy' and 'On Energy Saving and Renewable Energy', development of two technical regulations related to building EE, introduction of building energy passport and EE label systems, mandatory requirements on EE consideration in construction / reconstruction / capital repairs under public funding (2014), and assistance to the adaption and approval of 14 EN/ISO standards.
  - Establishment 2 testing laboratories for insulation materials.
  - Energy audits of 15 buildings (residential and public) based on the adopted standard and methodology (Annex XIII).
  - EE certificates (the first ones in the country) were issued to 9 buildings (existing and newly built).
  - Institutional support for preparation of greenhouse gas national inventories;
  - Training of architects and civil engineers on integrated building design approach concepts.
  - Elaboration of guidelines for thermal insulation of building envelopes, subsequently approved by the Ministry of Urban Development;

<sup>62</sup>

- A bilingual textbook, 'Green Architecture: EE and Renewable Energy' (430 pages), was developed and approved for inclusion into the curriculum of the National University of Architecture and Construction of Armenia.
- Development of typical replicable single-family energy efficient building designs and the respective catalogue, approved by the Ministry of Urban Development.
- A pilot project on restoration of the district heating system of the Avan residential area of Yerevan was the key to unlocking the application of cogeneration technology in the heat supply sector of Armenia and to providing the evidence that district heating restoration projects only become feasible and attractive for private investors when support schemes are available.
- Cooperation with Yerevan Municipality in improving the energy efficiency of the street lighting system and establishment of a special purpose EE fund the savings gained from EE initiatives.

152. **Financial status:** UNDP is accredited under 'basic' and 'project management' fiduciary standards of the GCF.

153. **Executing entity:** The programme will be implemented by the Ministry of Nature Protection (MoNP) following the UNDP National Implementation Modality (NIM). MoNP houses the National Focal Point for the UNFCCC and has been coordinating climate change programmes since 1997. MoNP will be responsible for the overall management and supervision of the project to ensure synergy with other GHG mitigation policies and measures in the country. UNDP has enjoyed a long-term and highly successful collaboration with MoNP. MoNP has the capacity and knowledge to guide and oversee the conceptual elements of the project implementation, including professional guidance for achieving the climate change mitigation objectives and overseeing the GHG emissions reduction impacts. MoNP has been the implementing agency for the UNDP-GEF 'Armenia- Improving EE of Municipal Heating and Hot Water Supply' and the UNDP-GEF 'Improving Energy Efficiency in Buildings' projects, and has a proven track-record of successful implementation and cooperation with different ministries and stakeholders. Staff of the Ministry of Nature Protection, other civil servants and Municipal staff who will work on this project will not receive salaries from the project, as this is contrary to the Law on the Civil Service and also UNDP rules.

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

154. **Summary of stakeholder consultations.** The project idea was initiated in November 2014, when the results of a UNDP-supported pilot project on EE retrofits in Avan municipality of Yerevan were presented to the Government and donor community. The Government (Municipality of Yerevan and MoNP) expressed strong interest and demand for scaling-up the successful pilot, as did EIB in terms of providing financing for that pilot programme. Between November 2014 and May 2015, two project scoping missions were organised by EIB and UNDP, during which a broad spectrum of partners and stakeholders were involved and consulted. As a result, the project concept was designed and presented to the NDA in May 2015. After discussing the project idea, the NDA provided a Letter of No Objection for the project on 19 May 2015. Further, a donor coordination meeting on energy efficiency was held in June 2015 at which the representatives of the Ministry of Urban Development and Ministry of Energy Natural Resources underlined the need for, and requested support to the donors for, energy-saving measures in the multi-apartment residential sector (see Minutes of the Donor Coordination meeting in Annex XIII). The full proposal was presented and discussed with the NDA on July 20, 2015, prior to the Project Appraisal Committee meeting (in which all key stakeholders from the Government, civil society and private sector participated, including the NDA). In addition, Yerevan Municipality and the Ministry of Nature Protection both provided co-financing letters for this project (Annex IV).

155. UNDP has long-standing and on-going stakeholder consultations with a variety of stakeholders, including Government agencies, NGOs, other development agencies and potential project beneficiaries. Stakeholder consultations during the preparation of the project included one-on-one meetings, as well as a presentation at the Local Project Appraisal Committee (LPAC) meeting (the minutes of the LPAC meeting are presented in Annex VII). Government agencies have been made aware of, and have engaged in, on-going discussions regarding the EE building retrofit project through activities associated with UNDP's existing EE buildings and EE lighting project activities and the well-established UNDP Climate Change Programme Unit coordinated by, and located at, the Ministry of Nature Protection. Other Government agencies that have been engaged include the

Ministry of Urban Development, the Ministry of Territorial Administration, the Ministry of Economy, the Ministry of Energy and Nature Resources, the National Institute of Standards, the R2E2 Fund, the Scientific Research Institute of Energy, and the National University of Architecture and Construction.

156. On 10 June 2015, a donor coordination meeting of the Armenian Working Group on Infrastructure, Energy and Environmental Sustainability was held. The group, co-chaired by the World Bank, UNDP and MoENR, includes a diverse and strategic cross-section of Armenian Government institutions and development partners. The representatives of the Ministry of Urban Development and Ministry of Energy and Natural Resources underlined the need to support energy-saving measures in the multi-apartment residential sector. In addition, the Group concluded that finding and using a common set of strategic and powerful metrics for measuring results will be critical, both for communicating broadly on the economic, environmental and development gains to be made from energy efficiency investments, and for mobilising additional resources and support. Minutes of the meeting are provided in Annex III.
157. Civil society organisations that have been consulted through one-on-one meetings include the Builders' Union of Armenia and the Architects' Union of Armenia. Informal discussions have also been held with potential project beneficiaries identified through engagements with UNDP's on-going activities in Armenia. A full list of stakeholders and their role in project design and implementation are presented in Annex II (pp. 18-20).
158. **Stakeholder coordination.** The primary means of stakeholder coordination will be via the Project Board, which will provide an official, ongoing forum for coordinating the work of various Government agencies and other donors. In addition to work through the Project Board, project staff will maintain regular communication with other agencies regarding their complementary work on energy efficiency building retrofits. See Section 5. 'Implementation and institutional arrangements' for more details on this arrangement.

## E.6. Efficiency and Effectiveness

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

### E.6.1. Cost-effectiveness and efficiency

159. The project's objective is to deploy an integrated suite of interventions to systematically de-carbonise the existing building stock to realise both greenhouse gas (GHG) emission reductions and sustainable development benefits. Barriers to achieving this include policy, financial, market and technical / capacity barriers. Addressing the policy, market and technical / capacity barriers requires technical assistance, which is provided in Components 1, 2 and 3. In order to address the financial barriers, financing is needed – which is provided in Components 3 and 4.
160. The concessional loan, subject to EIB's due diligence, will be offered on terms that will not crowd-out private and other public investment. EIB follows the principles of the 'DFI Guidance for Using Investment Concessional Finance in Private Sector Operations'.<sup>63</sup> These principles are: additionality, crowding-in, commercial sustainability, reinforcing markets, and promoting high standards. Taken together, these principles affirm EIB's commitment to provide market-consistent support for commercially sustainable projects in situations where private investment is not forthcoming or requires supplementing.
161. In Component 4, grants from the GCF will be given as a temporary targeted incentive to address the needs of the most vulnerable households. The financial analysis (Annex III) shows that, for those earning below the median household income of US\$400, building retrofits are not affordable. For middle- and higher-income households, grants are not needed from an affordability point of view, and will only be used at a low level to overcome early-mover barriers. The grants will support poor and vulnerable households to allow them access to improved thermal comfort and cost / energy savings. Furthermore, incentives in the form of grants are common in developed countries – both in the EU and USA sizeable grants are common practice. KfW, for instance, provides loans together with incentive grants for energy efficiency retrofits in Germany of between 7.5-22.5%, and consequently the proposed incentive grants in Armenia can be considered modest.
162. In the public sector, a small incentive (totalling approximately US\$ 1.5 million) is also justified based on the additionality that higher energy efficiency than 'business as usual' brings. This modest incentive will also serve

<sup>63</sup> <http://www.ebrd.com/downloads/news/roundtable.pdf>

to accelerate the renovation of buildings, thus improving the quality of life of citizens using public facilities such as hospitals and kindergartens.

Please describe the efficiency and effectiveness, taking into account the total project financing and the mitigation/adaptation impact that the project/programme aims to achieve, and explain how this compares to an appropriate benchmark. For mitigation, please make a reference to [E.6.5 \(core indicator for the cost per tCO<sub>2</sub>eq\)](#).

