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Mid-term Evaluation
of the UNDP-GEF project
**Improving Energy Efficiency
in Buildings in Armenia
(EE Buildings)**

PIMS 4245

Mid-Term Evaluation Report

prepared by International MTE Consultant
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April 2013

Evaluation Team

This Mid-term Evaluation of the UNDP-GEF project Improving Energy Efficiency in Buildings (PIMS 4245) was carried out between 01 April, 2013 and 30 April, 2013.

The evaluation has been conducted for the Armenian office of the United Nations Development Programme by the international consultant, Mr. Andreas Karner (andreas.karner@conplusultra.com).

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Acronyms and Abbreviations

AWP	Annual Work Plan
CEO	Chief Executive Officer
CEN	European Commission for Standardization
CIS	Commonwealth of Independent States
EE	Energy Efficiency
EPBD	EU Directive on Energy Performance in Buildings
EU	European Union
GEF	Global Environment Facility
GDP	Gross Domestic Product
GHG	Greenhouse gases
GoA	Government of Armenia
GOST	Russian National Building Standard
HBH	Habitat for Humanity
IBDA	Integrated building design approach
IEEB	UNDP/GEF Project “Improving Energy Efficiency in Buildings”
MEPS	Minimum Energy Performance Standards
MNP	Ministry of Nature Protection of RA
MUD	Ministry of Urban Development of RA
MSNs	Intergovernmental construction norms
M&E	Monitoring and Evaluation
NGO	Non-governmental Organization
NPD	National Project Director
PIF	Project Identification Form
PM	Project Management
PPG	Project Preparation Grant
QA/QC	Quality control/Quality assurance procedures
RE	Renewable Energy
RoA	Republic of Armenia
SNiP	Building Standards and Rules (building codes)
TL	Task Leader
tCO ₂ e	Tons of CO ₂ equivalent
toe	Tons of oil equivalent
UNDP	United Nations Development Programme
UNDP CO	United Nations Development Programme Country Office
UNFCCC	UN Framework Convention on Climate Change
USAID	United States Agency for International Development
USD	U.S. Dollar
YSUAC	Yerevan State University of Architecture and Construction

1 Executive summary

1.1 Project Summary

Programme or project number and title: PIMS 4245 “Improving Energy Efficiency in Buildings”, UNDP-GEF/00059937

Designated institutions

(Executing Agencies): Ministry of Nature Protection of the Republic of Armenia (MNP)
Ministry of Urban Development of the Republic of Armenia (MUD)

Implementing agency: UNDP

Project starting date

Originally planned: April 2010 (as approved in FSP proposal)
Actual: July 2010

Project completion date

Originally planned: July, 2015 (approved 5 years duration)

Total budget (US\$):

GEF:	1,045,000
UNDP:	150,000
GoA:	2,200,000 (including 200,000 in kind).

ProDoc signature date: June 30, 2010

Date of the Inception workshop: November 17, 2010

1.2 Project Objectives

The objective 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 is doing 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 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.

The project is being implemented under the UNDP-led GEF Global Framework for Promoting Low Carbon Buildings (LGGE) with a primarily focus on two thematic approaches 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.

The project approach of institutionalizing improved energy efficiency in buildings through building codes, construction materials certification, training, and demonstration directly contributes to the pursuit of Millennium Goal Number 7: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources. The project approach also builds on one of the key areas of the UNDP Armenia Country Programme: to “strengthen synergies of environmental, governance and socio-economic issues to ensure integrated solutions.”

Keeping in mind that 88% of buildings in the total non-commercial building stock of Armenia is in the residential sector, this project is directed towards enhancing energy efficiency in residential buildings. However, it is important to note that activities supporting a new, energy-efficient building code will cover not only construction and capital renovation of residential but also non-residential buildings, thus leading to wider replicability.

In pursuit of the objective, the project will deliver the following **outcomes**:

1. New EE Building Codes and/or Standards designed and enforced
2. Quality control, testing and certification of EE materials and equipment established
3. Outreach, training and education implemented/conducted
4. Integrated building design approach demonstrated on a selected multi apartment building
5. Project monitored and evaluated

1.3 Context and purpose of the Evaluation

This Mid-Term Evaluation (MTE) is being conducted at the request of UNDP in Armenia; it is a key element of the standard project monitoring and evaluation procedure.

The Monitoring and Evaluation (M&E) policy at the project level in UNDP/GEF has four objectives:

- to monitor and evaluate results and impacts;
- to provide a basis for decision making on necessary amendments and improvements;
- to promote accountability for resource use; and
- to document, provide feedback on, and disseminate lessons learned.

Specifically, the MTE is to assess and review

- the overall **project concept and design** in terms of appropriateness of objectives, planned outputs, activities and inputs compared to other cost-effective alternatives,
- the **implementation** of the Project in terms of quality and timeliness of inputs and efficiency and effectiveness of activities carried out as well as overall management and stakeholder involvement
- the **project outputs, outcomes and impact** and how the objectives of the Project contribute to the realization.

Summary of achieved outputs to date

The following results can be attributed to the project so far:

The EE Buildings Project has been operational for about 34 months (out of planned 60 months) since it has been kicked-off, with about 51% of its TA budget expended. While there

appears to be broad acceptance of most of the proposed activities and interventions of the Project, the progress of the Project to date can be characterized as follows:

- The project has made satisfactory progress so far. Achievements per Outcome 1 are not fully fit into the Project's implementation timelines due to delay in finalization and provision to the parties of the revised international building codes expected from intergovernmental scientific-technical commission for construction (MNTKS); the final version is pending since August 2011. The Project mitigated the issue via support to adoption of another document (Technical Regulation) serving as a legal basis for the codes.
- Otherwise, most of the log frame indicators were achieved in full compliance with the Work Plan. Special attention was paid to the pilot projects (Outcome 4) as it is the most complicated task. Current status is that the project will implement 3 demonstration projects (initially one planned); within one project (Goris town), a social housing development, the contracted building company performed the incremental part of the construction (energy efficiency measures). As a direct result of the project implementation, about USD 0.5 million co-financing was leveraged.
- Although the project is not 100% on track regarding implementation of EE legislation and standards, the relevance of the EE topic is high for the Armenian government and project stakeholders are principally committed to proceed with the activities they committed themselves to. Stronger co-ordination between decision-makers (e.g. through the IAWG or SC) is required in the second period to demand the necessary decisions to be made in progressing on the work programme.
- The project is overall professionally managed and administered, and has delivered some substantial results by now:
 - Basis for legislative framework improvements on building energy efficiency has been provided:
 - Quality control, testing and certification of EE materials and equipment initiated
 - Public outreach, awareness and training activities on integrated building design are on the way
 - Demonstration buildings to use IBDA design and construction principles are on the way
- The ability of the project to create long term impact has been partly achieved so far. Most of activities are ongoing and so are their results and achievements to be viewed in a longer perspective.
- As for the planned remaining activities need, they need to be reconsidered in terms of available resources and likeliness of timely implementation. The completion date of the Project is foreseen for May 2015. No major project delays are to be expected from today's point of view.

Further details are provided in section 4.3 Project Results.

1.4 Main conclusions, recommendations and lessons learned

Evaluation of Results

Table 1 provides an evaluation of the current outcomes of each Project output. Each output was evaluated (as far as possible at the MTE stage) against individual criteria of:

- **Relevance** - The extent to which the aid activity is suited to the priorities and policies of the target group, recipient donor, and national development priorities.

- **Efficiency** - Efficiency measures the outputs -- qualitative and quantitative -- in relation to the inputs. It is an economic term which signifies that the aid uses the least costly resources possible in order to achieve the desired results.
- **Effectiveness** - extent to which an aid activity attains its objectives.
- **Results/Impacts** – The positive and negative changes produced by a development intervention, directly or indirectly, intended or unintended. This involves the main impacts and effects resulting from the activity on the local social, economic, environmental and other development indicators.
- **Sustainability** - the extent to which the benefits of an activity are likely to continue after donor funding has been withdrawn.

Achievements of project objectives have been rated in terms of the criteria above at a six level scale as follows:

- Highly satisfactory (HS) - the project has no shortcomings
- Satisfactory (S) - minor shortcomings
- Moderately satisfactory (MS) - moderate shortcomings
- Moderately unsatisfactory (MU) - significant shortcomings
- Unsatisfactory (U) - major shortcomings
- Highly unsatisfactory (HU) - severe shortcomings.

The overall rating of the Project is Satisfactory (S), based mainly on:

- **Relevance:** the topic of EE in buildings is definitely relevant for the Armenian government and so is the design of the project. The project reflects the need of Armenia to improve energy efficiency legislation and the inadequate level of compliance with current legislation and poor enforcement, which are considered one of the main barriers to promotion of EE buildings. The project is further to showcase good examples of new integrated building design approaches combined with building capacity of construction professionals. The project is currently facing a low level of enforcement capacity of laws and regulations to be overcome in the second phase of the project.
- **Efficiency:** Project Management is generally very well established due to strong interlinkage with MNP as an executing agency. The good communication basis and exchange with all project partners and external stakeholders is an asset of the project, as are the increased number of demonstrations achieved during the project implementation.
- **Effectiveness:** apart from activities (outcomes) that have not yet started or have not delivered any major results, the achieved outputs have attained their objectives to a satisfactory level. The Project needs however to ensure that main outputs under component 1 will be achieved by the end of the project and uptake of further activities confirmed by the main project partners (MNP, MUD, MENR). Another aspect to be considered is increasing the effectiveness of training of architects, engineers at university. Just making students “aware” of IBDA concepts is not really a strong target. The project has a strong communication strategy and means to disseminate project results effectively through website, media and in the context of regional exchange through the network of UNDP/GEF Energy Efficiency in Buildings Projects implemented in Central Asia (beeca.net).

Table 1: Overall Evaluation of Project

Component	Relevance	Efficiency	Effective-ness	Overall
1. Design and enforcement of new EE Building Codes and Standards	HS	S	MS	S
2. Quality control, testing and certification of EE materials and equipment	S	S	S	S
3. Outreach, training and education on integrated building design	S	S	S	S
4. Demonstration of integrated building design	HS	S	S	
Overall Rating	S	S	S	S

Table 2: Summary Rating of the Project Implementation

Project Formulation	Rating
Project Relevance	Highly Satisfactory
Logical Framework	Satisfactory
Country ownership/drivenness	Satisfactory
Stakeholder Participation	Highly Satisfactory
Replication	Satisfactory
Cost effectiveness	Highly Satisfactory
Linkages between project and other initiatives	Satisfactory
Management Arrangements	Satisfactory
Project Implementation	Rating
Implementation Approach	Satisfactory
Partnership arrangement	Highly Satisfactory
Monitoring & Evaluation	Satisfactory
Financial Management	Satisfactory
Adaptive Management	Satisfactory
Project Results (to date)	Rating
Project Objective	Not relevant at MTE
Outcome 1	Satisfactory
Outcome 2	Satisfactory
Outcome 3	Satisfactory
Outcome 4	Satisfactory
Project Impact	Satisfactory
Sustainability	Moderately Likely

The financial mobilization in terms of GEF grants disbursement and co-financing provided by project partners is summarized below. Based on the assessment and data provided for the MTE, the project is currently meeting its financial mobilization targets satisfactorily.

GEF Outcome/Atlas Activity	Budget approved	Disbursement (by end 2012)					Revised budget (planned)			Total (USD)	Remaining unallocated
	from ProDoc (USD)	2010	2011	2012	Budget spent (USD)	% of budget spent	2013	2014	2015		Total (USD)
Outcome 1	137.000	22.770	36.990	51.599	111.359	60%	36.400	26.400	11.900	186.059	-49.059
Outcome 2	140.000	0	14.381	59.459	73.840	53%	47.000	11.000	8.000	139.840	160
Outcome 3	180.500	3.016	27.361	89.804	120.181	48%	55.500	48.500	28.575	252.756	-72.256
Outcome 4	600.000	28.104	110.950	78.647	217.701	47%	203.850	28.100	10.500	460.151	139.849
Project Management Unit	137.500	6.624	28.880	33.032	68.536	53%	25.200	19.268	15.600	128.604	8.896
TOTAL	1.195.000	60.514	218.562	312.541	591.617	51%	367.950	133.268	74.575	1.167.410	27.590

Summary of Recommendations

Recommendation 1: Legislation framework has been improving, but focus is needed to achieve adoptions of new Armenian Building Code

- Delivering key movement on Outcome #1 is main target of this Project. Its success will very much determine the success of the whole project and its market transformation impact.
- Therefore, UNDP country office together with Project Management and eventually other donor partners (World Bank, USAID, EU, etc.) should maintain high-level involvement at governmental and prime ministers' level to force the project partners to attain the agreed outputs.
- Main ministry to be addressed in implementation is MUD; however MENR should be strengthened in maintaining its coordinating role for implementation of Energy Policy of the Government by ensuring other project partners' adherence to legal and institutional setting.
- A detailed timeframe for adoption of new building code and by-legislation shall be agreed among project partners. The project should follow closely the situation with CIS code review and work out an alternative strategy as soon as possible.

Recommendation 2: Ensure that institutional bodies to take energy efficiency forward into the market are created

- A mandatory building EE legislation is required in Armenia following international best practice, and the project should aim as much as possible in achieving it.
- Enforcement of the new building code (as soon as implemented) and other laws and regulations will be required and thus public bodies to be created/assigned with specific tasks: energy auditing/passportization, building materials and equipment labeling/certification, building inspection and design approval, etc.
- An improvement of the co-ordination between institutions carrying out energy and building related projections and statistical assessments is definitely needed. The Project is expected to support this process by providing basic assessments and studies (e.g. such as indicators and benchmarks on energy efficiency in the building sector available or survey of potential building refurbishments conducted) on which relevant institutions could build upon for developing a country building statistics and information base for building energy consumption in Armenia.

Recommendation 3: Initial project structure is still valid, however needs slight adaptations:

- The project design and implementation framework has generally been well considered and still remains valid in regard to its anticipated outputs and targets to be achieved.
- Some of the targets, however, given under initial Project Results Framework (ProDoc) need to be revised in regard to their expectations and timing. A review of the logframe

has been performed and amended accordingly as a result of MTE findings and for approval of the SC.

- A budget revision to resize components with current over-spending is required.

Recommendation 4: Monitoring of GHG emission reductions to be followed-up and results visualized:

- GHG emission monitoring is to be continuously reviewed for the most relevant project outputs.
 - A detailed methodology should be developed for energy and GHG monitoring of the remaining project period, based on the results of the three pilot projects that are monitored regarding energy consumption, and for new buildings constructed according to new building code (once approved). Results from the demonstration projects' energy monitoring will be useful to improve the knowledge on actual energy consumption in buildings and what benefits are to be expected based on improved building design.
 - The energy and GHG monitoring should be continued after project termination through a suitable public entity and staff to be trained by project GHG experts.
 - Focus of the monitoring on most energy efficient buildings and promotion of best practices might motivate building developers, investors and owners, to actively cooperate during the monitoring evaluation.
 - Generally, the opportunities to monitor energy consumption data as long as possible within the project period to get more realistic picture of behavioral and technological effects on EE in buildings shall be encouraged. Minimum monitoring period is recommended to be 1 year, better 2 years. Continuous monitoring after project termination is recommended but depending on available equipment and budget availability.
 - Dissemination of evaluation results and benefits achieved is a key – The project shall focus on storytelling to visualize best-practice examples in buildings. Another possibility is to organize a competition for the most energy efficient building and results widely publicized to further attract attention of other building owners and developers/investors.
- The project has a good prospect to finalize all its key activities by its planned termination in June 2015. However, due to on-going construction of pilot buildings, there is a chance that not a whole heating season will be available for monitoring and evaluation of actual energy performance and GHG savings from constructed pilot buildings. From a current perspective, the on-going demonstration projects shall be implemented by late 2014 the latest.

A no-cost project extension until May 2016 could be required to allow monitoring and evaluating real achievements of the pilot buildings over the whole heating period.

Recommendation 5: Maintain high level of public outreach and institutionalize public awareness measures in the long term

- The Project shall maintain the high level of dissemination and public awareness creation activities throughout whole project period
- During the remaining project period, a focus shall be also given to IBDA dissemination and training at professional level. The number of training sessions shall be increased, together with an impact assessment of the effects of the training on improvement of capacities of building designers and engineers.
- Furthermore, in terms of networking and know-how exchange, the Project shall maintain its good communication basis with other on-going national (e.g. UNDP-GEF

Projects being implemented on Buildings Energy Efficiency in Central Asia (Kazakhstan, Kyrgyzstan, Turkmenistan, and Uzbekistan) or projects supported by EU, World Bank etc. in Armenia) as well as regional or international projects (such as ESIB INOGATE, HFH, etc.) Partnerships with other civil society groups and professional business organizations and other relevant professional chambers and associations shall be improved/maintained to identify common synergies and create further outreach of the project.

Summary of Lessons Learned

The following lessons learned can be drawn from the Project so far:

- Best practice from international (mainly European) approaches are a valuable input for developing EE framework in Armenia, especially with support and experience of national & international experts provided.
- Building Energy Performance regulation and corresponding implementation and enforcement in Armenia is still, although not fully implemented yet, in a very early stage. The Project needs strong focus on implementation and dissemination of improved building codes together with training & capacity building on basically all professional levels.
- Energy efficient building codes: Continuous consultations with respective national authorities/stakeholders and international experts underpinned by timely and proper delivery of expert developments in the frames of the Project are key to area identification for further code improvement. Because elaboration of a common approach is time- and effort-consuming.
- The partnership of the Project with private sector residential building developers clearly demonstrates that energy efficiency measures in construction projects can be easily accommodated in the initial design with a proper calculation of costs and benefits. A private developer company involved in this Project agreed to implement energy efficiency measures at own expenses, after recalculation of the costs and benefits he had additional space available for selling, resulting in marketing the benefits of the operational cost reduction.
- Regarding the pilot buildings selection, a proactive communication with project developers and design companies is important to becoming informed on similar initiatives and on other eligible sites that could be used for additional pilots if necessary. Selection of a pilot site requires building-specific and up-to-date information to manage the Project's resources adequately.
- Another target group tackled by the Project are residents and building users. They are the key players in making energy efficiency in buildings work and happen and provide the biggest replication potential in terms of user behavior if becoming involved properly. Building owners and tenants need continuous information and motivation to show them how energy efficient buildings benefit their living comfort and household budgets. The Project can possibly make a difference in the long term if building users are provided with the right decision-making perspectives.
- The project provides value added in terms of publicity for energy efficiency in buildings. Nevertheless, as a result from the EE Buildings Project and other initiatives supported through development institutions such as UNDP, a lesson learned is that Armenia requires an institutional setup that ensures that energy efficiency awareness and PR activities will be carried out widely on a continuous basis (i.e. after project termination) and throughout all sectors and target groups, based on a country wide

communication and awareness strategy. Such institution could be in the form of a National Energy Agency, which has been by the way, also proposed in the National Energy Efficiency Action Plan already.

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2 Introduction

2.1 Purpose of Evaluation

This Mid-Term Evaluation (MTE) is being conducted on a request of UNDP Country Office in Armenia; it is a key element of standard project monitoring and evaluation procedure.

