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**FINAL Report – December 2014**

Submitted to UNDP

PIMS 4134

Mid-term evaluation Report

UNDP-GEF: Improving Energy Efficiency in the Residential Building Sector of Turkmenistan

**Notes**

The findings, interpretations, and conclusions expressed in this paper are entirely those of the author. They do not necessarily represent the view of the UNDP, GEF, its affiliated organizations, or the governments they represent.

**Evaluation Team**

This Mid-Term Evaluation of the UNDP-GEF project Improving Energy Efficiency in Buildings (PIMS 4134) was carried out between 01 June and 30 September, 2014.

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

**Acknowledgements**

The author, Mr Andreas Karner, serving as an international MTE expert, would like to express his gratitude to all project stakeholders and external experts whom he has met and interviewed during the project mid-term evaluation mission in Ashgabad in July 2014 and who generously provided their views and opinions on project results and impacts.

The author would like to express his thanks specifically to Mr Rovshen Nurmuhamedov, Programme Specialist on Environment, Energy and Disaster Risk Management at UNDP, Mrs Irina Atamuradova, Project Coordinator of the UNDP-GEF project, Mr Mark Chao, International Technical Advisor and all members of the project team at the UNDP Country Office, as well as to all other interviewed parties, who provided all requested information and valuable inputs for the project evaluation. The cooperation with the project team, all project partners and UNDP Turkmenistan was effective, and the evaluator received all information requested.

# Executive Summary

## Project Summary

|  |  |
| --- | --- |
| **Project Title**  | **Improving Energy Efficiency in the Residential Building Sector of Turkmenistan** |
| UNDP Project ID (PIMS #):  | 4134 | PIF Approval Date:  | January 20, 2010 |
| GEF Project ID (PMIS #):  | 4097 | CEO Endorsement Date:  | October 17, 2011 |
| ATLAS Business Unit, Award # Proj. ID:  | 00061181 | Project Document (ProDoc) Signature Date (date project began):  | January 06, 2011 |
| Country(ies):  | Turkmenistan | Date project manager hired:  | May 1, 2012 |
| Region:  | ECA | Inception Workshop date:  | January 30, 2012 |
| Focal Area:  | Climate Change | Midterm Review completion date:  | September 30, 2014 |
| GEF Focal Area Strategic Objective:  | CC-SP1 | Planned planed closing date:  | December 2015 |
| Trust Fund [indicate GEF TF, LDCF, SCCF, NPIF]:  | GEF TF | If revised, proposed op. closing date:  | December 2016 (12 months extension) |
| Executing Agency/ Implementing Partner:  | Turkmengaz |
| Other execution partners:  |  |
| **Project Financing [[1]](#footnote-1)** | *at CEO endorsement (US$)* | *at Midterm Review (US$)\** |
| [1] GEF financing:  | 2,516,280 | 936,145 |
| [2] UNDP contribution: | 300,000 | 142,316 |
| [3] Government:  | 43,387,000 | 51,140,000 |
| [4] Other partners: |  |  |
| [5] Total co-financing [2 + 3+ 4]: | 43,687,000 | 51,282,316 |
| **PROJECT TOTAL COSTS [1 + 5]** | **46,203,280** | **52,218,461** |

## Project Objectives

The UNDP-GEF project is expected reduce greenhouse gas emissions in the residential sector in Turkmenistan by facilitating the improvement of energy management and reducing energy consumption. Under a baseline condition, the design and construction of new and the renovation and operation of existing buildings do not consider energy performance or lifetime operating costs. The proposed project will focus on improving energy efficiency in the residential sector in both new and refurbished buildings in the City of Ashgabat, where construction and refurbishment projects are common and can serve as a model for the rest of the country, with the goal of putting the residential construction sector on a lower carbon trajectory.

The project has been initially designed to:

* strengthen capacity and regulations on the design and construction of highly energy-efficient buildings,
* develop capacity at Turkmengaz and other national agencies to identify end-use energy savings in its housing stock and implement investments to reduce end-use energy consumption,
* introduce improved highly-efficient design measures to major housing designers and developers, and

replicate these measures through protocols for energy-saving measures in prototype buildings and through mainstreaming EE issues into state construction and housing policies and programs.

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 Turkmenistan to learn from experiences and best practices from countries with similar EE building projects in Central Asia (Kazakhstan, Kyrgyzstan, and Uzbekistan) and globally.

The project falls under the GEF-4 Strategic Objective CC – 1 “To promote energy-efficient technologies and practices in the appliances and buildings“. In realizing its objective of Improvement of energy management and reduction of energy consumption in the residential sector in Turkmenistan, the project will promote energy efficient technologies and practices in the country’s building sector with a focus on new and existing residential buildings.

Without the project being implemented, it is to be expected that neither new construction nor refurbishment projects would consider the energy performance of the buildings involved. Conservative estimates place the potential for savings in new buildings at a minimum of 25% and in reconstructed buildings at about 50%. However, as buildings being constructed and refurbished in a baseline case are designed and built without any attention to energy efficiency, they are effectively “locking in” patterns of energy consumption. The project is thus to overcome a set of given barriers: political and institutional and basic awareness and capacity related barriers 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 in the future 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 is structured into the following **four components**:

1. Energy efficient building codes and supporting capacity strengthening
* Strengthened requirements for building energy performance and revision of existing energy efficiency building code, introduction of building energy passports
1. Demand-Side Management : partnership with Turkmengaz
* Energy audits and DSM analysis of cost-effective potential for energy savings measures in residential buildings, and an energy efficiency investment plan developed
1. Improved design measures for major residential consumers
* Energy efficient pilot buildings: at least three newly designed and constructed energy efficient residential buildings, at least three existing residential buildings newly reconstructed to be more energy efficient and pilot buildings energy passports developed
1. Replication through training and support for policies that encourage energy efficiency
* Training of experts, information and experience disseminated and applied in at least 25 buildings

## Context and purpose of the Evaluation

This Mid-Term Evaluation (MTE) is being conducted at the request of UNDP in Turkmenistan; 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 realisation.

**Summary of achieved outputs to date**

The EE Buildings Project has been operational for about 30 months (out of planned 48 months) since it has been kicked-off, with about 36% 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 moderately satisfactory progress primarily since beginning of 2014 only. Achievements per Outcome 1 are not fully fit into the Project’s implementation timelines due to delay in progressing the finalization of the revised international building codes. The new building codes, together with the ones on *Building Climatology* and *Building Thermal Engineering* to be still developed, are waiting governmental emplacement and their enforcement in order to become effective in the market.; the final version is pending and yet unclear when the remaining building codes will be available.
* Otherwise, most of the log frame indicators are generally still on track, considering their time for finalisation throughout the remaining period of project implementation. Special attention is currently paid to the pilot projects (Component 3) as it is the most complex task involving several stakeholders from Ministry of Construction, Ministry of Communal Services and City of Ashgabad. Current status is that the project will implement 6 demonstration projects, from which 3 will be new housing developments (2 “Elite” style high-end buildings, 1 apartment block), and three building renovations (apartment blocks from different construction periods). As a direct result of the project implementation, so far about USD 0.28 million GEF co-financing (out of USD 0.8 million) was leveraged.
* Although the project is not fully on track regarding implementation of EE legislation and standards, the relevance of the EE topic is high for the Turkmen government and project stakeholders are principally committed to proceed with the activities they committed themselves to. Stronger co-ordination between decision-makers with support of the Project Management and Project Board 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:
	+ **The Basis for legislative framework improvements on building energy efficiency has been provided:**
		- Revision of four national building codes. Technical enhancements to these codes include elimination of outdated minimal levels of permitted thermal efficiency, as well as new calculation methods, new regulations on cooling efficiency, and inclusion of new documentation and rating requirements.
		- New codes to be considered for update: *Residential Buildings, Roofs and Roofing, Building Climatology, and Building Thermal Engineering.* Work on the first two codes has proceeded with only slight delays relative to the timetable set forth in the 2013 Annual Work Plan. Revised versions are scheduled to be submitted for final approval by summer 2014.
		- Revision of *Building Climatology* remains on its original timetable, with the revision process planned throughout 2014 and development of a final document to be completed by the end of the year. Work on *Building Thermal Engineering*, which is the most important of the four codes in terms of energy efficiency, has been delayed by approximately one full year because of scheduling and budgeting issues at the Ministry of Construction. Discussions about what revisions should be done on this code (or indeed, whether a whole new code on energy efficiency should be developed instead) occupied some time in 2013 as well.
		- It appears that the plans of the project and Ministry are in good order for 2014. According to the updated schedule, *Building Thermal Engineering* will be revised and a final version developed by the end of 2014. Each of the four codes will be followed by an official guidance manual intended to help building designers to understand the codes, their calculation methods, and various design solutions needed to achieve compliance. This schedule is contained both in the team’s Annual Work Plan and in the joint work plan to be submitted with a letter of agreement to the Ministry of Construction for approval.
		- Component 1, according to the Project Document, also will seek to develop and implement an energy-performance documentation system called the Energy Passport. Energy Passports, which are widely used in conjunction with building energy codes in Russia and Central Asia, are essentially standardized documents with embedded calculations to assess energy performance and demonstrate code compliance. Energy Passports also involve a rating system, based on percent deviation from code requirements for new buildings. The project is on track to fulfill its projected outputs for Energy Passports in direct conjunction with revision of *Building Thermal Engineering*, which will define the system and all its elements.
		- The project document and the Annual Work Plan for 2014 foresee the development of recommendations regarding labeling in conjunction with Passports in Turkmenistan. The purpose of energy-related labeling, ultimately, is to deliver information to market stakeholders – especially buyers and renters of buildings – so that they can distinguish among buildings in terms of their energy performance, and ultimately, favor energy-efficient buildings over inefficient ones. Empowering stakeholders with basic knowledge adds value to energy-efficient properties and thereby creates strong incentives and ideally, competition among building owners to achieve energy efficiency.
		- However, it appears that labeling of buildings is not appropriate for widespread implementation in Turkmenistan. Market conditions do not justify labeling as an instrument to create such incentives. First of all, heat, gas, and electricity are practically free for most of the population. Furthermore, the market for real estate is not so well developed as to be responsive to new information about energy performance. One possible way for labeling to be meaningful in Turkmenistan is therefore for promotion of certain showcase buildings.
	+ **Demonstration buildings to use energy efficient design and construction principles are partly on the way**
		- Respective design works in the demonstration buildings in Ashgabad are completed and the building is commissioned.
		- Letter of Agreement has been signed with the Ministry of Construction and Architecture to implement Joint Action Plan for revision of building codes and development of guidance manuals to building codes.
		- Letter of Agreement has been also signed with the Municipality of Ashgabad (Department of Capital Construction) and the State Corporation “Turkmen Oil and Gas Construction” concerning the application of energy efficiency measures in the construction of pilot buildings.
		- Demonstration buildings for development of energy management plan were selected and agreed upon with Ministry of Communal Services. The buildings were inspected, and the availability of energy meters analyzed.
		- Co-financing was committed by State Corporation “Turkmengas” for more 800 thousand gas meters in residential buildings. This will help to initiate a broad metering programme in residential buildings in the future.
	+ **Public outreach, awareness and training activities on integrated building design are on the way**
		- Training on energy efficient design, engineering equipment and maintenance of energy efficient buildings was delivered for forty architects and engineers.
		- Further educational and professional development needs pertaining to energy efficiency building design to backup further amendment of university curricula to be assessed
		- Recommendations on (i) applicability of the building energy efficiency rating system, and (ii) technical assistance on building energy efficiency can be seen as elements to foster EE assessment of newly constructed buildings.
		- Regular communication on project activities was established with high-level officials at Ministry of Construction and Architecture, Ministry of Communal Services, Municipality of Ashgabat, and leading design agencies.
		- Lesson learned reports of similar projects were studied. Recommendations to include energy efficient aspects to the tendering requirements of residential buildings were developed and delivered to the Cabinet of Ministers of Turkmenistan.
		- Public outreach activities:
			* Presentation of energy efficient measures and energy savings potential of new and renovated pilot buildings made at the Conference within International Construction Exhibition in Ashgabat in August 2013
			* Project folder and general information material about the project activities were developed and distributed.
			* The project is part of the common initiative of UNDP-GEF Projects being implemented on Buildings Energy Efficiency in Central Asia (Kazakhstan, Kyrgyzstan, Turkmenistan, and Uzbekistan) and Armenia published on the website ([www.beeca.net](http://www.beeca.net)). The network is providing valuable inputs to the EE building design and sharing experiences among the countries.
* 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 initially foreseen to be December 2015. There are some significant delays expected for the finalization of the pilot projects from today’s point of view, which make an extension of the project duration useful, especially in respect to monitoring results and achievements in terms of energy savings, and impact on user comfort.

## 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 Moderately Satisfactory (MS)****, based mainly on:*

* ***Relevance***: the topic of EE in buildings is very relevant for the Turkmen government and so is the design of the project. The project reflects the need of Turkmenistan to improve energy efficiency regulations and standards for the building sector and the inadequate level of compliance of housing construction with a specific view on their energy performance. The project is further about to prepare the grounds for building energy passportisation and/or labeling of residential buildings, including methodology of building energy performance calculation and compliance responsibilities and institutional and regulatory setup for enforcement of such scheme. Although the international technical advisor and project team do not see labelling schemes appropriate for widespread implementation in Turkmenistan, showcasing energy performance documentations in pilot projects does make sense and will empower stakeholders with basic knowledge that adds value to energy-efficient properties and thereby creates strong incentives and ideally, competition among building owners to achieve energy efficiency.