163. The proposed project, by focusing on addressing systemic barriers to energy efficiency in existing housing – through policy and financial de-risking – represents an efficient and effective way to address Armenia’s future GHG emissions and to meet the country’s stated mitigation objectives as stated in the INDC and the sub-national targets set by cities. By providing incentivised financing, the project will also address first-mover costs and kick-start market-based refurbishment of existing housing stock. The effectiveness and efficiency of the proposed activities are characterised by the following key performance indicators:

Key performance indicator	Target
Estimated cost per tonne CO <sub>2</sub> eq (total investment cost/expected lifetime direct emission reductions)	<ul style="list-style-type: none"> <li>US\$ 22 / tCO<sub>2</sub>e for total project financing</li> <li>US\$ 14.4 / tCO<sub>2</sub>e for GCF financing</li> </ul>
Estimated cost per tonne CO <sub>2</sub> eq (total investment cost/expected lifetime direct and indirect emission reductions)	<ul style="list-style-type: none"> <li>US\$ 5-6 / tCO<sub>2</sub>e for total project financing</li> <li>US\$ 3.4-3.6 / tCO<sub>2</sub>e for GCF financing</li> </ul>

164. An appropriate benchmark for the total investment cost/expected lifetime direct emission reductions is provided by data from a recent report on energy efficiency retrofits in residential buildings in the Western Balkans.<sup>64</sup> For Albania, which has an electricity system with a grid emission factor similar to that of Armenia, the calculated cost per tonne of lifetime emission savings is between US\$ 178-897/tCO<sub>2</sub>e, depending on the type of building and the type of measures considered. For some CDM projects, data are available that have enabled calculation of the investment cost per tCO<sub>2</sub><sup>65</sup>. Examples include:

Project	Period over which emission reductions are counted (year)	Investment US\$/tCO <sub>2</sub>
<i>Moldova Energy Conservation and Greenhouse Gases Emissions Reduction:</i> This programme of 27 projects will improve efficiency and promote switching from coal/mazut to natural gas for heating public buildings	10	3,452
<i>Massive introduction of Compact Fluorescent Lamps (CFLs) to Households in Ecuador</i>	10	45
<i>Energy Efficiency Measures in Office Building at Kalina of Ivory Property Trust (India)</i>	10	250
<i>Energy Efficiency Measures at MindSpace Building No 6 at Hyderabad</i>	10	133
<i>Energy Efficiency Measures at Terminal T3 (India)</i>	7	1,002
<i>Installation of Natural Gas-Based Combined Cooling, Heating and Power (CCHP) Systems in DLF Building 5 in Gurgaon, India</i>	7	3,176
<i>Energy Efficiency Measures at MindSpace Building No 9 at Hyderabad</i>	10	82
<i>Energy Efficiency Measures at MindSpace Building No 14 at Hyderabad</i>	10	167

165. As can be seen, the cost per tCO<sub>2</sub>e of building energy efficiency projects can vary widely (see also the sensitivity analysis in Annex D of the UNDP Project Document – Annex II). This cost will depend to a large extent on the measures to be implemented and on the carbon intensity of the local electricity grid. In the literature on energy efficiency, the cost presented is often the abatement cost, in which the energy cost savings are subtracted from the sum of investment and O&M cost. The abatement value for energy efficiency measures is often negative. This justifies the large difference between the direct emission reductions as a result of investments made in the project and the indirect emission reductions, which include investments that will be made due to the barrier removal and market creation by the project. Energy efficiency projects are justified by the fact that, although the

<sup>64</sup> [https://www.energy-community.org/portal/page/portal/ENC\\_HOME/CALENDAR/Other\\_Meetings/2015/03\\_Jun\\_and\\_https://www.energy-community.org/portal/page/portal/ENC\\_HOME/DOCS/3284024/Guidance\\_Note\\_on\\_Residential\\_Energy\\_Efficiency\\_programs.pdf](https://www.energy-community.org/portal/page/portal/ENC_HOME/CALENDAR/Other_Meetings/2015/03_Jun_and_https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3284024/Guidance_Note_on_Residential_Energy_Efficiency_programs.pdf)

<sup>65</sup> CDM Pipeline, [www.cdmpipeline.org](http://www.cdmpipeline.org)

direct cost of emission reductions may be relatively high, once existing barriers have been removed private and other public investment will follow that have the potential to lead to very large emission reductions.

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

*Please provide the co-financing ratio (total amount of co-financing divided by the Fund's investment in the project/programme) and/or the potential to catalyze indirect/long-term low emission investment.*

*Please make a reference to [E.6.5 \(core indicator for the expected volume of finance to be leveraged\)](#).*

Key performance indicators	Target
Co-financing ratio (total amount of the Fund's investment versus confirmed co-financing)	2:1
Leveraging ratio (total amount of the Fund's investment versus expected volume of finance to be leveraged)	1:5

166. The project's co-financing ratio, i.e. the total amount of the Fund's investment versus confirmed co-financing, stands at 2:1. There is also a significant potential to catalyse long-term low-emission investment (see Section E.6.5 for details), as reflected in the significantly higher project leveraging ratio (i.e. the total amount of the Fund's investment versus expected volume of finance to be leveraged), which stands at 1:5.

167. The project will undertake a number of activities beyond simple investments that will stimulate the market for energy efficiency in the residential and public building sectors. Therefore, investments not within the direct control of the project will be triggered. The indirect investment catalysed has been estimated using the GEF methodology for calculating indirect emission reductions. The total market / penetration is as given in the table below.

168. Total 10-year market size was estimated based on the following:

- The total numbers of each building-type in the country.
- The market-penetration rates over the course of 10 years after project completion if the project is carried out.
- The impact on this market development of the GCF project, using a relevant 'causality factor'. For this calculation, a level 2 causality factor is used (40% – modest).

	# of units in the country	Estimated 10-year market penetration rate <sup>66</sup>	Investment per unit (US\$)	Total investment (million US\$)
Single-family individual buildings	392,590	20%	10,000	785.1
Multi-family apartment buildings	4,300	20%	120,000	103.2
Public buildings (complex demand- and supply-side renovation, such as for a hospital)	180	50%	250,000	22.5
Public buildings (simple demand-side measures, such as for a school)	2,326	50%	95,000	110.5
Causality factor	-	-	-	40%
<b>Total investment catalysed</b>	-	-	-	<b>408.5</b>

<sup>66</sup> Market penetration rate is a measure of the number of sales or adoption of a product or service compared to the total theoretical market for that product or service – i.e. the number of households / apartment buildings / hospitals / schools that have adopted energy efficiency measures versus the total number of such buildings in the country.



E.6.3. Financial viability

Please specify the expected economic and financial rate of return with and without the Fund's support, based on the analysis conducted in F.1.

169. The economic rate of return of the project is given in the following table:

Key performance indicator	Overall	Houses (single dwelling)	Apartments (9-story, 36 dwellings)	Public buildings – demand-side	Public buildings – demand- and supply-side
Economic rate of return	12.7%	4.5%	12.9%	13.6%	17.0%

170. The investments in public buildings have the greatest economic return based on the technical and financial models used. At 12.7% for the overall project portfolio, the overall project has a positive economic net present value.

171. All GCF funds will be used as grants – either for technical assistance (Components 1, 2 and 3), or for investment incentives. The financial rate of return is given for the overall project and each sub-sector in the table below:

Key performance indicator	Overall	Houses (single dwelling)	Apartments (9-story, 36 dwellings)	Public buildings – demand-side	Public buildings – demand- and supply-side	
Average level of grant from GCF	13% grant (average)	9% grant (average)	22% grant (average)	5% grant (average)	8% grant (average)	
Financial rate of return	With the Fund's support	9.7%	1.7%	9.5%	11.7%	13.8%
	Without the Fund's support	7.5%	0.5%	5.6%	10.2%	12.8%

172. The GCF funds increase the financial rate of return from 7.5% to 9.7% for the project as a whole. The effect on the IRR for sub-sectors is proportional to the grant amount, with the impact being greatest for apartment buildings. While the IRR for individual houses is very low, experience of Central and Eastern European countries show<sup>67</sup> that most residents do not take financial performance into account when investing in building renovation. For this reason, the market at the individual house level is considered viable when incentivised with a grant. While the GCF grants will come to an end at the end of the project, the TA activities will address systemic barriers, including the creation of local incentives – a model very common in the EU and the USA.<sup>68</sup>

Please describe financial viability in the long-run beyond the Fund intervention.

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

<sup>67</sup> Cirman A et al (2011), *What Determines Building Renovation Decisions?* <http://www.enhr2011.com/sites/default/files/Paper-AndrejaCirman-WS11.pdf>

<sup>68</sup> See for instance <http://aceee.org/files/proceedings/2012/data/papers/0193-000422.pdf>, [http://www.epa.gov/cleanenergy/documents/suca/program\\_incentives.pdf](http://www.epa.gov/cleanenergy/documents/suca/program_incentives.pdf) and [http://www.inspirefp7.eu/wp-content/uploads/2014/08/WP2\\_D2.1b\\_20140523\\_P18\\_Policies-and-incentives-relevant-to-retrofit.pdf](http://www.inspirefp7.eu/wp-content/uploads/2014/08/WP2_D2.1b_20140523_P18_Policies-and-incentives-relevant-to-retrofit.pdf) and Slide 10 of [https://www.energy-community.org/portal/page/portal/ENC\\_HOME/DOCS/3736187/KfW\\_3\\_pillar\\_approach\\_EE\\_public\\_buildings.pdf](https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3736187/KfW_3_pillar_approach_EE_public_buildings.pdf)



174. The provision of a very modest amount of grant funding is needed to jump-start the EE retrofits market. The amount and share of grants in total investment will be progressively reduced; together with measures to reduce the risks of EE investment (i.e. enactment of supportive policies and work with domestic banking sector), this strategy will ensure that the need for grant financing is minimised by the end of the project's 6-year implementation period. It is, however, likely that a certain group of vulnerable households will continue to be in need of grant support and, therefore, the project will work with the Armenian social support system to ensure that ownership of this grant support shifts to internal Armenian social security funding. UNDP has successful experience with introducing such policy changes: for example, in Kazakhstan, UNDP worked with the government to expand the coverage of the state social support system to include grants to vulnerable households for EE measures in homes. A similar approach will be adopted in Armenia.

