



PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: FULL-SIZED PROJECT
THE GEF TRUST FUND

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Submission Date: 31 March 2009

Re-submission date: 22 April 2009

PART I: PROJECT IDENTIFICATION

GEF Project ID¹: PROJECT DURATION: 60 months
 GEF AGENCY PROJECT ID: 4245
 COUNTRY(IES): Armenia
 PROJECT TITLE: Improving Energy Efficiency in Buildings
 GEF AGENCY(IES): UNDP
 OTHER EXECUTING PARTNER(S): Ministry of Nature Protection, Ministry of Urban Development
 GEF FOCAL AREA (S)²: Climate Change
 GEF-4 STRATEGIC PROGRAM(S): CC-SP1-Building EE
 NAME OF PARENT PROGRAM/UMBRELLA PROJECT: Framework for Promoting Low Greenhouse Gas Emission Buildings

INDICATIVE CALENDAR*	
Milestones	Expected Dates mm/dd/yyyy
Work Program (for FSP)	June 2009
CEO Endorsement/Approval	Feb 2010
Agency Approval Date	Mar 2010
Implementation Start	Apr 2010
Mid-term Evaluation	May 2012
Project Closing Date	May 2015

* See guidelines for definition of milestones.

A. PROJECT FRAMEWORK

Project Objective: Reduce GHG emissions and energy consumption in Armenian building sector								
Project Components	Indicate whether Investment, TA, or STA ^b	Expected Outcomes	Expected Outputs	Indicative GEF Financing ^a		Indicative Co-Financing ^a		Total (\$) c = a + b
				(\$) a	%	(\$) b	%	
1. Design and enforcement of new EE Building Codes and Standards	TA	Each year approximately 200 thousand m2 of living space is built/reconstructed in compliance with new EE Building Code	- New mandatory EE Building Code - Standards and calculation methodology to assess energy performance in buildings -Institutional structures, staffing, capacities and accountability for agencies in charge of code enforcement	120,000	60	80,000	40	200,000
2. Quality control, testing and certification of EE materials and equipments	TA	Improved quality and availability of domestically produced EE materials and products	-Standards for internal QA/QC developed and piloted -Testing laboratory for EE products testing and certification	140,000	74	50,000	26	190,000
3. Outreach, training and education on	TA	- Practicing architects and engineers	-Modules on energy efficient buildings	100,000	40	150,000	60	250,000

¹ Project ID number will be assigned by GEFSEC.

² Select only those focal areas from which GEF financing is requested.

integrated building design		understand new code and can produce designs and buildings that comply with it - Investors and tenants informed about the benefits and potential of integrated building design	introduced to universities -Training courses for architects and engineers on new codes and calculation methodologies					
4. Piloting integrated building design	TA	Energy- and cost-saving potential of integrated building design is demonstrated in one new building	- One building designed and constructed using an integrated building design approach - Energy saving and GHG reduction in pilot buildings monitored and reported	600,000	23	2,000,000	77	2,600,000
5. Project management				85,000	55	70,000	45	155,000
Total project costs				1,045,000		2,350,000		3,395,000

^a List the \$ by project components. The percentage is the share of GEF and Co-financing respectively of the total amount for the component.

^b TA = Technical Assistance; STA = Scientific & Technical Analysis.

B. INDICATIVE CO-FINANCING FOR THE PROJECT BY SOURCE AND BY NAME (IN PARENTHESIS) IF AVAILABLE, (\$)

Sources of Co-financing	Type of Co-financing	Project
Project Government Contribution	In-kind	200,000
GEF Agency	Grant	150,000
Project Government Contribution	Cash	2,000,000
Total Co-financing		2,350,000

C. INDICATIVE FINANCING PLAN SUMMARY FOR THE PROJECT (\$)

	Previous Project Preparation Amount (a) ³	Project (b)	Total c = a + b	Agency Fee
GEF financing		1,045,000	1,045,000	104,500
Co-financing		2,350,000	2,350,000	
Total	0	3,395,000	3,395,000	104,500

D. GEF RESOURCES REQUESTED BY AGENCY (IES), FOCAL AREA(S) AND COUNTRY(IES): N/A

PART II: PROJECT JUSTIFICATION

A. STATE THE ISSUE, HOW THE PROJECT SEEKS TO ADDRESS IT, AND THE EXPECTED GLOBAL ENVIRONMENTAL BENEFITS TO BE DELIVERED:

1. The majority of Armenia's population of 3.23 million inhabitants lives in urban centers. There are over 400 thousand apartments totaling 25 million square meters residential floor area in the cities. The largest portion of the urban housing stock is between 30 and 60 years old and typically with poor thermal characteristics and