Mr. Andreas Karner, energy consultant from Austria, has been contracted to carry out the Evaluation. He was supported by the UNDP CO and Project Management Unit during a site visit conducted between 1-5 April 2013.

The MTE is to assess and review

- the overall **project concept and design** in terms of appropriateness of objectives, planned outputs, activities and inputs compared to other cost-effective alternatives,
- the **implementation** of the Project in terms of quality and timeliness of inputs and efficiency and effectiveness of activities carried out as well as overall management and stakeholder involvement
- the **project outputs, outcomes and impact** and how the objectives of the Project contribute to the realization.

2.2 Key issues addressed

This MTE follows the general rules for program evaluation, especially the **GEF Evaluation Criteria** as follows:

- Relevance - The extent to which the aid activity is suited to the priorities and policies of the target group, recipient donor, and national development priorities.
- Efficiency - Efficiency measures the outputs -- qualitative and quantitative -- in relation to the inputs. It is an economic term which signifies that the aid uses the least costly resources possible in order to achieve the desired results.
- Effectiveness - extent to which an aid activity attains its objectives.
- Impacts – The positive and negative changes produced by a development intervention, directly or indirectly, intended or unintended. This involves the main impacts and effects resulting from the activity on the local social, economic, environmental and other development indicators.
- Sustainability - the extent to which the benefits of an activity are likely to continue after donor funding has been withdrawn.

2.3 Evaluation Methodology

The Monitoring and Evaluation (M&E) policy at the project level in UNDP-GEF has generally four objectives:

- to monitor and evaluate results and impacts;
- to provide a basis for decision making on necessary amendments and improvements;
- to promote accountability for resource use; and

- to document, provide feedback on, and disseminate lessons learned.

The methodology used for the project mid-term evaluation is based on the **UNDP-GEF Monitoring & Evaluation Policies** and includes following key parts:

- I. Project documents review prior to the evaluation mission
- II. Evaluation mission and on-site visit conducted in April 2013, interviews with project management, UNDP CO, project partners and stakeholders, as well as with independent experts. Discussion with project management on key issues to be addressed and implemented till the end of the project, and presentation of the preliminary findings and recommendations to Project Stakeholders and UNDP CO.
- III. Drafting the evaluation report and ad-hoc clarification of collected information/collection of additional information
- IV. Circulation of the draft evaluation report for comments
- V. Finalizing the report, incorporation of comments

Achievements of project objectives have been rated in terms of the criteria above at a six level scale as follows:

- Highly satisfactory (HS) - the project has no shortcomings
- Satisfactory (S) - minor shortcomings
- Moderately satisfactory (MS) - moderate shortcomings
- Moderately unsatisfactory (MU) - significant shortcomings
- Unsatisfactory (U) - major shortcomings
- Highly unsatisfactory (HU) - severe shortcomings.

2.4 Structure of the Evaluation

This mid-term evaluation report follows the structure and content as specified in its Terms of Reference (see Annex 1 **Error! Reference source not found.**) and according to the evaluation template of the 2009 UNDP Handbook on Planning, Monitoring and Evaluating for Development Results, including its 2011 update.

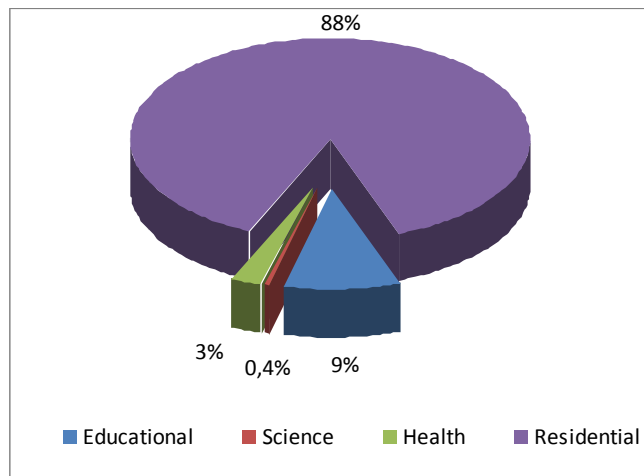
3 The Project and its development context

3.1 Problems that the project seeks to address

The project addresses the institutionalization of energy efficiency in buildings through improved building codes, construction materials certification, training, and demonstration which contributes to the pursuit of Millennium Goal Number 7: “Integrating the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources”. The project approach also builds on one of the key areas of the UNDP Armenia Country Programme, which is to “strengthen synergies of environmental, governance and socio-economic issues to ensure integrated solutions.”

Keeping in mind that 88% of buildings in the total non-commercial building stock of Armenia is in the residential sector (Figure 1), this project is directed towards enhancing energy efficiency in residential buildings. However, it is important to note that activities supporting a new, energy-efficient building code will cover not only construction and capital renovation of residential but also non-residential buildings, thus leading to wider replicability.

Figure 1: Armenian non-commercial buildings distribution by number¹ (2008)



Source: National Statistical Service (from Project Document)

3.2 Immediate and development objectives of the Project

The objective of the proposed project is to reduce GHG emissions and energy consumption in the Armenian buildings sector. The project will create an enabling regulatory environment that addresses building codes, building and materials certification and testing. At the same time, project activities will develop skills and capacity among industry professionals, introducing the principles of integrated building design in Armenian construction practices from the stage of building design through construction, QA/QC and maintenance.

The project focuses on the residential sector for several reasons:

- Residential sector accounts for some 80% of the total building stock,
- Emissions are increasing rapidly in this sector,
- The housing sector in Armenia is a key link between climate change mitigation and national development priorities,

¹Note: more detailed distribution by sectors is not available due to absence of data in the corresponding national statistics.

- Increased rates of housing construction are expected to continue throughout the project period, and the government has committed to investing in this sector, which could allow for relatively rapid replication of more efficient designs,
- The World Bank “Armenia Energy Efficiency” project to be implemented during 2010-2014 will target the energy conservation measures in existing public buildings (health and education entities, government administration buildings and other cultural and social institutions),
- Reduction of energy demand in the residential sector will have evident social impacts considering growing prices for natural gas.

However, it is important to note that key project results, such as strengthened codes, energy performance labeling/certification for buildings and construction materials, training in integrated building design, will also benefit non-residential buildings.

In pursuit of the objective, the project will deliver the following outcomes:

1. New EE Building Codes and/or Standards designed and enforced
2. Quality control, testing and certification of EE materials and equipment established
3. Outreach, training and education implemented/conducted
4. Integrated building design approach demonstrated on a selected multi apartment building
5. Project monitored and evaluated

3.3 Project start and its duration

The project development started in March 2009 with the development of a PIF and a request for a Project Preparation Grant (PPG). The full-sized proposal was finally approved on 7 May 2010.

Following the GEF CEO endorsement issued on 7 May 2010, UNDP Local Project Advisory Committee approved the Project as per the submitted Project Document on 18 May, 2010, and Project Document was signed on 30 June, 2010. Subsequently, multi-year 2010-2015 work plan was developed. According to the approved Project Document, the stakeholder agencies nominated the Project’s Steering Committee members.

The Project’s inception seminar was held on November 17, 2010.

The Project was originally planned to last for five years and is to be closed in July 2015, the project duration is therefore 5 years (60 months).

3.4 Main stakeholders

The primary means of stakeholder coordination is arranged via the Project Steering Committee (PSC), which provides an official and continuous discussion and decision-making forum for coordinating the work of various government agencies and other donors. In addition to work through the PSC, project staff maintains regular communication with the World Bank mission in

Armenia regarding their complementary work on efficient public buildings and works with the World Bank PIU in order to ensure very close coordination on the revision of procurement legislation. Other donors involved are USAID and the Delegation of the European Commission in Armenia regarding support for training in EU standards and legislation relevant to the buildings sector.

The project executing agencies are the Ministry of Nature Protection and the Ministry of Urban Development of the Republic of Armenia.

The implementing agency is UNDP Armenia.

Main project stakeholders identified in the Project Document to be actively involved in project implementation include:

- Ministry of Nature Protection (MNP)
- Ministry of Urban Development (MUD) - both acting as executing agency
- GEF Focal Point at MNP
- Ministry of Energy and Natural Resources (MENR)
- Ministry of Economy (ME)
- Inter-Agency Working Group on Energy Efficient Building Codes (IAWG)
- State Urban Inspectorate under the Ministry of Urban Development
- Yerevan State University of Architecture and Construction
- Builders' and Architects' Unions of Armenia
- Armenia Renewable Resources and Energy Efficiency Fund (R2E2)
- National Institute of Standards
- Accredited laboratories for construction and construction/insulation materials QA/QC
- The World Bank, USAID/EE Energy, European Union and other donors' funded projects in energy and building EE sectors

During project implementation, additional project stakeholders have been involved in the implementation and co-ordination of project activities:

- Swiss Development and Co-operation Agency (supporting one demonstration project in Goris town)
- Yerevan municipality (EE housing refurbishment)
- Architects, design and construction companies and project developers involved in the design and implementation of demonstration projects

3.5 Results expected

The Project Document specified expected project results – project outputs for each of the project component that relates to each of the project immediate objective.

1. **Immediate objective/outcome 1:**

Design and enforcement of new EE Building Codes and Standards: new building codes will be designed emphasizing energy performance requirements for all types of buildings, and code enforcement mechanisms will be strengthened.

Output 1.1: New mandatory EE building code designed and introduced

Output 1.2: Standards and calculation methodology to assess energy performance in buildings

Output 1.3: Institutional structures, staffing, capacities and accountability for agencies in charge of code enforcement

2. Immediate objective/outcome 2:

Quality control, testing and certification of EE materials and equipment: focus on establishing quality assurance/quality control (QA/QC) standards and support the certification of key building materials for energy performance.

Output 2.1: Standards for internal QA/QC developed and piloted

Output 2.2: Testing laboratory for EE products and certification operating

3. Immediate objective/outcome 3:

Outreach, training and education: training provided to two distinct groups: (1) architects and engineers (both mid-career professionals and students) and (2) real estate professionals.

Output 3.1: Modules on EE buildings introduced to universities

Output 3.2: Training courses for architects and engineers on new codes and calculation methodologies

Output 3.3: Outreach and awareness-raising campaign targeting investors and tenants implemented.

4. Immediate objective/outcome 4:

Demonstrating integrated building design: the energy and cost-saving potential of the integrated building design approach (IBDA²) will be demonstrated in a new, multi-apartment residential building to be built in the 1st Zone, the coldest of Armenia's climatic zones.

Output 4.1: At least one building designed and constructed using an integrated building design approach

² The **Integrated Building Design Approach (IBDA)** as it is discussed in the project documentation is understood as follows: building design that integrates climatic conditions, the capture and the conservation of the free solar and internal gains, the efficient and comprehensive reduction of all heat losses through walls and ventilation, the accurate control of all external energy introduced for providing thermal comfort, light, and hot water, and – last but not least – user awareness of a new behaviour regarding energy use and good operations and maintenance practices. The concept of IBDA calls for architects and engineers to work as a team in order to ingrate these conceptual parameters and the needs of the tenants. The ultimate goal of applying IBDA is to achieve high performance and multiple benefits at a lower cost than the total for all the components combined if these were considered separately.

Output 4.2: Energy saving and GHG reductions in pilot building monitored and reported

4 Findings and conclusions

4.1 Project Formulation

4.1.1 Project Relevance and Implementation Approach

65% of Armenia's population of 3.23 million inhabitants lives in urban areas. There are over 400,000 apartments with a total area of 25 million m² in multi-apartment buildings. The largest portion of the urban housing stock is between 30 and 60 years old, and it typically has poor thermal characteristics and is poorly sealed.

Without exception, all old buildings require some type of repairs, and 11% of the buildings are in urgent need of reconstruction. Buildings represent the largest energy end-use sector, accounting for 35.5% of electricity and 25.3% of gas consumption in Armenia (a major portion of both is consumed to cover the heating load, due to the absence/collapse of the centralized district heating system and switching to the individual heating options),³ and this sector offers the single largest and most cost-effective opportunity to improve energy efficiency: 40% of the national energy saving potential is in the buildings, an equivalent of 402,000 toe or 944,000 tCO₂e of GHG emission reductions annually.⁴ The buildings sector 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.

According to the Project Document, in 2009 the growth rate decreased by almost 40 % because of the global financial crisis; the 2010-2024 growth trend was assumed to be 2% annually in the first 4 years after the crisis and later on was supposed to grow up to 6%, linked to the anticipated GDP growth rate. The construction level of the years 2009-2013 included the residential construction that was supposed to take place under the state-supported earthquake zone restoration program.

The project contributes to the improvement of the energy efficiency regulatory normative field by its support to the development of corresponding technical regulation and concept of suggested legal/regulatory changes.

In accordance with the Action Plan of the RA Government for Implementation of National Program on Energy Saving and Renewable Energy (2010), a set of measures for legal and institutional improvements required for strengthening and development of energy efficiency approaches in urban development sector are required to be implemented by the project.

³ Ministry of Energy, Calculation Center (2006 report).

⁴ National Programme on Energy Saving and Renewable Energy of Republic of Armenia (2007).

The **relevance** of the project is, apart from the stated above, to be considered very high based on the importance of the EE topic for the Armenian government and since it addresses a number of critical barriers that impede the realization of energy efficiency improvements in the building sector:

- *Outdated building standards:* Current building codes do not explicitly address energy performance and integrated building design approach, and codes do not encourage the efficient use of energy in the buildings that are currently built. *Output 1.1* supports the revision/development of national building codes.
- *Low enforcement capacity:* Energy audits are not conducted to determine the actual performance of buildings and their compliance with building codes. *Output 1.3* supports the development of an energy passport program and the use of audits to determine the actual energy performance of buildings.
- *Immature market for EE products and services:* Outdated technologies and inefficient materials in use by a large number of construction and maintenance companies. The new building codes and building passports developed in *Component 1* will force companies to use more efficient materials. *Component 2* will also establish performance requirements and put into place a system for testing and certifying construction materials in a cost-effective way.
- *Low capacities of building sector players:* Lack of skills among building design and construction professionals that are necessary to integrate energy efficient technologies and design techniques into their work. *Component 3* will provide training for architects and engineers and *Component 4* will provide hands-on training for architects and engineers in integrated building design.

Project activity is therefore very relevant to the GEF objectives and countries development objectives and contributes to the country’s energy efficiency increasing objectives and plans.

Project relevance is rated Highly Satisfactory.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
HS					

4.1.2 Analysis of the Logical Framework

The GEF Project Results Framework (logframe) is a key basis for planning of detailed activities under the implementation framework that was defined in the Project Document. It is also used as a basis for reporting to GEF in the middle of the calendar year (end of GEF fiscal year) in a combined Annual Project Review (APR) and Project Implementation Report (PIR), together with the UNDP format for internal project management and reporting done on an annual basis (Standard Progress Reports).

The logframe shall in principle serve to monitor & evaluate the overall project achievements – based on defined targets and indicators to measure these targets. Indicative activities are related to each output and output target.

During the project inception the logical framework has been reviewed but no changes were made. So far, the targets seem quite specific in regard to its content and time of achievement (by project mid-term or end of project), although not all of the targets foreseen have been achieved by the mid-term.

The logical framework of the Project is rated as Satisfactory.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
	S				

4.1.3 Lessons from other relevant projects incorporated into project implementation

The project has worked closely since the project development phase with several other relevant projects and activities, namely with the

- World Bank/GEF Project “Armenia Energy Efficiency” to exchange experience in the rehabilitation of public buildings, and the
- EU-INOGATE Project “Energy Saving Initiative in Buildings in Eastern European and Central Asian Countries” on energy policy cooperation that is promoted as key aspect of this project between the European Union and the INOGATE Partner Countries.

Results and lessons learned from other finalized projects, such as the UNDP/GEF “Improving Energy Efficiency of Municipal Heating and Hot Water Supply”, or USAID funded project “Energy Efficiency and Renewable Energy Sources” have been incorporated partly in the project design or are have been made available to the project team.

A common initiative of UNDP-GEF Projects being implemented on Buildings Energy Efficiency in Central Asia (Kazakhstan, Kyrgyzstan, Turkmenistan, and Uzbekistan) and Armenia (www.beeca.net) is providing valuable inputs to the IEEB and sharing experiences among the countries. Majority of buildings in these countries do have a common history since they were built back in the Soviet times some 30-60 years ago and without energy efficiency considerations.

4.1.4 Country ownership/drivenness

Armenia ratified the UNFCCC on May 14, 1993 and is therefore eligible for funding from the GEF. The project was endorsed by the GEF Operational Focal Point for Armenia, Aram Harutyunyan, on 21 April 2009.

The project is fully in line 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 supports the 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), the “National Program on Energy Saving and Renewable Energy of Republic of Armenia” (adopted on January 18, 2007) and the “National Energy Efficiency Action Plan of Armenia” (adopted on November 4, 2010).

The project has been initiated and developed locally by UNDP Armenia and by local experts who were assisted by international consultants. The project receives full support from the project partners, nevertheless is facing some setbacks since there is lack of progress on adopting energy efficiency building codes. The MUD plays a key role in adopting new EE building codes and therefore needs to show stronger commitment throughout the remaining project period to achieve the results.

The country ownership and drivenness is rated **Satisfactory**.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
	S				

4.1.5 Stakeholder participation in the design phase

Project stakeholders including governmental agencies and ministries, namely Ministry of Nature Protection, Ministry of Energy and Natural Resources, Ministry of Urban Development, have been already actively involved during the project design phase.

Consultations and coordination with other international donors active in the building sector and implementing projects with a similar or complementary focus, namely the World Bank, the European Union and USAID, played an important role in project formulation, as well as in project implementation (see also 4.1.3).

Stakeholder participation in the design phase is rated **Highly Satisfactory**.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
HS					

4.1.6 Replication approach and sustainability strategy

The project document explicitly referred to replicability and sustainability strategy that were based on overcoming barriers identified in the project development phase:

- **Replication of demonstration project** because of *market pull* factors in place, such as locally-available materials and straightforward design techniques used that are also affordable and do not significantly increase the cost of buildings.
There are both demand-side and supply-side components of the replication strategy mentioned in the ProDoc:
 - On the supply side: (1) Practicing architects, who design both public and private buildings, and architecture and engineering students, that are going to be trained in IBDA techniques; and (2) Materials certification that are expected to make the energy performance of construction materials more transparent and make it easier for architects and engineers to select materials on the basis of energy performance.
 - On the demand side: (1) Close cooperation with MUD that will increase the uptake of the IBDA; (2) An awareness-raising campaign to increase the demand for buildings with lower operating costs; and (3) Stricter codes and improved enforcement will create a very strong incentive to design more efficient buildings.
- The focus on capacity building in the project to ensure the **sustainability of project results** in the following ways:
 - Strengthening the capacity of the MUD to enact more efficient building codes and enforcing the codes to result in building energy performance to be improved.
 - Strengthening the capacity of architects and engineers to design more efficient buildings to result in cost-effective techniques that these professionals will continue to use in their businesses.
 - Raising awareness of developers, real estate professionals, and homebuyers regarding the economic benefits of more-efficient housing to result in higher demand for more efficient apartments even after the awareness-raising activities have concluded.