Nevertheless, the new building codes, together with the ones on *Building Climatology* and *Building Thermal Engineering* to be still developed (by the way the most important ones in setting thermal requirements of buildings), are waiting governmental emplacement and their enforcement in order to become effective in the market. In the meantime, the project is to showcase good examples of energy efficiency building design in new and existing buildings combined with energy management and auditing elements (e.g. metered consumption and monitoring of gas and electricity consumption in buildings). The simple goal is to show how reading meters and possibly other data can lead to improved management of energy consumption. Notably, it is expected that such an approach will fit neatly with major initiatives on installation of meters, recently launched in Turkmenistan based on strong direct expressions of support for energy efficiency and metering from the President’s Office. Furthermore, aside from education and communication efforts to be implemented by the project team itself, the project will also develop new programs on energy efficiency to be implemented officially as part of instruction for students at the Turkmen State Institute for Architecture and Construction (TSIAC).

* ***Efficiency:*** Project Management is generally well established with an acknowledged project manager and a core team of key technical experts and international advisors.

Irina Atamuradova, Low-emission Development Component Manager at UNDP Turkmenistan, is serving as manager of the project – defining overall strategic directions, supervising three national experts responsible for project components, and overseeing the creation and implementation of work plans. She is performing these responsibilities with distinction. As both a manager and a strategist, she is a very strong asset of the project.

Ms. Atamuradova has noted that national partners and the national expert component leaders – while surely congenial, reliable, and technically very competent – have shown, to varying extents, rather weak initiative and incomplete understanding of project components. To address these shortcomings, Ms. Atamuradova has emphasized the importance of defining very clear, detailed, step-by-step work plans and timetables for each component leader. She herself has required each of the experts, in close conjunction with relevant national partners to prepare draft plans for 2014, which she has integrated into a single document and thoroughly reviewed. The full Annual Work Plan for the project was submitted to UNDP management around 20 January.

The project has also prepared letters of agreement elaborating expected commitments and timetables from key national partners (Ministry of Construction and Architecture, Ministry of Communal Affairs, Municipality of Ashgabat, the State Corporation “Turkmen Oil and Gas Construction” and the Turkmen State Institute of Architecture and Construction). These letters have been accepted in principle but to date, Ministry of Communal Affairs and TSIAC haven’t signed their letters yet.

* ***Effectiveness***: To a large extent, problems of mismatched interests between the project and its national partners have arisen from the Project Document, which foresaw a very large role for the state concern Turkmengaz but presented the roles of other partners with less clarity. Indeed, Turkmengaz remains the named national executing partner of the project and has been reliable and supportive. It has a certain amount of influence within Turkmenistan, and is well funded. However, for the vast majority of policy and programs in the building sector, the Ministry of Construction (for new buildings) and the Ministry of Communal Services (for existing buildings) bear primary responsibility in Turkmenistan, which in turn receive their budgets and policy mandates from the Cabinet of Ministers.

Therefore, success in the project depends on support from these two ministries and the Cabinet. However, for much of the project period, such support has fallen short of required levels, especially from the Ministry of Communal Services. During the inception phase of 2012 and 2013, the project faced difficulties and delays across all of its key technical components. The delays arose in large part because the timetables and annual budgets of government partners did not match with the planned activities of the project. It is highly urgent, therefore, for the project to make significant progress in all areas in the remaining implementation period. Fortunately, it appears that the project and all of its partners have come to agreement on essentially all key plans, and the team is on target for fulfillment of an ambitious, highly detailed 2014 Annual Work Plan. This is already a significant progress compared to the previous years and will hopefully allow the project to deliver results.

As for the output themselves, the project has made good progress in key areas, in close correspondence with the 2013 and 2014 Annual Work Plans, most notably:

* Completion of revisions to the building codes “Residential Buildings” and “Roofs and Roofing” as well as associated guidance manuals, submitted on time to Ministry of Construction and Architecture in Q4 2013;
* Selection of 22 buildings in nine cities for energy audit, with installation of gas meters and hiring of a contractor, with completion due on time in Q3 2014;
* Completion of design work and initiation of construction of two new pilot EE residential buildings (9-storey, 54-unit and 12-storey 114-unit), with entry into operation due on time in Q4 2014 (third new building also remains on appointed timetable) and Q1 2015.

But implementation of other outputs has already lagged or is under threat of delay because of insufficient availability, slow responses, or absent permissions from national partners:

* Selection of authorized national organization for revision of codes “Building Thermal Engineering” and “Building Climatology” completed in Q2 2014, one quarter later than 2014 work plan. The 2014 work plan itself represents a departure from the 2013 work plan, which called for the submittal of the code to the Ministry of Construction for adoption already by the end of 2013. The reason for the delay is the unclear responsiveness for several months, and ultimately the unavailability of the thermal code’s original author, Turkmenkommuntaslama, which required engagement of a new authorial group at Turkmendovlettaslama.
* Completion of three pilot renovation projects originally scheduled for Q3 and Q4 2013, but then shifted to Q3 and Q4 2014 because of absence of necessary permissions and financing from Ministry of Communal Services. Formal Ministry approval still pending. High risks of delay for start of construction renovation on time in Q3 2014.
* Training and development of educational materials has been delayed with the delay in implementation of the renovation demonstration projects.
* Despite numerous contacts and meetings with project staff, Turkmen State Institute of Architecture and Construction has not approved collaboration on introduction of new EE curricula. Shortly before the mission of the MTE consultant TSIAC has obviously decided to sign the Letter of Agreement with UNDP; this message was conveyed during the meeting with MTE consultant and project manager in July 2014.
* The Project does not have an effective communication and awareness plan. Lack of involvement of educational institutes as TSIAC to upgrade existing tertiary education system hasn’t shown results so far. General awareness on energy and energy efficiency requirements is at overall very low, and the project has not had a clear strategy yet to tackle this issue.

As a result of these delays or shortcomings, there is still moderate risk that some of the major project outputs may not be achieved as expected or within the given timeline of the project.

**The overall evaluation of project results in respect to the above mentioned criteria is therefore to be rated as Moderately Satisfactory (MS).**

**Table 1: Overall Evaluation of Project**

Table 10: Overall Evaluation of Project

| **Component** | **Relevance** | **Efficiency** | **Effective-ness** | **Overall** |
| --- | --- | --- | --- | --- |
| 1. Energy consumption in new buildings is reduced beyond current requirements
 | HS | MS | MS | MS |
| 1. Turkmengaz and other national agencies understand the potential for savings in its housing stock and have the capacity to identify and undertake investments in energy efficiency there.
 | S | S | MS | S |
| 1. Energy-efficient design and technologies are incorporated and visually demonstrated in new and reconstructed residential buildings.
 | S | MS | MS | MS |
| 1. Replication facilitated via development of skills, prototype designs and policies for energy efficient buildings
 | MS | MS | MU | MS |
| **Overall Rating** | **S** | **MS** | **MS** | **MS** |

**Table 2: Summary Rating of the Project Implementation**

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

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



**Summary of main Recommendations:**

**Recommendation 1: Legislation framework has been developing with the support of the Project, but focus is needed to achieve government adoptions of new Turkmen Building Code and linking it with an investment planning and new national strategy on energy efficiency in buildings.**

* Delivering key movement on Outcome #1 is one of the main targets of this Project. Its success will very much determine the success of the whole project and its future market transformation impact in providing the path for a more energy efficient construction regime in the country.
* Therefore, UNDP country office together with Project Management should maintain high-level involvement at governmental and prime ministers’ level to force the project partners to attain the agreed outputs. For instance, providing government stakeholders with a clear idea about the need for improving the energy efficiency performance of the country’s building sector is seen crucial. A major driving point might the fact that based on increased efficiency on the domestic market it will be possible in the long-run to sell more natural gas to foreign countries – with a main advantage to increase the comfort of living of the own population.
* An effective implementation and enforcement mechanism to apply the new building codes on the construction market will be the key for success. A detailed timeframe for adoption of new building code, technical standards (GOSTs) and supporting manuals will depend on the Government and the speed at which the proposed codes will be finally approved and become effective in the country. UNDP support and intervention on higher level (e.g. Cabinet of Ministers) should be proactively sought to better engage among all project partners and beneficiaries on government level (mainly the involved ministries and design institutes).
* Furthermore, the project should follow closely the situation with the review of other EE building codes in the region and learn from best-practice implemented in other countries.
* Perhaps the most important part of Component 2 is the **development of investment plans for increasing energy efficiency in buildings in Turkmenistan**. As articulated in the project document, this part of Component 2 calls for the project to assist Turkmengaz in developing a demand-side management (DSM) program for energy efficiency in the building sector. If Turkmengaz reduces the volume of gas it supplies for free to domestic consumers, then it will have more gas to export at world market prices. Thus, Turkmengaz apparently has a strong incentive to pursue energy efficiency. Given all this, Turkmengaz can be a partner, but ultimately, a meaningful investment program requires approval at the Cabinet level and implementation in buildings at the Ministry level.
* The government needs to create and approve a plan for annual allocation of state budget funds for energy efficiency in buildings, especially with regard to existing building stock.  This allocation should be spent mostly on actual measures to improve efficiency in real buildings – insulation, windows, enclosed entryways, better controls, solar protection, better water heaters and other equipment, etc.  The scale of this program should be large, ideally covering the country’s entire building stock over the course of, say, two decades.
* The project’s role is to provide the technical basis for identifying what measures should be included.  This technical basis would come primarily from energy audits, as well as other research on best available technology and practices.  Then the project would also help to elaborate and justify the annual allocation of budget funds, probably through the work of a hired consultant on economic analysis.
* The planned output for this activity shall be a comprehensive set of recommendations by the project team, which would form the basis of a national plan, plus follow-up support for refinement of the plan itself.

**Recommendation 2: Ensure that institutional bodies to take energy efficiency forward and market awareness is created in the longer term**

* A mandatory building EE legislation considering minimum energy performance standards is required in Turkmenistan (similar to other countries in the region) 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 (by-)laws and regulations will be required and thus public bodies to be created/assigned with specific tasks; although this development is at very early stage in Turkmenistan so far and will need more time and efforts to create basic awareness among governmental and institutional stakeholders, building design and construction experts acting on the market, and the general public (mainly residents and users of buildings). Challenges laying ahead are related to the adoption of appropriate energy auditing/passportization mechanism, energy monitoring and performance-based billing systems, building materials and equipment labelling/certification, building inspection and design approval mechanisms.
* Basic assessments and information on the energy use in buildings (not only residential, but also public and private service buildings) will be required to better understand the quantitative and qualitative use of energy in buildings across different building types (and also old and new buildings). The level of information is quite weak and initial baseline assessments are being conducted within the Project through a set of energy audits in selected buildings; without such basic analysis, strategies to utilize the potential of energy efficiency conditions in the Turkmen building sector cannot be elaborated, since firm information on the actual quality of buildings in would be factually not available.
* Since the Project is supporting this process by providing basic energy audit, building assessments and studies (e.g. such as indicators and benchmarks on energy efficiency in the building sector available through energy audits and simple energy management methods introduced), institutional building for developing a country building statistics and information base for building energy consumption in Turkmenistan should be envisaged in the longer term, knowing that such institutions do not exist currently (and probably will not in the near future).

**Recommendation 3: Monitoring of project results and GHG emission reductions to be followed-up and results visualised:**

* GHG emission reduction targets had to be significantly amended due to wrong assumptions made in the baseline calculations provided in the ProDoc.
* As a result, GHG emission monitoring is to be continuously reviewed and updated 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 six pilot projects that are monitored regarding energy consumption. 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 eventually continued after project termination through a suitable public entity and staff to be trained by project GHG experts.
	+ Monitoring of energy consumption in buildings and promotion of best practices might motivate building developers, design institutes and finally residents, to understand how energy use in buildings will affect the building design and user behaviour during their operation and how users can benefit of the information generated.
	+ 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, in cases where pilot projects are to be finished soon, even longer (until end of project or even thereafter). Continuous monitoring after project termination is recommended but depending on available equipment and budget.
	+ Dissemination of evaluation results and benefits achieved is a key – The project may focus on storytelling to visualize best-practice examples in buildings. Another possibility is to organize information events for governmental stakeholders, building developers and residents to further attract attention to energy use in buildings.
* The project has a good prospect to finalize all its key activities by its planned termination in December 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 mid-2015.
* A no-cost project extension at least until May 2016 will be required just to allow monitoring and evaluating real achievements of the pilot buildings over the whole heating period.

**Recommendation 4: Project needs to monitor results effectively with the given timeline and to keep track of possible risks that need to be managed:**

* 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. Effective adaptations on the work programme and some of its components have been introduced during the Inception phase and have shown significant advantage compared to initial project design (following ProDoc) – example: the activities under component 1 that resulted in the development of new building codes (rather than providing initial recommendations).
* The Project Results Framework that was adapted and presented in the Inception Report seems to remain valid at the MTE stage. However, as moving forward, the project management needs to ensure an effective monitoring and keeping track of the missing bits in order to align the limited time frame for finalization of the work programme with the budget provisions, the given personal resources and towards the GHG emission reduction achievements to be evaluated.
* Nevertheless, in terms of timing, the overall finalization of the project is expected to require a non-cost project extension in the range of one year. The extension will be required since several of the pilot demonstrations are either still ongoing or haven’t started so far (in case of rehabilitation of buildings proposed by Ministry of Communal Services), which creates a general performance risk. From a technical perspective, it is highly recommended to initiate a detailed results monitoring (including review of energy performance, metering, interviews with residents about the level of satisfaction and evaluation of comfort aspects, etc.) and evaluate these results for future replication activities properly (i.e. at least for period of 12 months after finalization of pilot projects).
* Since the project still faces a medium risk that some pilot projects (especially rehabilitation of existing apartment blocks owned by Ministry of Construction) might not materialize, it might be useful to think about other activities that will create significant GHG emission reduction impact in the future. The project should pursue to initiate and build current activities upon a larger-scale energy management programme (e.g. based on activities that were already started in Ashgabat) that will allow to convince high-level decision makers and technical experts from the building sector to better understand the need for metering & monitoring of energy consumption in buildings to better target energy efficiency programmes in the future.
* A budget revision in line with a possible project extension will be required throughout the second implementation period of the project, although it seems that a draft budget revision done at MTE stage will allow the project funds to stay within the initial budgetary limits of each project component.