³ Include project preparation funds that were previously approved but exclude PPGs that are awaiting for approval.

poorly sealed. All old buildings without exception require some sort of repairs and 11% of the buildings are in the stage of emergency and in urgent need for reconstruction. Buildings represent the largest energy end-use sector which accounts for 35,5% of electricity and 25,3% of heat consumption in the country⁴, and offers the single largest and most cost-effective opportunities for energy efficiency improvements: 40% of the national energy saving potential is in the buildings, an equivalent of 400 Mtoe or 2.3 MtCO_{2e} of GHG emission reductions annually⁵. It is also the second fastest growing sector (after transport) in terms of energy use and GHG emissions: in 2002-2005 consumption of natural gas in residential and public buildings grew by 206% and 85% respectively. This growth is partially a result of a construction boom that Armenian economy has witnessed since early 2000 when construction volumes increased by 15-20% annually (see Table 1). Global financial crisis has not yet been seen to have any serious impact on Armenia economy and construction business: GDP has been growing rapidly since 2001 at above 10% annually and in January – October 2008 grew by 9.2 % with construction sector contributing 28-30% of GDP and displaying growth rates of 17% year-on-year. Experts estimates that growth in construction volumes and investments in new buildings and reconstruction will sustain and account for 15% until 2010, 10% until 2015 and 7% till 2020. This is partially due to governmental commitments to implement the Programme for Restoration of the areas suffered from the disastrous earthquake in 1988. In November 2008, Prime Minister declared full restoration of the earthquake zone among its priorities and pledged 77 bln Drams (250 mln US dollars) for finalizing the construction of new housing for 75,000 people still living in the temporary dwellings.

Table 1: Investment in Armenian Construction Sector, mln Drams

	2000	2001	2002	2003	2004	2005	2006
Total investment, including:	100,990	110,394	166,628	237,844	276,403	435,125	584,608
Housing and Commercial	21,098	28,656	65,275	113,104	120,280	202,750	306,030

Source: Armenian Economic Association 2007

2. Due to Armenia’s markedly continental climate with long heating season and winter average temperatures around -5°C, energy consumption and GHG emissions in Armenian building sector are mainly associated with heating. Introduction of most common and low-cost measures (e.g. thermal insulation) can noticeably improve energy performance in buildings resulting in 30-40% energy saving. On the other side, climate change projections for Armenia indicate continuous rise in summer temperatures (from 2.1 to 8.4⁰C in year 2090⁶) leading to increased demand for air-conditioning in summer, the trend which is already being observed (in 2008 the number of imported AC units (19,000 pcs) is 3,5 times more compared to 2004). At the same time, construction continues to proceed according to old Soviet practices and norms when little or rather no attention is being paid to energy performance characteristics of the buildings and energy efficiency is not being considered, let alone factored in the design and construction process bringing in excessive energy consumption and increase in GHG emissions.

3. The goal of the proposed project is to reverse the existing trends and reduce consumption of electrical and thermal energy and associated GHG emissions in new and restored, primarily residential buildings in Armenia. It will do this by creating enabling regulatory environment, skills and capacity among industry professionals to introduce the principles of integrated building design in Armenian construction practices from the stage of building design through construction to maintenance of the buildings. The concept of Integrated Building Design calls for architects and engineers to work as a team in order to ingrate conceptual parameters: the building shape, the orientation, the thermal properties and the quality of the materials, the layout of the indoor spaces, the needs of the tenants, the efficiency of the indoor heating system. The support to be provided by the project will combine development of a new regulation (EE building codes and certification scheme) with the training of professionals, demonstration of integrated building design and stimulating manufacturing of new EE materials and equipment as outlined below.