Both, replication and sustainability strategy are well integrated into the project’s implementation approach. Replication plays a very important role in showcasing good practice in demonstration buildings (more projects implemented than planned) and so is the sustainability strategy that focusses on capacity building activities and awareness raising measures.

Replication approach and sustainability is rated **Highly Satisfactory**.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
	S				

4.1.7 Cost-effectiveness

The UNDP-GEF project budget is 1.045 mil USD. The investment costs for new buildings to be constructed with support from the project have been designed to be provided by national support (from Government of Armenia). This contribution was estimated to be 2.2 mil USD, from which 2.0 mil USD are cash contributions and 0.2 mil USD are provided in-kind.

The Project Document has calculated CO₂ abatement costs to be 2.5 USD/tCO₂, based on the total project budget of 3.395 mil USD (including in-kind co-financing), and estimated indirect project GHG emission savings of 1.35 MtCO₂eq (top-down lifecycle emission savings from buildings built in 2010-2025, i.e. up to 10 years after the project termination, with conservative assumptions on compliance rate with the new EE code).

Considering assessments that global baseline emissions in the residential sector can be avoided cost-effectively through no or low cost best-practice measures cheaper than 20 US\$/t CO₂ the project's GHG abatement costs are very low.

The designed cost-effectiveness of the project in terms of GEF costs per ton of estimated lifetime CO₂ reductions is therefore rated **Highly Satisfactory**.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
HS					

4.1.8 Linkages between the project and other interventions within the sector

- A working co-operation with the EU-funded regional project “Energy Saving Initiative in the Building Sector in Eastern Europe and Central Asia” (ESIB project of INOGATE program) was strengthened was initiated; several working meetings with ESIB project experts and consultants were held, and consent on the joint implementation of a number of activities was reached;
- Regional Environmental Center for the Caucasus (REC Caucasus) organized an array of conferences on cleaner industrial development, greener energy sector, achievements of energy efficiency projects in Tbilisi, Georgia, at which Project's experts submitted their thematic articles and made presentations;
- In the frames of broader regional cooperation between UNDP-managed GEF-funded “Improving Energy Efficiency in Buildings” projects that currently comprise a regional network, exchange of experience is ongoing on mainstreaming advanced energy efficiency oriented approaches into the current practices of building design, construction, operation and maintenance; the Project's experts took part in a line of relevant international events organized within the network and presented Armenia's respective achievements.
- UNDP-GEF Regional Project Team Meeting on Energy, Infrastructure, Technology and Transport was organized in Ashgabat, Turkmenistan (30.01-03.02.12). The Project's experts presented the main outcomes and findings of their Project's implementation.

- Cooperation opportunities with GEF-WB (IBRD) “Armenia Energy Efficiency Project” were discussed to avoid duplication of activities.
- Cooperation opportunities between the IEEB Project and Universities (YSUAC, AUA), and the Builders’ Union of Armenia were discussed. Cooperation is planned around the awareness raising and training components of the Project. E.g., the Association of Energy Efficient Windows’ Producers (APROK) of Russia jointly with the Project organized a session of their annual conference “Energy Efficient Windows-2012” in Yerevan.

Linkages between the project and other interventions within the sector are rated **Satisfactory**.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
	S				

4.1.9 Management Arrangements

The Project Management arrangements are as follows:

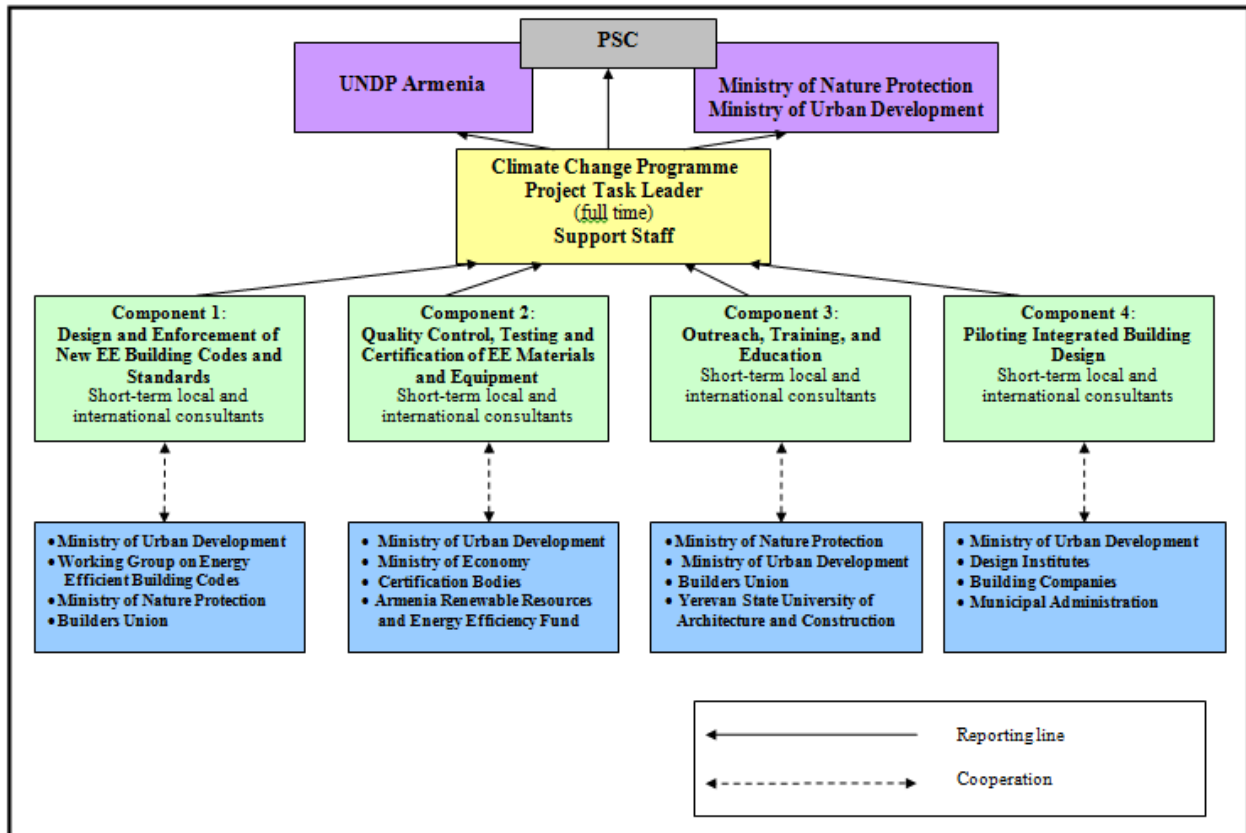
- The Project Implementation Agency is UNDP.
- The Ministry of Nature Protection and the Ministry of Urban Development are appointed to serve as Executing Agency.
- A Project Task Leader is responsible for daily management and actual implementation and monitoring of the project and is accountable to the Climate Change Program Coordinator. The project team has its project office in the premises of the Climate Change Information Center of Armenia hosted in the governmental building by Ministry of Nature Protection, i.e. outside of the UNDP country office in Armenia.
- The overall responsibility over the project is with a Project Steering Committee where ministries and governmental agencies are represented.
- UNDP Country Office Armenia is offering full support to project implementation, including administrative support as well as high level support by participation in the Steering Committee of the UNDP Resident and Deputy Resident Representatives.
- The project is implemented by the ministries MNP, MUD, MENR, and experts who are supported by international consultants.

Short-term experts hired under the project comprised:

- International Expert on Pilot Building Design
- International Expert on Curricula Development Guidance and Advice
- Local Experts on Architecture, Design, Engineering and Building Energy Audits
- Local Experts on Legal and Regulatory Aspects, Building Codes
- Local Public Outreach Expert
- Local GHG Monitoring & Evaluation Expert

The Project management structure is summarized in the figure below.

Figure 2: Project Management Organigram



The Task Leader and his project management team are doing a good job. One advantage of the given project management structure is the integration and close interaction with the MNP and MUD, since the project office is in the premises of the government building, where both ministries are located as well. Furthermore, the Task Leader maintains a good communication basis and exchange with all project partners and external stakeholders, such as municipalities and project developers, designers and implementers of demonstration buildings. The increased number of demonstrations achieved during the project implementation does not only provide a strategic advantage (visibility and replicability of project results) but is also due to strong communication with external stakeholders and management & co-ordination under the Task Leader.

Management arrangements are rated **Satisfactory**.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
	S				

4.2 Project Implementation

4.2.1 Implementation Approach

The project implementation approach contributes to the improvement of the energy efficiency regulatory normative field by its support to the development of corresponding technical regulation and concept of suggested legal/regulatory changes.

Its overall strategy and scope, i.e. promotion of building energy efficiency via legal and regulatory improvements, institutional and technical capacity development, and on-the-ground demonstration projects, remain highly relevant and bear high potential to bring about desired market transformation impact in Armenian building sector.

At the conclusion of the inception workshop, being the first major stakeholder meeting, it was stated that the project has been acceptable in terms of its implementation approach, and no modifications were needed.

Recommendations were given regarding the following issues:

- Avoid duplication of work and activities already planned under other donor assistance projects
- Consider urgency of providing support to the local EE materials producers: assisting them via product testing, certification and market penetration;
- Proper planning and implementation of the pilot project activities should be done to ensure the replicability;
- Importance of conducting trainings on EE building design and IBDA to be considered

So far, the project has been able to integrate these stakeholder recommendations into its project activities, although the activities are not to full extent implemented yet.

Project activities have been structured within four project outcomes:

- *Project outcome 1: Design and enforcement of new EE Building Codes and Standards*

Some analytical assessment reports forming the basis for recommendations on institutional and legal improvements have been developed. “Research Institute of Building Physics” from Moscow was contracted to assist in development of technical regulations and building codes. Nevertheless, there is still a lack of progress with adoption of energy efficient building codes, primarily due to external factors, which poses risks to the project and jeopardizes achievement of its development objective.

- *Project outcome 2: Quality control, testing and certification of EE materials and equipment*

A capacity assessment of laboratories involved in testing and certification of building materials and an assessment of certification procedures was conducted. Based on this, a

laboratory was selected for receiving technical assistance in the form of testing equipment and computer hardware and software provided. Together with NIISF, certification of Armenian building materials was piloted. A study tour was arranged to Moscow to strengthen capacities of partner testing laboratories, and a database of construction and insulation materials compiled.

- *Project outcome 3: Outreach, training and education on integrated building design*

The Project's experts analyzed the educational and professional development needs pertaining to energy efficient building design. Energy efficiency assessment of newly constructed buildings in RA was performed using a specifically elaborated questionnaire and a respective report format. The Project selected and contracted several companies that developed five replicable/typical designs of energy efficient individual residential houses and then compiled a catalogue of working designs. A catalogue of technical solutions for insulation of residential, public and industrial buildings' envelopes in accordance with construction norms on thermal protection of buildings was developed. Several public outreach and awareness raising materials were developed (e.g. TV spots, radio program, website, project leaflets and reports).

Six trainings and workshops on Integrated Building Design Approach and on buildings code issues were organized in Yerevan State University for Architecture and Construction. Participation of international training expert and international consultants on laboratory testing, certification and on building codes from NIISF was ensured. About 25 lecturers and over 40 Master and PhD students participated.

- *Project outcome 4: Piloting integrated building design*

In the frame of the Project, it is envisaged to demonstrate the energy saving and cost efficiency potential of integrated building design via its application to selected multi-apartment buildings.

Three demonstration projects were selected for implementation:

- New building being constructed in Akhuryan community of Shirak marz;
- New building being constructed in Goris town of Syunik marz;
- Reconstruction and thermal modernization of A1-451 KP1P/9 type existing multi-apartment building in Yerevan city.

Additionally, an energy audit and building energy monitoring was conducted at the multi-apartment building # 2 in "Mush-2" district of the city of Gyumri. This building was selected as a study object because the demonstration building in Akhuryan community is of the same construction type and lies within the same climatic zone. The results of this audit of the selected building served as a baseline for the design of the demonstration building in Akhuryan.

An energy passport was prepared for this building in Gyumri. Energy performance class of the building was set at "D" (as to IGCN 24-01-2011 "Thermal protection of buildings"), concluding that it is desirable that the building design should be reconsidered since

designing a building of that category is impermissible (according to the Armenian standard; based on the European standard EN 15217:2007, it corresponds to energy performance class G, which is used to designate building with the lowest energy performance).

Furthermore, under the project outcome 4 a no cost extension of the Project’s demonstration component as well as further promotion of energy efficiency buildings was achieved through a cooperation established with “Al Hamra Real Estate Armenia” LLC on the application of energy efficiency measures in a residential buildings’ complex currently under construction (“Cascade Hills” Project, Yerevan). Furthermore, continuous consultations were held with Armenian Missionary Association of America in the frames of ‘green building’ school construction according to Leadership in Energy and Environmental Design (LEED) standards in Yerevan city, and with “National Social Housing Association” Fund of Armenia and “Energy Saving Initiative in Buildings” (ESIB) project of INOGATE initiative of the EU in the frame of the first social housing pilot in Dilijan town.

The overall rating of implementation approach is **Satisfactory**.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
	S				

4.2.2 Effective partnerships arrangements established for implementation of the project with relevant stakeholders involved in the country

Apart from the close linkage with similar projects and initiatives in the country and the region, the Project has been already successful in arranging partnerships with stakeholders for the implementation of the project.

These include:

- For two demonstration projects (demonstration/pilot component of the Project aims at demonstration of tangible and replicable example(s) of using building energy and cost-saving potential via the energy efficient/integrated building design approach), UNDP signed three-lateral Letters of Intent:
 - with Syunik Regional Administration and Swiss Development and Cooperation Agency to construct an EE social multi-apartment building in Goris town; and
 - with Ministry of Urban Development of the RA and “Glendale Hills” CJSC (developer) to ensure EE measures implementation in multi-apartment building under construction
- The NGO “Third Nature” supported the Project’s energy audit demonstration activities in Shirak marz.

- Cooperation with Armenian Association of Real Estate Developers emerges.
- Cooperation with Builder’s Union of Armenia and Union of Architects of Armenia continues.
- Cooperation was established with “Al Hamra Real Estate Armenia” LLC on application of energy efficient approach, including signature of Letter of Intent for energy efficiency incremental activities implementation (Project contributed with consultations on insulation technologies and recommendations).
- According to Letter of Intent signed with “Glendale Hills” CJSC, continuous consultation are held regarding the demonstration building construction in Akhuryan community.
- There are continuous consultations with the Small Grants Project on building energy efficiency related issues.
- According to the agreed approaches, cooperation with EC funded “Energy Saving Initiative in Buildings” (ESIB) INOGATE project continues.
- Organization of training sessions and support with laboratory capacity building for Yerevan State University of Architecture and Construction is on-going. Organization of Extension Summer Course on Solar Architecture jointly with American University of Armenia.

Project efforts to engage with a broad range of stakeholders, such as private sector, municipal authorities and bilateral donors, EU, Swiss Government, is an excellent practice, which has delivered results and leveraged additional co-financing and mutually beneficial partnerships.

The overall rating of partnership arrangements is **Highly Satisfactory**.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
HS					

4.2.3 Monitoring and evaluation

The project is subject to standard UNDP monitoring and evaluation procedures. Project planned activities and achievements are regularly reported and approved by the Project Steering Committee. Annual Work Plans, Annual Progress Reports, and Project Implementation Reports are regularly developed and submitted for approval.

The project’s page on the CC Program web-site (nature-ic.am) is continuously updated. The web-site presents the goals, major outputs and outreach activities of the Project, lists the main partners and contractors to it. In parallel, respective information on the Project is regularly renewed on regional web-site on energy efficient buildings in Central Asia and Armenia (beeca.net) that was developed with contribution of the Project.

According to the ProDoc a Project Steering Committee (PSC) was established and comprises 11 members nominated by the corresponding agencies: MNP, MUD, MENR, ME, UNDP, UNIDO,

Armenia Renewable Resources and Energy Efficiency Fund (R2E2), Yerevan State University for Architecture and Construction (YSUAC), and the Builders Union of Armenia (BUA).

Steering Committee meetings of the Project were held in November 2011, and December 2012. Analytical reports on the Project's activities performed within 2010-2011 and within 2011-2012 were presented and endorsed by the Committee. Work plans for 2012 and 2013 were discussed/commented and approved provided that the Committee's recommendations are taken into account. Meeting minutes (in Armenian) are downloadable from the project website.

Ad hoc Inter Agency Working Group (IAWG) was established by the order of the Minister of Urban Development in November 2010, comprising from nominees from the: MUD, MNP, MENR, ME, BUA, YSUAC, R2E2, "Glendale Hills" CJSC (pilot area builder) chaired by the Deputy Minister of Urban Development. The IAWG is the body to support the inter-agency co-operation in developing construction norms and regulations for the use of modern energy-efficient construction technologies and construction materials and their mandatory enactment, as well as building professional skills and capacities for introducing the construction principles in the design of energy efficient buildings (from the design phase up to the construction and exploitation phase). The Project benefits from this working group since a regular communication basis is maintained among stakeholders to discuss the proposed legal-regulatory changes aiming at improving energy efficiency in building sector.

There were so far 4 meetings of the IAWG held in November 2010 (2 meetings), December 2011 and October 2012. Meeting minutes (in Armenian) are downloadable from the project website. During the last meeting of the IAWG, it was decided to recommend the Project to draft amendments to concrete legal acts as per the presented **draft set of measures** for legal and institutional improvements required for strengthening and development of energy efficiency approaches in urban development sector. The draft legal amendments should be submitted to the discussion of the RA Ministry of Urban Development, the RA Ministry of Energy and Natural Resources and other stakeholders. At present, drafts of respective amendments to the legal acts are being elaborated based on the Inter-Agency Working Group consultations.

The overall rating of evaluation and monitoring approach is **Satisfactory**.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
	S				

4.2.4 Financial planning and management

The project benefits from having an experienced Task Leader as well as Administrative/Financial Assistant in place that have experience in managing and administration of UNDP projects. The project is generally professionally managed and administered.

Table 3 provides an overview of the budgeted expenditures of the GEF Project of USD 1.195 million. As of end December 2012, USD 591,617, or about 51% of the GEF-funded Project budget, has been expended. Thus, more than USD 0.603 million remain in the Project budget for technical assistance, implementation of demonstration projects and other activities for the project, including USD 27,000 of unallocated funds (less than 3%).

The largest share of budget has been spent within outcome 1, less in outcome 4.

The project budget initial allocations for the Outcome 1 and Outcome 3 were underestimated (Table 3); the budget reallocations between outcomes should be done for proper planning of the activities under the mentioned Outcomes.

The spending of the budget is pretty much in plan and according to the period of implementation, as are also the results of the project delivered so far. The PMU still needs to plan on how to use the unallocated funds for scaling-up efforts for energy efficient buildings.

Financial management is rated Satisfactory.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
	S				

4.2.5 Co-financing and in-kind contributions

The project budget includes USD 2.0 million from the Government of Armenia and additionally USD 0.2 million as in-kind contribution. USD 0.15 million are funds co-financed by UNDP, which makes the whole planned co-financing contribution USD 2.35 million over the project period.