**E.6.4. Application of best practices**

*Please explain how best available technologies and practices are considered and applied. If applicable, specify the innovations/modifications/adjustments that are made based on industry best practices.*

175. Best available technologies have been considered and will be applied. The energy efficiency parameters of the materials and measures will be higher than local standards, and reflect best EU practices. The following technical parameters are proposed:

- EE insulation for outer walls – final U-value (W/m<sup>2</sup>K) of 0.75 or better
- EE windows – U-value (W/m<sup>2</sup>K) of 2 or better
- Roof insulation – final U-value (W/m<sup>2</sup>K) of 0.25 or better

176. Measures included in the analysis for residential buildings are:

- Insulation of outer walls and of the roof
- Energy-efficient windows
- Installation of windows and doors in staircases and landing areas of apartment buildings

177. Measures included in the analysis for public buildings:

- Insulation of the outer walls, of the cavities beneath the windows and of the roof
- Energy-efficient windows and doors
- Heating system replacement with a condensing gas boiler system
- Thermostatic valves for the heating system
- Hydraulic balance valves for the heating system
- CFL or LED lighting
- Improved management

178. Best international practice is followed in terms of project design. The project includes both technical assistance focused on permanent reduction and removal of market barriers and reduction of risks, coupled with incentivised commercial lending in conjunction with an International Financial Institution. The demonstration effect in residential and public sector buildings and within involved banks, coupled with systemic barrier removal activities, is considered best practice and a cost-effective means to create markets: this is an approach followed by Multilateral Development Banks around the world.<sup>69</sup>

**E.6.5. Key efficiency and effectiveness indicators**

<i>GCF core indicators</i>	Estimated cost per t CO <sub>2</sub> eq, defined as total investment cost / expected lifetime emission reductions (mitigation only)
----------------------------	---

<sup>69</sup> In the Eastern European region, the most notable development bank using this approach is the EBRD – see [www.ebrdseff.com](http://www.ebrdseff.com)

(a) Total project financing	US\$ 29,820,000 <sup>70</sup>	
(b) Requested GCF amount	US\$ 20,000,000	
(c) Expected lifetime emission reductions overtime	1,389,677 tCO <sub>2</sub> eq	
(d) Estimated cost per tCO <sub>2</sub> eq (d = a / c)	US\$ 22 tCO <sub>2</sub> eq	
(e) Estimated GCF cost per tCO <sub>2</sub> eq removed (e = b / c)	US\$ 14.4 / tCO <sub>2</sub> eq	
	Low	High
(f) Expected indirect and direct lifetime emissions (tCO <sub>2</sub> eq)	5,558,709	5,827,059
(g) Estimated cost per tCO <sub>2</sub> eq (g = a / f) (US\$/ tCO <sub>2</sub> eq)	5.12	5.36
(h) Estimated GCF cost in US\$ / tCO <sub>2</sub> eq removed (h = b / f)	3.43	3.60

A detailed bottom-up analysis of model buildings in Armenia has been conducted. Four models were developed, two in the residential sector (one for an individual single-family house and one for a multi-family apartment building) and two in the public sector (a hospital and a school). Building parameters and energy characteristics were determined for each type of building. A set of efficiency measures was then applied and the energy needs and potential savings for these measures calculated. Total energy savings were estimated taking into account a rebound factor. Using the model buildings as a guide to potential energy and GHG reductions, the estimated total emission reductions from the project investments were calculated. The GHG emissions analysis makes use of the Global Environment Facility (GEF) methodology for energy efficiency projects. GHG emission coefficients were taken from the GEF GHG calculation worksheets for natural gas and electricity. For electricity, the grid emission factor is taken from the IGES database and is based on the CDM combined margin approach. Total direct emission reductions are the sum of the reductions achieved in the four building categories evaluated.

The project will undertake a number of activities beyond simple investments that will also stimulate the market for energy efficiency in the residential and public building sectors. Therefore, there will be indirect energy savings triggered by investments not within the direct control of the project. These are estimated using bottom-up and top-down approaches based on the GEF methodology. For bottom-up emission estimates, the estimated direct reductions are multiplied by a replication factor – with the expectation that the volume of investments and GHG emissions reductions will increase by a factor of 3 over a 10-year period after project completion due to the project intervention. This is a modest replication factor according to GEF practice. To estimate the indirect GHG emission reductions using a top-down methodology, total 10-year market size was estimated.

The full methodology used for calculating the factors is given in Annex D of the UNDP project document.

*Please describe how the indicator values compare to the appropriate benchmarks established in a comparable context.*

See the discussion of the appropriate benchmark for cost per tCO<sub>2</sub> in Section E.6.1

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

<sup>70</sup> Note that the amount of project cost indicated here does not include potential EIB loan and own funds from residential borrowers of credit lines (potential parallel financing)

The expected volume of finance to be leveraged by the proposed project as a result of the Fund's financing is US\$ 102.82 million. Of this, US\$ 86 million will be from the EIB loan and private sector (from residents, once loans are repaid), and US\$ 20 million will be public investment (from national and city governments, once loans are repaid) in energy efficiency retrofits, representing a total leveraging ratio of 1:5.

The volume of finance to be leveraged is the sum of all finance for the project.

Source of financing	Amount, US\$
GCF	20,000,000
<b>Confirmed co-financing</b>	
Yerevan Municipality	8,000,000
UNDP	1,420,000
MoNP	400,000
<b>TOTAL Co-financing</b>	<b>9,820,000</b>
<b>Potential parallel financing/leverage</b>	
EIB	86,250,000
Residents	6,750,000
<b>TOTAL Potential parallel financing/leverage</b>	<b>93,000,000</b>
<b>TOTAL Volume of finance</b>	<b>102,820,000</b>

The financial analysis that was used to arrive at the values of leveraged financing is given in Annex D of the UNDP Project Document.

*Please describe how the indicator values compare to the appropriate benchmarks established in a comparable context.*

The GEF has indicated a level of ambition for the overall GEF portfolio to reach a co-financing ratio of at least 6:1 (total co-financing to total GEF resources) for the Sixth Replenishment of the GEF Trust Fund (GEF-6)<sup>71</sup>

Other relevant indicators (e.g. estimated cost per co-benefit generated as a result of the project/programme)

<sup>71</sup> GEF/C.46/09, 2014.

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

## F.1. Economic and Financial Analysis

Please provide the narrative and rationale for the detailed economic and financial analysis (including the financial model, taking into consideration the information provided in [section E.6.3](#)).

179. The project will accelerate the market for energy efficient retrofits of buildings in: a) the residential sector, and b) the public sector. In the residential sector, two typical building models are considered: a single-family house and a multi-owner apartment building (see Section F.2 below). In the public sector, two technical scenarios are considered for the same building: a retrofit with only demand-side (energy-saving) measures, and a retrofit with both demand- and supply-side (fuel-switch) measures.
180. Starting with the investment costs and modelled energy and financial savings, a bottom-up financial and economic model has been developed for each building-type. The fuel prices (for natural gas and electricity) are increased annually at a rate of 1% per year. This is a conservative figure: until recent public protests broke out, the Government's plan was for electricity prices to increase by 16% in 2015 alone. Investment parameters include own funds (10% for residential buildings and 20% for public building), an incentive grant and a loan, and sensitivity analysis has been carried out for these parameters. The simple payback, internal rate of return (IRR) and net present value (NPV) are determined using standard financial modelling.
181. The choice of discount rate for the NPV calculations is guided by which party is being affected and what the time value of money is for that party.<sup>72</sup> The time value of money for a household varies considerably according to household members' perception of risk and the perception of likelihood of returns on the investment. There is a difference in investment in energy efficiency in the residential sector between individual households and multi-owner buildings. For investments in energy efficiency in Armenia at the building level in multi-owner buildings, the discount rate is higher due to factors such as lack of awareness amongst the owners, lack of access to financing, inertia in the decision-making process, perceptions that the building space outside of the apartment is not the owner's individual responsibility, coordination costs, absentee owners, and the perceived risk of free riders. This indicates that there should be a difference in the appropriate discount rate to be used in any financial modelling. The justification for using particular discount rates is provided below:
- **For households (houses and dwellings within apartment buildings)**, the discount rate represents the opportunity cost of other investing options. As a proxy for this opportunity cost, the interest rate on savings deposits in Armenia is used (10.4% in 2014).<sup>73</sup> The discount rate used in calculations is 10%.
  - **For residential building-level investments**, the discount rate chosen is 17.5%:
    - For building-level investments, the perception of risk is higher and the perception of likelihood of returns on the investment is lower. This is generally due to the perception that collective action may not succeed. Additionally, there is general inertia of apartment owners to invest together. This is demonstrated by the lack of investment at the apartment-building level in countries even where the legal framework is already conducive to collective decision-making (for example, Croatia, Serbia and Montenegro<sup>74</sup>).
    - This figure is consistent with that given in the EU analysis, 'Study evaluating the current energy efficiency policy framework in the EU and providing orientation on policy options for realising the cost-effective energy efficiency/saving potential until 2020 and beyond'<sup>75</sup>, which uses 17.5%. This figure is also consistent with that used in the EU's PRIMES model for households<sup>76</sup>. While, clearly,