⁴ Ministry of Energy Calculation Center, 2006 report

⁵ National Programme on Energy Saving and Renewable Energy of Republic of Armenia. 2007

⁶ “UNDP Climate Change Country Profiles” <http://country-profiles.geog.ox.ac.uk>

Component I Design and enforcement of new EE Building Codes and Standards

4. Outcome 1.1 New EE Building Codes and Standards designed and adopted

A national commission/expert group of local experts will be organized in order to define the content of a new EE building code⁷, the implementation rules, and the control and supervision based on Intergovernmental building codes which Armenia had voted for. This commission would have the following targets:

- Define new normative energy consumption: maximum nominal energy demand for new and renovated buildings
- Define the real definition and the calculation methodology of the existing heating index:
 - Building needs: gross heat losses from envelope and ventilation
 - Energy consumption at building level: needs + indoor heating and regulation efficiency
 - Raw energy consumption: fuel (natural gas) which is consumed by the boiler.
- Define the technical solutions to reach the new heat index: insulation type and thickness for walls, basement and roof, type of windows, building location and orientation, building shape coefficient, window size and orientation, heating system; for each item, points would be attributed, then totalized to reach the minimum required quotation to comply with the new norms.
- Provide the characteristics of insulating materials and equipments, their certification, and the construction technologies, for existing and new buildings
- Prepare and adopt new building codes, calculation methodology, and procedures for its implementation

5. Output 1.2 Institutional structures and capacities built for enforcement of new codes and standards

- Institutional roles and responsibilities with respect to enforcement of new building energy efficiency codes during design, construction and commissioning stages are clarified and regularized
- Create a department in the Ministry of Urban Construction, train staff and build capacity for (i) implementation of the integrated building design, (ii) coordinating the group of local experts (commission) who will develop and write the new Building Code, (iii) controlling the effectiveness of the material certification (under Component 2)
- Introduce energy performance certification scheme (Energy Passport) to support compliance check of new and reconstructed buildings with new code, including standardized procedures and methodologies for checking compliance with new codes (energy audit) and issuance of Energy Passport.

Component II Quality control, testing and certification of EE materials and equipments

6. Outcome 2.1 Product selection

Integrated building design cannot be performed without adapted materials and equipment. The project will therefore support identification of selected EE materials and introduce their certification scheme as follows:

Insulating materials	<ul style="list-style-type: none"> ▪ Survey available insulating materials, the local manufactures, the potential manufacturing at low cost ▪ Select the products adapted to the country ▪ Develop a certification labelling
Windows	<ul style="list-style-type: none"> ▪ Define the needs and make a survey on the current production and the potential capacity to produce new type of EE windows, ▪ Develop lab test and certification
Heating equipments inside the building	<ul style="list-style-type: none"> ▪ Survey on local boiler manufacturing ▪ Appraisal of the quality and efficiency of local boilers ▪ Selection of boilers by size, quality, efficiency ▪ Same approach for regulation equipment (temperature control), balancing valves, thermostatic valves, potentially radiators
Technologies for implementing outside insulation:	<ul style="list-style-type: none"> ▪ Insulating material with high density ▪ Cement-mortar/mesh/rendering for outside insulation ▪ Sandwich type walls with insulation

⁷ For a discussion on existing Building Codes and Implementation structures see Section F

7. Outcome 2.2 Quality control

The reliability of the building energy performance is narrowly linked to the quality of the materials and equipment that are used. The following activities will be supported:

- Technical assistance and provision of expert support to testing laboratories and certification bodies accredited in the field of testing and certification of building materials, components, building envelopes and insulation materials;
- Developing of national norms for quality control/quality assurance procedures (QA/QC) inside the manufactures and assistance for the suppliers of selected products to set-up QA/QC and comply with national norms.
- Procure equipment for at least one local testing laboratory to undertake energy audits (currently none is properly equipped).

Component III: Outreach, training and education on integrated building design

8. Output 3.1 Design tools

The implementation of integrated building design necessitates provision of the adapted design tools to the professionals; including:

- Develop and test a national standard of energy audit that can be used by all verification bodies in Armenia
- Develop a model to calculate the heat index, including passive integrated design, and the optional technical solutions, that can be practically used by design institutes, architects and engineers.
- Develop a handbook on passive design providing information on the concept, the physical principles, the technologies, ready to use technical solutions, concrete examples of passive integrated design

9. Output 3.2 Training of professionals

Training of professionals and government officers is the key condition for spreading out the integrated building design including passive design rules, energy efficiency measures, and efficient heating system. At the same time the new building code is developed, training sessions will be set up for architects and engineers working in governmental institutions, in design institutes, in construction firms. These sessions will include, in particular, the following courses: thermal behaviour of buildings and materials characteristics; materials uses, technologies, passive solar design; thermal simulation of buildings; design of buildings, and EE renovation of existing buildings: materials, technologies, technical solutions; energy audit model developed and adapted to the country, climate and local skills and materials; energy audits on concrete cases, design of real buildings (in conjunction with Component 5)