Confirmed Project co-financing to date has amounted to an estimated USD 1.98 million (by April 2013) following the actual project implementation status, with details from project partners provided in Table 4.

Additionally, the project has benefited from additionally leveraged resources of about USD 0.5 million from the Swiss Development Agency for the residential demo building being built in Goris city and private sector cash-contribution from the building developer Cascade Hills – Al Hamra Real Estate Development Armenia (USD 2.4 million) and USD 4,700 from Shincertificate LLC. Up to now, the achieved co-financing contribution is around 37% of the actually committed value of USD 5.41 million (84% of the initially committed contribution of USD 2.35 million), which is satisfactory.

Table 3: Project Budget and Expenditures (in USD)

GEF Outcome/Atlas Activity	Budget approved	Disbursement (by end 2012)					Revised budget (planned)			Total (USD)	Remaining unallocated
	from ProDoc (USD)	2010	2011	2012	Budget spent (USD)	% of budget spent	2013	2014	2015		Total (USD)
Outcome 1	137.000	22.770	36.990	51.599	111.359	60%	36.400	26.400	11.900	186.059	-49.059
Outcome 2	140.000	0	14.381	59.459	73.840	53%	47.000	11.000	8.000	139.840	160
Outcome 3	180.500	3.016	27.361	89.804	120.181	48%	55.500	48.500	28.575	252.756	-72.256
Outcome 4	600.000	28.104	110.950	78.647	217.701	47%	203.850	28.100	10.500	460.151	139.849
Project Management Unit	137.500	6.624	28.880	33.032	68.536	53%	25.200	19.268	15.600	128.604	8.896
TOTAL	1.195.000	60.514	218.562	312.541	591.617	51%	367.950	133.268	74.575	1.167.410	27.590

Table 4: Co-financing of Project Partners (in USD)

Source	Note	Amount		Amount		Amount		Amount		Amount		Total USD		
		2010		2011		2012		2013		2014/2015		planned	actual	in %
		planned	actual	planned	actual	planned	actual	planned	actual	planned	actual			
According to Project Document														
GoA (in-cash)	Akhuryan demo project	4,000	4,000	950,000	250,000	1,050,000	450,000	1,000,000		296,000		2,000,000	704,000	35%
	Goris demo project			50,000		100,000	150,000					150,000	150,000	100%
GoA (in-kind)		25,000	25,000	40,000	40,000	40,000	40,000	50,000		45,000		200,000	105,000	53%
UNDP	TRAC	30,000	29,000	30,000	29,000	30,000	27,000	30,000		35,000		150,000	85,000	57%
Additionally leveraged co-financing														
Swiss Development and Cooperation Agency	Goris demo project	10,000	10,000	180,000	160,000	310,000	330,000					500,000	500,000	100%
Private Sector (in-cash)	Cascade complex demo project					400,000	430,000	1,100,000		900,000		2,400,000	430,000	18%
	Shincert labs					4,700	4,700					4,700	4,700	100%
TOTAL		69,000	68,000	1,250,000	479,000	1,934,700	1,431,700	2,180,000	0	1,276,000	0	5,404,700	1,978,700	37%

Financial Planning Cofinancing

Co-financing (Type/Source)	IA own Financing (mill US\$)		Government (mill US\$)		Other* (mill US\$)		Total (mill US\$)		Total Disbursement (mill US\$)	
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
- Grants	0.15	0.09	2.0	0.7		0.5	2.15	1.29	1.09	0.45
- Loans/Concessional (compared to market rate)										
- Credits										
- Equity investments										
- In-kind support			0.2	0.1						
- Other (*)						0.5				
Totals	0.15	0.09	2.2	0.8		0.5	2.35	1.29	1.09	0.45

* Other is referred to contributions mobilized for the project from other multilateral agencies, bilateral development cooperation agencies, NGOs, the private sector and beneficiaries.

4.2.6 Identification and management of risks (Adaptive Management)

The following project related risk categories have been identified at the inception workshop.

Risk Category	Level	Status	Description	Manager response
Institutional	Medium	Prospective	Code enforcement will not improve sufficiently in response to project activity on training and certification in due time.	Project team would support the provision of additional incentives (real estate advertising through energy passports/labels) to the builders/developers to ensure proper enforcement.
Institutional and Organizational	Medium	Prospective	The state construction planned in demo area might be delayed/reduced or canceled.	As the project has established good information exchange with number of private developers as well, in case the risk occurs the project will ensure enough flexibility to implement the demo component in private funded building(s) construction.
Organizational	Medium	Prospective	The scheme of covering the incremental cost under the demo component might be unclear and control might be loose.	The meeting in UNDP CO Operations was organized. The organization of procurement procedure to cover the incremental cost under the Project Component 4 (demonstration of IBDA) was discussed. Further discussions will be held with representatives of the construction company to apply appropriate procurement policy.
Institutional and Technical	Low	Prospective	Technology and design principles demonstrated in pilot project will not be widely replicated in other state and/or private funded construction projects.	Project team has engaged key governmental agencies, including the MUD, as well as YSUAC, Architects and Builders Unions of Armenia to disseminate results, and promote replication in other buildings.

Some of risks mentioned above are still valid; the most obvious risks the project faces currently (at the MTE stage) can be summarized as follows.

- Energy efficiency building regulation and enforcement levels will not improve sufficiently
- Integrated Building Design will not be replicated to a large extent due to missing or low capacity of architects, designers, engineers.

- Pilot buildings will not be accomplished and implemented during project duration.
- Standards and norms for QA/QC of key building materials are not being developed with the required effort and thus quality of materials on the market are low or incoherent.
- Non-fulfillment of project target to reduce GHG emissions due to weak enforcement of EE buildings legislation and integrated design approaches in market activities

In fact, the project implementation faces currently a medium to high-level risk that is related to implementation of outcome 1 – design and enforcement of new EE Building Codes and Standards:

In 2004, the Commonwealth of Independent State's Interstate Scientific-Technical Commission on Standardization, Technical Norms and Certification in Construction (known by its Russian abbreviation *MNTKS*) voted to adopt Russia's SNiP 23-02-2003 on "Thermal Protection of Buildings" as MSN 2.04-02-2004. "MSN" is the Russian abbreviation for "Interstate Building Code." The following countries ratified MSN 2.04-02-2004: Armenia, Moldavia, Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, and Russia.

One main activity within the Project is the supposed revision and localization of the MSN 2.04-02-2004; however, the MSN was recently set under substantial revision for harmonization with EU requirements. This harmonization with EU requirements is of high importance for Armenia, since the country's approach to EU is also reflected in a need to adopt EU legislation.

As the adoption of MSN to Armenian conditions is now pending, the risk of delay or non-fulfillment in regard to legislative improvements tackling the building sector is obvious.

As a result, the Project undertook a streamlining of the energy efficiency concerns through a Technical Regulation on safety of buildings, constructions, materials, and pre-fabricates.

International and local experts and specialized organizations were involved in the development of the Technical Regulation. Completed at high professional level and scientifically substantiated, the draft Technical Regulation is currently pending response from Government of Armenia. Chapter 6 of the Technical Regulation sets up requirements for energy savings and thermal protection of buildings. These requirements are a legal basis for adoption of the Intergovernmental building codes "Thermal Protection of Buildings".

The code on "Thermal Protection of Buildings" of 2004 is being revised since 2011, the recast of the code (harmonized with EU requirements) was supposed to be provided to former CIS countries by intergovernmental scientific-technical commission for construction (MNTKS) by the end of 2012. So far, this did not happen and it's also not clear when it will be provided to the GoA.

Also recent developments indicate that the forthcoming revision of CIS code will have more lax requirements for building thermal performance, lower than existing international best practices such as EU Building Performance Directive, and lower than the earlier, 2003 version of the CIS code. As such, if indeed revised CIS code would contain less stringent building energy performance requirements, the project strategy, aiming at adaptation and adoption of the CIS code by Armenia would need to be revised and an alternative policy pathway and roadmap adopted to ensure achievement of project targets and development goals. The project should follow closely the situation with CIS code review and work out an alternative strategy, such as the proposal mentioned by the MUD to closer adhere to EU

standards (to which the GoA has anyway committed itself to) and eventually using CIS standards in parallel during a transition period. For the moment, the prospects of adoption of a building code considering improved energy efficiency standards remain a major risk. The Project during current year will support MENR in adaptation/transposition of the EPBD directive in Armenia.

Further risk imposed by delayed implementation of component 1 is related to the sustainability of the project results. Since energy efficiency is not yet mandatory anchored in the building legislation, the governmental administration is also not endowed with enforcement requirements. As a result this may impose another risk in ensuring that stakeholder commitment will be provided after the finalization of the IEEB project. The main ministry responsible for implementation of outcome 1 is MUD; however MENR should be strengthened in maintaining its coordinating role for implementation of Energy Policy of the Government, also after the project's termination. The risk can be regarded as moderate.

Other potential risks can be currently assessed as follows:

- *Delay in the schedule set for the pilot building construction:* Pilot buildings are planned to be constructed in Akhuryan in the framework of the state program on earthquake zone rehabilitation. The start of the construction was set preliminary on March 2011, but it has been delayed. In the meantime construction has started and is supposed to be finished by May 2013. Apart from this risk, the project has been able to mobilize other stakeholders and implement more demonstration projects than foreseen. The risk for non-performance in this regard is therefore low.
- *Integrated building design approach does not get sufficient uptake due to lack of understanding or replication:* capacity building activities provided are the key to replicate IBDA to decision-makers, architects & engineers, which is targeted by the project. However, the market actors have to understand and get acquainted with new concepts, which will take time and sufficient access to experienced (well-trained) experts. The risk can still be regarded as low.
- *Demonstration buildings to showcase IBDA do not have replication potential:* The Project is in continuous search of new opportunities to demonstrate benefits of energy efficient building design that requires high managerial flexibility in activity re-scoping and partner selection; e.g. negotiations are on-going for selecting typical panel-type building to perform its further energy efficient retrofit. To maintain its comprehensive approach and based on stakeholder consultations, the Project initiated development of a catalogue of replicable (typical) designs of energy efficient individual residential houses in Armenian settlements including working designs. The catalogue would promote energy efficient construction and resource saving, application of advanced construction technologies and materials, extension of design practices of energy efficient residential houses, as well as raising public awareness on the issue. In accordance with the other regional projects' experience and lessons learned, the mentioned initiative was paralleled with a technical solutions catalogue for insulation of envelopes of residential, public and industrial buildings. This would be of practical support for designers, civil engineers, specialists of other related professions and students. This risk can also be regarded as low.
- *Overall slowdown of construction activity and therefore impact GHG emission reduction estimates due to effects of international economic crisis:* this risk has already become evident from the actual development of construction activities in Armenia between 2009 and 2012, which shows already a decline and resulting baseline energy consumption and GHG emissions being lower than expected. There is

factually not much the Project can do about this development; nevertheless, the Project should maintain increased focus and also focus of project partners to achieve movement on implementation of outcome 1, as much as possible. Any further delay will adversely influence mainly the indirect GHG emission reductions attributed to the project. The risk can be considered analogous to the implementation of component 1 as high.

Adaptive management is rated Satisfactory.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
	S				

4.3 Results

The project is partially on track to achieve its development objectives. In all but one area of project work positive trends have been observed. However, the lack of progress with adoption of energy efficient building codes (component 1), primarily due to external factors, poses serious risks to the project and jeopardizes achievement of its development objective.

Overall strategy and scope of UNDP-GEF intervention, i.e. promotion of building energy efficiency via legal and regulatory improvements, institutional and technical capacity development, and on-the-ground demonstration projects, remain highly relevant and bear high potential to bring about desired market transformation impact in Armenian building sector.

Component 1: Design and enforcement of new EE building codes and standards.

The Project’s international experts’ missions to Armenia were organized in the first half of November 2010. Within the missions, the experts met main actors in the fields of building design and building codes, discussed project implementation details including building code improvement approaches and demo building EE features. International expert on building codes participated in the project’s inception seminar.

The IAWG held four meetings during the Project’s implementation and provided advisory support for further activities, especially those per buildings codes’ and relevant legal acts’ revision/improvement and enforcement of energy efficiency enhancing provisions.

The analytical report on energy efficiency related building codes’ amendment/improvement was developed, presented to the stakeholders and discussed during the Collegium in the Ministry of Urban Development on March 30, 2011. The Project’s experts further discussed the new energy efficient building codes adaptation strategy with the members of the Collegium as well as with the Ministry of Energy and Natural Resources, Ministry of Economy, and Ministry of Justice and with other project stakeholders to decide on scope of code localization/amendment. The results were submitted to the Minister of Urban Development on May 16, 2011. The final decision taken was to localize Inter-State Construction Norms (MSN) “Thermal Protection of Buildings”, for which the RA voted on September 20, 2004, in the frames of “Cooperation in construction activities” intergovernmental agreement. It is considered crucial to take into account developments/updates to be introduced by CIS interstate scientific-technical council on standardization, technical norms and certification in construction in the norms. At the same time, MUD requested to consider development of

technical regulation on “Safety of buildings and constructions, construction materials and prefabricates” (letter of July 8, 2011). The regulation was drafted, endorsed by specialized organizations, then presented to the RA MUD, and submitted to the RA Ministry of Justice for state legal expertise in September 2012. The draft was assessed positively and returned to the MUD in October 2012 for minor amendments and further submission to the RA Government. The draft was submitted to the GoA, commented and amended respectively; currently, the draft is pending response from the GoA. The mentioned regulation has a separate chapter on energy efficiency in buildings, which is making references to the corresponding building codes and standards, thus ensuring their enforcement.

Needs assessment to ensure enforcement of energy efficient legislative and normative documentation requirements in the building design, construction and operation was performed in August-October 2011. Respective recommendations on institutional and legal aspects of the issue were developed. Further, in accordance with the Action Plan of the RA Government for Implementation of National Program on Energy Saving and Renewable Energy (2010), the Project’s experts drafted a set of measures for legal and institutional improvements required for strengthening and development of energy efficiency approaches in urban development sector. On August 10, 2012, the draft was submitted for comments and recommendations to specialized organizations and to Inter-Agency Working Group (IAWG) established to ensure effectiveness of the Project’s first component implementation. The draft was then discussed at the IAWG meeting held in October 2012 and recommended for further improvement and circulation. The revised draft set of legal acts was submitted to the Ministry of Urban Development for approval in December 2012. Currently, discussions per the submitted draft are being held within the Ministry among respective departments.

Buildings’ energy audit methodology was drafted and submitted for comments and recommendations to stakeholder parties in August 2012; at present, the draft is under revision and harmonization with the Directive 2006/32/EC on energy end-use efficiency and energy services (April 2006).

“Research Institute of Building Physics” (NIISF) RAABS in Moscow was contracted to assist national team in development of technical regulations and building codes on energy efficiency and thermal protection of the buildings (Project Component 1) as well as certification and testing of construction materials energy performance (Project Component 2).

In the frames of contract with NIISF, two missions of the Consultant per this Component were arranged that included: (i) presentation and discussion of main localization principles of Technical regulations “Buildings, structures, construction materials. Safety” to the IAWG, in December 2011; and (ii) workshop on current development per MSN 2.04-02-2004 “Thermal Protection of Buildings” (about 70 participants, June 2012).

The Project cooperates actively with the Builder’s Union of Armenia on building energy efficiency issues. A summarizing article on the Project, its goals and activities was developed and published in “Architecture and Construction” journal of the Union in 2011.

Component 2: Quality control, testing and certification of EE materials and equipment.

Capacity assessment of laboratories involved in testing and certification of construction/insulation materials was conducted as was an assessment of building insulation materials certification procedures and on development of quality assurance/quality control systems in production facilities, and report containing respective recommendations were developed in 2011. Based on the findings of these assessments and on responses of stakeholder parties, a construction/insulation materials’ testing laboratory was selected as a

beneficiary for technical assistance of the Project in 2012. According to the signed Letter of Intent (LoI), the Project procures and provides testing equipment and computer hardware and software for estimation of heat transfer factor, while the laboratory at its own expense renovates the space allotted for laboratory testing and procures required auxiliary devices as listed in the respective annex to the LoI.

In the frames of contract with testing laboratory of “Research Institute of Building Physics” (NIISF) RAABS in Moscow, certification of RA-produced building envelope insulation materials and prefabricates was piloted by local certification authority (“Shincertificate” LLC) and foreign testing laboratory (NIISF). Recommendations on options of sample certification were made, including selection of approach for items subject to sample certification and selection principles and process for local and foreign certification authorities and testing laboratories to perform the sample certification. A number of working meetings and discussions were held to reveal perception of the actors and to outline main points of action. Seven types of construction insulation materials and pre-fabricates were selected and sampled for testing by the NIISF laboratory. Three of the samples were granted certificates according to the respective standards, while for the other four, to ensure that the certificates reflect their performance correctly, technical specifications (TU) development was initiated; their completion is currently underway and approval procedure will be respectively followed.

A mission of an assigned NIISF expert was organized that included a seminar-discussion was held on testing and certification of construction and insulation materials with participation of local producers’, laboratories’, certification bodies’ (over 40 participants, November 2011).

A mission of two assigned NIISF experts was arranged that included a seminar-training on international experience in testing and certification of energy performance of construction and insulation materials and pre-fabricates (about 60 participants, April 2012).

To strengthen capacities of partner testing laboratories, a study tour for their leading specialists was arranged to “Research Institute of Building Physics” (NIISF) RAABS in Moscow (November 2012). The training had several objectives: testing laboratory equipment, relations with clients, sampling, testing procedures, methodologies on thermal conductivity, density, moisture, and thermal resistance of construction materials.

The Project initiated and completed compilation of a data-base of construction and insulation materials and subsequent preparation of data-marts for visual demonstration of the physical features of the materials. The data-marts were held on to the Yerevan State University of Architecture and Construction and State Engineering University of Armenia for installation in the respective laboratories.

The Project purchased three manuals and guides on energy saving, energy efficiency and passive houses, and distributed those among specialized and educational organizations (published in RF in Russian language, total 100 copies).

Component 3: Outreach, training, and education on integrated building design

The Project’s experts analyzed the educational and professional development needs pertaining to energy efficient building design to backup further development/amendment of the university curricula and delivering training(s) for specialists. The analysis was based on the opinion study of the pre-defined target groups: students, teachers and acting professionals; the study was performed with the specifically designed questionnaire. The findings were summarized during the mission of the international consultant and finalized in the respective report.

Energy efficiency assessment of newly constructed buildings in the RA was performed using the specifically elaborated questionnaire and the respective report was developed. The report includes recommendations on (i) applicability of the building energy efficiency rating system, and (ii) technical assistance on building energy efficiency and energy saving parameter assessment for building developers and owners.

The Project selected and contracted several companies that developed five replicable/typical designs of energy efficient individual residential houses and then compiled a catalogue of working designs that would promote energy efficient construction and resource saving, application of advanced construction technologies and materials, extension of design practices of energy efficient residential houses, as well as raising public awareness on the issue in Armenia.