**Recommendation 5: Introduce a higher level of public outreach and institutionalise public awareness measures in the frame of the country’s policy framework**

* The Project must improve the current level of information dissemination and public awareness creation activities throughout the remaining project period. EERB needs therefore to start to draft a ToR based on the marketing strategy.
* The project team is in the need of additional marketing & communications expert (most support to be hired for improving the marketing and communication performance of the project in general). Knowing that the role of media and possibilities to implemented a widespread awareness and communication campaign are partly restricted, nevertheless the task will be to develop a marketing and communication strategy that is in line with the PR and communication means provided by and through Turkmengaz and the Ministry of Construction (and other national institutions, as deemed necessary), but should effectively address the relevance of the EE topic to national stakeholders and the general public. Elements of a marketing strategy have been developed by the International Chief Technical Advisor in early 2014, but haven’t been taken any further so far.
* Considering the limited possibilities to publish project results and achievements through own channels (such as project website, which is not deemed effective due to low general visibility), co-operations should be sought with national media and should be able to share several substantial success stories and provide general awareness topics throughout the remaining project period. This plan also will make the EERB project in Turkmenistan more consistent with other projects throughout the region, which are already actively documenting their projects’ successes via publications, Internet, and mass media.
* Furthermore, in terms of networking and know-how exchange, the Project shall maintain its good communication basis with other on-going international projects supporting the building EE in the ECA region (e.g. UNDP-GEF Projects being implemented on Buildings Energy Efficiency in Central Asia (Kazakhstan, Kyrgyzstan, Uzbekistan and Armenia) or projects supported by EU, World Bank and Asian Development Bank as well as regional or international projects (such as ESIB INOGATE, etc.).

**Summary of Lessons Learned:**

The GEF Project has provided value added to the development of energy efficiency framework in Turkmenistan so far by providing additional quality into the political and administrative decision-making process.

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

* Best practice from international approaches are a valuable input for developing the energy efficiency framework in Turkmenistan, especially with support and experience of national & international experts provided.
* Building Energy Performance regulation and corresponding implementation and enforcement in Turkmenistan is still in a very early stage (and to large extent not implemented yet). 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 State Design Institutes and residential building developers demonstrates that energy efficiency measures in construction projects can be accommodated in the initial design. Yet, there is low awareness and experience in the evaluation of cost-effectiveness and acceptance due to proper calculation and monitoring of costs and benefits (such as decreased energy costs, improved living standard or comfort). This awareness will have to be built with continuous information and pilot measures and based on an improved building code regime that will also consider minimum energy performance targets at a certain stage.
* 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 behaviour 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.
* As with all UNDP/GEF projects, success depends directly on the support of key national partners in the form of staff availability, budget for agreed co-financing, and political will. In the case of this project, such support has been present in certain areas but not in others, leading to delays and uncertainty. UNDP in Turkmenistan must emphasize government “ownership” of projects and their activities – that is, government agencies should feel that the project’s priorities reflect their own priorities, and that fulfillment arises from activities planned and executed in a truly joint way

In addition, the following lessons learned were highlighted during the mission and in discussions with project team members, involved experts and stakeholders:

* Highly detailed annual work plans, in which project outcomes each have numerous associated outputs, and the outputs in turn have numerous associated steps and timetables, have been a useful tool for planning, management, and tracking of results.
* The concepts of energy management and demand-side management are complex and inherently elusive to explain in all languages. Clarification of these concepts has led to significant progress in framing of project activity.
* In the case of demand-side management, the original Project Document identified an unusual and promising apparent alignment of interests, in which Turkmengaz had an incentive to invest in end-use energy efficiency in Turkmenistan, thereby reducing the quantity of gas provided for free to citizens and increasing gas available for export for profit. Nevertheless, in several respects, this view does not match with institutional conditions in Turkmenistan.
* The Cabinet of Ministers, not Turkmengaz itself, is responsible for investment decisions via the state budget.
* In Turkmenistan, consumers and Turkmengaz would not get strong benefits from an investment/DSM program. The main beneficiary of an investment program would be the state itself – as it ultimately receives gas revenue (Turkmengaz itself is a state agency).
* The responsibility for new construction lies with the Ministry of Construction and the responsibility for renovating existing building stock lies with the Ministry of Communal Services.
* Therefore, any program to promote energy efficiency in national building stock would require investment decisions by the Cabinet about the state budget on the whole, rather than by Turkmengaz alone.

# 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 |
| GOST | Russian National Building Standard |
| IBDA | Integrated building design approach |
| EERB | UNDP/GEF Project “Improving Energy Efficiency in Residential Buildings” |
| MEPS | Minimum Energy Performance Standards |
| 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 |
| SNiP | Building Standards and Rules (building codes) |
| TL | Task Leader |
| tCO2e | Tons of CO2 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 |
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# Introduction

## Purpose of Evaluation

This Mid-Term Evaluation (MTE) is being conducted on a request of UNDP Country Office in Turkmenistan; 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 21-25 July 2014.

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 realisation.

## 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.

## 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 latest **UNDP-GEF Monitoring & Evaluation Policies[[2]](#footnote-2)** and includes following key parts:

1. Project documents review prior to the evaluation mission
2. Evaluation mission and on-site visit conducted in July 2014, 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.
3. Drafting the evaluation report and ad-hoc clarification of collected information/collection of additional information
4. Circulation of the draft evaluation report for comments
5. 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.

## Structure of the Evaluation

This mid-term evaluation report follows the structure and content as specified in its Terms of Reference (see Annex 1) and according to the evaluation template of the 2009 UNDP Handbook on Planning, Monitoring and Evaluating for Development Results, including its 2011 update.

# The Project and its development context

## Problems that the project seeks to address

The project approach of institutionalizing improved energy efficiency in buildings through improved design, efficient renovation, 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”*.

This project is developed in the light of the high level of government interest and commitment to providing improved living conditions for the population of Turkmenistan on the one hand, and the interest in providing a system of “environmentally sustainable economic management,” as expressed in Outcome 3 of the UNDAF, on the other. The project approach of institutionalizing improved energy efficiency in buildings through improved design, efficient renovation, 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. More specifically, the fuel savings generated by the project directly support Outcome 3.2 of the UNDP Turkmenistan Country Programme (“Environmentally sustainable use of natural resources contributes to effectiveness of economic processes and increased quality of life”) and Output 3.2.3 of the Country Programme Action Plan (Government introduces carbon reduction and energy saving technologies).

Without the project being implemented, it is to be expected that neither new construction nor refurbishment projects would consider the energy performance of the buildings involved. Conservative estimates place the potential for savings in new buildings at a minimum of 25% and in reconstructed buildings at about 50%. However, as buildings being constructed and refurbished in a baseline case are designed and built without any attention to energy efficiency, they are effectively “locking in” patterns of energy consumption. The project is thus to overcome a set of given barriers: political and institutional and basic awareness and capacity related barriers 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 in the future not only construction and capital renovation of residential but also non-residential buildings, thus leading to wider replicability.

## Immediate and development objectives of the Project

The UNDP-GEF project is expected reduce greenhouse gas emissions in the residential sector in Turkmenistan by facilitating the improvement of energy management and reducing energy consumption. Under a baseline condition, the design and construction of new and the renovation and operation of existing buildings do not consider energy performance or lifetime operating costs. The proposed project will focus on improving energy efficiency in the residential sector in both new and refurbished buildings in the City of Ashgabat, where construction and refurbishment projects are common and can serve as a model for the rest of the country, with the goal of putting the residential construction sector on a lower carbon trajectory.

The proposed project is designed based on two approaches:

1. Capture immediate benefits in the housing sector given the current institutional arrangements and energy market. The activities involved will be focused on working with key partners who are already paying for energy and who are working to improve energy efficiency policies and measures.
2. Lay the groundwork for continued growth in EE housing programs (and EE buildings programs more generally). The activities that will be carried out will be focused on awareness enhancement and capacity building, so that the government and other stakeholders can take advantage of the increasing opportunities and incentives for EE that will come with future reforms.

Without the project being implemented, it is very likely that neither new construction nor refurbishment projects would consider the energy performance of the buildings involved. Conservative estimates place the potential for savings in new buildings at a minimum of 25% and in reconstructed buildings at a minimum of 48%. However, as buildings being constructed and refurbished are usually designed and built without any attention to energy efficiency, they are effectively “locking in” patterns of energy consumption – and associated greenhouse gas emissions -- for the next several decades that are needlessly high. In 2004, natural gas consumption in the residential sector comprised 44% of all greenhouse emissions from natural gas in the country[[3]](#footnote-3); from 2000-2007, residential consumption of natural gas increased by 35%. Without intervention, these emissions will continue to grow unchecked.

The project focuses on the residential sector for several reasons[[4]](#footnote-4):

* In the past decade, the Government of Turkmenistan has promoted a number of policies to encourage an increase in housing construction and to increase private sector investment in construction, including the introduction of credit lines and mortgages for housing.
* Private sector investment increased from 55% of total investment in the housing sector in 2000 to 77% in 2007, which has also led to a 3-fold increase in overall investment in housing construction. The subsequent “boom” in housing construction has resulted in a 45% increase in the housing stock from 2000 to 2007, and government programs will continue to support increased rates of construction.
* While in 2000, per capita living space in Turkmenistan averaged 17.8 m2, in 2007 it was 19.9 m2, and the government target has been set at 21.1 m2 by the year 2020. Furthermore, annual government investment in the housing sector is expected to increase by more than a third during the project implementation period.
* While 17% of population lives in the capital city of Ashgabat, an even higher percentage of new residential construction is taking place there, much of it carried out under “Construction of high-rise residential buildings with increased comfort and improved designed in the City of Ashgabat,” a state program that has provided the impetus for the construction of tens of modern residential high-rise buildings in new suburbs of the city.
* Furthermore, Ashgabat is the site of a relatively new government initiative to refurbish existing residential buildings, though at present, refurbishment efforts have been limited to cosmetic improvements to selected low-rise buildings in downtown Ashgabat.

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

1. Energy consumption in new buildings is reduced beyond current requirements
2. Turkmengaz and other national agencies understand the potential for savings in its housing stock and have the capacity to identify and undertake investments in energy efficiency there.
3. Energy-efficient design and technologies are incorporated and visually demonstrated in new and reconstructed residential buildings.
4. Replication facilitated via development of skills, prototype designs and policies for energy efficient buildings

## Project start and its duration

The project development started in 2009 with the submission of a PIF and a request for a Project Preparation Grant (PPG). The full-sized proposal was finally approved on 17 March 2010.

Following the GEF CEO endorsement issued on 17 October 2011, the Project’s inception workshop was held on January 30, 2012. A first project meeting of the Local Program Appraisal Committee was held on May 11, 2012. At the meeting draft Annual Work Plan was approved as well as establishment of a Steering Committee and an Advisory Committee, and institutional members of the Steering Committee and Advisory Committee have been nominated

The Project was originally planned to last for 48 months and is to be closed in December 2015, the project duration is therefore 4 years.

## Main stakeholders

**Executing Agency:** The project is executed by the State Concern “Turkmengaz” following the UNDP guidelines for nationally-executed (NEX) projects. Turkmengaz, among its other activities, provides natural gas to households, covers the costs of natural gas for most residents, and also oversees a significant amount of housing stock. It has a direct interest in all project components, and its corporate leadership is interested in supporting national efforts to prioritize resource efficiency.

**Other Partners:** The other key implementing partner in the project is the Ministry of Construction of Turkmenistan, which plays a key role in Components 1, 3, and 4, particularly in codes work and capacity building and training and the Ministry of Communal Services providing 3 pilot buildings for retrofitting under Component 3. Other government bodies that are involved in project implementation include (1) the City of Ashgabat Local Administration (for the incentive program in Component 1, and the pilot reconstruction work in Component 3, among other activities); and (2) the Turkmen State Institute for Architecture and Construction (for the training components in Component 4).

In addition, the project engages the services of authorized and duly licensed national agencies in Turkmenistan.

* **Building codes.** The project engages three different national building-design institutes for the development and revisions of four building codes: the Turkmen Communal Design Institute (Turkmenkommuntaslama) for the new code *Thermal Performance of Buildings;* the Turkmen State Building Design Institute (Turkmendovlettaslama) for the codes *Residential Buildings* and *Roofs and Roofing*; and the Ashgabat Building Design Institute (Ashgabattaslama) for the code *Building Climatology*. These institutes will also be responsible for development of accompanying guidance documents with methodological instruction on how to use these new codes.
* **Building design.** The project will engage the services of one national design institute for design of the new nine-story residential building and one institute for the design of retrofits for three existing pilot buildings subject to retrofit.
* **Construction and renovation.** The project will engage the services of one national construction firm (general contractor) for construction of the new nine-story residential building and one construction firm for the implementation of retrofits for three existing pilot buildings subject to retrofit.