<sup>72</sup> See discussions in, for example Woolf *et al.* (2012), *Best Practices in Energy Efficiency Programme Screening: How to Ensure that the Value of Energy Efficiency is Properly Accounted For*. Available at [http://www.synapse-energy.com/sites/default/files/SynapseReport.2012-07.NHPC\\_EE-Program-Screening.12-040.pdf](http://www.synapse-energy.com/sites/default/files/SynapseReport.2012-07.NHPC_EE-Program-Screening.12-040.pdf)

<sup>73</sup> See World Bank (2015) Data: Deposit interest rate (%) <http://data.worldbank.org/indicator/FR.INR.DPST/countries>

<sup>74</sup> World Bank (2014), *Western Balkans: Scaling-up Energy Efficiency in Buildings*: [https://www.energy-community.org/portal/page/portal/ENC\\_HOME/DOCS/3282025/Final\\_Report\\_Scaling\\_Up\\_Energy\\_Efficiency\\_in\\_Buildings\\_in\\_the\\_Western\\_Balkans.pdf](https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3282025/Final_Report_Scaling_Up_Energy_Efficiency_in_Buildings_in_the_Western_Balkans.pdf)

<sup>75</sup> [https://ec.europa.eu/energy/sites/ener/files/documents/2014\\_report\\_2020-2030\\_eu\\_policy\\_framework.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/2014_report_2020-2030_eu_policy_framework.pdf)

<sup>76</sup> See page 87 of this report:

perceptions of risk are far higher in Armenia than in the EU (as reflected by high interest rates on savings accounts, loans, etc.), this conservative figure has been used in the analysis.

- **For public buildings**, a discount rate of 10% is used.

182. The economic analysis takes into account increasing fuel prices, an increase in property values (for residential buildings), and an economic benefit of reduced GHG emissions valued at \$25 per tonne of CO<sub>2eq</sub> reduced.<sup>77</sup> A detailed financial and economic model has been prepared for each building-type (at the building level), and combined into an overall project-wide integrated financial model. This model is available in Annex III.

*Based on the above analysis, please provide economic and financial justification (both qualitative and quantitative) for the concessionality that GCF provides, with a reference to the financial structure proposed in section B.2.*

183. The US\$ 20 million of GCF grants will be composed of funding used for technical assistance (Components 1, 2 and 3) to remove market and policy barriers to EE building retrofits; and for incentives (Component 4) to address the needs of vulnerable households by making loans for EE building retrofits more affordable. The technical assistance provided in Components 1, 2 and 3 are grant-funded since they address and remove systemic risks and overcome market barriers.

184. In Component 4, grants from the GCF will be given as a **temporary targeted incentive**. They will be used to target vulnerable households. The grants will support poor and vulnerable households to allow them access to improved thermal comfort and cost / energy savings. Incentives in the form of grants are common in developed countries – both in the EU and USA, sizeable grants are common practice.<sup>78</sup> In Germany, for instance, KfW provides loans together with incentive grants for energy efficiency retrofits of between 7.5-22.5%<sup>79</sup>, and consequently the proposed incentive grants in Armenia can be considered modest. A total of US\$ 12.5 million in incentive grants will be used to support vulnerable households in the **residential sector**.

185. In the public sector, a small incentive (totalling around US\$ 1.5 million) is also justified based on the additionality that a higher level of energy efficiency will be promoted than under the ‘business as usual’ scenario. In addition, the modest incentive will also serve to accelerate the renovation of buildings, thus improving the quality of life of citizens using public facilities such as hospitals and kindergartens.

## F.2. Technical Evaluation

186. The technical evaluation<sup>80</sup> has been carried out using bottom-up building energy models (4 models in total), using empirical Armenian data from building energy audits and feasibility studies undertaken by UNDP and the R2E2 Fund. The models account for building geometry, climatic conditions and building use. For each building-type, a typical Armenian building is modelled, and the most common fuel and energy characteristics used. Investment costs are based on installed costs of energy-efficient materials in the Armenian market. The before and after energy needs and costs are determined for each building-type.

187. The technical measures selected have high energy efficiency parameters comparable to those used in the EU (see Section E6.4 above). From a technology perspective, all these measures are well known and proven over decades of experience. While energy performance characteristics are higher than commonly used in Armenia, the base technology is well known (wall insulation, efficient windows, roof insulation, etc.), so technology risks are very low. The measures proposed offer the following energy savings:

[https://ec.europa.eu/energy/sites/ener/files/documents/2014\\_report\\_2020-2030\\_eu\\_policy\\_framework.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/2014_report_2020-2030_eu_policy_framework.pdf)

<sup>77</sup> This value is within the lower end of the range of estimations used by the U.S. Environmental Protection Agency for the Social Cost of CO<sub>2</sub> for 2015 which were (in 2011 Dollars) USD 12 per tonne using a 5% average discount rate, USD 39 per tonne using a 3% average discount rate and USD 61 per tonne using a 2.5% average discount rate:

<http://www.epa.gov/climatechange/EPAactivities/economics/scc.html>

<sup>78</sup> See for instance <http://aceee.org/files/proceedings/2012/data/papers/0193-000422.pdf>,

[http://www.epa.gov/cleanenergy/documents/suca/program\\_incentives.pdf](http://www.epa.gov/cleanenergy/documents/suca/program_incentives.pdf) and

[http://www.inspirefp7.eu/wp-content/uploads/2014/08/WP2\\_D2.1b\\_20140523\\_P18\\_Policies-and-incentives-relevant-to-retrofit.pdf](http://www.inspirefp7.eu/wp-content/uploads/2014/08/WP2_D2.1b_20140523_P18_Policies-and-incentives-relevant-to-retrofit.pdf)

<sup>79</sup> See slide 10 of [https://www.energy-](https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3736187/KfW_3_pillar_approach_EE_public_buildings.pdf)

[community.org/portal/page/portal/ENC\\_HOME/DOCS/3736187/KfW\\_3\\_pillar\\_approach\\_EE\\_public\\_buildings.pdf](https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3736187/KfW_3_pillar_approach_EE_public_buildings.pdf)

<sup>80</sup> See Annex II (pp. 61-96), Annex IIa and Annex XIII for details about the technical evaluation.

Technical performance summary	Houses (single-dwelling)	Apartments (9-story, 36 dwellings)	Public buildings – demand-side	Public buildings – demand- and supply-side
Modelled energy savings	77%	76%	43%	49%
Rebound factor used to correct for suppressed demand	20%	20%	40%	40%
Savings used in financial and economic calculations	62%	61%	26%	29%

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

188. The project will eliminate policy, financial, market and technical barriers to create an enabling environment for investments in energy-efficient building retrofits. The interventions from the technical assistance of the GCF are mainly capacity building. The \$14 million investment by the GCF accounts for approximately 11% of the total investment cost (\$122.82 million), or about 16% compared to EIB's potential parallel contribution of \$86.25 million. Building retrofits may cause impacts such as generation of waste and safety risks to the community from installation and dismantling, but these are minimal, temporary and can be easily mitigated.
189. The overall outcome of the project will be reduction in energy consumption of the building sector, with associated reductions in GHG emissions and wider opportunities for gender mainstreaming in capacity building, financing and employment (about 1,700 jobs will be created).
190. The project has completed the UNDP social and environmental screening procedure (see SESP attached as Annex VI). This screening was undertaken to ensure this project complies with UNDP's Social and Environmental Standards. The overall social and environmental risk category for this project is: **Low**.
191. Given the type and scale of the interventions proposed by the project, no EIA is required by the Government (as confirmed in the Letter from the MoNP, Annex VIb).
192. The UNDP SESP template used to classify the project follows the current best international practice (i.e. EBRD, EIB, ADB, WB, etc.), whereby similar projects (i.e. involving EE building retrofits) have been classified by IFIs as 'low-risk'. For example, this was the case for a recent €137 million EIB project in Romania ('Bucharest Thermal Rehabilitation', as well as the WB-GEF US\$ 10.9 million grant for the Municipal Energy Efficiency Project in Armenia (approved in 2012). The EIB investment in Romania and the World Bank's project in Armenia funded identical technical measures to what are proposed under the current proposal: i.e. thermal rehabilitation of multi-storey residential and public buildings, including such physical interventions as insulation of walls, basements and attics, repair/replacement of external doors and windows, installation of reflective surfacing of walls behind radiators, replacement of boilers and heating systems. Consequently, the project has been assigned a 'low' category in UNDP's E&S Screening template based on consultation with the Government to ensure consistency in environmental and social assessments among project partners and similar initiatives in Armenia and elsewhere. However, the SESP recognises that categorisation of projects is an iterative process; should stakeholders raise concerns about the project's social and environmental aspects during implementation, the 'low risk' designation will be carefully reviewed.