The Project also developed a catalogue of technical solutions for insulation of residential, public and industrial buildings' envelopes in accordance with construction norms on thermal protection of buildings that is considered highly relevant as practical support for designers, students, civil engineers, specialists of other related professions and students.

For both catalogues, an expertise of the proposed designs and solutions is arranged to ensure proper quality of the output.

In accordance with the Letter of Intent signed with the Yerevan State University of Architecture and Construction (YSUAC), laboratory equipment is procured, data-mart of construction and insulation materials is prepared and delivered, and training modules on energy efficiency are being developed for further inclusion into the respective curricula.

A mission of the international expert on development of comprehensive training program on energy efficient building design was organized in May 2012 that included two workshops: for faculty and students of YSUAC and for sector specialists/architects. The Project jointly with American University of Armenia (AUA) organized a "Solar Architecture" summer course on active and passive solar solutions in building design for acting architects and engineers (30.06-07.07.2012). The international consultant of the Project also delivered a presentation on integrated building design approach in general in the Yerevan State University of Architecture and Construction (December 2011). In total six trainings and workshops on Integrated Building Design Approach and on buildings code issues were organized in Yerevan State University for Architecture and Construction. Participation of international training expert and international consultants on laboratory testing, certification and on building codes from NIISF was ensured. About 25 lecturers and over 40 Master and PhD students participated.

In the frames of "Sustainable Energy for All" initiative, a media contest was announced on the same topic. Of media that took part in the contest in two nominations, "printed article" and "online article", two were announced as winners. The award ceremony was held on November 28, 2012, in AUA.

A documentary was produced on application of energy efficient technologies in demonstration building in Goris town of Syunik marz. About a 5-minute long film demonstrating the benefits of energy efficient technologies application on various stages of construction was broadcasted in early 2013.

To raise public awareness on energy efficiency improvement issues, a documentary on energy saving and energy efficiency was shoot and broadcasted in early 2012, a radio program was developed, and several articles and other printed materials were published (including in "Architecture and Construction" journal and "Delovoy Express" newspaper).

Among the recent developments, three social advertisements on advantages of energy performance of residential buildings were produced and broadcasted in prime-time via two of the major TV-channels of Armenia in February-March 2013. Besides, designing an array of advertising posters and a thematic calendar of year 2013 and 2014 was initiated.

Another recent development was a training for journalists held in Armenia in cooperation with ESIB INOGATE project linked to how energy efficiency in buildings issues are best reflected within mass media in writing and presentation.

Component 4: Demonstration of integrated building design

In the frame of the Project, it is envisaged to demonstrate the energy saving and cost efficiency potential of integrated building design via its application to selected multi-apartment buildings.

Improvement of energy efficiency in buildings pursues a number of practical goals: decrease in operation costs, saving of fuel and energy resources (natural gas and electricity), improvement of indoor comfort, meeting requirements of environmental protection and soundproofing. The major criteria for selection of demonstration buildings were as follows:

- Project replication potential;
- Social importance of the multi-apartment building to be constructed;
- State participation as guarantor and co-financer of the construction;
- The building's seismic safety/stability;
- The building's occupancy rate.

Subsequently, three projects were selected per the listed criteria:

- New building being constructed in Akhuryan community of Shirak marz;
- New building being constructed in Goris town of Syunik marz;
- Reconstruction/thermal modernization of A1-451 KP1P/9 type existing multi-apartment building in Yerevan city.

In application to the selected buildings, economic and environmental benefits as well as fuel and energy saving due to energy efficiency improvement measures are demonstrated. Besides, options of architectural and engineering solutions are highlighted with application of the new approaches for meeting thermal protection requirements in design and construction/reconstruction of buildings.

So far, with participation of site developers and construction companies as well as local design companies and the Project management, the Project has been actively involved in the following activities:

1. Three-lateral Letter of Intent was signed between Syunik marz administration, Swiss Development and Cooperation Agency and UNDP Armenia demonstrating a successful cooperation with international organizations and the State on social housing issues. Respective works in the demonstration building in Goris town are completed and the building is commissioned. The opening ceremony was held on December 18, 2012. This activity raised 500,000 USD of additional co-financing for the project. Besides the insulation measures, the Project implemented a set of additional ones aimed at energy efficiency improvement; the following were installed: energy saving lamps in all the apartments and entrances, automatic air inlet valves on windows for ventilation, heat allocators on all radiators to ensure apartment-level heat metering and motion sensors.

2. Three-lateral Letter of Intent on cooperation was signed between the RA Ministry of Urban Development, “Glendale Hills” CJSC and UNDP Armenia that enables the Project to implement energy efficiency improvement activities in the demonstration building in Akhuryan community of Shirak marz. The Ministry of Urban Development implements a housing program in the community. At present, construction works reached the last (the forth) storey.

For the both above-mentioned pilot buildings, energy efficient re-design was performed, incremental costs and energy consumption estimated, working design elaborated and final report developed; the corresponding contracts with construction companies were signed and the construction monitored.

3. To identify a building for energy efficient refurbishment demonstration, the Project applied to the MUD and Yerevan city Municipality. A Letter of Intent was signed between UNDP and Yerevan Municipality enabling technical support for the private developers. The retrofit/refurbishment design of the selected operating/existing building is ongoing.

4. A Letter of Intent is signed with “Al Hamra Real Estate Armenia” LLC constructing “Cascade Hills” residential complex in Yerevan city to ensure incorporation of energy efficiency measures in the construction process.

5. Cooperation was continued with the Armenian Missionary Association of America, Inc. (AMAA) which is carrying out the design and construction of a LEED certified (USA green building standard) school in Yerevan, Armenia. Several meetings were organized and held with Project experts and stakeholders, consultation provided to the AMAA technical team.

Resident opinion survey/instrumental checking was conducted by the project contractor “3rd Nature” NGO for assessment of the preferences and awareness of households on issues of energy efficiency, heat supply options, conditions and thermal-technical deficiencies of building envelopes, as well as data on energy consumption in newly settled buildings in “Mush-2” residential area of Gyumri city in 2011.

Measuring equipment necessary to perform energy audit was procured and energy audit/energy performance assessment was conducted in bld.#2 of “Mush-2” residential area in Gyumri city (the reference building) with individual data loggers (HOBOS) installed in each apartments for data collection. Based on the findings of the audit, energy passport of the building was compiled. Energy passports were prepared for demonstration buildings in Goris town and Akhuryan community. Based on the assessment of 35 newly constructed residential buildings (completed in 2011), three buildings were selected for sample energy passport preparation (to be concluded in 2013).

Monitoring and supervision visits to Gyumri, Akhuryan and Goris are organized regularly and discussions with constructor companies and the Project’s partners and beneficiaries are held. Specific monitoring of energy performance was conducted in Goris town of Syunik marz in February-March 2013; respective troubleshooting was performed.

Benefits demonstrated in pilot buildings

The table below summarizes the main benefits in terms of improving the specific energy consumption (project design versus baseline consumption) and shows as well the required energy consumption levels (for new buildings) as of the building code. The achieved energy savings through improved energy efficient building design are significant and somewhere between 55% and 68% compared to the baseline consumption.

As a result of the energy efficiency measures implemented in the Goris demo building, a

decrease in the specific consumption of thermal energy necessary for maintaining 20°C temperature (i.e. a 100% comfort level) inside the building will be almost 3-fold and equal to about 78 kWh/m² per year, whereas annual GHG emissions will decrease by about 28 tons and will equal around 17 tons per year.

The incremental cost of energy efficiency measures was estimated at 7% of the baseline cost of the building construction. As a result of the implementation of energy efficient measures the energy costs for the residents will decrease by more than 60% at the same time ensuring improved living conditions in the apartments. Decreased energy costs are especially significant as the housing is provided to socially vulnerable families who will now be able to redirect their limited family budgets to address other issues.

Project	Size (m ²)	Specific energy consumption in kWh/m ² .year			Project budget (USD)	GEF contribution (USD)
		Baseline	Project	Required		
Pilot #1: New Residential Building, Akhuryan (ongoing)	2,389	209	70	70	1,000,000	44,000
Pilot #2: New Social Housing, Goris (finalized)	813	216	82	75	650,000	37,000
Pilot #3: Residential refurbishment, Yerevan (ongoing)	2,790	171	67	58	110,000	98,000

4.3.1 Attainment of objectives, outcomes and outputs

The following table summarizes the actual outputs achieved by the Project and rates them against their initial objectives and outcomes according to the following scale:

- Full achievement of targets (green cells)
- Partial achievement of targets or full achievement expected by the end of the project (yellow cells)
- Non or poor achievement of targets (red cells)

Table 5: Rating of Project Outputs and Results

Project Strategy	Baseline	Output Target(s)	Achievement of targets as of April 2013	Rating
Global Development Objective: Reduce GHG emissions and energy consumption in the Armenian residential building sector	160 kWh/m ² year	96 kWh/m ² year	This target was initially based on the estimation of specific heat consumption of buildings. Updated baseline shows slightly different target values (185 and 111 kWh/m ² .year) but with same 60% of savings assumed.	To be achieved by the end of the Project
	Cumulative CO ₂ emission reductions from new residential buildings to be built during project lifetime (2010-2015) against the baseline	Approx. 60 ktCO ₂ eq reduced compared to the BAU scenario	The baseline emissions from residential buildings commissioned in 2011 were about 20,456 tCO ₂ eq/yr (baseline emissions have increased by 2,700 tCO ₂ eq/yr based on recalculations done)	
Output 1.1: New mandatory EE building code	Existence and substance of legally binding codes that mandate an improved level of energy performance in four climate zones of Armenia	By end of project, new codes adopted, setting mandatory energy performance targets comparable with CIS/EU standards	This is an ongoing activity. Although some progress has been achieved in regard to legislative improvement, there is still a gap to what is initially expected as project achievement, e.g. mandatory energy performance targets, which are not in place yet.	To be achieved by the end of the Project
Output 1.2 Standards and calculation methodology to assess energy performance in buildings	Standards and methodology for assessing energy performance in buildings	<ul style="list-style-type: none"> By the project midterm, audit protocols are in place By the project mid-term, guidelines for energy passport are drafted and 	First two targets were supposed to be achieved by project mid-term, however are still in development. Achievement of targets 3 & 4 is still regarded to be a challenge, however demonstration projects	To be achieved by the end of the Project

Project Strategy	Baseline	Output Target(s)	Achievement of targets as of April 2013	Rating
		<p>approved</p> <ul style="list-style-type: none"> • By the end of the project, audits are carried out in at least 50% of new buildings and buildings undergoing capital reconstruction • By the end of the project, energy passports provided for at least 50% of new buildings and buildings undergoing capital reconstruction. 	<p>have successfully showcased the benefits of having energy audits and energy passport implemented, which should be replicated to overall building sector.</p>	
<p>Output 1.3 Institutional structures, staffing, capacities and accountability for agencies in charge of code enforcement</p>	<p>Capacity of the MUD inspectorate and independent technical supervision bodies to implement and check compliance with energy efficiency codes</p> <p>Integration of EE requirements into state-funded construction and procurement activities</p>	<ul style="list-style-type: none"> • By project mid-term, code enforcement program in place. • By end of project, revision process for codes carried out or underway. • By end of project, code enforcement program reaches 50% of new and reconstructed buildings. • By end of project, EE requirements factored into all state-funded construction and procurement activities 	<p>The analytical report on energy efficiency related building codes' amendment/improvement was developed, presented to the stakeholders and results submitted to MUD on May 16, 2011.</p> <p>However, the revision of existing building code is still ongoing and it is not obvious that the mentioned code enforcement program could reach nearly to the expected target of 50% of new and reconstructed buildings.</p>	<p>To be achieved by the end of the Project</p>

Project Strategy	Baseline	Output Target(s)	Achievement of targets as of April 2013	Rating
Output 2.1: Standards for internal QA/QC developed and piloted	Demand for local testing laboratory(ies) testing/certification services	By end of project, at least one laboratory can perform testing and certification of domestic and imported construction materials such as insulation, windows, doors, and heating systems	Certification of RA-produced building envelope insulation materials and prefabricates was piloted by local certification authority (Shincertificate) and foreign testing laboratory (NIISF). 7 types of construction insulation materials and pre-fabricates were selected and sampled for testing by the NIISF laboratory. Three of the samples were granted certificates according to the respective standards	Target achieved
Output 2.2: Testing laboratory for EE products and certification	Increase in share of domestically produced EE materials in the construction market	By end of project, domestically-produced EE materials comprise at least 10-20% of the market.	The Project initiated and completed compilation of a data-base of construction and insulation materials and subsequent preparation of data-marts for visual demonstration of the physical features of the materials. As of now share of local producers is growing and is as high as about 45%	To be achieved by the end of the Project
Output 3.1: Modules on EE buildings introduced to universities	Use of Integrated Building Design Approach (IBDA) concepts in new building constructions	By end of project, all graduating architecture and civil engineering students with an emphasis on residential buildings are aware of IBDA concepts.	Six trainings and workshops on Integrated Building Design Approach and on buildings code issues were organized in Yerevan State University for Architecture and Construction. About 25	To be achieved by the end of the Project

Project Strategy	Baseline	Output Target(s)	Achievement of targets as of April 2013	Rating
			lecturers and over 40 Master and PhD students participated. The target seems not very specific, since it doesn't consider what "awareness on IBDA" really means	
Output 3.2: Training courses for architects and engineers on new codes and calculation methodologies	Use of Integrated Building Design Approach (IBDA) concepts in new building constructions	<ul style="list-style-type: none"> • By project mid-term, key experts at design institutes and in academia are using IBDA concepts. • By end of project, at least 4-5 % of buildings constructed annually apply IBDA 	The uptake of IBDA concept by academia is ensured through project activities and is starting to get slowly, but steadily introduced at relevant universities. Up to now, 6 trainings and workshops on IBDA have been organized with YSUAC with about 40 participants so far. However it's not obvious, what the share of trained experts is expected to be at the end of project. Also, the actual level of IBDA applied to new constructed buildings is currently not possible to be evaluated. Project needs to further address the training and capacity building needs within remaining project duration and monitor this progress together with project partners.	To be achieved by the end of the Project
Output 3.3: Outreach and awareness-raising campaign targeting investors and tenants implemented	Rate of application of the energy passport and label system by real estate developers	<ul style="list-style-type: none"> • By project mid-term, a majority of real estate professionals are aware of the potential benefits of 	The project has a strong communication strategy and manifold ways to disseminate project results. Nevertheless, the	To be achieved by the end of the Project

Project Strategy	Baseline	Output Target(s)	Achievement of targets as of April 2013	Rating
		<p>energy-efficient buildings and understand the energy passport and label.</p> <ul style="list-style-type: none"> By end of project, at least 10% of new residential building stock is marketed with energy passports and labels 	<p>majority of market actors is unaware of EE buildings' benefits or does not have the means or experience of applying energy efficiency measures in construction.</p> <p>The success of the project will be also rated against the availability of energy passports in new residential construction. This will require institutionalization and monitoring of passports issued through a specific Energy Auditor Institute.</p>	
<p>Output 4.1: At least one building designed and constructed using an integrated building design approach</p>	<p>Thermal performance of the demonstration building</p>	<p>By project mid-term, the building design is completed and approved by the developer and MUD.</p>	<p>One pilot project (Goris town) has been finalized and implemented by end 2012. Further projects are in development (over achievement of initial targets).</p>	<p>Target achieved</p>
<p>Output 4.2: Energy saving and GHG reductions in pilot building monitored and reported</p>		<p>By end of project, demonstration building showing at least 30% better thermal performance than the improved code and 60% better than the existing code</p>	<p>Energy performance of Goris project improved by about 65%, while incremental costs reached 8.5%. Figures increased due to extra energy efficiency measures implemented in lighting and heating systems.</p> <p>Thorough monitoring of ongoing works was performed for all demo sites in due and timely manner.</p>	<p>To be achieved by the end of the Project</p>

Project Strategy	Baseline	Output Target(s)	Achievement of targets as of April 2013	Rating
			Awareness of the Project partners and interested developers was raised via continuous consultations and support in revision of their design documents.	

Achievement of GHG emission reductions

The project objective is to reduce energy consumption and associated GHG emissions in the Armenian building sector. The Project Document provides the key assumptions used for the calculation of the project direct and indirect CO₂ emission reductions; they are summarized below:

- *Direct Emission Reductions:* The project was supposed to support investments into construction of one energy efficient building (a residential building in the “Mush-2” district in Gyumri city, under the state supported restoration program) following IBDA principles. As a result of these activities, direct emission reductions **totaling 1,209 tons of CO₂eq** were to be achieved over 20 years of the building useful lifetime.
- *Indirect Emissions Reductions:* Using the GEF bottom-up (BU) methodology, indirect emission reductions attributable to the project were estimated at **405 ktCO₂eq** calculated over 20 years of useful lifetime of the investments. This figure assumed a replication factor of 200,000 m² or 95 similar buildings (i.e. 40% of new construction by state supported programs of around 460,000 m²) using the methodology applied by this project in the demo buildings. For the rest of the country it was assumed that about 240 new buildings (10% of the projected construction in the residential segment) were to be built over 10 years after GEF project completion using the methodology applied by this project in the demo buildings.

Using the GEF top-down (TD) methodology, indirect emission reductions from new buildings constructions attributable to the project have been estimated at 1.35 million tons of CO₂eq calculated over 20 years of useful lifetime of the buildings and using a GEF causality factor 3 (60% - the GEF contribution is substantial, but modest indirect emission reductions can be attributed to the baseline). The difference between top-down and bottom-up approaches can be explained by the fact that the bottom-up estimate includes only residential buildings, whereas the top-down estimates looks at the entire new building stock (to be built over 2016-2025) and inherently reflects impacts from better code compliance, material certification etc.

Based on the actual project achievements the direct GHG emission reductions have been calculated to about 25 tons of CO₂eq per year. Since several of the targeted outputs are still in implementation or not started yet the final evaluation report will have to provide an assessment of any further direct and indirect GHG emissions avoided through the Project's activities.

The following criteria are regarded to be the key for measuring the GHG benefits as a result of project activities:

- Accuracy of baseline data: a detailed model has been developed reflecting the available level and development of construction (residential and non-residential, in m² per year) since the year 2000 (historic data) and prospects for new construction (until 2025). Based on an average total heat demand (expressed in kWh/m² and year) for residential and non-residential buildings the total heat demand and equivalent CO₂ emission reductions have been calculated.
- Improving the energy demand of buildings in new construction (and rehabilitations) based on minimum energy performance standards that are being implemented and enforced during building inspection. Monitoring of implemented demonstration projects will provide real case data and thus the opportunity to validate existing assumptions on building energy demand.
- Level of compliance with new codes and regulations (as part of enforcement as well) and its improvement over the years

- Year of implementation of new codes, regulations and IBDA in buildings, since this influences the annual penetration rate and in worst case delays the achievement of GHG emission reductions.

Although the activities are to large extent not finished and real impact can hardly be measured it is moderately likely that the project will by the end reach valuable results in terms of GHG emission reduction benefits.