**Implementing Agency:** The implementing agency is UNDP Turkmenistan.

**Project Board**: 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.

The Project Steering Committee is led by Turkmengaz and includes representatives of the following organizations:

1. Turkmengaz
2. Ashgabat Municipality
3. Ministry of Communal Services
4. Ministry of Construction
5. Ministry of Energy and Industry
6. Ministry of Environmental Protection
7. UNDP

The Advisory Board consists of local experts and decision makers representing following organizations:

1. National Parliament - Medjlis
2. Ministry of Economy and Development
3. Turkmengaz
4. Turkmennebitgasgurlushchik (also commonly referred to as Turkmenneftegasstroi – a building design and construction company associated with Turkmengaz)
5. Neftegaskhizmat
6. Ashgabat municipality, Department of Capital Construction
7. Main Department of Architecture and Urban Planning
8. Ashgabataslama Design Institute
9. Ministry of Communal Services
10. Turkmendjemagattaslama Design Institute
11. Ashgabatteplo Heating Utility
12. Ministry of Energy and Industry
13. Ministry of Construction, Department of Main State Expertise (Glavgosexpertise)
14. Ministry of Construction, Department of Architecture, Urban Planning and Science
15. Turkmendovlettaslama Design Institute
16. Ministry of Industry of Construction Materials
17. Institute of Strategic Planning and Economic Development
18. Polytechnic Institute (Institute for Architecture and Development)
19. UNDP – Low Emission Development Program Manager
20. Technical Consultant of the Project on improving energy-efficiency in residential buildings sector of Turkmenistan

## 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. In the course of the project inception, the outputs were slightly amended following actual developments and discussions with project stakeholders. The latest version of the Project Results Framework has been provided with the Inception Report.

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

*Energy consumption in new buildings is reduced beyond current requirements.*

**Output 1.1**: More stringent requirements for energy performance in buildings are adopted and supporting capacity for building code enforcement is strengthened

**Output 1.2**: Energy passport system and other policy tools to promote and enforce more energy efficient construction

**Output 1.3:** Development of new official normative document providing guidance on EE building design and compliance with new and revised codes, as building design beyond code requirements.

1. **Immediate objective/outcome 2:**

*Turkmengaz and other national agencies understand the potential for savings in its housing stock and have the capacity to identify and undertake investments in energy efficiency there.*

**Output 2.1:** Analysis conducted on the most cost-effective means of reducing energy consumption in the residential sector.

**Output 2.2:** Responsible staff is trained in energy management and the identification of energy savings in the housing stock

**Output 2.3:** Investment plan for reducing energy losses for the housing stock that Turkmengaz supplies with natural gas in Ashgabat

1. **Immediate objective/outcome 3:**

*Energy-efficient design and technologies are incorporated and visually demonstrated in new and reconstructed residential buildings.*

**Output 3.1:** Three new multi-unit residential buildings with significantly improved energy performance are designed and constructed.

**Output 3.2:** Three multi-unit residential buildings are reconstructed with significantly improved energy performance.

1. **Immediate objective/outcome 4:**

*Replication facilitated via development of skills, prototype designs and policies for energy efficient buildings.*

**Output 4.1:** Design institutes and major housing developers are trained in and encouraged to incorporate advanced energy efficiency in residential building design.

**Output 4.2:** Recommendations from the project are incorporated into government energy efficiency policies and programs.

# Findings and conclusions

## Project Formulation

### Project Relevance and Implementation Approach

The housing sector in Turkmenistan is over the past years undergoing significant change.  Private construction is on the increase, and the government plans to privatize up to 90% of the housing stock in the next several years.  At the same time, much of the existing housing stock suffers from outdated design and highly-inefficient heat and power supply, and institutional capacity to support improvements is low.  Traditionally, programs to promote energy efficiency in this sector have met with serious barriers in the form of subsidized energy for households and public buildings.

The scale of construction of new residential buildings is expected to continue in about the same magnitude as in past years. According to information provided in the Inception Report and what can be observed while driving around Ashgabad is that the construction of new “elite” multi-apartment buildings with improved design and comfort is increasing. Elite-design housing is characterised by for the country’s average housing stock untypical large living areas (in average 110 m² and up to 250 m²), improved furnishing and comfort in terms of air-conditioning (central A/C systems) and other amenities. On the other hand, multi-apartment prefabricated panel buildings with typical “Soviet-style” design are constructed annually in new development areas around the capital and other major towns of Turkmenistan.

Reconstruction of existing residential buildings in Ashgabat (built from the 1950s through the 1990s) has been accelerated over the last couple of years. However, the reconstruction of buildings primarily alongside main streets includes typically only improvement of their appearance, but no energy efficiency measures such as building insulation and shading is implemented. A typical building reconstruction includes reconstruction of the façade, new façade plastering and painting, removal of air-conditioners and satellite dishes from the street facing façade, and in some cases reconstruction/replacement of roof. The only measure that improves energy performance of reconstructed buildings is a replacement of old windows with new plastic framed double glazed windows. Averted sides of buildings and buildings inside micro-blocks not facing main streets remain so far often not reconstructed.

Renovation of state-owned residential buildings is carried out under the Ministry of Communal Services. The Ministry has promised to support the inclusion of the three buildings chosen by the project as renovation pilots in the project.

The value-added of the GEF project is that it plans to introduce energy efficient construction standards and improved design measures to major housing developments in the residential area of Turkmenistan. These measures will be replicated through energy efficient practices introduced in prototype buildings and through mainstreaming energy efficiency issues into state construction and housing policies and programs. As part of the project’s capacity building activities, curricula for architecture and engineering studies will be enriched to reflect building energy efficiency aspects.

The **relevance** of the project is therefore to be considered very high, based on the growing importance of the EE topic and commitment observed by the Turkmen government. The project is designed to address a number of critical barriers that impede the realisation of energy efficiency improvements in the residential building sector:

* *Outdated building standards*: Current building codes do not address energy performance and integrated building design elements at all, and codes do not encourage the efficient use of energy in the buildings that are currently built. *Component 1* supports the revision/development of national building codes and energy passportisation system and other policy tools to promote and enforce more energy efficient construction.
* *Low enforcement capacity:* absence of energy performance data from the housing stock (and from the building stock more generally) Energy audits are not conducted to determine the actual performance of buildings and their compliance with building codes. *Output 1.2* supports the development of an energy passport program and *Output 2.2* the energy audit methodology to determine the actual energy performance of buildings.
* *Low awareness 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. GEF funding and government co-financing will jointly support identification and development of protocol designs. GEF funding will also support capacity development of current and future architects and engineers through a competition for students and a study tour for practicing architects; it will also fund the development and disseminaton of all lessons learned. *Component 4* will provide training for architects and engineers students in incorporating energy efficiency measures for the most common residential prototype designs.
* *Immature market for EE products and energy management practices:* 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 and 3* will allow housing developers (mainly state and communcal housing programms) to introduce more efficient construction practices and equipment. *Component 2* will also establish performance requirements and introduce energy management practices in housing.

The 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.**

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| **Highly Satisfactory** | **Satisfactory** | **Moderately Satisfactory** | **Moderately Unsatisfactory** | **Unsatisfactory** | **Highly Unsatisfactory** |
| **HS** |  |  |  |  |  |

### 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. 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 inception phase, and based on detailed programmatic planning activities in the starting phase of the project the Inception Report has summarised several changes that were discussed during the inception workshop and reflect more substantive shifts based on changing conditions and opportunities in Turkmenistan. Some of the project logframe indicators and targets have been redefined to better and more specifically reflect project outputs and revised project activities and to remove duplications.

The basic changes summarised in the Inception Report and compared to the Project Document are as follows:

* ***Overall targets***

One key difference to the Project Document is based on the finding that the target direct project GHG emission reductions have been based on probably overestimated energy consumption – and thus also absolute energy savings - in new “elite” residential buildings. The Project Results Framework in the Inception Report contains a footnote that the project will gather more baseline data and reconfirm this quantitative target for direct emissions reduction by the time of Midterm Evaluation.

*See further comments in Chapter 3.3.2*

One critical factor for sufficient replication is the investment costs of re/constructed energy efficient buildings. Since the pilot new residential buildings are expected to be based on already existing building design, the Inception Report states that it would not be possible to fully implement Integrated Building Design principles within the GEF activity. The suggestion was that the project team should thus maximize its effort to develop fully new design of new pilot buildings that would allow demonstrating not only technical/energy savings but also investment cost savings.

As a result, a main change in the project logical framework include:

* Removal of indicators based on amount of investment spent and planned for energy efficiency/ buildings

The rational for the removal of such indicators is that the ultimate goal of the project is the GHG emission reduction target, and the critical success factor is the lowest possible cost of achieved GHG emission reductions (in USD/tCO2). The investment indicator (in USD) could easily become counter-productive since it might encourage rather costly energy efficient solutions.

Another but rather formal change in the Logframe target is a change of 48% energy savings target in reconstructed buildings to 44% in Outcome 3/Output 3.2.

This is because the 48% energy savings target was an arithmetical mistake. The target has been corrected and replaced by 44%. (The combined total energy savings target consists of 10% business as ususal energy savings and additional 38% energy savings delivered by project. By mistake the total combined energy savings have been calculated as a simple sum of 10% and 38% (10 + 38 = 48), instead of correct 100% - [(100% - 10%) x (100% - 38%)] = 44.2%.) See also footnote to Project Results Framework, page 32.

* ***Components and activities***

The Inception Report made the following changes to the Project Results Framework.

* Elimination of Output 1.1, with merging of certain of its activities into Component 2.
* Greater emphasis and more concrete targeted outputs with regard to new building codes under Component 1.
* All seminars and training for building designers have been consolidated in Output 4.2.
* All of Component 2 has been made much more concrete, with descriptions of activities in energy management and audit, plus more clarity about our goals for the investment program. This component retained a focus on renovation of existing buildings, but the investment program may also include support for energy-efficient design and construction of new buildings.
* Output 3.3 (model energy passports) has been consolidated with Output 1.3. Plans for thorough documentation of energy performance of demonstration projects remained unchanged.
* Output 4.1 (retrofit protocols for common designs) has been eliminated because of redundancy with Component 2, which already foresees replication of the most cost-effective retrofit measures., as well as Outputs 3.1 and 3.2, which specifically call for replication of demonstration-project designs. The removal of Output 4.1 also eliminates some confusion associated with the term “protocol,” which has been unclear to the project team in both Russian and English. Targets associated with the original Output 4.1 for replication of retrofit measures have been transferred to Output 2.3 in the Project Results Framework.

The GEF Project Results Framework is also used as a basis for reporting to GEF in the middle of the calendar year (end of GEF fiscal year) in an annual Project Implementation Review (PIR – so far available for mide-2013 and mid-2014), together with the UNDP format for internal project management and reporting done on a quarterly basis (Standard Progress Reports).

The logframe generally provides a clear summary of targets to be achieved within the different project components. It thus serves as an effective tool to measures project progress and attainment of results. Detailed assessment of achieved outputs and results throughout the mid-term phase are provided in chapter 3.3.1.

**Therefore, the logical framework of the Project is rated as Satisfactory.**

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| **Highly Satisfactory** | **Satisfactory** | **Moderately Satisfactory** | **Moderately Unsatisfactory** | **Unsatisfactory** | **Highly Unsatisfactory** |
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### Country ownership/drivenness

The project is generally consistent with Turkmenistan’s plans in the housing sector; in the area of energy sector development; and in the general field of socio-economic development. The project has been designed to overcome barriers to energy-efficient housing – both in newly constructed buildings as well as in existing residential buildings. Barriers identified in the project development phase continue to be valid. Strategies to overcome these barriers remain appropriate.

Since the project preparatory phase, the government of Turkmenistan, including several specific agencies plus Turkmengaz, has continually shown its interest and will to implement the project. Two specific policy developments are of particular note.

* A new National Strategy on Climate Change was adopted by the government of Turkmenistan on June 15, 2012. The National Strategy on Climate Change lists as the first priority area “energy efficiency” and highlights “housing” as one of four key sectors in the economy to address limitation of greenhouse gas emissions. The high political support to the National Strategy on Climate Change illustrates the statement o the President of Turkmenistan, Mr. Gurbanguly Berdimuhamedov, who stressed that “environmental protection and ecological safety is one of the priorities of Turkmenistan's state policy” (Source: UNDP Turkmenistan news archive, “Turkmenistan adopts National Strategy on Climate Change”, July 11, 2012).
* The Ministry of Construction of Turkmenistan has stated its intentions to develop a new building code on thermal performance of buildings, and also to revise existing building codes on roofs and roofing, residential buildings, and building climatology. The Ministry has accepted the project’s offer of technical assistance in this work.

Furthermore, the project incorporates lessons learned from other similar projects in the GEF portfolio, from the previous GEF project on centralized heating in Turkmenistan, and from analysis conducted during the implementation of the PPG project. These lessons include the following:

* There is a need to pay special attention to renovation as a sector with largest potential for savings
* The project should reach beyond space heating to address cooling, lighting, and hot water provision in all training and design activities because of their significant roles in residential energy consumption
* In order to address the principal-agent issues in the energy sector of Turkmenistan, the energy provider should be fully engaged in project implementation
* Estimates of project impact and market transformation should be conservative given the very low baseline capacity and the current policy and regulatory framework in Turkmenistan
* The project will require significant time for the pilot buildings design and construction in order to allow local experts to be involved in the process in a meaningful way that will allow them to develop these skills, which can then be applied elsewhere.