### F.4. Financial Management and Procurement

*Describe the project/programme's financial management and procurement, including financial accounting, disbursement methods and auditing.*



193. The financial management and procurement of this project will be guided by UNDP financial rules and regulations<sup>81</sup> and the NIM Guidelines<sup>82</sup>. Further guidance is outlined in the financial resources management section of the UNDP Programme and Operations Policies and Procedures, available at <https://info.undp.org/global/popp/frm/Pages/introduction.aspx>.
194. NIM Guidelines identify four modalities for cash transfer to manage project finances. All four modalities can be used in the same project, for different activities and/or inputs:
- Direct cash transfer - UNDP advances cash funds on a quarterly basis to the implementing partner, who in turn reports back expenditure;
  - Direct payment - the implementing partner carries out the procurement but requests UNDP to make the disbursement;
  - Reimbursement – as for direct cash transfer, except that UNDP pays the implementing partner after the implementing partner has itself made the disbursement;
  - Direct Agency Implementation – UNDP conducts expenditure from requisition through to disbursement with no cash being transferred to the implementing partner. However, the implementing partner has full programmatic control and so full control over expenditures.
195. UNDP has comprehensive procurement policies in place as outlined in the ‘Contracts and Procurement’ section of UNDP’s Programme and Operations Policies and Procedures (POPP). The policies outline formal procurement standards and guidelines across each phase of the procurement process, and they apply to all procurements in UNDP. See here: <https://info.undp.org/global/popp/cap/Pages/Introduction.aspx>
196. In line with NIM Guidelines, UNDP will ascertain the national capacities of the Responsible Parties (the PIU of the Municipality of Yerevan, once established and operational, and the EPIU of the MoNP) by undertaking an evaluation of capacity following the Framework for Cash Transfers to Implementing Partners (part of the Harmonised Approach to Cash Transfers - HACT).
197. In line with NIM Guidelines and cash transfer modalities, procurement under the project will be undertaken by either Responsible Parties (EPIU of the MoNP and Municipality of Yerevan’s PIU) or by UNDP under the ‘Direct Agency Implementation’ modality. Wherever procurement is carried out by the Responsible Parties, it will be fully aligned with Government regulations and procedures and will also have to be compatible with UNDP’s financial and procurement standards. Specifically, according to the UNDP Policies and Procedures, “UNDP has a responsibility to accept appropriate cash advance requests, reported expenses or direct payments that are consistent with the Annual Work Plan and UNDP’s Financial Rules and Regulations (FRRs) and – therefore – to reject improper advance requests, expenses, or requests for direct payments. If subsequent information becomes available that questions the appropriateness of expenses recorded or direct payments already made, these should be rejected at any point up to the issuance and signature of the Combined Delivery Report”.
198. Project will be audited following the UNDP financial rules and regulations noted above and applicable audit guidelines and policies along with any specific requirements agreed in the AMA with the GCF. In line with NIM rules, periodic (quarterly) financial reviews of project expenditures will be conducted to ensure funds are used for the purpose intended in the approved proposal.
199. The project will apply international accounting financial reporting standards for the project reporting.
200. UNDP will ensure compliance with the GCF’s Fiduciary Principles and Standards, including anti-corruption and AML/CFT requirements.

<sup>81</sup> [https://info.undp.org/global/documents/frm/Financial-Rules-and-Regulations\\_E.pdf](https://info.undp.org/global/documents/frm/Financial-Rules-and-Regulations_E.pdf)

<sup>82</sup>

<https://info.undp.org/global/documents/layouts/WopiFrame.aspx?sourcedoc=/global/documents/frm/National%20Implementation%20by%20the%20Government%20of%20UNDP%20Projects.docx&action=default&DefaultItemOpen=1>

### G.1. Risk Assessment Summary

Please provide a summary of main risk factors. Detailed description of risk factors and mitigation measures can be elaborated in G.2.

201. Technical and operational risks include risks related to lack of knowledge and skills, and the under-developed nature of the ESCO market. Financial risks include those related to the level of energy prices and the availability of loans for EE investments. Social and environmental risks to the project are minor. An additional risk relates to the Government's commitment to adopt and implement legislation. The most significant risks are the financial risks. These will be mitigated through the creation of financial mechanisms as part of the project.

### G.2. Risk Factors and Mitigation Measures

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

#### Selected Risk Factor 1

Description	Risk category	Level of risk	Probability of risk occurring
Government does not commit to refine and implement new building legislation	Other	Medium	Very low

#### Mitigation Measure(s)

202. This risk is mitigated through UNDP's established working relationship with the Government to develop laws and building codes. The Government clearly recognises the need for energy efficiency improvements in buildings and is committed to introduce appropriate regulations. Illustrating this, in December 2014 a Resolution was adopted that makes energy efficiency as well as cost-effective renewable energy solutions mandatory for integration in construction / reconstruction projects. Development and enforcement of an ambitious regulatory framework is also a central element of the NAMA on 'Energy efficient public buildings and housing in Armenia'. The Government has requested UNDP support to help ensure development and implementation of legislation in line with international best practices on building energy efficiency. The GCF project will be implemented by a Government body, the Ministry of Nature Protection, which is responsible for UNFCCC implementation in Armenia and which is also the GCF NDA.

#### Selected Risk Factor 2

Description	Risk category	Level of risk	Probability of risk occurring
Government does not continue to bring energy prices in line with market prices	Financial	High (>50%)	High

#### Mitigation Measure(s)

203. Government policy, demonstrated through significant growth in energy prices over the past 5 years, clearly shows positive intentions: natural gas prices increased by roughly 170% between 2008 and 2014, and the electricity tariff increased by 35% (day-time) and 41% (night-time). However, at the time of writing (July 2015), large protests are ongoing in Yerevan due to proposed tariff increases, putting into question future developments on this front. However, even with modest 1% increase per year, as conservatively assumed in the financial analysis, EE retrofits can represent a viable investment alternative (provided other barriers are eliminated).

#### Selected Risk Factor 3

Description	Risk category	Level of risk	Probability of risk occurring
-------------	---------------	---------------	-------------------------------

Knowledge and skills among local professionals are too limited to support the growth of the market	Technical and operational	Medium	Low
Mitigation Measure(s)			
204. This risk will be mitigated through provision of technical assistance to build capacities of various local stakeholders involved in building design, construction and operation. Capacity building will mostly take place through practical experience gained as a result of the financial incentives under Component 4. Thus, technical assistance will be provided through a 'learning-by-doing' approach whereby local specialists will work together with international consultants to deliver energy efficiency projects in residential buildings.			
<b>Selected Risk Factor 4</b>			
Description	Risk category	Level of risk	Probability of risk occurring
Lack of demand for building sector energy efficiency retrofits	Financial	Medium	Low
Mitigation Measure(s)			
205. UNDP's prior work in Armenia shows that demand exists where conditions are supportive. Through the de-risking activities of the project, supported by a temporary financial incentive, demand is expected to be significant. For the public sector, energy audits show that there is a reasonable payback period (between 5-15 years) for EE measures and this indicates that, when market barriers are addressed, the underlying investments should be bankable. For residential investments, decisions are seldom made solely on the basis of financial returns (they are primarily driven by comfort). However, the models also indicate reasonable returns on investment. Demand for retrofits in the context of the GCF project has been confirmed by the commitment of the Municipality of Yerevan (home to one-third of the Armenian population), as reflected in its co-finance letters (Annex IVc).			
<b>Selected Risk Factor 5</b>			
Description	Risk category	Level of risk	Probability of risk occurring
High levels of default on loans for the residential sector	Financial	Medium	Low
Mitigation Measure(s)			
206. Investments in building renovation have proven to have low levels of default. <sup>83</sup> The incentive and other project activities will support the viability of investments on a temporary basis and thus reduce costs, especially for vulnerable residents; since local banks will still have exposure to some risk, moral hazard will be avoided.			
<b>Selected Risk Factor 6</b>			
Description	Risk category	Level of risk	Probability of risk occurring
The Government will have spending and procurement responsibilities for the project under the AWP's and quarterly disbursements of the NIM modality	Financial	Medium	Very low
Mitigation Measure(s)			
207. HACT assessments will be conducted prior to project implementation to identify and resolve potential (if any) financial management deficiencies in the Implementing Entities. The constraints on Government spending imposed by NIM (only quarterly advances, etc.). Regular reporting on financial and other operational aspects of the project through PIRs and also the MTR and TE. Annual independent financial audits.			
<b>Selected Risk Factor 7</b>			

<sup>83</sup> <http://siteresources.worldbank.org/INTEAPASTAE/Resources/FinancingEnergyEfficiency.pdf>, in particular page 174 for Hungary, 209 for Romania

Description	Risk category	Level of risk	Probability of risk occurring
Lenders remain unwilling to provide loans for energy efficiency investments	Financial	Medium	Medium
Mitigation Measure(s)			
<p><i>Please describe how the identified risk will be mitigated or managed. Do the mitigants lower the probability of risk occurring? If so, to what level?</i></p> <p>208. The global economic recovery is resulting in a growing willingness of lenders to offer financing for energy efficiency investments in Armenia, although the building sector is currently virtually unaddressed. While this project will not be able to eliminate macroeconomic risk, the financial mechanisms to be supported will provide lenders with ample learning opportunities. Experience in other countries shows that this learning, when accompanied by technical assistance to address systemic barriers, leads to sustained lending since lenders and borrowers will be shown the benefits of energy efficiency investments.</p>			
<b>Selected Risk Factor 8</b>			
Description	Risk category	Level of risk	Probability of risk occurring
Lack of developed ESCO market prevents achievement of reductions of energy intensity in public buildings	Technical and operational	High (>50%)	Low
Mitigation Measure(s)			
<p>209. Armenia has a number of quasi-ESCO companies, but their operations have, to date, been limited to the public sector only, and there are deficiencies in the regulations regarding performance-based contracting models with the public and residential building sub-sectors, which pose a risk. The gradual introduction of performance-based contracts and associated policy changes, combined with capacity building, will help to mitigate this risk.</p>			
<b>Selected Risk Factor 9</b>			
Description	Risk category	Level of risk	Probability of risk occurring
Climate change (such as increases in winter temperature reducing the demand for space heating) can make investments in EE building retrofits less attractive	Social and environmental	Low (<5% of project value)	Low
Mitigation Measure(s)			
<p>210. The climate-related risk of the project is considered very low because long-term climate impacts (i.e. temperature extremes, higher average temperatures and reduced precipitation) will be directly addressed through housing units that will be more energy-efficient and comfortable (and yet more affordable) at both high and low temperatures. While average winter temperatures are projected to increase, since the 1961-1990 average winter temperature was -5.3°C, even with a significant increase in temperature there will still be a considerable need for heating. It should be noted that increases in temperature will reduce demand for heating and increase demand for cooling. Since cooling is electrical and more costly, this may increase demand for retrofits.</p>			
<b>Selected Risk Factor 10</b>			
Description	Risk category	Level of risk	Probability of risk occurring
Environmental and social risks	Social and environmental	Low (<5% of project value)	Low
Mitigation Measure(s)			

211. No substantial environmental and social risks have been identified that the project may face. The project will be implemented in accordance with UNDP's environmental and social policies to ensure that any environmental risks are minimised. The Government has determined that the environmental and social risks posed by the project are sufficiently small that an ESIA is not required under national legislation, and has issued a formal letter accordingly – see Annex VI.