It is though highly recommended that these criteria will be considered for a GHG monitoring for the remaining duration of the project and should thus be integrated into the overall monitoring activities under output 4.2. So far, the project management is doing very well in monitoring the direct GHG impact of demonstration buildings (through detailed energy monitoring) initiated through the Project; the weakness remains regarding the monitoring of indirect GHG emission reductions, since required data (either from national energy statistics or specific building statistics, e.g. level of building construction, refurbishments, building energy consumption, etc.) is not regularly updated.

Evaluation of Results

Table 6 provides an evaluation of the current outcomes of each Project output. Each output was evaluated (as far as possible at the MTE stage) against individual criteria of:

- **Relevance** - The extent to which the aid activity is suited to the priorities and policies of the target group, recipient donor, and national development priorities.
- **Efficiency** - Efficiency measures the outputs -- qualitative and quantitative -- in relation to the inputs. It is an economic term which signifies that the aid uses the least costly resources possible in order to achieve the desired results.
- **Effectiveness** - extent to which an aid activity attains its objectives.
- **Results/Impacts** – The positive and negative changes produced by a development intervention, directly or indirectly, intended or unintended. This involves the main impacts and effects resulting from the activity on the local social, economic, environmental and other development indicators.
- **Sustainability** - the extent to which the benefits of an activity are likely to continue after donor funding has been withdrawn.

Achievements of project objectives have been rated in terms of the criteria above at a six level scale as follows:

- Highly satisfactory (HS) - the project has no shortcomings
- Satisfactory (S) - minor shortcomings
- Moderately satisfactory (MS) - moderate shortcomings
- Moderately unsatisfactory (MU) - significant shortcomings
- Unsatisfactory (U) - major shortcomings
- Highly unsatisfactory (HU) - severe shortcomings.

The overall rating of the Project is Satisfactory (S), based mainly on:

- **Relevance:** the topic of EE in buildings is definitely relevant for the Armenian government and so is the design of the project. The project reflects the need of Armenia to improve energy efficiency legislation and the inadequate level of compliance with current legislation and poor enforcement, which are considered one of the main barriers to promotion of EE buildings. The project is further to showcase

good examples of new integrated building design approaches combined with building capacity of construction professionals. The project is currently facing a low level of enforcement capacity of laws and regulations to be overcome in the second phase of the project.

- **Efficiency:** Project Management is generally very well established due to strong inter-linkage with MNP as an executing agency. The good communication basis and exchange with all project partners and external stakeholders is an asset of the project, as are the increased number of demonstrations achieved during the project implementation.
- **Effectiveness:** apart from activities (outcomes) that have not yet started or have not delivered any major results, the achieved outputs have attained their objectives to a satisfactory level. The Project needs however to ensure that main outputs under component 1 will be achieved by the end of the project and uptake of further activities confirmed by the main project partners (MNP, MUD, MENR). Another aspect to be considered is increasing the effectiveness of training of architects, engineers at university. Just making students “aware” of IBDA concepts is not really a strong target. The project has a strong communication strategy and means to disseminate project results effectively through website, media and in the context of regional exchange through the network of UNDP/GEF Energy Efficiency in Buildings Projects implemented in Central Asia (beeca.net).

Table 6: Overall Evaluation of Project

Component	Relevance	Efficiency	Effectiveness	Overall
1. Design and enforcement of new EE Building Codes and Standards	HS	S	MS	S
2. Quality control, testing and certification of EE materials and equipment	S	S	S	S
3. Outreach, training and education on integrated building design	S	S	S	S
4. Demonstration of integrated building design	HS	S	S	S
Overall Rating	S	S	S	S

4.3.2 Project Impact

As of the MTE, the project has a good prospect to improve energy efficiency newly designed and rehabilitated buildings in the residential sector. It is providing a high level impact on the energy demand of one of the most relevant sectors, the building sector. This sector offers also the single largest and most cost-effective opportunity to improve energy efficiency: 40% of the national energy saving potential is in buildings. But key project results such as strengthened codes, energy performance labeling/certification for buildings and construction materials, training in integrated building design, will also benefit non-residential buildings.

However, there still is a potential for further improvement of the impact.

- Newly refined building codes need to be approved and become mandatory. Demonstration projects show that through improved design savings of at least 35%

can be achieved compared to a baseline. However, this compulsory minimum requirement level one is not energy efficient enough when compared with today's common practice even in countries in the region with similar climate. The project impact would be improved if the energy efficiency would become mandatory for all new and reconstructed buildings financed from public funds (all public buildings, including residential buildings financed with governmental support – subsidized mortgage etc.), and for all other regularly utilized buildings with a total area larger than a minimum threshold.

- Energy efficient reconstruction of existing building stock is practically none existent due to scarce sources of financing and low capacity of building owners and utilities to accept and repay loans. In this respect the focus of the project on development of an energy efficiency code for buildings and development of local capacity in Integrated Building Design is perhaps one of the most effective strategies applicable in Armenia. Such strategy has a limited impact in short term, during project implementation, due to its relatively long adoption time. However, its long term potential impact in terms of CO2 savings is substantial.
- Pilot projects being designed and constructed will provide visible impact in bringing the new IBD approach to the Armenian construction market. At this point, yet the results have to be awaited before being able to judge the quality of IBD principles being implemented.

Project impact is rated Satisfactory.

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
	S				

4.3.3 Prospects of Sustainability

The project has been designed to deliver sustainable impact since the energy efficiency legislation is to be further improved in regard to Building Energy Performance regulations and minimum energy performance standards, and capacity of enforcement and integrating building design principles to be enhanced.

This improved framework conditions being continuously developed leads the Armenian building sector into a transformation process that has already started and will be taking place over next years, since:

- EE is a high governmental priority and is backed by legislative framework in place including targets specified in Armenia's National Energy Efficiency Action Plan (from 2010)
- Armenia is committed to EU approximation which shall affect the commitment and willingness to further uptake relevant EU legislation in coming years
- Market actors are increasingly showing interest in EE; since building materials certification including testing and capacity building of accredited laboratories is being supported through the IEEB Project, and building professionals are trained on IBDA concept. Both activities shall improve the awareness and know-how of project developers, architects and engineers as well as public administration/decision-makers in achieving higher quality construction (new as well as rehabilitation of buildings). The following project achievements will create a sustainable impact of the Project:

- Successful co-operation with building developers, construction companies, designer initiated
- Demonstration projects create public interest and support residents to get involved in energy efficiency and experience the benefits through improved quality of living.
- Strong public awareness measures and manifold PR activities initiated to promote project results to wide audience (e.g. end consumers as well as professionals)
- New technologies (renewables, energy efficiency) are already introduced but need more time to get proper experience and reliability (quality of building materials and equipment)

Looking into the specific dimensions where the project is to create sustainability:

- Component 1 – design and enforcement of new EE building codes and standards, is the most relevant project outcome in terms of expected impact and sustainability. Institutional building and enforcement needs to be put in place and incentives provided to the building sector to provide a basis for long-term implementation of EE measures. This needs upfront political commitments and institutional support, which is to be maintained over the next years. Sustainability of Outcome 1 is rated Moderately Likely.
- Implementation of component 2 is focused on the QC, testing and certification of EE materials and equipment. Developing a procedure for buildings materials testing and certification will require a certain level of institutional capacity and financing of activities on an operational basis. There is therefore a slight financial risk. Sustainability of Outcome 2 is rated Moderately Likely.
- Component 3, outreach, training and education require continuous activities, outlasting the Project duration. Armenia requires an institutional backing and some long-term strategy for awareness raising among project stakeholders and target groups as well as improving capacities to promoting IBDA into the professional sector (architects and engineers, university curricula, training programmes, dissemination). However, as legislation will be further upgraded, also the institutional setting and professionals are expected to adhere to these conditions without major constraints. From the perspective of public outreach and dissemination, the Project has strong performance. Sustainability of outcome 3 is therefore rated Likely.
- Component 4, demonstrating integrated building design, requires mainly trained experts being and upfront costs to implement demonstration buildings in the short term. Sustainability of Outcomes 4 is expected to be Moderately Likely.

Rating scale includes: Likely (L): no or negligible risks, Moderately Likely (ML): moderate risks, Moderately Unlikely (MU): significant risks, and Unlikely (U): severe risks.

Project sustainability is rated Moderately Likely.

Likely	Moderately Likely	Moderately Unlikely	Unlikely
	ML		

5 Conclusions and Recommendations

5.1 Conclusions

The EE Buildings Project has been operational for about 34 months (out of planned 60 months) since it has been kicked-off, with about 51% of its TA budget expended. While there appears to be broad acceptance of most of the proposed activities and interventions of the Project, the progress of the Project to date can be characterized as follows:

- The project has made satisfactory progress so far. Achievements per Outcome 1 are not fully fit into the Project's implementation timelines due to delay in finalization and provision to the parties of the revised international building codes expected from intergovernmental scientific-technical commission for construction (MNTKS); the final version is pending since August 2011. The Project mitigated the issue via support to adoption of another document (Technical Regulation) serving as a legal basis for the codes.
- Otherwise, most of the log frame indicators were achieved in full compliance with the Work Plan. Special attention was paid to the pilot projects (Outcome 4) as it is the most complicated task. Current status is that the project will implement 5 demonstration projects (initially one planned); within one project (Goris town), a social housing development, the contracted building company performed the incremental part of the construction (energy efficiency measures). As a direct result of the project implementation, about USD 0.5 million co-financing was leveraged.
- Although the project is not 100% on track regarding implementation of EE legislation and standards, the relevance of the EE topic is high for the Armenian government and project stakeholders are principally committed to proceed with the activities they committed themselves to. Stronger co-ordination between decision-makers (e.g. through the IAWG or SC) is required in the second period to demand the necessary decisions to be made in progressing on the work programme.
- The project is overall professionally managed and administered, and has delivered some substantial results by now:
 - **Basis for legislative framework improvements on building energy efficiency has been provided:**
 - Analytical Report on energy efficiency related building codes' amendment/improvement was developed.
 - Needs assessment to ensure enforcement of energy efficient legislative and normative documentation requirements in the building design, construction and operation was performed
 - Respective recommendations on institutional and legal aspects of the issue were developed.
 - Project's experts drafted a set of measures for legal and institutional improvements required for strengthening and development of energy efficiency approaches in urban development sector. The revised draft set of legal acts was submitted to the Ministry of Urban Development for approval.
 - Buildings' energy audit methodology was drafted and submitted for comments and recommendations to stakeholder parties.
 - "Research Institute of Building Physics" (NIISF) RAABS in Moscow was contracted to assist national team in development of technical regulations and building codes on energy efficiency and thermal

protection of the buildings (Project Component 1) as well as certification and testing of construction materials energy performance (Project Component 2).

- **Quality control, testing and certification of EE materials and equipment initiated**
 - Capacity assessment of laboratories involved in testing and certification of construction/insulation materials was conducted as was an assessment of building insulation materials certification procedures and on development of quality assurance/quality control systems in production facilities
 - Based on the findings of these assessments and on responses of stakeholder parties, a construction/insulation materials' testing laboratory was selected as a beneficiary for technical assistance of the Project
 - Seven types of construction insulation materials and pre-fabricates were selected and sampled for testing by the NIISF laboratory.
 - To strengthen capacities of partner testing laboratories, a study tour for their leading specialists was arranged to "Research Institute of Building Physics" (NIISF) RAABS in Moscow (November 2012).
 - A data-base of construction and insulation materials and subsequent preparation of data-marts for visual demonstration of the physical features of the materials was prepared.
 - The Project purchased three manuals and guides on energy saving, energy efficiency and passive houses, and distributed those among specialized and educational organizations
- **Public outreach, awareness and training activities on integrated building design are on the way**
 - Educational and professional development needs pertaining to energy efficiency building design to backup further amendment of university curricula have been assessed
 - Recommendations on (i) applicability of the building energy efficiency rating system, and (ii) technical assistance on building energy efficiency were developed within an EE assessment of newly constructed buildings
 - A catalogue of working designs that would promote energy efficient construction and resource saving, application of advanced construction technologies and materials, extension of design practices of energy efficient residential houses, as well as raising public awareness on the issue in Armenia was compiled
 - Furthermore, a catalogue of technical solutions for insulation of residential, public and industrial buildings' envelopes in accordance with construction norms on thermal protection of buildings was developed
 - Public outreach activities:
 - Media contest announced under the "Sustainable Energy for All" Initiative
 - A documentary was produced on application of energy efficient technologies in demonstration building in Goris town of Syunik marz
 - A documentary on energy saving and energy efficiency was shoot and broadcasted in early 2012, a radio program was developed, and several articles and other printed materials were published

- 3 social advertisements on advantages of energy performance of residential buildings were produced and broadcasted in prime-time TV
- **Demonstration buildings to use IBDA design and construction principles are on the way**
 - Respective works in the demonstration building in Goris town are completed and the building is commissioned.
 - Project to implement energy efficiency improvement activities in the demonstration building in Akhuryan community of Shirak marz is presently ongoing, construction works reached the last (the forth) storey.
 - A Letter of Intent was signed between UNDP and Yerevan Municipality enabling technical support for the private developers. The retrofit/refurbishment design of the selected operating/existing building is ongoing.
 - A Letter of Intent is signed with “Al Hamra Real Estate Armenia” LLC constructing “Cascade Hills” residential complex in Yerevan city to ensure incorporation of energy efficiency measures in the construction process.
 - Cooperation was continued with the Armenian Missionary Association of America, Inc. (AMAA) which is carrying out the design and construction of a LEED certified (USA green building standard) school in Yerevan, Armenia.
 - The number of demo buildings has increased from 1 to 3 and the total enclosed area of the demo buildings has increased from 2,100 m² to approx. 6,500 m²
- The ability of the project to create long term impact has been partly achieved so far. Most of activities are ongoing and so are their results and achievements to be viewed in a longer perspective.
- As for the planned remaining activities need, they need to be reconsidered in terms of available resources and likeliness of timely implementation. The completion date of the Project is foreseen for May 2015. No major project delays are to be expected from today’s point of view.

5.2 Recommendations

Recommendation 1: Legislation framework has been improving, but focus is needed to achieve adoptions of new Armenian Building Code

- Delivering key movement on Outcome #1 is main target of this Project. Its success will very much determine the success of the whole project and its market transformation impact.
- Therefore, UNDP country office together with Project Management and eventually other donor partners (World Bank, USAID, EU, etc.) should maintain high-level involvement at governmental and prime ministers’ level to force the project partners to attain the agreed outputs.
- Main ministry to be addressed in implementation is MUD; however MENR should be strengthened in maintaining its coordinating role for implementation of Energy Policy of the Government by ensuring other project partners’ adherence to legal and institutional setting.

- A detailed timeframe for adoption of new building code and by-legislation shall be agreed among project partners. The project should follow closely the situation with CIS code review and work out an alternative strategy as soon as possible.

Recommendation 2: Ensure that institutional bodies to take energy efficiency forward into the market are created

- A mandatory building EE legislation is required in Armenia following international best practice, and the project should aim as much as possible in achieving it.
- Enforcement of the new building code (as soon as implemented) and other laws and regulations will be required and thus public bodies to be created/assigned with specific tasks: energy auditing/passportization, building materials and equipment labeling/certification, building inspection and design approval, etc.
- An improvement of the co-ordination between institutions carrying out energy and building related projections and statistical assessments is definitely needed. The Project is expected to support this process by providing basic assessments and studies (e.g. such as indicators and benchmarks on energy efficiency in the building sector available or survey of potential building refurbishments conducted) on which relevant institutions could build upon for developing a country building statistics and information base for building energy consumption in Armenia.

Recommendation 3: Initial project structure is still valid, however needs slight adaptations:

- The project design and implementation framework has generally been well considered and still remains valid in regard to its anticipated outputs and targets to be achieved.
- Some of the targets, however, given under initial Project Results Framework (ProDoc) need to be revised in regard to their expectations and timing. A review of the logframe has been performed and amended accordingly as a result of MTE findings and for approval of the SC.
- A budget revision to resize components with current over-spending is required.

Recommendation 4: Monitoring of GHG emission reductions to be followed-up and results visualized:

- GHG emission monitoring is to be continuously reviewed for the most relevant project outputs.
 - A detailed methodology should be developed for energy and GHG monitoring of the remaining project period, based on the results of the three pilot projects that are monitored regarding energy consumption, and for new buildings constructed according to new building code (once approved). Results from the demonstration projects' energy monitoring will be useful to improve the knowledge on actual energy consumption in buildings and what benefits are to be expected based on improved building design.
 - The energy and GHG monitoring should be continued after project termination through a suitable public entity and staff to be trained by project GHG experts.
 - Focus of the monitoring on most energy efficient buildings and promotion of best practices might motivate building developers, investors and owners, to actively cooperate during the monitoring evaluation.
 - Generally, the opportunities to monitor energy consumption data as long as possible within the project period to get more realistic picture of behavioral and technological effects on EE in buildings shall be encouraged. Minimum monitoring period is recommended to be 1 year, better 2 years. Continuous

monitoring after project termination is recommended but depending on available equipment and budget availability.

- Dissemination of evaluation results and benefits achieved is a key – The project shall focus on storytelling to visualize best-practice examples in buildings. Another possibility is to organize a competition for the most energy efficient building and results widely publicized to further attract attention of other building owners and developers/investors.
- The project has a good prospect to finalize all its key activities by its planned termination in June 2015. However, due to on-going construction of pilot buildings, there is a chance that not a whole heating season will be available for monitoring and evaluation of actual energy performance and GHG savings from constructed pilot buildings. From a current perspective, the on-going demonstration projects shall be implemented by late 2014 the latest.

A no-cost project extension until May 2016 could be required to allow monitoring and evaluating real achievements of the pilot buildings over the whole heating period.

Recommendation 5: Maintain high level of public outreach and institutionalize public awareness measures in the long term

- The Project shall maintain the high level of dissemination and public awareness creation activities throughout whole project period
- During the remaining project period, a focus shall be also given to IBDA dissemination and training at professional level. The number of training sessions shall be increased, together with an impact assessment of the effects of the training on improvement of capacities of building designers and engineers.
- Furthermore, in terms of networking and know-how exchange, the Project shall maintain its good communication basis with other on-going national (e.g. UNDP-GEF Projects being implemented on Buildings Energy Efficiency in Central Asia (Kazakhstan, Kyrgyzstan, Turkmenistan, and Uzbekistan) or projects supported by EU, World Bank etc. in Armenia) as well as regional or international projects (such as ESIB INOGATE, HFH, etc.) Partnerships with other civil society groups and professional business organizations and other relevant professional chambers and associations shall be improved/maintained to identify common synergies and create further outreach of the project.

5.3 Lessons Learned

The GEF Project has provided value added to the dynamic development of energy efficiency framework in Armenia so far by providing additional quality into the political and administrative decision-making process (e.g. IBDA, MEPS, EU Energy Service Directive and EE Directive being adapted to ARM conditions).

As a result, the following lessons learned can be drawn from the Project so far:

- Best practice from international (mainly European) approaches are a valuable input for developing EE framework in Armenia, especially with support and experience of national & international experts provided.
- Building Energy Performance regulation and corresponding implementation and enforcement in Armenia is still, although not fully implemented yet, in a very early stage. The Project needs strong focus on implementation and dissemination of

improved building codes together with training & capacity building on basically all professional levels.