The project has been initiated and developed locally by UNDP Turkmenistan and by local experts who are and were assisted by international consultants and advisors. The project receives full support from the project partners, nevertheless is facing some setbacks since there was lack of progress on adopting energy efficiency building codes and some setbacks on the implementation of pilot projects in respect to residential building retrofits (implemented by Ministry of Communal Services). The Ministry of Construction plays a key role in developing and adopting new EE building codes and only recently (from end 2013/beginning 2014) shows stronger commitment to proactively work to achieve the results.

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

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| **Highly Satisfactory** | **Satisfactory** | **Moderately Satisfactory** | **Moderately Unsatisfactory** | **Unsatisfactory** | **Highly Unsatisfactory** |
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### Stakeholder participation in the design phase

Project stakeholders including governmental agencies and ministries, namely Turkmengaz as project executing agency, the Ministry of Construction, Ministry of Natural Resources (GEF National Focal Point), or the City of Ashgabat have been already actively involved during the project design phase.

As from the beginning of the project preparation, the government has demonstrated strong interest in housing reforms and in climate change mitigation; it understood that building codes represent a straightforward and effective means of reducing end-use consumption in the housing sector. However, there was no binding formal commitment of the government to adopt new regulations supporting energy efficiency. Thus the project chose to approach top level policy and decision makers from the beginning and inform them about project achievements and benefits of strengthened building codes and new energy efficiency regulations.

Turkmengaz, as executing agency, and major gas supplier to households (and covering most of costs given away to households to some extent for free) had from the beginning a direct interest in all project components, and its corporate leadership was interested in supporting national efforts to prioritize resource efficiency.

Consultations and coordination with other international donors active in the building sector and implementing projects with a similar or complementary focus, namely the GEF/UNDP Projects on Promoting Energy Efficiency in Construction sectors of Armenia, Kazakhstan, Kyrgyzstan, Turkmenistan and Uzbekistan ([beeca.net](file:///C%3A%5CUsers%5Crovshen.nurmuhamedov%5CAppData%5CLocal%5CMicrosoft%5CWindows%5CTemporary%20Internet%20Files%5CContent.Outlook%5C74CUB80P%5Cbeeca.net)) or EU’s Inogate Program, played an important role in project formulation.

The UNDP/GEF Projects implemented in several countries across the region in parallel generally expresses interests of international community to energy efficiency in buildings since such attention provides for significant advantages in climate change mitigation. Countries of Central Asia can contribute to achieving international goals in GHG emissions, while improved energy efficiency secures long-term economy of funds, support healthier economy and improve welfare of people.

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

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| **Highly Satisfactory** | **Satisfactory** | **Moderately Satisfactory** | **Moderately Unsatisfactory** | **Unsatisfactory** | **Highly Unsatisfactory** |
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### 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:

* **Replicability of project results:**

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, will be trained in efficient building techniques; and
	+ On the demand side: (1) Close cooperation with Ministry of Construction that will increase the uptake of the techniques that are piloted in the demonstration building in other state-funded construction, and cooperation with municipalities, which oversee renovation projects in the residential sector, will demonstrate results that can be replicated in municipalities across Turkmenistan; (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:
	+ Under Component 1, sustainability to be ensured by strengthening the capacity of housing developers to oversee efficient building practices and allow them to request more efficient designs that results in reduced operating costs. Strengthening the capacity of Glavgosexpertiz to evaluate highly-efficient designs and to systematize enforcement of the energy performance aspects of buildings and to provide the staff the expertise to enforce future, even more stringent versions of the codes.
	+ Under Component 2, the demand-side partnership between the UNDP-GEF project and Turkmengaz shall allow to reduce operating costs in its housing stock and increase the amount of natural gas for export, providing strong incentives to invest over the long term in energy savings.
	+ Under Component 3, the energy efficient pilot buildings, both new and reconstructed, shall incorporate measures and techniques that can easily be replicated by housing developers, and the energy passports on the pilot buildings shall provide a visual demonstration of the possible life-cycle savings.
	+ Under Component 4, strengthening the capacity of architects and engineers to design more efficient buildings shall result in cost-effective techniques to be used by designing professionals in their businesses. Raising awareness of developers and utilities regarding the economic benefits of more-efficient housing will result in higher demand for more efficient apartments even after the awareness-raising activities have concluded.
	+ Cross-cutting capacity measures, such as the development of policy recommendations and testing of key measures, such as an incentive program for high-efficiency buildings and a system of energy passports for buildings, shall encourage the incorporation of EE concepts into government policies and measures.

Both, replication and sustainability strategy are generally integrated into the project’s implementation approach. Replication plays a role in showcasing good practice in demonstration buildings and so is the sustainability strategy that focusses on strengthening the capacity of decision-makers, designers, and housing developers activities in promoting awareness raising measures. Major grounds for replication will be provided by the Project, in case that the development of new building codes and integration of energy efficiency standards will materialise into the construction regime of new and refurbished residential buildings in the future.

During the inception phase, as a result of critical review of the project components, selected project activities have been amended or merged having in mind the effectiveness of project results, which would influence the replicability and sustainability of such results.

Such changes introduced were e.g. the project shifting the focus of Component 1 away from incentives and long-term transformation of the enabling environment for building codes, and toward the immediate adoption of new and revised building codes themselves; or the review of the energy passport system and a proposed scheme that would be most effective for Turkmenistan under current conditions.

As a result, it can be concluded that the replication approach and sustainability in the project formulation is rated ***Highly*** ***Satisfactory***. Prospects of sustainability achieved in the project implementation so far are described in section 3.3.3.

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| **Highly Satisfactory** | **Satisfactory** | **Moderately Satisfactory** | **Moderately Unsatisfactory** | **Unsatisfactory** | **Highly Unsatisfactory** |
| **HS** |  |  |  |  |  |

### Cost-effectiveness

This project is designed to leverage existing government support for residential construction and guide this spending towards the commissioning and construction of more efficient buildings. The project will build capacity not only in the area of policies and measures, but also in the area of design and construction.

The UNDP-GEF project budget is 2.516 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 Turkmenistan). This contribution was estimated to be 43.387 mil USD in cash, from which 1.067 mil USD in-kind contributions.

The Project Document has calculated CO2 abatement costs of around 33 USD/tCO2, based on the total project budget of 46.353 mil USD (including in-kind co-financing), and estimated indirect project GHG emission savings of 1.42 MtCO2eq (top-down lifecycle emission savings from buildings built in 2012-2025, 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 slightly higher.

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

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| **Highly Satisfactory** | **Satisfactory** | **Moderately Satisfactory** | **Moderately Unsatisfactory** | **Unsatisfactory** | **Highly Unsatisfactory** |
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### Management Arrangements

The Project Management arrangements are as follows:

* The Project Implementation Agency is UNDP.
* The Executing Agency is Turkmengaz.
* A Project Manager is responsible for daily management and actual implementation and monitoring of the project and is accountable to the UNDP Programme Specialist on the Environment. The project team has its project office in the premises of Turkmengaz, i.e. outside but in close proximity of the UNDP country office in Turkmenistan.
* The overall responsibility over the project is with a Project Steering Committee where Turkmengaz, UNDP and ministries and governmental agencies are represented.
* The Advisory Board consists of local experts and decision makers of national organizations, UNDP and a International Technical Advisor.
* UNDP Country Office Turkmenistan is offering full support to project implementation, including administrative support (project implementation unit) as well as high level support by participation in the Steering Committee of the UNDP Resident Representative.
* The project is implemented by Turkmengaz, the ministries Ministry of Construction, Ministry of Communal Services, the Turkmen State Institute for Architecture and Construction, and national experts who are supported by international consultants.

Short-term experts hired under the project so far comprised:

* International Chief Technical Advisor: which main functions are 1) to provide technical and managerial assistance with work planning and implementation; 2) to prepare and/or review various written program outputs, including English-language reports to UNDP and GEF; 3) to help plan and oversee the work of other consultants, especially international consultants; and 4) to share information on international best practices in energy efficiency in buildings.
* International Consultant on Building Codes
* National Technical Advisor
* National Expert on Building Codes
* National Expert on Energy Audits
* National Expert on Pilot Buildings

The National Technical Advisor was contracted from the beginning of the project in order to co-ordinate the work of national key experts; however, he left in 2013, but was never replaced and the project has been proceeding normally under the project manager’s direction.

The Project management structure is summarised in the figure below.

Figure 2: Project Management Organigram according ProDoc



The Programme Specialist for Environment and his project management team are doing a good job. One advantage of the given project management structure is the close interaction of the project management with the main governmental stakeholders, which in generally seems to work on a good relationship basis. Thematic national experts are each focusing on a set of components and activities and are capable and technically sound to manage the implementation of the related tasks in close co-operation with the governmental representatives.

The UNDP Resident Representative and the Programme Specialist for Environment do furthermore maintain contacts on a higher political level, such as to Ministries or the Cabinet of Ministers, which sometimes seems to be a key for reminding the governmental institutions that their commitment and implementation-drivenness is key for a successful project outcome; the Project Manager maintains on her level a good communication basis and exchange with her experts and all project partners (Turkmengaz, Ministries) and external stakeholders, state design institutes, designers and implementers of demonstration buildings, and seems to be empathic in her role.

During 2013, the project faced difficulties and some delays across all major components. The delays arose largely because the timing and annual budgets of government stakeholders did not match with the planned activities of the project.

One reason for problems that occurred in the initial implementation phase was an obvious mismatch of interests between the project and its national partners that may have arisen from the Project Document, which foresaw initially a large role for the state concern Turkmengaz but presented the roles of other partners with less clarity. Although Turkmengaz remains the nominated executing partner of the project and has been very reliable and supportive, the majority of policy and programs design and implementation in the building sector are with the responsibility of the Ministry of Construction (for new buildings) and the Ministry of Communal Services (for existing buildings); both in turn receive their budgets and policy mandates from the Cabinet of Ministers.

Therefore, project success depends on support to a large extent on these two ministries and the Cabinet. But during large parts of the first project implementation period, such support has fallen short of required levels, especially from the Ministry of Communal Services.

Continued progress is required on a regular basis to follow-up advocacy from the project team – for timely completion and review of building codes and other documents, approval of audits and various stages of pilot projects implementation, etc. Project management team needs continuously to keep project partners engaged.

Management arrangements are so far rated **Satisfactory.**

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| **Highly Satisfactory** | **Satisfactory** | **Moderately Satisfactory** | **Moderately Unsatisfactory** | **Unsatisfactory** | **Highly Unsatisfactory** |
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## Project Implementation

### Implementation Approach

The implementation strategy is based on transfer of best international practice in designing energy efficient housing with standard affordable costs, and cost-effective energy efficiency reconstruction of existing buildings from leading developed countries as well as from similar UNDP projects implemented in countries in the region, and active involvement and hands-on training of local experts supported with experienced international experts.

Its overall strategy and scope is a key factor for success and includes aspects such as introducing improved, highly-efficient design measures to major housing designers and developers, and replicate these measures in prototype buildings and through mainstreaming EE issues into state construction and housing policies and programs. Furthermore, capacities of governmental stakeholders and technical institutions such as Turkmengaz, Ministries of Construction and Communal Services as well as State Design Institutes are going to be built to identify end-use energy savings in their housing stock and implement investments to reduce end-use energy consumption. 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 the Turkmen 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, but nevertheless several modifications were proposed and agreed (summarised in the Inception Report).

*See details in chapters 3.1.2 and 3.3.2.*

So far, the project has been able to progress towards its development objectives and targeted outcomes, although there has been significant delay compared to the endorsement stage and several activities are not to full extent implemented yet.

Project activities have been structured within four project outcomes:

* *Project outcome 1: Energy consumption in new buildings is reduced relative to existing requirements*

The project was shifting during inception phase the focus of Component 1 away from incentives and long-term transformation of the enabling environment for building codes, and toward the immediate adoption of new and revised building codes themselves. Output 1.2, on new and revised building codes, is the main element of this component.

Secondly, the project team, supported by the ITA, will review international experience with adoption of building energy passports and labeling and will develop a proposal on implementation of a local scheme of building energy passports, including methodology of building energy performance calculation and compliance responsibilities and institutional and regulatory setup for enforcement of such scheme.

Finally, a guidance manual on compliance with the new energy codes will be developed and to provide building designers with explanations of calculation methods for energy performance, as well as design principles.

* *Project outcome 2: Turkmengaz and other national agencies understand the potential for energy conservation in the building sector and have the knowledge and capacity for determining necessary investment to be made in energy efficiency in buildings.*

A comprehensive Demand-Side Management (DSM) study on technical and cost-effective energy efficiency potential in existing housing stock in Turkmenistan/Ashgabat will be prepared. The study will provide information on technical and cost-effective energy saving potential for each of the selected building representative as well as estimates of aggregated savings potential for the whole housing stock nationwide.

A system of energy management in multi-apartment buildings that are supplied by Turkmengaz and possibly other owners of multiple buildings, including buildings with building level gas boilers and decentralized district heating schemes will be developed and implemented.

At the building level, the energy management system will monitor energy consumed for space heating, air-conditioning, and other end-use appliances, and the findings of the energy monitoring will be presented to building owners and utility suppliers (Turkmengaz and others) and will serve to identify potential candidates with highest specific energy consumption for implementation of energy audits and subsequent energy efficiency improvements as well for monitoring actually achieved savings in pilot buildings.

In cooperation with Turkmengas, Municipality of Ashgabat and other relevant organizations an energy-efficiency investment plan with different scenarios of scale and rate of implementation will be prepared.

* *Project outcome 3: Energy-efficient design and technologies are incorporated and visually demonstrated in new and reconstructed residential buildings*

Three new buildings were selected for construction and confirmed by the Government of Turkmenistan. Energy efficient designs of three demo buildings to be completed and reviewed by International consultant on building design. Energy saving to be achieved in new buildings is minimum 20% compared to baseline.