Component IV: Demonstrating integrated building design

- Showcase energy- and cost-saving potential of integrated building design in residential building
- Work with local architects and engineers to ensure selected building is designed and constructed following an integrated building design
- Co-finance incremental costs (up to 10%) of energy efficient technology options in pilot building (See Section H)
- Monitor pilot building energy performance and quantify energy and financial saving and GHG emission reductions in pilot and sample buildings

B. DESCRIBE THE CONSISTENCY OF THE PROJECT WITH NATIONAL/REGIONAL PRIORITIES/PLANS:

10. The proposed project is fully in with the strategic priority of the Armenian Government to increase the efficiency of fossil fuel use and thus ensure long-term economic and environmental stability of the country. In particular, the project will support practical implementation of the Law on “Energy Saving and Renewable Energy” (adopted on November 9, 2004) which calls for promotion of energy efficiency in building and constructions via development and implementation of energy examination/audit system for the existing and planned buildings and constructions. The project will also contribute to the implementation of a number of measures stated in “Energy Sector Development Strategies in the Context of Economic Development of Armenia” (adopted on June 23, 2005) and the “National Program on Energy Saving and Renewable Energy of Republic of Armenia” (adopted on January 18, 2007).

C. DESCRIBE THE CONSISTENCY OF THE PROJECT WITH [GEF STRATEGIES](#) AND STRATEGIC PROGRAMS:

11. The project falls under GEF-4 Strategic objective CC – 1 “To promote energy-efficient technologies and practices in the appliances and buildings“. It aims at promoting energy efficient technologies and practices in Armenian building sector with focus on construction of new and restoration of existing residential buildings. The project will be implemented under the UNDP-led GEF Global Framework for Promoting Low Carbon Buildings with a primarily focus on two thematic approached promoted by the Global Framework: a) Promotion and increased uptake of High Quality Building Codes and Standards; and b) Developing and Promoting Energy Efficient Building Technologies, Building Materials and Construction Practices. The coordination offered by the global program will help Armenia to learn from experiences and best practices from countries with similar EE building projects.

D. JUSTIFY THE TYPE OF FINANCING SUPPORT PROVIDED WITH THE GEF RESOURCES:

12. GEF support will be delivered in the form of technical assistance which was considered the most suitable modality for grant delivery given the nature of barriers to be addressed and proposed intervention (institutional capacity development, training, awareness raising and demonstration of integrated building design).

E. OUTLINE THE COORDINATION WITH OTHER RELATED INITIATIVES:

13. Project Executing Agency, the Ministry of Urban Development, is the main governmental body in charge of development and enforcement of building norms and standards, as well as implementation of all state-funded construction programs the largest being the Program for Restoration of the areas suffered from the disastrous earthquake in 1988 (it is envisaged that 200,000 sq m of new residential space will be commissioned by the Ministry by 2013 under this Programme). Following is the list of building projects already approved by the Government. At PPG stage UNDP will jointly with the Ministry will select one new building from the following list of approved projects to be designed and built following integrated building design approach.

Table 2: Approved construction projects by the Government of Armenia

Town	Buildings/Apartments	Budget, mln AMD
Stepanavan	4 buildings (49 apartments)	380 mln AMD
Tsaghkahovit	one building (50 apartments)	240 mln AMD
Maralik	9 buildings (3 - 4 floor buildings, 110 single room apartments)	450 mln AMD
Spitak	8-10 buildings (354 apartments)	n/a
Gyumri	60-80 buildings (2300 apartments)	n/a
Yerevan	one building (50 apartments)	n/a

14. Project will work in close collaboration with WB/GEF Energy Efficiency Project in Armenia to make sure that experience and lessons learnt incorporated in energy efficient building retrofit programme to be financed from WB loan. At PPG stage both project will work closely together to identify practical coordination arrangements and scope of joint activities.