- Energy efficient building codes: Continuous consultations with respective national authorities/stakeholders and international experts underpinned by timely and proper delivery of expert developments in the frames of the Project are key to area identification for further code improvement. Because elaboration of a common approach is time- and effort-consuming.
- The partnership of the Project with private sector residential building developers clearly demonstrates that energy efficiency measures in construction projects can be easily accommodated in the initial design with a proper calculation of costs and benefits. A private developer company involved in this Project agreed to implement energy efficiency measures at own expenses, after recalculation of the costs and benefits he had additional space available for selling, resulting in marketing the benefits of the operational cost reduction.
- Regarding the pilot buildings selection, a proactive communication with project developers and design companies is important to becoming informed on similar initiatives and on other eligible sites that could be used for additional pilots if necessary. Selection of a pilot site requires building-specific and up-to-date information to manage the Project's resources adequately.
- Another target group tackled by the Project are residents and building users. They are the key players in making energy efficiency in buildings work and happen and provide the biggest replication potential in terms of user behavior if becoming involved properly. Building owners and tenants need continuous information and motivation to show them how energy efficient buildings benefit their living comfort and household budgets. The Project can possibly make a difference in the long term if building users are provided with the right decision-making perspectives.
- The project provides value added in terms of publicity for energy efficiency in buildings. Nevertheless, as a result from the EE Buildings Project and other initiatives supported through development institutions such as UNDP, a lesson learned is that Armenia requires an institutional setup that ensures that energy efficiency awareness and PR activities will be carried out widely on a continuous basis (i.e. after project termination) and throughout all sectors and target groups, based on a country wide communication and awareness strategy. Such institution could be in the form of a National Energy Agency, which has been by the way, also proposed in the National Energy Efficiency Action Plan already.

6 Annexes

Annex 1: Mission Terms of Reference



TERMS OF REFERENCE

FOR

MID-TERM

EVALUATION

OF “IMPROVING ENERGY EFFICIENCY IN BUILDINGS” UNDP-GEF/00059937 PROJECT

1 Introduction

1.1 Standard UNDP-GEF M&E requirements

UNDP-GEF wishes to contract an Evaluation Expert (EE) to carry out Mid-term Evaluation (MTE) of the project “Improving Energy Efficiency in Buildings”.

The Monitoring and Evaluation (M&E) policy at the project level in UNDP-GEF has four objectives⁵:

- i) to monitor and evaluate results and impacts;
- ii) to provide a basis for decision making on necessary amendments and improvements;
- iii) to promote accountability for resource use; and
- iv) to document, provide feedback on, and disseminate lessons learned.

A mix of tools is used to ensure effective project M&E. These might be applied continuously throughout the lifetime of the project – e.g. periodic monitoring of indicators – or as specific time-bound exercises such as mid-term reviews, audit reports and independent evaluations.

In accordance with UNDP-GEF M&E policies and procedures, all projects with long implementation periods are strongly encouraged to conduct mid-term evaluations. In addition to providing an independent in-depth review of implementation progress, this type of evaluation is responsive to GEF Council decisions on transparency and better access of information during implementation.

1.2 Project Context

⁵ UNDP Evaluation Policy (web.undp.org/evaluation/policy.htm)

The project has been implemented since July 2010 and is expected to be completed in 2015. The project is nationally executed by the Ministry of Nature Protection of RA (MNP) and Ministry of Urban Development of RA (MUD) and implemented within Climate Change Program of Environmental Governance Portfolio of UNDP Armenia. The Project Steering Committee (SC) is composed of 11 members representing the MNP, MUD, UNDP, as well other governmental, educational and international organizations. The total project budget is \$3,395,000 (GEF contribution amounts to \$1,045,000 and UNDP - to \$150,000 matched by \$2,200,000 from the Armenian Government).

The project aims to decrease the average thermal energy consumption for space heating in new residential buildings in Armenia from 160 kWh/m² year in ‘business-as-usual’ scenario to 96 kWh/m² year. Thus cumulative CO₂ emission reductions from new residential buildings to be built during project lifetime will reach approximately 60 ktCO₂eq against the baseline compared to the BAU scenario.

The project’s activities are grouped by the following components:

Component 1. Design and enforcement of new mandatory EE Building Codes and Standards: methodology, institutional capacities and accountability,

Component 2. Quality control, testing and certification of EE materials and equipment: standards for internal QA/QC and testing/certifying laboratory,

Component 3. Outreach, training and education on integrated building design, including curricula improvement and professional development for architects and engineers, and outreach for investors and tenants,

Component 4. Piloting integrated building design approach: at least one building designed and constructed using an integrated building design approach and energy-saving and GHG reductions in pilot building monitored and reported.

2 Objectives of the Evaluation

The evaluation is initiated and commissioned jointly by UNDP Armenia Country Office and by the UNDP-GEF regional coordination unit in Bratislava. Mid-term evaluations are intended to identify potential project design problems, assess progress towards the achievement of objectives, identify and document lessons learned (including lessons that might improve design and implementation of other UNDP-GEF projects), and to make recommendations regarding specific actions that might be taken to improve the project. It is expected to serve as a means of validating or filling the gaps in the initial assessment of relevance, effectiveness and efficiency obtained from monitoring. The mid-term evaluation provides the opportunity to assess early signs of project success or failure and prompt necessary adjustments. To this end, the MTE will serve to:

1. Strengthen the adaptive management and monitoring functions of the project;
2. Enhance the likelihood of achievement of the project and GEF objectives through analyzing project strengths and weaknesses and suggesting measures for improvement;
3. Enhance organizational and development learning;
4. Enable informed decision-making;
5. Create the basis of replication of successful project outcomes achieved so far.

Particular emphasis should be put on the current project results and the possibility of achieving all the objectives in the given timeframe, taking into consideration the speed, at which the project is proceeding. More specifically, the evaluation should assess:

Project concept and design

The EE will assess the project concept and design. EE should review the problem addressed by the project and the project strategy, encompassing an assessment of the appropriateness of the objectives, planned outputs, activities and inputs as compared to cost-effective alternatives. The executing modality and managerial arrangements should also be judged. The EE will revise and re-assess the relevance of indicators and targets, review the work plan, planned duration and budget of the project.

Implementation

The EE will assess the implementation of the project in terms of quality and timeliness of inputs and efficiency and effectiveness of activities carried out. Also, the effectiveness of management as well as the quality and timeliness of monitoring and backstopping by all parties to the project should be evaluated. In particular, the MTE is to assess the Project Management's use of adaptive management in project implementation.

Project outputs, outcomes and impact

The EE will assess the outputs, outcomes and impact achieved by the project as well as the likely sustainability of project results. MTE should encompass an assessment of the achievement of the immediate objectives and the contribution to attaining the overall objective of the project. The EE should also assess the extent to which the implementation of the project has been inclusive of relevant stakeholders and to which it has been able to create collaboration between different partners. The EE will also examine if the project has had significant unexpected effects, whether of beneficial or detrimental character.

3 Detailed Scope of Work

The MTE expert will look at the following aspects:

3.1 Project Concept

3.1.1 Project relevance and strategy: The extent to which the project is suited to local and national development priorities and organizational policies, including changes over time as well as the extent the activities contribute towards attainment of global environmental benefits:

- a. How and why project outcomes and strategies contribute to the achievement of the expected results.
- b. Examine their relevance and whether they provide the most effective way towards results.
- c. Do the outcomes developed during the inception phase still represent the best project strategy for achieving the project objectives (in light of updated underlying factors)? Consider alternatives.
- d. Were the relevant country representatives, from government and civil society, involved in the project preparation?
- e. Does the recipient government maintain its financial commitment to the project?

3.1.2 Preparation and readiness

- a. Are the project's objectives and components clear, practicable and feasible within its timeframe?

- b. Were the capacities of executing institution and counterparts properly considered when the project was designed?
- c. Were lessons from other relevant projects properly incorporated in the project design?
- d. Were the partnership arrangements properly identified and the roles and responsibilities negotiated prior to project approval?
- e. Were counterpart resources (funding, staff, and facilities), enabling legislation, and adequate project management arrangements in place at project entry?

3.1.3 Stakeholder participation during project preparation

- a. Did the project involve the relevant stakeholders through information-sharing, consultation and by seeking their participation in the project's design?

3.1.4 Underlying Factors/Assumptions

- a. Assess the underlying factors beyond the project's immediate control that influence outcomes and results. Consider the appropriateness and effectiveness of the project's management strategies for these factors.
- b. Re-test the assumptions made by the project management and identify new assumptions that should be made
- c. Assess the effect of any incorrect assumptions made by the project

3.1.5 Project organization/Management arrangements

- a. Were the project roles properly assigned during the project design?
- b. Are the project roles in line with UNDP and GEF programme guides?
- c. Can the management arrangement model suggested by the project be considered as an optimum model? If no, please come up with suggestions and recommendations

3.1.6 Project budget and duration

- a. Assess if the project budget and duration were planned in a cost-effective way?

3.1.7 Design of Project Monitoring and Evaluation system

- a. Examine whether or not the project has a sound M&E plan to monitor results and track progress towards achieving project objectives.
- b. Examine whether or not the M&E plan includes a baseline (including data, methodology, etc.), SMART indicators and data analysis systems, and evaluation studies at specific times to assess results and adequate funding for M&E activities.
- c. Examine whether or not the time frame for various M&E activities and standards for outputs are specified.

3.1.8 Sustainability and replication strategy

- a. Assess if project sustainability and replicability strategy was developed during the project design? And assess its relevance

3.1.9 Gender perspective:

- a. Extent to which the project accounts for gender differences when developing project interventions.
- b. How gender considerations are mainstreamed into project interventions?

3.2 Project Implementation

3.2.1 Project's Adaptive Management

a. Monitoring Systems

- Assess the monitoring tools currently being used:
 - o Do they provide the necessary information?
 - o Do they involve key partners?
 - o Are they efficient?
 - o Are additional tools required?
- Reconstruct baseline data if necessary. Reconstruction should follow participatory processes and could be achieved in conjunction with a learning exercise
- Ensure the monitoring system, including performance indicators, at least meets GEF minimum requirements. Apply SMART indicators as necessary.
- Apply the GEF Tracking Tool and provide a description of comparison with initial application of the tool.

b. Risk Management

- Validate whether the risks identified in the project document and PIRs are the most important and whether the risk ratings applied are appropriate. If not, explain why.
- Describe any additional risks identified and suggest risk ratings and possible risk management strategies to be adopted
- Assess the project's risk identification and management systems:
 - o Is the UNDP-GEF Risk Management System appropriately applied?
 - o How can the UNDP-GEF Risk Management System be used to strengthen the project management?

c. Work Planning

- Assess the use of the logical framework as a management tool during implementation and any changes made to it
 - o Ensure the logical framework meets UNDP-GEF requirements in terms of format and content
 - o What impact did the retro-fitting of impact indicators, if such have on project management
- Assess the use of routinely updated work plans;
- Assess the use of electronic information technologies to support implementation, participation and monitoring, as well as other project activities;
- Are work planning processes result-based⁶? If not, suggest ways to re-orientate work planning;
- Consider the financial management of the project, with specific reference to the cost-effectiveness of interventions. Any irregularities must be noted.

d. Financial management

- Consider the financial management of the project, with specific reference to the cost-effectiveness of interventions. (Cost-effectiveness: the extent to which results have been delivered with the least costly resources possible. Also called efficacy). Any irregularities must be noted.
- Is there due diligence in the management of funds and financial audits?
- Did promised co-financing materialize? (Please fill the form on co-financing attached table 1).

e. Reporting

- Assess how adaptive management changes have been reported by the project management;

⁶ See Result-based Management Handbook
(<http://www.un.cv/files/UNDG%20RBM%20Handbook.pdf>)

- Assess how lessons derived from the adaptive management process have been documented, shared with key partners and internalized by partners.

f. Delays

- Assess if there were delays in project implementation, then what were the reasons?
- Did the delay affect the achievement of project's outcomes and/or sustainability, and if it did affect outcomes and sustainability then in what ways and through what causal linkages?

3.2.2 UNDP Contribution

- Assess the role of UNDP against the requirements set out in the UNDP Handbook on Monitoring and Evaluating for Results. Consider:
 - o Field visits
 - o Participation in Project Steering Committee
 - o Project reviews, PIR preparation and follow-up
 - o GEF guidance
 - o Skill mix
 - o Operational support
- Consider the new UNDP requirements outlined in the UNDP User Guide, especially the Project Assurance role, and ensure they are incorporated into the project's adaptive management framework
- Assess the contribution to the project from UNDP in terms of "soft" assistance (i.e. policy advice & dialogue, advocacy, and coordination) and suggest measures to strengthen UNDP's soft assistance to the project management.

3.2.3 Stakeholder Participation, Partnership Strategy

- a. Assess whether or not local stakeholders participate in project management and decision-making. Include an analysis of the strengths and weaknesses of the approach adopted by the project and suggestions for improvement if necessary;
- b. Consider the dissemination of project information to partners and stakeholders and if necessary suggest more appropriate mechanisms;
- c. Identify opportunities for stronger partnerships;

3.2.4 Implementation of replication approach;

- a. Sustainability: extent to which the benefits of the project will continue, within or outside the project scope, after it has come to an end. The evaluators may look at factors such as establishment of sustainable financial mechanisms, mainstreaming project objectives into the broader development policies and sectorial plans and economies or community production;

3.3 Project Results (Outputs, Outcomes and Impact)

3.3.1 Progress towards achievement of intended outcomes/measurement of change: Progress towards results should be based on a comparison of indicators before and after (so far) the project intervention, e.g. by comparing current conditions for development of Protected Areas management effectiveness, financial sustainability and capacity to the baseline ones.

4 Products Expected from the Evaluation

- Detailed methodology, work plan and outline;
- Mid-term evaluation report with findings;
- Lessons learned and recommendations for improvement, including recommendations for the revision of project strategy, approach, outputs and activities, if necessary;
- Recommendations for a strategy for future replication of the project approach for other types of the energy efficiency related projects, for other countries in the region;
- Description of best practices, and an “action list” in a certain area of particular importance for the project.

5 Evaluation Methodology

The project progress and achievements will be tested against following GEF evaluation criteria:

- (i) Relevance – the extent to which the activity is suited to local and national development priorities and organizational policies, including changes over time.
- (ii) Effectiveness – the extent to which an objective has been achieved or how likely it is to be achieved.
- (iii) Efficiency – the extent to which results have been delivered with the least costly resources possible.
- (iv) Results/impacts – the positive and negative, and foreseen and unforeseen, changes to and effects produced by a development intervention. In GEF terms, results include direct project outputs, short-to medium term outcomes, and longer-term impact including global environmental benefits, replication effects and other, local effects.
- (v) Sustainability – the likely ability of an intervention to continue to deliver benefits for an extended period of time after completion. Projects need to be environmentally as well as financially and socially sustainable.

The Project will be rated against individual criterion of *relevance, effectiveness, efficiency and impact/results based* on the following scale:

- Highly Satisfactory (HS): The project has no shortcomings in the achievement of its objectives.
- Satisfactory (S): The project has minor shortcomings in the achievement of its objectives.
- Moderately Satisfactory (MS): The project has moderate shortcomings in the achievement of its objectives.
- Moderately Unsatisfactory (MU): The project has significant shortcomings in the achievement of its objectives.
- Unsatisfactory (U) The project has major shortcomings in the achievement of its objectives.
- Highly Unsatisfactory (HU): The project has severe shortcomings in the achievement of its objectives.

As for *sustainability criteria* the evaluator should at the minimum evaluate the “likelihood of sustainability of outcomes at project termination, and provide a rating for this.

The following four dimensions or aspects of sustainability should be addressed:

Financial resources:

- a. Are there any financial risks that may jeopardize sustenance of project outcomes?
- b. What is the likelihood of financial and economic resources not being available once the GEF assistance ends (resources can be from multiple sources, such as the public and private sectors, income generating activities, and trends that may indicate that it is likely that in future there will be adequate financial resources for sustaining project’s outcomes)?

Socio-political:

- c. Are there any social or political risks that may jeopardize sustainability of project outcomes?
- d. What is the risk that the level of stakeholder ownership (including ownership by governments and other key stakeholders) will be insufficient to allow for the project outcomes/benefits to be sustained?
- e. Do the various key stakeholders see that it is in their interest that the project benefits continue to flow?
- f. Is there sufficient public / stakeholder awareness in support of the long term objectives of the project?

Institutional framework and governance:

- a. Do the legal frameworks, policies and governance structures and processes pose risks that may jeopardize sustenance of project benefits?
- b. While assessing this parameter, also consider if the required systems for accountability and transparency, and the required technical know-how are in place.

Environmental:

- a. Are there any environmental risks that may jeopardize sustenance of project outcomes? The evaluation should assess whether certain activities will pose a threat to the sustainability of the project outcomes. For example, construction of dam in a protected area could inundate a sizable area and thereby neutralizing the biodiversity related gains made by the project.

On each of the dimensions of sustainability of the project outcomes will be rated as follows:

- Likely (L): There are no or negligible risks that affect this dimension of sustainability.
- Moderately Likely (ML): There are moderate risks that affect this dimension of sustainability.
- Moderately Unlikely (MU): There are significant risks that affect this dimension of sustainability
- Unlikely (U): There are severe risks that affect this dimension of sustainability.

All the risk dimensions of sustainability are critical. Therefore, overall rating for sustainability will not be higher than the rating of the dimension with lowest ratings. For example, if a project has an 'Unlikely' rating in either of the dimensions then its overall rating cannot be higher than 'Unlikely'.

The evaluator(s) should develop detailed methodology and work plan for MTE during the preparatory phase of the MTE. The MTE tools and techniques may include, but not limited to:

- Desk review;
- Interviews with major stakeholders, including UNDP-GEF project implementing and executing agencies, government representatives, etc.
- Field visits to the project sites;
- Questionnaires;
- Participatory techniques and other approaches for gathering and analysis of data.

An indicative outline of the Mid-term Evaluation Report is presented below.