**Selected Risk Factor 11**

Description	Risk category	Level of risk	Probability of risk occurring
The project may discriminate against women with regard to access to opportunities and benefits	Social and environmental	Low (<5% of project value)	Low

Mitigation Measure(s)

212. The project will analyse any gender-based differences in access to financing and capacity building, and will involve an in-country gender expert in developing gender-disaggregated data and indicators to ensure an equitable gender representation in the selection process for financing, focus group discussions and training. The project will ensure female-headed households are among project participants to an extent at least representative of the general population.

**Selected Risk Factor 12**

Description	Risk category	Level of risk	Probability of risk occurring
Retrofit works and failure of structural elements from building retrofits may pose safety risks to communities	Social and environmental	Low	Low

Mitigation Measure(s)

213. Only registered contractor(s) will be allowed to implement EE building retrofits. Contractor(s) will be required to conduct orientation and training for workers on EE building retrofits, particularly multi-family apartment buildings and public buildings.

**Selected Risk Factor 13**

Description	Risk category	Level of risk	Probability of risk occurring
Duty-bearers do not have the capacity to meet their obligations such as in collecting baseline data for the EMIS and in managing EE building retrofit financing projects	Social and environmental	Low (<5% of project value)	Low

Mitigation Measure(s)

214. Component 1 will include capacity building on establishing MRV, data collection and analysis, and procurement / installation of EMIS. Component 2 will support broader legislative reforms to develop building codes, energy auditing, energy certification and labelling for existing buildings, multi-owner building management, payment enforcement, and a framework for energy efficiency retrofits that will significantly contribute to building the necessary capacity.

**Selected Risk Factor 14**

Description	Risk category	Level of risk	Probability of risk occurring
Potential for excluding affected stakeholders from participation	Social and environmental	Low (<5% of project value)	Low

Mitigation Measure(s)

215. Consultations have been undertaken to determine the stakeholders and their roles during project implementation. These consultations will continue throughout the project cycle. Consultations on various components of the project will be designed to be gender-sensitive, inclusive and responsive to the needs of

the stakeholders identified. A mechanism to deal with potential conflict issues during implementation will be incorporated in the project design and contracts for commercial firms (e.g. architects etc.) will be through public procurement according to UNDP rules.

**Selected Risk Factor 15**

Description	Risk category	Level of risk	Probability of risk occurring
Generation of waste from building retrofits	Social and environmental	Low (<5% of project value)	Low
Mitigation Measure(s)			
216. Recipients of financing for EE building retrofits will be required to dispose of the waste generated from civil works following the applicable regulations. Management of waste / construction debris will be part of the conditions in granting the funds and for awarding the civil works to the Contractor. According to the Laws of the Republic of Armenia on Waste Disposal and Sanitary Purification, on Local Self-Government, Self-Government in Yerevan City and the Law on Waste, the municipality is responsible for arranging the removal of waste but passes on this responsibility to the Contractor through the terms of the contract.			

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

**H.1. Logic Framework.**

Please specify the logic framework in accordance with the GCF's [Results Management Framework](#) and [Performance Measurement Framework](#).

H.1.1. Paradigm Shift Objectives and Impacts at the Fund level <sup>84</sup>						
Paradigm shift objectives						
<i>Shift to low-emission sustainable development pathways</i>	1.	The project objective is to use an integrated suite of interventions to systematically decarbonise the existing building stock to realise both energy savings and sustainable development benefits.				
	2.	The project will create a favourable market environment and scalable business model for investment in energy efficiency retrofits, leading to sizeable energy savings and accompanying GHG emission reductions (directly, 1.4 million tCO <sub>2</sub> over the 20-year lifetime of the investments; including additional indirect savings, a total of between 4.2-4.4 tCO <sub>2eq</sub> ). It will also catalyse additional private and public sector financing of approximately US\$ 100 million.				
Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
Fund-level impacts						
<i>M3.0 Reduced emissions from buildings, cities, industries and appliances</i>	GCF core indicator: Tonnes of carbon dioxide equivalent (t CO <sub>2eq</sub> ) reduced or avoided as a result of Fund-funded projects/programmes	EMIS system to be set up in Component 1 of the Project	0	100 kt CO <sub>2e</sub> / year	Direct 1.4 Mt CO <sub>2e</sub> over 20-years	Housing units and buildings are more resource- efficient and comfortable (and yet more affordable) at both

<sup>84</sup> Information on the Fund's expected results and indicators can be found in its Performance Measurement Frameworks available at the following link (Please note that [some indicators are under refinement](#)): [http://www.gcfund.org/fileadmin/00\\_customer/documents/Operations/5.3\\_Initial\\_PMF.pdf](http://www.gcfund.org/fileadmin/00_customer/documents/Operations/5.3_Initial_PMF.pdf)



						high and low temperatures and thus subject to reduced long-term climate impacts
<i>M3.0 Reduced emissions from buildings, cities, industries and appliances</i>	GCF core indicator: Cost per t CO <sub>2</sub> eq Defined as total investment cost / expected lifetime emission reductions	Project monitoring data on costs plus data from the indicator on tonnes of CO <sub>2</sub> eq reduced	0	-	14.4 USD / tCO <sub>2</sub> e for GCF	
<i>M3.0 Reduced emissions from buildings, cities, industries and appliances</i>	GCF core indicator: Volume of finance leveraged by the project and as a result of the Fund's financing, disaggregated by public and private sources	Project reporting	0	-	US\$ 100 million	

H.1.2. Outcomes, Outputs, Activities and Inputs at Project/Programme level						
Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term	Final	
<b>Project/programme outcomes</b>	<b>Outcomes that contribute to Fund-level impacts</b>					
M5.0 Strengthened institutional and regulatory systems	5.1 Institutional and regulatory systems that improve incentives for low-emission planning and development and their effective implementation (outcome indicator for Component 2)	Score on World Bank RISE indicators for buildings sector (see the UNDP Project Document for details – Annex II)	34	64	91	Strengthened institutional and regulatory systems lead to practical change and do not remain on paper
<i>M7.0 Lower energy intensity of buildings, cities, industries and appliances</i>	7.1 Energy intensity / improved efficiency of buildings, cities, industries and appliances as a result of Fund support	Reported data from project monitoring component	160 kWh / m <sup>2</sup>	-	Reduced by 50%	Rebound effect due to lower energy intensity is limited
UNDP IRRF 1.5: Inclusive and sustainable solutions adopted to achieve increased energy efficiency and universal modern energy access	1.5.1 Number of new development partnerships with funding for improved energy efficiency and / or sustainable energy solutions targeting underserved communities / groups and women	Project plans, signed agreements, MoUs, financial reports and budgets.  These may be available on partners' websites,	0	-	5	See Annex A of the Project Document (Annex II) for a discussion of UNDP's indicators.