In addition, during PIF preparation a number of selected stakeholders were interviewed in order to identify needs, gaps, and expectations from the project and agree on coordination arrangement and joint activities. Results of these consultations are presented below and will be refined at PPG stage:

Partner	Joint activities/complimentarity
Ministry on Nature Protection	<ul style="list-style-type: none"> ▪ Coordination of the project activities in line with objectives of UNFCCC ▪ Development of GHG emission reduction assessment manuals and promoting the GHG inventory reporting practices in building sector
Ministry of Urban Development	<ul style="list-style-type: none"> ▪ Design and enforcement of new building codes and standards; ▪ Coordination and supervision of construction/reconstruction of the residential buildings
Ministry of Energy and Underground Resources	<ul style="list-style-type: none"> ▪ Development and enforcement of the legal base, methodologies and procedures for Energy Certification Scheme (Energy Passport)
USAID/EE Energy	<ul style="list-style-type: none"> ▪ Awareness raising activities ▪ Exchange of data and analytical studies
Armenia Renewable	<ul style="list-style-type: none"> ▪ Financing Renewable Energy and Energy Efficiency projects

Resources and Energy Efficiency Fund	<ul style="list-style-type: none"> ▪ Promotion of the development of EE market in Armenia ▪ Development of activities focused on energy security and reliability of energy systems
Builder's Union of Armenia	<ul style="list-style-type: none"> ▪ Implementation of assistance in demo project implementation ▪ Organization of trainings on EE construction materials and technologies , development of advertising materials, exhibitions, support with publication in media, awareness rising
Yerevan state university of architecture and construction	<ul style="list-style-type: none"> ▪ Organization of education and trainings
National Institute for standardization	<ul style="list-style-type: none"> ▪ Development of procedures for licensing of independent verifiers in the sphere of EE materials certification and labeling

F. DISCUSS THE VALUE-ADDED OF GEF INVOLVEMENT IN THE PROJECT DEMONSTRATED THROUGH INCREMENTAL REASONING :

15. In business-as-usual scenario state- and commercially-funded construction and renovation in Armenia will be implemented following on outdated building norms and practices and with no regard given to energy efficiency resulting in excessive energy use. 2nd National Communication projects increase in the share of building sector in Armenia in total GHG emissions from current 17% to 34% already by 2020. GEF assistance is requested to help overcome a number of barriers which currently prevent adoption of more energy-efficient construction practices in buildings, in particular:

16. *Outdated building norms and standards:* Building codes in Armenia do not contain provisions or standards for building energy performance. Existing codes (norms) can be divided in the following three groups: Codes developed in the Soviet period (SNiPs); Building codes developed throughout 1990-2000 by Armenian experts, and Intergovernmental construction norms (MSNs) developed by Intergovernmental Normative-Technical Commission on Standards and Certification in Building Sector of CIS, the latter were voted for, but not yet adopted by Armenia, including MSN 2.04-02-2004 “Thermal Insulation of the Buildings”. The existing old Soviet as well as newly developed Armenian codes does not consider the buildings energy performance aspects.

In particular, there are two sector specific codes which have direct implications for energy use in buildings, namely II.7-02.95 “Building thermo physics of the building structures” and IV-12.02.01-04 “Heating, ventilation and air conditioning”, as well as building code manual: II-7.102-98 “Thermo physics of the building structures”. These codes are mandatory for application, but they are prescriptive in nature and do not contain any provisions or standards with regard to energy efficiency aspects of the buildings. Energy performance of buildings is left at the discretion of investors and is not regulated by the existing legislation.

Revision of building codes should take place once every five years. The list of the codes to be revised is presented every year from the Ministry of Urban Development to the Government for funding. However in reality very few codes are revised on time, mainly due to lack of financing and expertise.

17. *First Cost Decision-making Practices:* Construction is usually done on a first-cost basis. This means that investment costs are minimized to provide for as quick investment recovery as possible. Investments in improved energy efficiency and GHG emission reduction may only add a few percent (normally up to 10% in most countries) to construction costs and save money over the life cycle of the building, but currently even such low investments are avoided. Current tendering practices do not take building operating costs into account when comparing the costs of various building designs.

18. *Low awareness of and experience with modern building practices, such as integrated building design:* building codes also do not incorporate the provisions for integrated building design, such as the choice of location, requirements for thermal insulation in the roof, wall and floor of the building, the use of more energy efficient building materials, design and technologies for heat and water supply and lighting systems, as well as the use of renewable energy sources. Local experts estimate that only adequate internal and external insulation could save up to 30% of energy, while incorporating all available options in building design could provide for up to 50-60% of energy savings.

19. *Low institutional capacity:* The Ministry of Urban Development is the main governmental body responsible for development and implementation of national policies, norms and standards in construction sector. The Ministry exercises control for implementation of all state-funded construction and renovation programmes and their compliance with established norms and standards. It has limited technical experience in the field of energy

efficiency, as well as institutional capacity to design and enforce new regulations: there is no dedicated staff dealing with energy efficiency, little to no awareness about the principles of integrated building design and no system in place for the systematic collection and analysis of information on energy saving measures and their costs and benefits that would allow them to be incorporated into building sector regulations.