Furthermore, renovation projects are to be provided by Ministry of Communal Services. Specifications and design of renovation projects to be reviewed with experts’ support and measures will be installed under strict quality control. Local experts will develop energy passports for all pilot projects based on developed methodology.

Methodologies, results, and lessons learned from all the pilot projects will be compiled in detail and presented to national design institutes, developers, and government officials, with the goal of facilitating the widest possible replication of positive demonstration-project results.

* *Project outcome 4: Replication facilitated via development of skills, prototype designs and policies for energy-efficient buildings*

Initial output 4.1 (retrofit protocols for common designs) was eliminated during the inception stage. This component was from the beginning rather unclear, and was interpreted by project team to call for the development of a formal technical process for retrofitting of common existing building types. However, this activity would have been redundant with Component 2, which already foresaw replication of the most cost-effective retrofit measures.

Activities kept under this outcome were training seminars for at least 50 architects and engineers on the following issues: (i) compliance with new codes, (ii) methods for calculating building energy performance, and best practices in energy-efficient building design, (iii) including integrated building design (beyond mere compliance with thicker insulation requirements), (iv) integration of low-cost no-cost energy efficiency principles into building design, (v) lessons learned and best experience available internationally with a special focus not only on space heating but on summer cooling needs, shading principles, etc. Training will also be delivered at the university level. The project will prepare a curriculum for university students on energy efficiency practices in housing sector

The project team will compile results and lessons learned from the whole project and will disseminate them not only to the aforementioned stakeholders within Turkmenistan, but also throughout Central Asia and beyond.

Considering the above mentioned approach, that have already foreseen amendments during the implementation (agreed at the Inception workshop) mainly for the reason of higher effectiveness and practicability, the overall rating of implementation approach can be rated ***Satisfactory***.

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| **Highly Satisfactory** | **Satisfactory** | **Moderately Satisfactory** | **Moderately Unsatisfactory** | **Unsatisfactory** | **Highly Unsatisfactory** |
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### Effective partnerships arrangements established for implementation of the project with relevant stakeholders involved in the country

The project management team generally has a good working relationship with major stakeholders from Government of Turkmenistan. The relationship on a personal basis allows linking key partners to the project and achieving their necessary commitment throughout the overall project activity.

Taking into consideration the efforts of the project team, all key government partners appear ready to provide their full support to the project wherever needed. However, a differentiated view is required between the general interest and overall commitment shown by some project partners and their actual readiness (and eventually willingness) to implement the activities they have agreed to.

Some elements demonstrating the effectiveness the project partnership is able to achieve towards major stakeholders and beneficiaries are summarized below.

These include:

* The Project Manager, with the assistance of the International Chief Technical Advisor, have developed a highly detailed annual work plan for the project team itself for 2014. This plan is very useful as a tool for management, planning, and tracking and defining co-operation with governmental stakeholders.
* Letter of Agreement has been signed with the Ministry of Construction and Architecture to implement the Joint Action Plan for revision of building codes and development of guidance manuals to building codes. Similar letters have been accepted in principle between UNDP and the Ministry of Communal Services as well as Turkmen State Institute for Architecture and Construction, but to date, only Ministry of Construction and Architecture has signed its letter.
* Bilateral agreement on design and Letter of Agreement for construction of two high-comfort demo-buildings (114-units and 66-units) was signed between UNDP-GEF project and the State Corporation “Turkmen oil and gas construction”.
* Bilateral agreement on design and Letter of Agreement for construction of one U-148 typical demo-building (54-units) was signed between UNDP-GEF project and Municipality of Ashgabat.
* The project also has reached agreements with all relevant parties on a pilot project on energy management, with associated development and dissemination of plans and methods for replication.
* Co-operation initialized with EU projects on sustainable energy; in October 2014 a joint workshop on energy management with one EU project is planned to be held in October in Ashgabat, another is assisted by the GEF project in regard to the development of technical specifications for energy-efficient construction of private houses.
* UNDP has been in contact with all UNDP projects on energy efficiency in buildings in the region to share knowledge, lessons learnt and experience. For example, in the beginning of 2013 the team leader of Uzbek UNDP project on energy efficiency in public buildings visited Ashgabat to consult at identifying and developing energy efficiency measures for the pilot buildings.
* Also, representatives of the project participated in the annual International Energy Forum, which is organized by UNECE, UNDP and ESCAP to present the results of the project and share knowledge with colleagues from other countries.

The weaknesses observed in this respect:

* The Ministry of Communal Services has for long time not signed the Letter of Agreement confirming the implementation of pilot retrofits of residential buildings, but finally did so after the MTE was carried out. Apart from that fact, difficulties in the communication can be observed; the project management team is eager to get the foreseen activities with MCS to the ground and approved, but reactions of MCS representatives tend to be vague in their commitment or the formal communication gets delayed for sometimes very superficial reasons, thus the partnership with MCS cannot be regarded as effective or co-operative.
* The Turkmen State Institute of Architecture and Construction has been approached repeatedly about including energy efficiency in national higher-education curricula, but no specific results have been achieved. Only during the mission of the evaluation consultant (or shortly before) the TSIAC has provided the commitment on the implementation of agreed activities, and finally signed the LoA only after the MTE was carried out.
* Progress reports (latest PIR for 2014) mention the availability of a detailed communications plan elaborating different types of outreach for various components, across various media. Apart from themed seminars and a general openness to international conferences, the project did not have specific plans for 2014 or beyond about communications. Communication and dissemination of results remain a general weakness of the project; taking into consideration the difficulties to effectively provide public awareness and information dissemination activities through different media sources in Turkmenistan, still the project communication needs to become more effective.

Project efforts to engage with a broader range of stakeholders, such as private sector, municipal authorities and bilateral donors, are envisaged but yet have not produced significant results.

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

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| **Highly Satisfactory** | **Satisfactory** | **Moderately Satisfactory** | **Moderately Unsatisfactory** | **Unsatisfactory** | **Highly Unsatisfactory** |
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### Monitoring and evaluation

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

According to the Inception Report, a *Project Steering Committee* (PSC) was established to comprise 7 members nominated by the corresponding agencies: Turkmengas, Ashgabat Municipality, Ministry of Communal Services, Ministry of Construction, Ministry of Energy and Industry, Ministry of Environmental Protection and UNDP.

The PSC is responsible for making management decisions for a project in particular when guidance is required by the Project Manager. The PSC plays a critical role in project monitoring and evaluations by quality assuring these processes and products, and using evaluations for performance improvement, accountability and learning. It ensures that required resources are committed and arbitrates on any conflicts within the project or negotiates a solution to any problems with external bodies. In addition, it approves the appointment and responsibilities of the Project Manager and any delegation of its Project Assurance responsibilities. Based on the approved Annual WorkPlan, the Project Board can also consider and approve the quarterly plans (if applicable) and also approve any essential deviations from the original plans.

Steering Committee meetings of the Project were held in May 2012, December 2012, March 2013, July 2013, and June 2014. Analytical reports on the Project's activities performed between 2012 and 2014 were presented and endorsed by the Committee. Work plans for 2013 and 2014 were discussed, com­mented and approved provided that the Committee's recommendations were taken into account. Meeting minutes (in Russian) were prepared.

The *Advisory Board* consists of local experts and decision makers representing following organizations:

1. National Parliament - Medjlis
2. Ministry of Economy and Development
3. Turkmengas
4. Turkmennebitgasgurlushchik (also commonly referred to as Turkmenneftegasstroi – a building design and construction company associated with Turkmengas)
5. Neftegaskhizmat
6. Ashgabat municipality, Department of Capital Construction
7. Main Department of Architecture and Urban Planning
8. Ashgabataslama Design Institute
9. Ministry of Communal Services
10. Turkmendjemagattaslama Design Institute
11. Ashgabatteplo Heating Utility
12. Ministry of Energy and Industry
13. Ministry of Construction, Department of Main State Expertise (Glavgosexpertise)
14. Ministry of Construction, Department of Architecture, Urban Planning and Science
15. Turkmendovlettaslama Design Institute
16. Ministry of Industry of Construction Materials
17. Institute of Strategic Planning and Economic Development
18. Polytechnic Institute (Institute for Architecture and Development)
19. UNDP – Low Emission Development Program Manager
20. Technical Consultant of the Project on improving energy-efficiency in residential buildings sector of Turkmenistan

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

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| --- | --- | --- | --- | --- | --- |
| **Highly Satisfactory** | **Satisfactory** | **Moderately Satisfactory** | **Moderately Unsatisfactory** | **Unsatisfactory** | **Highly Unsatisfactory** |
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### Financial planning and management

The project benefits from having a Project Implementation Unit (PIU) as well as Administrative/Financial Assistants in place that have experience in managing and administration of UNDP projects. The project is generally professionally managed and administered, although the Evaluator wants to pinpoint the following weakness: although there is a detailed monitoring of funds disbursed through the PIU and financial management team, it seems that the overall spending of project budget is not well linked to the progress of activities made within each project component. For example, the available progress reports (PIR, QR) are not showing (or at least indicating) the % of activity implemented versus the % of budget spent within each outcome. In terms of overall monitoring it would be good to see in the summary reports such indications and the linkage to actual budget disbursement. While in the first period of project implementation with sufficient budget available in all outcomes this information is not so meaningful, it will have a greater meaning towards the end of the project (when budget spending gets closer to 100%).

As for the current spending, the largest share of budget has been expended within outcome 1, less in outcome 4, which is obvious following the activities implemented so far.

Table 3 provides an overview of the budgeted expenditures of the GEF Project of USD 2.616 million. As of end July 2014, USD 936,145, or about 36% of the GEF-funded Project budget, have been spent. Regarding budget lines (details not shown in Table 3 but were reviewed by Evaluator), all 4 outcomes have experienced slight internal shifting compared to the original budget provided in the ProDoc, namely by adding budget lines “Individual Contractual Services” (ATLAS Budget Account Code 71400), “Contractual Services” (72100) or “Communication and Audio-Visual Equipment” (72400). Budget lines 71400 and 72100 have been evidently used instead of initially foreseen budget line “Local Consultants (short-term)” (71300) – according to information of Project Manager to pay for the support of key experts (under 71400) or additional expertise required for development of improved building codes or experts for (re-)construction of demonstration buildings. While these internal shifts do not provide a problem to GEF, they reveal the strong expert exposure within the project being the result of initial delays and setbacks during 2012 and 2013, where the project faced implementation difficulties and delays across all of its key technical components. The delays partly led to increased expert involvement and their inclusion throughout the different project components to assure progress towards project objectives and timetables.

At the MTE stage, almost USD 1.4 million remain in the Project budget for technical assistance, implementation of demonstration projects and other activities for the project. Taking into consideration the outstanding implementation of pilot activities during the next months, utilisation of funds are going to significantly increase in line with the contributions of the governmental institutions co-financing the pilot investment projects.

From today’s point of view and based on the information provided by the Project Manager, it is expected that no overspending of any of the project components is to come, and remaining activities can be allocated under the outstanding budget lines, with only shifts within a project component to eventually happen. Thus, the unallocated funds are currently zero.

Nevertheless, the timely spending of allocated funds for the remainder period of the project is an issue, since it is doubtful that the activities within mainly outcomes 3 and 4 can be implemented in the foreseen time and allow the project to be terminated by end 2015 (as approved). The project is therefore expected to consider an extension (details and conditions to be defined still) and correlating shifting of budget to additional year(s).

Financial management is rated **Satisfactory.**

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| **Highly Satisfactory** | **Satisfactory** | **Moderately Satisfactory** | **Moderately Unsatisfactory** | **Unsatisfactory** | **Highly Unsatisfactory** |
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### Co-financing and in-kind contributions

The project budget includes USD 24.8 million in cash from the Government of Turkmenistan plus USD 1.067 million in kind. The City of Ashgabat was supposed to provide about USD 17.5 million. USD 0.3 million are funds co-financed by UNDP (from which USD 0.1 million as grant), which makes the whole planned co-financing contribution USD 43.687 million over the project period.

Confirmed Project co-financing to date has amounted to an estimated USD 51.3 million (by August 2014) following the actual project implementation status (actually 17% more than initially foreseen at CEO Endorsement stage), with details from project partners provided in Table 4.

The project is expected to benefit from additionally leveraged resources of about USD 29 million from the State Corporation "Turkmen oil and gas construction" for the new construction of 2 “Elite” demonstrations buildings, and another USD 64 million from the Ministry of Communal Services (MCS) that are so far only committed for the capital renovation of 3 retrofit demo buildings (both not foreseen at the project approval stage). Additional USD 0.1 million in-kind contribution is to come from the Turkmen State Building Design Institute for the development of new building codes. The co-financing contribution thus could increase to a total of USD 115 million by the end of the project, which is around 2.5 times higher than initially committed in the Project Document.

Governmental co-funding allocated to the project in terms of volumes and additional contributors is currently to be considered **highly satisfactory**; nevertheless, the actual provision of funds from MCS for the planned retrofits still needs to be awaited.

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| --- | --- | --- | --- | --- | --- |
| **Highly Satisfactory** | **Satisfactory** | **Moderately Satisfactory** | **Moderately Unsatisfactory** | **Unsatisfactory** | **Highly Unsatisfactory** |
| **HS** |  |  |  |  |  |

Table 3: Project Budget and Expenditures (in USD)



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



## Results

The project is partially on track to achieve its development objectives. Especially in 2014, positive trends have been observed in the development of the new national building codes (2 out of 4). However, the lack of progress with implementation of the pilot retrofits of residential buildings (component 3) as well as the so far delayed involvement of the Turkmen State Institute of Architecture and Construction in the training/curriculum development poses some risks to the project and jeopardizes achievement of its development objective.