		through media reports or direct communication with the partners involved				
Robust MRV for the building sector established <i>(Component 1 – Establishment of building sector MRV and knowledge management)</i>	Establishment of a web-based, publicly-accessible MRV database	Project reporting	No MRV in place	Website established and fully web-accessible	5,000 website hits per year	MRV systems continue producing data after project end
National, sub-national and local authorities adopt and implement an enabling policy framework for EE retrofits <i>(Component 2 – Policy de-risking)</i>	See indicator 5.1 above					
Access to affordable capital for EE retrofits provided <i>(Component 3 – Financial de-risking)</i>	Value of loans for building renovation provided	Reported data from project monitoring component	0	US\$ 22m	US\$ 100m	The Government continues to bring energy prices in line with market prices  Level of skills among local professionals is maintained at a level that can support market growth  Lenders make use of learning opportunities offered by the financial mechanisms supported in this project
Affordability of EE retrofits for most vulnerable households ensured through targeted financial incentives to building / apartment owners / ESCOs <i>(Component 4 – Financial incentives)</i>	Number of vulnerable beneficiaries (lowest quintile of household income) with improved building EE	Applications submitted for the financial incentives scheme	0	15,000	50,000	Targeted financial incentives are aligned with the capital provided for EE retrofits, effectively leading to the implementation of retrofits
<b>Project/programme outputs</b>	<b>Outputs that contribute to outcomes</b>					
1.1 MRV systems for the buildings sector in Armenia established	Development and coverage of MRV system and database	Regular project reporting	N/A	Developed & in use for renovated buildings: full coverage of buildings retrofitted	Developed & in use for renovated buildings: full coverage of	Building occupants cooperate with the implementation of MRV systems

				in this project	buildings retrofitted in this project	
1.2 Knowledge management and MRV information disseminated	Number of beneficiaries with access to knowledge about energy use in buildings, opportunities and financing for EE	Regular project reporting	N/A	Number of beneficiaries: 50,000	Number of beneficiaries: 250,000	Learning opportunities offered by this project lead to sustained lending for EE investments
2.1 Public instruments for the promotion of investment in EE selected	UNDP's framework to support policy-makers in selecting public instruments to promote energy efficiency investment in developing countries used, adapted as necessary	Report on implementation of the framework	Framework not used for EE in Armenia	Number of public instruments selected: 3	Number of public instruments selected: 3	Policy-makers follow through on implementation of the selected instruments
2.2 Support provided to ongoing legal reform in the field of EE	Binding legislation on building codes and adequate secondary legislation adopted.	National legislation	Level 3. Policies proposed and consultation ongoing. <sup>85</sup>	Level 4. Strong policy adopted	Level 5. Strong policy adopted and institutional capacity strengthened	UNDP's working relationship with the Government is effectively employed to maintain the momentum for legal reform
2.3 Support provided for the creation of an enabling policy framework for EE retrofits in multi-owner residential buildings	Adequate secondary legislation providing a clear and effective set of functional models and a standard set of rules for multi-owner building management bodies to undertake EE retrofits developed, introduced and enforced	National legislation	Secondary legislation lacking	Level 6. Sub-sector plans reflect key policy targets	Level 7. Regulatory framework developed	UNDP's working relationship with the Government is effectively employed to maintain the momentum for creation of an enabling policy framework
2.4 Support provided to building owners / managers / owner associations / ESCOs on legal matters related to EE retrofit projects	Business models for repayment of EE investments implemented	Regular project reporting	Level 1. No business models for repayment of EE investments in buildings in place	Level 3. Strong proposal defined with buy-in from stakeholders confirmed	Level 5. Financial mechanism in operation with evidence of stability	Gradual introduction of performance-based contracts and risk transfer to ESCOs, combined with capacity building, lead to the development of an ESCO market
2.5 Exit strategy measures implemented	Additional exit strategy measures designed and implemented	Regular project reporting	N/A	Additional exit strategy measures designed	Additional exit strategy measures	Exit strategy succeeds in maintaining the momentum created by the project and

<sup>85</sup> The indicators for 2.2, 2.3 and 2.4 use GEF definitions (as defined in Annex II of the Climate Change Mitigation Focal Area Strategy in the GEF-6 Programming Directions) for the baseline and targets.

					imple- mented	leads to local stakeholders continuing to further develop the market
3.1 Technical assistance provided to banks and other financial institutions	Capacity of banks to develop and market products for energy efficiency retrofits in individual houses	Survey of bank employees	Banks do not have the capacity to develop and market products for energy efficiency retrofits in individual houses	2 Armenian banks have the capacity to develop and market products for energy efficiency retrofits in individual houses	4 Armenian banks have the capacity to develop and market products for energy efficiency retrofits in individual houses	Banks are interested and participate in capacity building to enable them to deliver EE projects in individual houses
3.2 Technical assistance for HOA market facilitation provided to banks	Capacity of banks to develop and market products for energy efficiency retrofits in multi-owner residential buildings	Survey of bank employees	Banks do not have the capacity to develop and market products for energy efficiency retrofits in multi- owner residential buildings	2 Armenian banks have the capacity to develop and market products for energy efficiency retrofits in multi- owner residential buildings	4 Armenian banks have the capacity to develop and market products for energy efficiency retrofits in multi- owner residential buildings	Banks are interested and participate in capacity building to enable them to deliver EE projects in multi-owner residential buildings
3.3 Technical assistance provided to local government to develop EE retrofit projects for publicly- owned buildings	Percentage of local government employees in Armenia who believe they have the capacity to develop EE retrofit projects for publicly- owned buildings	Survey of local government employees	Local government does not have the capacity to develop EE retrofit projects for	50% of local government employees believe local government has the capacity to	80% of local government employees believe local government has the capacity	Local government is interested and participates in capacity building to enable it to deliver EE projects in public buildings

			publicly-owned buildings	develop EE retrofit projects for publicly-owned buildings	to develop EE retrofit projects for publicly-owned buildings	
3.4 Access to affordable capital for EE retrofits provided	Amount and number of loans for building renovation provided	Reported data from project monitoring component	No lending provided	US\$ 20 million	US\$ 86.25 million	Economic situation continues to improve
3.5 Marketing platform created	Marketing materials developed and platform created	Marketing materials, project reporting	No marketing materials exist	Marketing materials created and disseminated to at least 5,000 stakeholders	Marketing platform created and disseminated to at least 25,000 stakeholders	Marketing campaign successfully raises awareness of the opportunities offered by building EE retrofits
4.1 Targeted financial incentives provided to vulnerable groups to help address the affordability gap	Financial mechanism to provide targeted financial incentives in place and incentives provided	Reported data from project monitoring component	No incentives in place	Incentives provided to 15,000 beneficiaries	Incentives provided to 50,000 beneficiaries	Sufficient uptake of the financial incentive among the target market of vulnerable home owners
<b>Activities</b>	<b>Description</b>		<b>Inputs</b>		<b>Description</b>	
1.1.1 MRV framework	Development of the MRV framework, including guidelines and monitoring methodologies for the various categories of buildings		International consultants, Local consultants, PMU staff time, Funds		Hiring of consultants to develop MRV framework in conjunction with the project team	
1.1.2 EMIS implementation	Support to full implementation of building EMIS in targeted buildings for demonstration and capacity building purposes		Software International consultants, Local consultants, PMU staff time, Funds		Following competitive tender and based on detailed technical specifications, Ministry of Nature Protection financially supported for the purchase of EMIS systems	
1.2.1 Stakeholder engagement	Identifying appropriate formats for reaching the relevant stakeholders		International consultants, Local consultants, PMU staff time, Funds		Specialist communications consultants engaged to develop communications strategy	
1.2.2 Website	Establishment of a website that will provide information and a platform for communication between the different stakeholders		Web developer, Web hosting		Competitive tender for Web design and implementation	
1.2.3 Formats for dissemination	Formats for information dissemination will be developed based on their likely effectiveness for raising awareness,		International consultants, Local consultants,		Specialist communications consultants assist with the development of informative and	

	facilitating information access and providing actionable guidance and support to the sector	PMU staff time, Funds	accessible literature and other media communications tailored to specific user-groups
1.2.4 Information provision	Provision of information to consumers	Printing and publication costs, International consultants, Local consultants, PMU staff time, Funds	Procurement of design and print services, and development of accessible information products
2.1.1 Public instrument selection	The project will make use of UNDP's framework to support policy-makers in selecting public instruments to promote energy efficiency investment in developing countries	Workshops (2) and meetings (15), International consultants, Local consultants, PMU staff time, Funds	Specialist DREI consultants and UNDP staff to assist in instrument selection
2.2.1 Technical specialist support to authorities to adopt and implement an enabling policy framework	Support to national, sub-national and local authorities to adopt and implement an enabling policy framework for EE retrofits.	International consultants, Local consultants, PMU staff time, Funds	Hiring of consultants to assist in preparation of policies and regulations defining the terms of EE retrofits
2.2.2 Introduction of legislation	Support to the gradual introduction of binding legislation on energy auditing, energy passports / certificates and labelling for existing buildings	International consultants, Local consultants, PMU staff time, Funds	Hiring of consultants to assist in design and implementation of legislation, and the design and implementation of auditing, passports and labelling
2.2.3 Public building legislation	Support to the introduction of legislation specific to public buildings	International consultants, Local consultants, PMU staff time, Funds	Hiring of consultants to assist in design and implementation of legislation
2.3.1 Technical support from experts to policy-makers in developing policy related to HOA legal status, payment enforcement and management	Support to policy-makers in developing policy relating to HOA legal status, payment enforcement, professional management and consensus levels	International consultants, Local consultants, PMU staff time, Funds	Hiring of consultants to advise and develop evidence base for policy-makers for development of HOA policy
2.4.1 Legal support to management of multi-owner buildings related to energy efficiency retrofits	Provide support on legal matters related to EE retrofit projects for multi-owner buildings	International consultants, Local consultants, PMU staff time, Funds	Specialist legal support hired on a retainer basis and made available to retrofit projects as and when required
2.4.2 ESCOs	Provide support to establishing ESCOs	International consultants, Local consultants, PMU staff time, Funds	Specialist technical and legal consultants hired to assist with support to ESCO establishment
2.5.1 Exit strategy	Development and implementation of exit strategy	International consultants, Local consultants, PMU staff time, Funds	Hiring of consultants to advise on design and implementation of post-project impact sustainability measures
3.1.1 Technical support provided to banks to develop and market energy efficiency products to individual residences	Provide support to banks to develop and market products for energy efficiency in individual residences	International consultants, Local consultants, PMU staff time, Funds	Technical and financial consultants hired to assist with support to local banks