20. *Immature market for energy efficiency services and products in building sector*: The building sector is also handicapped by a lack of understanding of energy efficiency issues for buildings. Awareness of integrated building design is extremely low among technical experts, architects, engineers and builders and there are no pilot projects or education curricula to learn from. Another technical barrier is the limited availability of building components and construction supplies that would meet higher energy efficiency requirements. Finally, laboratorial and technical base to assess thermal characteristics of building materials and buildings and check compliance with the norms is extremely weak: according to local certification company, they have to lease required equipment from their foreign partner each time when a request arise to assess energy performance and certify building compliance with international norms.

G. INDICATE RISKS, INCLUDING CLIMATE CHANGE RISKS, THAT MIGHT PREVENT THE PROJECT OBJECTIVE(S) FROM BEING ACHIEVED, AND IF POSSIBLE INCLUDING RISK MITIGATION MEASURES THAT WILL BE TAKEN:

Risk	Assessment	Mitigation
Lack of governmental commitment to revise and introduce more stringent energy efficient building norms and standards	Low	According to the Laws of Armenia, Building Codes are to be revised every 5 years. Further, the Government recognized the need for energy efficiency improvements in buildings and is committed to introduce stringent regulation and demonstrate its willingness by agreeing to pilot new building approaches through state-funded programme. The Government has requested GEF support to help ensure that the next scheduled revisions of national building codes and state-funded construction are in line with international best practices on building energy efficiency.
Low level of knowledge and skills among local professionals to integrate energy efficiency in building design and operations	M	Provision of technical assistance to build capacities of various local stakeholders involved in building design, construction and operation will constitute the major part of the project. This technical assistance will be provided through a “learning-by-doing” approach whereby local specialist will work together with international consultants to design and operate pilot EE projects in residential buildings.

H. DESCRIBE, IF POSSIBLE, THE EXPECTED COST-EFFECTIVENESS OF THE PROJECT:

Table 3: Estimation of direct GHG emission reductions

Building type and type of works	Size, m ²	Cost, thousand US\$/m ²		Energy consumption, kWh/m ²		Life-time, years	Energy saving, annual, MWh	GHG emission reduction*, tCO ₂	
		BAU	Alt	BAU	Alt			Annual	Life-time
New 9- storey building	3,500	800	880	165	100	50	228	103	5,142

* based on CO₂ emission coefficient of Armenian grid: 0.452 kgCO₂e/kWh calculated following CDM baseline methods

21. As illustrated in Table 3 above the project will result in 5,000 tCO₂ of direct GHG emission reductions from implementation of demonstration project. In addition, the project will bring cca 3 mln tCO₂ in indirect savings by introducing stringent EE building codes and application of integrated building design in state-funded construction. Even these tentative assessment (to be refined at PPG) shows high cost-effectiveness of GEF grant use, i.e. less than 1 US\$/tCO₂e or 1.5 US\$/tCO₂e for a total project budget (GEF and co-financing). These estimates are consistent with the findings of IPCC 4th Assessment Report which show that energy efficiency measures in building sector in transition countries possess some of the highest ratio of cost-effectiveness globally.

Table 4: Estimation of indirect GHG emission reductions

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
Area of multi-storey dwellings, thousand sq.m	174	192	211	232	243	256	269	282	296	2,155
Energy savings, kWh/m2	65	65	65	65	65	65	65	65	65	65
Annual CO2 reduction, tCO2	5,112	5,641	6,199	6,816	7,139	7,521	7,903	8,285	8,696	63,313
Expected life-time CO2e reduction, tCO2e	255,606	282,048	309,959	340,808	356,967	376,064	395,161	414,258	434,824	3,165,695

I. JUSTIFY THE COMPARATIVE ADVANTAGE OF GEF AGENCY: N/A

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):

Name	Position	Ministry	Date (Month, day, year)
Aram Harutunyan	GEF Operational Focal Point for Armenia	Ministry of Natural Protection of the Republic of Armenia	21 April 2009

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF policies and procedures and meets the GEF criteria for project identification and preparation.

Agency Coordinator, Agency name	Signature	Date (Month, day, year)	Project Contact Person	Telephone	Email Address
Yannick Glemarec UNDP-GEF Executive Coordinator	<i>Y. Glemarec</i>	4/22/2009	Marina Olshanskaya	+421-259-337-285	marina.olshanskaya@undp.org