Overall strategy and scope of UNDP-GEF intervention, i.e. promotion of residential building energy efficiency via legal and regulatory improvements, institutional and technical capacity development, energy audits and energy management approaches and on-the-ground demonstration projects, remains highly relevant and bears high potential to bring about a market transformation impact in the Turkmen building sector.

***Component 1: Energy consumption in new buildings is reduced relative to existing requirements***

This component calls for the revision of four national building codes – *Residential Buildings, Roofs and Roofing, Building Climatology, and Building Thermal Engineering.* Work on the first two codes has proceeded with only slight delays relative to the timetable set forth in the 2013 Annual Work Plan and as agreed with the Ministry of Construction the draft revised building codes “Residential buildings” and “Roofs and roofing” were submitted to the Scientific-Technical Council in late spring 2014 for further confirmation by the Ministry of Justice. Revised versions are scheduled to be approved by end of 2014. A guidebook providing methodological instructions to the two revised codes has been provided for approval as well.

Revision of *Building Climatology* also remains on its original timetable, with the revision process planned throughout 2014 and development of a final document to be completed by the end of the year. Work on *Building Thermal Engineering*, which is the most important of the four codes in terms of energy efficiency, has been delayed by approximately one full year because of scheduling and budgeting issues at the Ministry of Construction. Discussions about what revisions should be done on this code (or indeed, whether a completely new code on energy efficiency should be developed instead) were held during 2013 and further delayed this activity as well.

Recent discussions with governmental stakeholders in the first half of 2014 revealed that there is progress to be expected on the outstanding codes’ development. According to the recent schedule, *Building Thermal Engineering* will be revised and a final version developed by the end of 2014. Each of the remaining codes will be followed by an official guidance manual intended to help building designers to understand the codes, their calculation methods, and various design solutions needed to achieve compliance. This schedule is contained both in the team’s Annual Work Plan and in the joint work plan to be submitted with a letter of agreement to the Ministry of Construction for approval.

In respect to the update of the *Building Thermal Engineering* code, Component 1, according to the Project Document, also will seek to develop and implement an energy-performance documentation system called the Energy Passport. Energy Passports, which are widely used in conjunction with building energy codes in Russia and Central Asia, are essentially standardized documents with embedded calculations to assess energy performance and demonstrate code compliance. Energy Passports also involve a rating system, based on percent deviation from code requirements for new buildings. The project is still on track to fulfill its projected outputs for Energy Passports in direct conjunction with revision of *Building Thermal Engineering*, which will define the system and all its elements.

The project document and the Annual Work Plan for 2014 foresee the development of recommendations regarding labeling in conjunction with energy passports in Turkmenistan. Since market conditions in Turkmenistan do not justify labeling as an instrument to create major incentives, due to several facts, such as (1) heat, gas, and electricity are practically free for most of the population, (2) or market for real estate is not so well developed as to be responsive to new information about energy performance, most relevant will be to use the energy labeling of buildings purely for promotion of certain showcase buildings.

***Component 2: Turkmengaz and other national agencies understand the potential for energy conservation in the building sector and have the knowledge and capacity for determining necessary investment to be made in energy efficiency in buildings.***

Work planned for 2013 on energy audits of existing buildings was delayed because the Ministry of Communal Services was unable to approve necessary permissions. For 2014, however, the Ministry of Communal Services has pledged its full support.

So far, a methodology to conduct energy audits in buildings has been developed and further improved by including cooling parameters. 22 demo buildings for energy audits were selected by the key national expert at sites in 9 cities around Turkmenistan and agreed upon with Ministry of Communal Services.

In addition, the methodology for conducting energy audits in selected buildings has been completed (buildings subject to retrofit) and regular measurements of energy consumption are being conducted in 3 demonstration retrofits and 3 baseline buildings for comparison purposes. The demonstration buildings for development of energy management plans were selected and agreed upon with Ministry of Communal Services. The buildings were inspected and availability of energy meters analysed. In addition, more than 135,000 gas meters were installed by Turkmengaz so far in residential buildings, about 700,000 gas meters are committed to be installed by 2016.

The project held a round-table meeting on in January 2014 specifically on energy management. This meeting included participants from the Ministry of Communal Services, Turkmengaz, Turkmennebitgazhizmat (the agency responsible for the housing stock of the oil-and-gas industry in Turkmenistan), the energy inspectorate of the Ministry of Energy, and the Ashgabat city gas utility. It was agreed that the project should arrange pilot energy-management activities in at least one building owned and operated by Turkmennebitgazhizmat, as well as in a four-home complex at the Kishi development complex within Ashgabat, which is serviced by the Ministry of Communal Services. These facilities are already equipped with meters. A full plan for energy management will be developed for each building, reflecting the respective levels of complexity of each building and its HVAC systems, as well as the technical capacity of responsible staff.

***Component 3: Energy-efficient design and technologies are incorporated and visually demonstrated in new and reconstructed residential buildings***

**New construction:**

The majority of buildings in Turkmenistan of the U148, U76, and Uz500 series were built in the Soviet era and even today, U148 and U76 continue to be built in Ashgabat and around Turkmenistan.

In 2011, the UNDP project team decided to choose one 9-storey U148 building and two 5-storey Uz500 buildings in Ashgabat as demonstration buildings. GEF support will cover the incremental costs of more efficient design and (re)construction, while baseline (re)construction costs will be covered by the project developers and owners of the buildings.

* The three new buildings were selected for construction and confirmed by the Government of Turkmenistan.
* Bilateral agreement on design and Letter of Agreement for construction of two high-comfort demo-buildings (114-units and 66-units) signed among UNDP/GEF project and client/owner - State Corporation “Turkmen oil and gas construction”.
* Bilateral agreement on design and Letter of Agreement for construction of one U-148 typical demo-building (54-units) signed among UNDP/GEF project and client/owner - Municipality of Ashgabat.
* Energy efficient designs of the demo buildings are already completed and reviewed by international consultant on building design.
* Energy saving to be achieved in new buildings is from 10-13% (for the two “elite” buildings) up to 30% (for typical panel building) compared to baseline.
* Cost estimations were completed for two buildings (9-storey 54-unit and 12-storey 114-unit), with construction in progress and due for completion by August and October 2014, respectively. Cost estimation for third (12-storey 66 unit) building were in progress, with construction due for completion in 2015.

**Retrofit of existing buildings**

Mutual consent was achieved about a joint renovation of demonstration projects provided by Ministry of Communal Services. Sites were selected for the renovation of 3 buildings. Specifications and design of renovation projects were also completed; currently projects are waiting design approval and allocation of state funds for reconstruction. Energy saving to be achieved in retrofitted buildings is about 45-50% according to expert evaluation.

* In January 2014 an agreement was reached with Ashgabat housing agency representative on work plan and projects on renovation of three pilot buildings in Ashgabat, including the discussion of proposed EE measures. Ministry of Communal Services sent consecutively a letter to the mayor of Ashgabat, asking for inclusion of three pilot buildings into the plan for 2014 and to Minister of Finance of Turkmenistan with a request for allocation of funds for realization of the UNDP project.
* UNDP, jointly with specialists from the residential services agency of the Kopetdag district of Ashgabat, as well as specialists from the design institute Ashgabattaslama, having made visits to the buildings themselves, prepared a statement of needed repairs including EE upgrades for №21 Parakhat 2/2, № 51 Parakhat 3/1, and №15 Parakhat 4/1.The agency sent the statements to Ashgabattaslama for preparation of initial design and cost estimation work for the three buildings. So far, the project is waiting for formal feedback of the MCS on the design approval as well as

In addition to this long-planned work, the project may also pursue one completely new addition to the project plan: development of energy-efficient and/or renewable energy solutions for typical single-family house design. At present, the project team foresees participation only in design, not construction or material support, under this new activity. Therefore, it is expected to involve fairly low costs, well within the project budget. At the same time, the new work has great potential for replication if it is closely coordinated with existing state plans for development of single-family house designs. In 2014, the project team will study the possibilities and given sufficient interest among national partners, will develop more concrete plans accordingly with national partners.

***Benefits demonstrated in pilot buildings***

The table below summarises the main benefits in terms of improving the specific energy consumption (project design versus baseline consumption) for all 6 pilot projects, the new construction as well as building retrofits. The achieved energy savings through improved energy efficient building design are significant and in the range of 10-31% for new construction and 44-51% for building retrofits.

The incremental cost of energy efficiency measures (provided as GEF contribution) compared to the overall project costs (co-financing provided by GoT) for realised (actual) projects is in average less than 1% of the baseline cost for new “Elite” buildings, whereas approximately 3% of new standard apartment building (pilot #3). As a result of the implementation of energy efficient measures the energy costs for the residents will decrease by 10 to 50% and at the same time ensuring improved living conditions in the apartments.

Table 5: Energy saving benefits in demonstration buildings vs. incremental costs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Project** | **Size (m²)** | **Specific energy consumption in kWh/m².year (approximately)[[5]](#footnote-5)** | **Project budget (USD) /****(Co-financing by GoT)** | **GEF contribution (USD)** |
| **Baseline** | **Project** | **Savings** |
| **New construction** |
| Pilot #1: New “Elite” (high-comfort) Building, 114 units | 35,500 | 126 | 110 | 13% | 38,709,200 USD (actual) | 169,360 USD (actual) |
| Pilot #2: New “Elite” (high-comfort) Building, 66 units | 23,300 | 130 | 117 | 10% | 21,493,920 USD (actual) | 140,000 USD (planned) |
| Pilot #3: New Standard Apartment Building (Type U-148), 54 units | 4,970 | 200 | 138 | 31% | 3,527,242 USD (actual) | 95,787 USD (actual) |
| **Retrofitting of existing buildings** |
| Pilot #4: Existing building (Type U-148), 54 units | 4,970 | 333 | 187 | 44% | 115,315 USD (planned) | 55,000 USD (planned) |
| Pilot #5: Existing building (Type Uz-500), 45 units | 2,280 | 362 | 185 | 49% | 122,270 USD (planned) | 33,000 USD (planned) |
| Pilot #6: Existing building (Type U-76), 40 units | 2,670 | 301 | 147 | 51% | 130,750 USD (planned) | 39,000 USD (planned) |

***Component 4: Replication facilitated via development of skills, prototype designs and policies for energy-efficient buildings***

An analysis of the general construction plan of Ashgabat city for 2013-2015 was conducted, and general constructions plans of other major cities were reviewed. A presentation of energy efficient measures and energy savings potential of new and renovated pilot buildings were made at the Conference within International Construction Exhibition in Ashgabat in August 2013. Furthermore, a training session on energy efficient design, engineering equipment and maintenance of energy efficient buildings was delivered for forty architects and engineers.

As mentioned under chapter 3.2.1, the initial output 4.1 (retrofit protocols for common designs) was eliminated during the inception stage, as the component was from the beginning rather unclear.

Component 4 will rather focus on providing training seminars for architects and engineers on best-practice in building energy efficient codes, management and design aspects Training will be delivered at the university level and a curriculum prepared for university students on energy efficiency practices in housing sector

The project team will finally compile results and lessons learned from the whole project and will disseminate them not only to the aforementioned stakeholders within Turkmenistan, but also throughout Central Asia and beyond.

### Attainment of objectives, outcomes and outputs

The following table summarises 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 6: Rating of Project Outputs and Results