3.2.1 Technical support provided to banks to develop and market energy efficiency products to multi-owner building management (HOAs)	Support to development of bank products for HOAs	International consultants, Local consultants, PMU staff time, Funds	Technical and financial consultants hired to assist with support to local banks
3.3.1 Publicly-owned buildings	Support to the process of identification, development and aggregation of technically and financially feasible EE retrofit projects in publicly-owned buildings	International consultants, Local consultants, PMU staff time, Funds	Specialist consultants hired to assist with development of screening criteria and aggregation methodologies for EE retrofit projects in public buildings
3.4.1 Technical structure for financial instruments	Establishment and maintenance of the technical structure for the financial de-risking instruments offered	Concessional loans: US\$ 86.25 million	Mode of operation of the financial de-risking instruments designed, implemented and documented
3.4.2 Verification	Verification of funded investments	International consultants, Local consultants, PMU staff time, Funds	MRV system designed, implemented and documented
3.5.1 Marketing support	Provide marketing support to banks	Printing and publication costs, International consultants, Local consultants, PMU staff time, Funds	Specialist communications consultants assist with the development of literature and other media communications tailored to specific customer segments
4.1.1 Targeted incentives	Targeted financial incentives provided to building / apartment owners, or the ESCOs serving these clients	Incentives: US\$ 14 million	Mode of operation of the financial incentives designed, implemented and funds transferred

## H.2. Arrangements for Monitoring, Reporting and Evaluation

217. Project-level monitoring and evaluation will be undertaken in compliance with the UNDP POPP and the UNDP Evaluation Policy. Concerning energy savings, Component 1 focuses on collection of data. Since it is not cost-effective to measure the savings in all retrofitted buildings, a selection of buildings (covering locations, building types, usage, retrofit measures) will receive Energy Management Information Systems, providing detailed performance information in real-time. This data will be used to determine overall project savings by including details of the measures and types of buildings retrofitted. Responsibility for reporting on savings rests with the Project Management Team, and will report to UNDP. UNDP will perform monitoring and reporting throughout the Reporting Period in accordance with the Accreditation Master Agreement (AMA). UNDP has the country presence and capacity to perform such functions. In the event of any additional post-implementation obligations over and above the AMA, UNDP will discuss and agree these with the GCF Secretariat in the final year of the Reporting Period and will prepare a post-Reporting Period plan and budget for approval by the GCF Board as necessary.
218. The primary responsibility for day-to-day project monitoring and implementation rests with the Project Manager. The Project Manager will develop annual work plans to ensure the efficient implementation of the project. The Project Manager will inform the Project Board and the UNDP Country Office of any delays or difficulties during implementation, including the implementation of the M&E plan, so that the appropriate support and corrective measures can be adopted. The Project Manager will also ensure that all project staff maintain a high level of transparency, responsibility and accountability in monitoring and reporting project results.
219. The UNDP Country Office will support the Project Manager as needed, including through annual supervision missions. The UNDP Country Office is responsible for complying with UNDP project-level M&E requirements as

outlined in the UNDP POPP. Additional M&E and implementation quality assurance and troubleshooting support will be provided by the UNDP Regional Technical Advisor as needed. The project target groups and stakeholders, including the NDA Focal Point, will be involved as much as possible in project-level M&E.


220. A project inception workshop will be held after the UNDP project document has been signed by all relevant parties to: a) re-orient project stakeholders on the project strategy and discuss any changes in the overall context that influence project implementation; b) discuss the roles and responsibilities of the project team, including reporting and communication lines and conflict resolution mechanisms; c) review the results framework and discuss reporting, monitoring and evaluation roles and responsibilities and finalise the M&E plan; d) review financial reporting procedures and mandatory requirements, and agree on the arrangements for the annual audit; e) plan and schedule Project Board meetings and finalise the first year annual work plan. The Project Manager will prepare the inception report no later than one month after the inception workshop. The final inception report will be cleared by the UNDP Country Office and the UNDP Regional Technical Advisor, and will be approved by the Project Board.
221. A project implementation report (PIR) will be prepared for each year of project implementation. The Project Manager, the UNDP Country Office and the UNDP Regional Technical Advisor will provide objective input into the annual PIR and the GCF reporting requirements as described in the Accreditation Master Agreement. The Project Manager will ensure that the indicators included in the project results framework are monitored annually well in advance of the PIR submission deadline and will objectively report progress in the Development Objective tab of the PIR. The annual PIR will be shared with the Project Board and other stakeholders. The UNDP Country Office will coordinate the input of the NDA Focal Point and other stakeholders to the PIR. The quality rating of the previous year's PIR will be used to inform the preparation of the next PIR. The final project PIR, along with the terminal evaluation report and corresponding management response, will serve as the final project report package.
222. An independent mid-term review process will be undertaken and the findings and responses outlined in the management response will be incorporated as recommendations for enhanced implementation during the final half of the project's duration. The terms of reference, the review process and the final MTR report will follow the standard templates and guidance available on the UNDP Evaluation Resource Centre. The final MTR report will be cleared by the UNDP Country Office and the UNDP Regional Technical Advisor, and will be approved by the Project Board. The final MTR report will be available in English.
223. An independent terminal evaluation (TE) will take place no later than three months prior to operational closure of the project. The terms of reference, the review process and the final TE report will follow the standard templates and guidance available on the UNDP Evaluation Resource Centre. The final TE report will be cleared by the UNDP Country Office and the UNDP Regional Technical Advisor, and will be approved by the Project Board. The TE report will be available in English. The UNDP Country Office will include the planned project terminal evaluation in the UNDP Country Office evaluation plan, and will upload the final terminal evaluation report in English and the management response to the public UNDP Evaluation Resource Centre (ERC) ([www.erc.undp.org](http://www.erc.undp.org)).
224. The UNDP Country Office will retain all M&E records for this project for up to seven years after project financial closure in order to support ex-post evaluations.
225. A detailed M&E budget, monitoring plan and evaluation plan are included in the UNDP Project Document. See Chapter 6 of the Project Document (Annex II) for more details.

## I. SUPPORTING DOCUMENTS FOR FUNDING PROPOSAL

- NDA No-objection Letter (Annex I)
- UNDP Project Document including Feasibility Study (Annex II)
- Integrated Financial Model that provides sensitivity analysis of critical elements (xls format) (Annex III)
- Confirmation letters for co-financing commitment (Annex IV)
- Term Sheet (Annex V)
- Environmental and Social Screening Report (Annex VI)
- Appraisal Report and Due Diligence Report with recommendations (Annex VII)
- Evaluation Report of the baseline project (Annex VIII)
- Map indicating the location of the project/programme (Annex IX)
- Timetable of project/programme implementation (Annex X)
- Project/programme confirmation (Annex XI)
- Economic analysis- theory of change (Annex XII)
- Additional background details (Annex XIII)
- Responses to GCF comments on concept note (Annex XIV)



# No-objection letter issued by the national designated authority



ՀԱՅԱՍՏԱՆԻ ՀԱՆՐԱՊԵՏՈՒԹՅԱՆ ԲՆԱԳԱՎՈՐՈՒԹՅԱՆ ՆԱԽԱՐԱՐՈՒԹՅՈՒՆ  
**ՆԱԽԱՐԱՐ**  
 MINISTRY OF NATURE PROTECTION OF THE REPUBLIC OF ARMENIA  
**MINISTER**  
 МИНИСТЕРСТВО ОХРАНЫ ПРИРОДЫ РЕСПУБЛИКИ АРМЕНИЯ  
**МИНИСТР**

---

0010, ք. Երևան, Հանրապետության հր. Կառավարական 3-րդ տուն  
 3 Government Bldg, Republic Sq, Yerevan, 0010, Armenia  
 0010, Армения, г.Ереван, Дом правительства, здание N3  
 էլ.փոստ /E-mail/ эл.почта: [min\\_ecology@mnp.am](mailto:min_ecology@mnp.am)  
 Web page: [www.mnp.am](http://www.mnp.am)  
 ☎ (374 11) 818 501  
 ☎ (374 11) 818 506

№ 1/37/11936  
 «04» «09» 201թ.

**NO OBJECTION LETTER**

To: The Green Climate Fund ("GCF")

Yerevan, .....September, 2015

Re: Funding proposal for the GCF by UNDP regarding "De-risking and Scaling up Investment in Energy Efficient Building Retrofits" project

Dear Ms. Cheikhrouhou,

We refer to the GCF USD 20,000, 000 funding "De-risking and Scaling up Investment in Energy Efficient Building Retrofits" project in Armenia, as included in the funding proposal submitted by UNDP to us on 27 July, 2015.

The undersigned is the duly authorized representative of Ministry of Nature Protection, National Designated Authority of the Republic of Armenia.

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

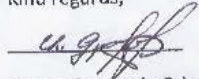
By communicating our no-objection, it is implied that:

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


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

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

Kind regards,



Name: Aramayis Grigoryan  
 Title: Minister of Nature Protection of the Republic of Armenia



## Environmental and social report(s) disclosure

Basic project/programme information	
Project/programme title	De-risking and scaling-up investment in energy efficient building retrofits (in Armenia)
Accredited entity	United Nations Development Programme (UNDP)
Environmental and social safeguards (ESS) category	Category C
	<i>Note: Environmental and social report disclosure not required for Category C and Intermediation 3 projects and programmes.</i>
Environmental and social report disclosure information	
Description of report/disclosure	N/A
Date of disclosure on accredited entity's website	
Language(s) of disclosure	N/A
Link to disclosure	http://
Other link(s)	http://