6 Indicative Outline of the Mid-term Evaluation Report

The key product expected from this mid-term evaluation is a comprehensive analytical report in English that should, at least, include the following contents⁷:

⁷ See UNDP Evaluation Guidance for GEF-Financed Projects (erc.undp.org)

- Executive summary (1-2 pages)
 - Brief description of the project
 - Context and purpose of the evaluation
 - Main conclusions, recommendations and lessons learned
- Introduction (2-3 pages)
 - Project background
 - Purpose of the evaluation
 - Key issues to be addressed
 - Methodology of the evaluation
 - Structure of the evaluation
- Project and its development context (3-4 pages)
 - Project start and its duration
 - Implementation status
 - Problems that the project seeks to address
 - Immediate and development objectives of the project
 - Main stakeholders
 - Results expected
- Key findings (including best practice and lessons learned, assessment of performance) (8-10 pages)
 - Project formulation
 - Project relevance
 - Implementation approach
 - Country ownership/Drivenness
 - Stakeholder participation
 - Replication approach
 - Cost-effectiveness
 - UNDP comparative advantage
 - Linkages between project and other interventions within the sector
 - Indicators
 - Management arrangements
 - Implementation
 - Financial management
 - Monitoring and evaluation
 - Execution and implementation modalities
 - Management by the UNDP country office
 - Coordination and operational issues
 - Identification and management of risks (adaptive management)
 - Results
 - Attainment of objectives
 - Prospects of sustainability
 - Contribution to upgrading skills of the national staff
- Conclusions and recommendations (4 – 6 pages)
 - Corrective actions for the design, duration, implementation, monitoring and evaluation of the project
 - Actions to follow up or reinforce initial benefits from the project
 - Proposals for future directions underlining main objectives
 - Suggestions for strengthening ownership, management of potential risks
- Lessons learned (3 – 5 pages)
 - Best and worst practices in addressing issues relating to relevance, performance and success
- Annexes

- TOR
- Itinerary
- List of persons interviewed
- Summary of field visits
- List of documents reviewed
- Questionnaire used and summary of results

The length of the mid-term evaluation report shall not exceed 30 pages in total (not including annexes).

7 Management Arrangements

The mid-term evaluation will be carried out by Mid-term Evaluation Expert. The logistical support and venue to the MTE Expert will be provided by the UNDP Armenia CO under overall supervision of Environmental Governance Portfolio Analyst and Portfolio Associate. The principal responsibility for managing this evaluation lies with UNDP Armenia.

8 Duration of the Mid-term Evaluation

It is expected to start MTE by the beginning of March, 2013 and is planned to be conducted within 12 consultancy days. The proposed period for the in-country mission to Armenia is March 2013. The assignment is to be completed no later than May 2013.

9 Duties, Skills and Qualifications of Evaluation EXPERT

International Expert

Duties and Responsibilities:

- Desk review of documents, development of draft methodology, detailed work plan and MTE outline (maximum 2-day homework);
- Debriefing with UNDP CO, agreement on the methodology, scope and outline of the MTE report (0.5 day);
- Interviews with project implementing partner (executing agency), relevant Government, NGO and donor representatives and UNDP-GEF Regional Technical Advisor (maximum 2 days);
- Field visits to the pilot project sites and interviews with on-site responsible persons (3 days);
- Debriefing with UNDP and project implementing partner (0.5 day);
- Development and submission of the first MTE report draft (maximum of 3 days). Submission due is in two weeks after the in-country mission. The draft will be shared with the UNDP CO, UNDP-GEF (UNDP-GEF RCU Bratislava) and key project stakeholders for review and commenting;
- Finalization and submission of the final MTE report through incorporating suggestions received on the draft report (maximum 1 day).

Required Qualifications and Competencies:

Minimum qualification requirements:

- Advanced university degree in Engineering, Energy Management or other related areas;
- 7 years of working experience in providing management or consultancy services to the projects in the field of energy and environment;
- Experience in monitoring and evaluating similar projects for UN or other international development agencies (at least in one project);

- Fluency in English both written and spoken;
- E-literacy.

Technical qualification criteria for short-listing:

- Higher Education
- Experience/technical knowledge:
 - a. Experience in providing management or consultancy services to energy and environment projects;
 - b. Experience in monitoring and evaluating energy and environment projects for UN or other international development agencies;
 - c. Sound knowledge in results-based management (especially results-oriented monitoring and evaluation);
 - d. Knowledge of GEF M&E guidelines and procedures;
 - e. Knowledge of the CIS region and particularly Armenia's context is an asset;
- Other skills: Technical writing skills in English

Competencies:

- Ability to critically analyze issues, find root-causes and suggest optimum solutions;
- Ability to interact with a wide range of partners: government officials, development agencies and etc.;
- Excellent team working and management skills;

CV and P11 should provide evidence on the abovementioned qualifications and competencies.

Contract Type, Duration and Payment Modality:

The consultant will be hired for maximum 12 days under Individual Contract (IC) with maximum 6 days of home work and maximum 6 days of in-country mission to Armenia.

Duty Station:

Home based with an in-country mission to Armenia.

10 List of Documents to be Reviewed

1. Project document and its annexes;
2. Project Inception Report
3. Project Annual (multiyear) Work Plans;
4. Project financial work plans (recruitment and procurement) and expenditure reports;
5. Annual/Quarter operational and progress reports;
6. 2012 UNDP-GEF Project Implementation Review (APR/PIR);
7. Minutes of the PB meetings;
8. Minutes of the stockholder meetings;
9. GEF Monitoring and Evaluation Policies⁸;
10. Handbook on planning, monitoring and evaluating for development results⁹;
11. Thematic reports of individual consultants and contractor companies;
12. Developed drafts of building codes, legislation amendment packages etc.;
13. Others upon request.

⁸ updated in 2010, www.thegef.org/gef/node/1555

⁹ web.undp.org/evaluation/handbook/index.html

11 Evaluation Policy

The evaluators should follow the major GEF principles for evaluation:

- Independence
- Impartiality
- Transparency
- Disclosure
- Ethics
- Partnership
- Competencies and Capacities
- Credibility
- Utility

The EE must be independent from both the policy-making process and the delivery and management of assistance. Therefore applications will not be considered from EE who have had any direct involvement with the design or implementation of the project. Any previous association with the project must be disclosed in the application.

If selected, failure to make the above disclosures will be considered just grounds for immediate contract termination, without recompense. In such circumstances, all notes, reports and other documentation produced by the evaluator will be retained by UNDP.

12 APPLICATION:

The application should contain a current and complete P11 with indication of the e-mail and phone contact. Shortlisted and interviewed candidates will be requested to submit a price offer of the assignment indicating: (a) the total cost (including daily fee, per diem and round-trip ticket costs) and (b) the consultancy fee per day.

UNDP applies a fair and transparent selection process that will take into account the competencies/skills of the applicants as well as their financial proposals. Qualified women and members of social minorities are encouraged to apply.

13 PAYMENT MODALITIES AND SPECIFICATIONS

(this payment schedule is indicative, to be filled in by the CO and UNDP GEF Technical Adviser based on their standard procurement procedures)

%	Milestone
50%	Following submission and approval of the 1st draft terminal evaluation report
50%	Following submission and approval (UNDP-CO and UNDP RTA) of the final terminal evaluation report

Annex 2: Mission itinerary

MISSION AGENDA

In-country mission of **Mr. Andreas Karner**, International Consultant for Mid-term Evaluation,
“Improving Energy Efficiency in Buildings” UNDP-supported, GEF-funded Project (PIMS 4245)
(01-06 April 2013)

Mission Purpose:

- Meetings and interviews at UNDP CO, Project Team, Project Implementing Partner and Responsible Parties, and Project partners.
- Field missions to Shirak and Syunik marzes: meetings and interviews with pilot project sites’ responsible persons, constructor companies and local self-government authorities.

Time	Venue	Purpose	Other Participants
01 April 2013 – Yerevan			
Early morning		<ul style="list-style-type: none"> • Arrival 	
13:00 – 14:00		<ul style="list-style-type: none"> • Transfer of required data, reports, factsheets, etc. • Desk work • Finalization of mission agenda 	<ul style="list-style-type: none"> • Mr. Vahram Jalalyan • Ms. Diana Harutyunyan, CC Related Projects Coordinator
14:00 - 15:30	UNDP CO	<ul style="list-style-type: none"> • Meeting with UNDP Environmental Governance Portfolio 	<ul style="list-style-type: none"> • Mr. Armen Martirosyan, EG Portfolio Analyst • Ms. Diana Harutyunyan, CC Related Projects Coordinator • Mr. Vahram Jalalyan
02 April 2013 – Yerevan			
09:00 - 10:00	Project office	<ul style="list-style-type: none"> • Meeting with the Project Management 	<ul style="list-style-type: none"> • Ms. Diana Harutyunyan, CC Related Projects Coordinator • Mr. Vahram Jalalyan • Ms. Rubina Stepanyan, CC Related Projects Associate • Ms. Marianna Arzangulyan, Expert Team Assistant

Time	Venue	Purpose	Other Participants
		<ul style="list-style-type: none"> Meeting with the Project Expert Team - general introduction 	<ul style="list-style-type: none"> Mr. Apres Nazaryan, National Expert on Construction Supervision Mr. Tigran Sekoyan, National Expert on energy saving assessment and QA/QS of insulation materials Mr. Artur Tsughunyan, National Expert on Energy Audit and Evaluation of Energy Potential Ms. Anna Dira, National Expert on Public Outreach Ms. Svetlana Galoyan, National Expert on institutional aspects of multi-apartment buildings Mr. Vahram Jalalyan
10:00 - 10:45	Ministry of Urban Development	<ul style="list-style-type: none"> Meeting with MUD Deputy Minister, Head of IAWG and communal department 	<ul style="list-style-type: none"> Ms. Ruzan Alaverdyan, Deputy Minister Ms. Evgenya Atayan, head of the communal department Mr. Samvel Srabyan, head of housing stock management and municipal infrastructures division Interpreter
11:00 – 11:45	Ministry of Urban Development	<ul style="list-style-type: none"> Meeting with Normative-Regulatory Department 	<ul style="list-style-type: none"> Mr. Levon Kosyan, Head of the Department Ms. Ovsanna Karapetyan, Head of the Division Interpreter
12:00 - 12:45	Ministry of Energy and Natural Resources	<ul style="list-style-type: none"> Meeting with Development Department 	<ul style="list-style-type: none"> Mr. Hrach Tsughunyan, Head of the Development Department Mr. Hayk Badalyan, Head of Energy Savings and Technical Standards Division Mr. Tigran Sekoyan Interpreter
13:00 - 14:00	LUNCH		
14:30 - 16:00	Shincertificate LLC	<ul style="list-style-type: none"> Visit to the newly opened building physics testing laboratory 	<ul style="list-style-type: none"> Mr. Alexander Vardanyan, Head of the Laboratory Mr. Mesrop Karapetyan, Specialist of the Laboratory Mr. Tigran Sekoyan Mr. Vahram Jalalyan Interpreter

Time	Venue	Purpose	Other Participants
16:30 - 17:00	Yerevan State University of Architecture and Construction	• Visit to the newly established laboratory on Energy Efficiency	• Mr. Eghiazar Vardanyan, Head of Rector staff • Mr. Ara Zakaryan, Information Technologies Coordination Division • Mr. Tigran Sekoyan • Mr. Vahram Jalalyan • Interpreter
17:30 - 18:00	Project office	Wrap-up of the day	• Mr. Tigran Sekoyan • Mr. Vahram Jalalyan
03 April 2013 – Pilot site visit: Goris town, Syunik Marz			
07:00 – 20.00	Goris town	Demonstration Building Mayor's office	Site visits demonstration building
04 April 2013 – Yerevan			
09:30 – 11:00	R2E2 office	• R2E2	• Ms. Tamara Babayan • Mr. Vahram Jalalyan • Interpreter
11:30 – 12:00	Ministry of Economy	• Meeting with Deputy Minister	• Mr. Vahram Jalalyan •
13:00 – 14:00	UNDP	• Meeting with UNDP DRR	• Mr. Vahram Jalalyan •
16:00 – 18:00	Project office	• Wrap-up of the day • Desk work	• Mr. Apres Nazaryan • Mr. Vahram Jalalyan
05 April 2013			
09:00 – 10:00	Project office	• Discussion of the pilot project in Goris and Akhuryan	•
11:00 – 12:00	Ministry of Nature Protection	• Meeting with GEF national director • Meeting with UNFCCC National Focal Point	• Mr. Simon Papyan, First Deputy Minister • Mr. Aram Gabrielyan, UNFCCC National Focal Point

Time	Venue	Purpose	Other Participants
15:00 – 16:30	Cascade Hills residential complex	<ul style="list-style-type: none"> • Meeting with Al Hamra Real Estate Armenia 	<ul style="list-style-type: none"> • Mr. Haig Puzantian, General Director • Mr. Apres Nazaryan • Mr. Vahram Jalalyan
06 April 2013 – Yerevan			
Departure			

Annex 3: List of Documents Reviewed

- Project document and its annexes;
- Project Inception Report
- Analytical Report on activities performed for the years 2010/2011 and 2012
- Project Annual (multiyear) Work Plans for 2011/2012 and 2013;
- Project financial work plans (recruitment and procurement) and expenditure reports;
- Annual/Quarter operational and progress reports;
- 2011 and 2012 UNDP-GEF Project Implementation Review (APR/PIR);
- Minutes of the PSC meetings;
- Minutes of the stockholder meetings;
- GEF Monitoring and Evaluation Policies;
- Handbook on planning, monitoring and evaluating for development results ;
- Thematic reports of individual consultants and contractor companies;
- Reports on energy audits and energy passports developed for Goris, Akhuryan and Mush2-district (Gyumri) reports
- Developed drafts of building codes, legislation amendment packages etc.;
- Communication strategy
- PR material (videos and TV spots)
- Project factsheets
- Financial reports (CDRs) for 2010 and 2011
- GHG Models and updated produced under the project implementation

Annex 4: Project Results Framework (with proposed amendments)

Intended Outcome as stated in the Country Programme Results and Resource Framework: Output 4.1.5: Innovative policies / practices for environmentally sound, energy efficient technologies and clean production developed and implemented.
Outcome indicator(s) as stated in the Country Programme Results and Resources Framework, including baseline and targets: Indicator: 1. No. of laws and legal acts promoting energy efficiency adopted. 2. No. of initiatives promoting energy efficiency developed and implemented. Baseline: Around 28% of GDP growth was ensured through construction activities; however, no EE standards were followed. Innovative EE practices have limited implications in Armenia. Target: Legal acts on promotion of energy efficiency in buildings developed and updated by the end of 2015. At least 1 building piloted under new energy efficiency approach by the end of 2015.
Programme Component (Strategic Plan 08-11): Environment and sustainable development
Partnership Strategy: Ministry of Nature Protection, Ministry of Urban Development
Project title, Atlas Award ID and Atlas Project ID: Improving Energy Efficiency in Buildings in Armenia

Project Strategy	Output Baseline		Output Indicator		Output Target	
	In ProDoc	MTE Report	In ProDoc	MTE Report	In ProDoc	MTE Report
Global Development Objective: Reduce GHG emissions and energy consumption in the Armenian residential building sector	Average thermal energy consumption for space heating in new residential buildings in Armenia	no change recommended at this time	160 kWh/m ² a	185 kWh/m ² .a	96 kWh/m ² a	111 kWh/m ² .a
	Zero reductions below business as usual (BAU) scenario.	no change recommended at this time	Cumulative CO ₂ emission reductions from new residential buildings to be built during project lifetime against the baseline	no change recommended at this time	Approx. 60 ktCO ₂ eq reduced compared to the BAU scenario	no change recommended at this time

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Project Strategy	Output Baseline		Output Indicator		Output Target	
	In ProDoc	MTE Report	In ProDoc	MTE Report	In ProDoc	MTE Report
Outcome 1: Design and enforcement of new EE Building Codes and Standards	Codes for residential buildings are limited in energy performance to minimal hygienic norms.	no change recommended at this time	Existence and substance of legally binding codes that mandate an improved level of energy performance in four climate zones of Armenia	no change recommended at this time	By end of project, new codes adopted, setting mandatory energy performance targets comparable with MSN/EU standards	no change recommended at this time
	Lack of methodology for assessing energy performance in buildings; lack of protocol for energy audits and performance certification and labeling	no change recommended at this time	Standards and methodology for assessing energy performance in buildings	no change recommended at this time	<p>By the project midterm, audit protocols are in place</p> <p>By the project mid-term, guidelines for energy passport are drafted and approved</p> <p>By the end of the project, audits are carried out in at least 50% of new buildings and buildings undergoing capital reconstruction</p> <p>By the end of the project, energy</p>	<p>By the end of the project, audit protocols are in place</p> <p>By the end of the project, guidelines for energy passport are drafted and approved</p>

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Project Strategy	Output Baseline		Output Indicator		Output Target	
	In ProDoc	MTE Report	In ProDoc	MTE Report	In ProDoc	MTE Report
					passports provided for at least 50% of new buildings and buildings undergoing capital reconstruction.	
	<p>Statistics on enforcement do not exist</p> <p>EE requirements not included</p>	no change recommended at this time	<p>Capacity of the MUD inspectorate and independent technical supervision bodies to implement and check compliance with energy efficiency codes</p> <p>Integration of EE requirements into state-funded construction and procurement activities</p>	no change recommended at this time	<p>By project mid-term, code enforcement program in place.</p> <p>By end of project, revision process for codes carried out or underway.</p> <p>By end of project, code enforcement program reaches 50% of new and reconstructed buildings.</p> <p>By end of project, EE requirements factored into all state-funded construction and procurement activities</p>	<p>By end of project, code enforcement program in place.</p>

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Outcome 2: Quality control, testing and certification of EE materials and equipment	Due to the negligible demand for the corresponding services, the laboratories have no incentives to obtain the modern equipment, thus no testing and certification of EE materials is done in country.	no change recommended at this time	Demand for local testing laboratory(ies) testing/certification services	no change recommended at this time	By end of project, at least one laboratory can perform testing and certification of domestic and imported construction materials such as insulation, windows, doors, and heating systems	no change recommended at this time
	5-10%	no change recommended at this time	Increase in share of domestically produced EE materials in the construction market	no change recommended at this time	By end of project, domestically-produced EE materials comprise at least 10-20% of the market.	no change recommended at this time
Outcome 3: Outreach, training and education	IBDA concepts are not used in the country at present	no change recommended at this time	Use of Integrated Building Design Approach (IBDA) concepts in new building constructions	no change recommended at this time	By end of project, all graduating architecture and civil engineering students with an emphasis on residential buildings are aware of IBDA concepts.	no change recommended at this time
	IBDA concepts are not used in the country at present	no change recommended at this time	Use of Integrated Building Design Approach (IBDA) concepts in new	no change recommended at this time	By project mid-term, key experts at design institutes & in academia are using	By end of project, key experts at design institutes & in

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	In ProDoc	MTE Report	In ProDoc	MTE Report	In ProDoc	MTE Report
			building constructions		IBDA concepts. By end of project, at least 4-5 % of buildings constructed annually apply IBDA	academia are using IBDA concepts.
	Energy passports and labels are not used	no change recommended at this time	Rate of application of the energy passport and label system by real estate developers	no change recommended at this time	By project mid-term, a majority of real estate professionals are aware of the potential benefits of energy-efficient buildings and understand the energy passport and label. By end of project, at least 10% of new residential building stock is marketed with energy passports and labels	By end of project, a majority of real estate...
Output 4: Demonstrating integrated building design	The standard building design used in housing developments may not comply with current building codes regarding	no change recommended at this time	Thermal performance of the demonstration building	no change recommended at this time	By project mid-term, the building design is completed and approved by the developer and MUD.	no change recommended at this time

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Project Strategy	Output Baseline		Output Indicator		Output Target	
	In ProDoc	MTE Report	In ProDoc	MTE Report	In ProDoc	MTE Report
	thermal performance				By end of project, demonstration building showing at least 30% better thermal performance than the improved code and 60% better than the existing code	