| **Project Strategy** | **Indicator** | **Output Target(s)** | **Achievement of targets as of MTE** | **Rating** |
| --- | --- | --- | --- | --- |
| **The proposed UNDP-GEF project will reduce greenhouse gas emissions by improving energy management and reducing energy consumption in the residential sector in Turkmenistan.** | Reduction of direct GHG emissions from residential sector of Turkmenistan as a result of the project over 20 years, tCO2e | 202,866 t CO2e by the end of the project | - Estimated avoided CO2 emissions from new buildings over 20-year lifetime of almost 12,265 tonnes.- Estimated avoided CO2 emissions from renovated buildings over 20-year lifetime of more than 10,845 tonnes. - Total estimated avoided CO2 emissions from 6 pilot buildings over 20-year lifetime of 23,110 tonnes. | Initial GHG reduction targets have been far overestimated (based on wrong assumptions).New targets proposed with the MTE report to be achieved by the end of the Project |
|  | Natural gas saved annually as a direct result of the project | 5 133 thousand m³ | - Estimated annual natural gas savings of about 322,788 m³ per year in 3 new pilot buildings, and about 285,400 m3 per year in 3 pilot retrofits. - Total estimated natural gas savings of about 608,187 m³ per year in 6 pilot buildings. | Equivalent to GHG reduction targets, natural gas savings need to be revised.To be achieved by the end of the Project |
|  | Co-financing leveraged for investments in energy efficient reconstruction of existing buildings and construction of new energy efficient housing stock (i.e. beyond existing building code requirements) | USD 40,000,000 | - 3 new selected pilot buildings and 3 retrofits confirmed by the Government. - The co-financing by the Government disbursed so far amounts to approx. 51.3 million USD (compared to initially committed 43.7 million USD for the whole project). | Target achieved |
| **Outcome 1: Energy consumption in new buildings is reduced beyond current requirements** | Existence and content of applicable building codes on building energy performance | - New building energy efficiency code on whole-building thermal performance and revisions of existing building codes on roofs and roofing, residential buildings, and building climatology developed and implemented. - New code requires heat energy consumption at or beyond Level 2 for all buildings (5 to 10 percent less than Level 2 for elite residential buildings), with Level 1 compliance no longer applicable. - Introduction of energy passport system in conjunction with adopted new and revised building codes. | - Review of building codes “Residential buildings”, “Roofs and roofing” by local stakeholders has been completed and the codes submitted to Ministry of Construction and Architecture for approval and further acceptance. - Guidance manuals accompanying building codes “Residential buildings”, “Roofs and roofing” have been developed and submitted to Ministry of Construction and Architecture for approval. - Terms of Reference for revision of building codes “Thermal engineering” and “Building climatology” have been developed and agreed upon with Ministry of Construction and Architecture and sent to the Contractor - State Design Institute “Turkmendovlettaslama”. Project Team provides with support of International Consultant planning, coordination and technical oversight. | To be achieved by the end of the Project |
| **Outcome 2: Turkmengas and other national agencies understand the potential for savings in its housing stock and have the capacity to identify and undertake investments in energy efficiency there.** | - Number of energy audits - Number of professionals trained | - 25 energy audits carried out by project (5 planned for 2013, 10 each for 2014 and 2015. - At least 30 professionals including Turkmengas staff trained. | - 22 demo buildings for energy audits selected in 9 cities and agreed upon with Ministry of Communal Services. - Gas meters provided by State Corporation “Turkmengas” and local affiliates have been installed in all buildings. - Regular measurements of energy consumption conducted in 3 demonstration retrofits and 3 baseline buildings. - Demonstration buildings for development of energy management plan selected and agreed upon with Ministry of Communal Services. The buildings inspected, availability of energy meters analyzed. | To be achieved by the end of the Project |
|  | Existence and volume of activity of program, run and funded by Turkmengas and/or other state agencies, on energy efficiency investment in buildings | Short- and long-term investment plan for Turkmengas and Ashgabat housing stock developed, with EE design and/or retrofit carried out in at least 25 buildings by the end of the project. | Investment plan is not available yet.  | To be achieved by the end of the Project |
| **Outcome 3: Energy-efficient design and technologies are incorporated and visually demonstrated in new and reconstructed residential buildings** | - Number of pilot buildings designed and built  - Energy consumption of pilot buildings relative to similar new and existing buildings in Turkmenistan | New pilot buildings designed and constructed with calculated energy consumption 15 percent less than required by code, and five percent less than prevailing best practice for high-comfort buildings | - Three new buildings selected for construction and confirmed by the Government of Turkmenistan.- Energy efficient designs of three demo buildings are already completed and reviewed by International consultant on building design. - Cost estimation completed for two buildings (9-story 54-unit and 12-story 114-unit), with construction in progress and due for completion by August and October 2014, respectively. Cost estimation for third (12-story 66 unit) building in progress, with construction due for completion in 2015. - Energy savings in new pilot buildings re-evaluated | To be achieved by the end of the Project |
|  | - Number of pilot buildings designed and renovated - Energy consumption of pilot buildings relative to similar new and existing buildings in Turkmenistan | Three designs for reconstruction developed and implemented with at least 44% energy consumption reduction | - Confirmation about joint renovation of demonstration projects provided by Ministry of Communal Services. - Sites selected for renovation (3 buildings). Specifications and design of renovation projects also completed. - Energy savings in the renovated pilot buildings re-evaluated: | To be achieved by the end of the Project |
| **Outcome 4: Replication facilitated via development of skills, prototype designs and policies for energy-efficient buildings.** | - Number of architects, engineers, and students trained with regard to energy efficient building design and code compliance | - Training on energy efficient building re/construction, experience from implementing integrated building design delivered to at least 50 architects and/or engineers - Course materials on energy efficient building design and re/construction developed and delivered to at least 30 students by the end of Q4/2014 | - Presentation of energy efficient measures and energy savings potential of new and renovated pilot buildings made at the Conference within International Construction Exhibition in Ashgabat in August 2013. | To be achieved by the end of the Project |
|  | - Existence and content of executive reports and briefings of decision-makers on project findings, lessons learned and recommendations | - Executive reports and at least one high-level meeting on project findings, lessons learned and recommendations for policy makers developed and delivered to key governmental and regional policy makers by the end of the Q3/2015 | N/A yet. Regular communication on project activities with high-level officials at Ministry of Construction and Architecture, Ministry of Communal Services, Municipality of Ashgabat, and leading design agencies. | To be achieved by the end of the Project |

### Achievement of GHG emission reductions

The project objective is to reduce energy consumption and associated GHG emissions in the Turkmen building sector. The Project Document provides the key assumptions used for the calculation of the project direct and indirect CO2 emission reductions; but based on the initial findings the target direct project GHG emission reductions have been based on a highly overestimated energy consumption. And thus absolute energy savings and corresponding GHG direct emission reduction targets, mainly in new “elite” residential buildings, need a substantial review. The Inception Report and the updated Project Results Framework presented therein has mentioned in a footnote *“that the project will gather more baseline data and reconfirm this quantitative target for direct emissions reduction by the time of Midterm Evaluation”*. The initial assumptions provided in the ProDoc and a review of these targets at MTE stage are provided below.

* Assumptions provided in Project Document

**1. Direct Project Emission Reductions**

* Project activities that were supposed to reduce emissions directly were as follows: 1) Construction of three new buildings under Component 3 of the project; and 2) Reconstruction of three existing buildings under Component 3 of the project.
* **In new buildings**, expert analysis conducted during the project design indicated that more efficient materials and technologies would result in savings of at least 15% and design measures would reduce heat consumption by at least an additional 10%. **In existing buildings**, retrofitting them to comply with building codes (by that time the code # СНТ 2.01.03 - 98 on heat parameters for construction) would reduce energy consumption by an average of 38%. Obviously, this 38% savings in retrofitted buildings created some confusion in the Inception Report[[6]](#footnote-6).
* Initial assumptions for natural gas and GHG emission reductions (soure: ProDoc, Table F1):

Table 7: Direct project emission reductions as of ProDoc

| **Pilot Building** | **Size** | **Characteristics** | **Baseline** **Total Annual Energy Demand** **(m3 natural gas)** | **Potential for Savings** | **Estimated****Annual Energy Savings****(m3 natural gas)** | **Corresponding Annual GHG Reductions****(tCO2e)** |
| --- | --- | --- | --- | --- | --- | --- |
| New Buildings #1, #2, #3 | 20,299 m2 each | three 12-storey residential buildings, each 72 units, reinforced concrete construction, mineral wool insulation, central heating and cooling | 6,454,272 m³/a(each) [[7]](#footnote-7)19,362,816 m³/a (total) | 25% | 1,613,568 m³ (each)4,849,704 m³ (total) | 3,198 t/a (each)9,594 t/a(total) |
| Renovated Buildings #1, #2, #3  | 2,792 m² each | three 4-storey residential buildings, each 24 units, constructed prior to 1985, brick or keramsite construction with plaster façade; no wall or roof insulation. | 256,870 m³/a(each) [[8]](#footnote-8)770,610 m³/a (total) | 38% | 97,611 m³ (each)292,833 m³ (total) | 183 t/a (each)549 t/a(total) |
| **Total** | **69,273 m²** |  | **20,133,426 m³/a** |  | **5,133,537 m³/a** | **10,143 tCO2e/a** |

* As for the new “Elite” buildings, a baseline (primary energy) demand of approx. 6.4 million m³ of natural gas for a building size of 20,299 m² is exorbitantly high. In the ProDoc, a gas demand for heating & hot water production of about 723,000 m³ was assumed, which resulted in a specific demand for heating & hot water the equivalent of 285 kWh/m².a[[9]](#footnote-9), whereas in addition the electricity demand for cooling (and other electricity uses) based on the consumption of ca. 5.73 million m³ corresponded to a specific electricity demand of approx. 730 kWh/m².a. With a potential saving of 25% therefore the heating/hot water demand would have come down to approx. 215 kWh/m².a and the cooling demand to about 545 kWh/m².a.
* Considering renovated buildings, the specific heat demand was assumed to be about 41,250 m³ per year or an equivalent to 118 kWh/m².a, and for cooling 215,620 m³ or about 308 kWh/m².a. The potential savings have been estimated at a higher level (minus 38%) and thus the heating/hot water demand to be reduced to about 73 kWh/m² and the cooling/electricity demand to approx. 190 kWh/m².a.
* As a result, the initial annual direct reductions that were attributed to the project were expected to be approximately 10,143 tCO2e due to savings from the six pilot buildings (3 new residential buildings, and 3 existing residential buildings to be reconstructed) implemented under project activities in Component 3. Over a 20-year project lifetime, these savings were estimated to a total of **202,866 tCO2e**.

**2. Indirect Project Emission Reductions**

* Within a **top-down approach** the indirect post-project emission reductions were calculated based on GHG emission data for the residential sector available from the 2nd National Communication of Turkmenistan to UNFCCC, according to which a conservative 3% improvement in the buildings sector (including both new construction and reconstruction) compared to a baseline situation would be realistic. Considering a GEF causality factor of 50%, GHG emission reductions were assumed to equal 142,324 tCO2e per year, or 1,423,424 tCO2e over a 10-year post-project lifetime.
* Using a **bottom-up approach,** the effects and results of project activities that directly were to promote the replication of pilot approaches to new construction and reconstruction of existing buildings were considered. Based on a replication factor of 5 and the direct GHG emission reduction of 202,866 tCO2e, an additional post-project indirect reduction of 1,014,330 tCO2e were supposed to be realized over the 10-year post-project lifetime.
* The indirect project emission reductions provided with the ProDoc were therefore assumed to be in the range between 1,014,000 tCO2e and 1,423,000 tCO2e.

*[Comment: the ProDoc has calculated the bottom-up emission based on direct GHG emission reductions of 202,866 tCO2e with a replication factor of 5. Since the direct GHG emission reductions have been assumed already for a period of 20 years, the additional post-project indirect GHG reductions over the 10-years post project lifetime should have been actually halved, i.e. 507,150 tCO2e.].*

* Proposed Revision of GHG Emission Reduction Targets

**1. Direct Project Emission Reductions**

In comparison to the ProDoc, the approach to component 3 has been reasonably adapted (and thus improved) at the Inception Workshop in the way that the project team was requested to develop a detailed methodology for monitoring of GHG emission reductions tailored for concrete pilot projects, as follows:

*“Calculation of energy consumption needs to combine both methods, metering and calculation, and use assumptions in such a way that the results would be reasonable and realistic enough to calculate corresponding GHG emission savings.*

* *As suggested in the Inception Report, project direct GHG emission savings are to be calculated based on energy savings of specific energy form (fuel) realized from re/constructed pilot buildings and respective CO2 emission factor*
* *Energy savings are to be calculated as difference between weather normalized “after project” energy consumption and a weather normalized baseline consumption for space heating and air-conditioning. In case other energy savings measures will be implemented (lighting, lift, domestic appliances and other technologies) these savings are to be added to calculation separately.*
* *Energy consumption (baseline and “after project”) to be assessed by a combination of two methods: actual metered energy consumption and calculated energy consumption*
* *Baseline energy consumption of newly constructed buildings are to be based on metered energy consumption in new buildings of similar construction type adjusted for its size/volume, potential other energy consuming facilities (e.g. other buildings supplied from the same boiler house, or amenities offered in these buildings).*
* *In case of only more energy efficient redesign of new buildings the metered baseline will be compared with calculated energy consumption of original building design without additional energy savings measures.*

*In addition, all reconstructed and newly constructed pilot buildings are to be equipped with building level energy meters (electricity, natural gas, heat). Building level heat meters might not be installed in buildings that have their own boiler house with already metered natural gas consumption, and if efficiency of boilers and heat piping losses can be calculated sufficiently precise.”*

The assumptions provided above and the methodology of a combined metered and calculated consumption do allow to receive a more accurate picture for assessing a “revised baseline energy consumption” and corresponding direct GHG emissions of the proposed demonstration buildings.

The project team has provided a calculation of energy savings during the MTE mission to Ashgabad, that is based on regular measurements of heat and electricity consumption in 3 buildings to be retrofitted, as well as corresponding baseline buildings (for comparison). As for the new buildings design, an expert revaluation has been provided based on technical assessments and pre-design, showing the updated baseline energy consumption of new and reconstructed buildings.

Details of the assessment, the energy consumption (in kWh/year) and corresponding primary energy demand of natural gas (in m³/year) – for both, a baseline and project scenario (after implementation of energy saving measures) are provided in the table below.

Table 8: Revaluated energy consumption (baseline and project scenario) of pilot buildings



Table 8 provides a significantly revised picture of the baseline energy demand of the pilot residential buildings and corresponding energy savings and GHG emission reductions. The variation of the updated baseline consumption versus annual energy savings (“NEW”) in comparison to the assumptions made in the ProDoc (“OLD”) are provided in Table 9 below.

Table 9: New assumptions for GHG emission reduction

| **Pilot Building** | **Size** | **OLD****Baseline Total Annual Energy Demand** **(m3 natural gas)** | **Potential for Savings** | **Estimated****Annual Energy Savings****(m3 natural gas)** | **Corresponding Annual GHG Reductions****(tCO2e)** |
| --- | --- | --- | --- | --- | --- |
| **New Buildings:****NEW:****No. 1 (Elite Oguzhan)No. 2 (Elite Niyazov)No. 3 (Apartment 148-U)****Total (New):** | 60,897 m2 (OLD)**NEW:****23,307 m²35,498 m²4,972 m²****63,777 m²** | 19,362,816 m³/a(OLD)**NEW:****859,589 m³/a1,489,436 m³/a189,783 m³/a****2,538,808 m³/a** | -25% (OLD)**NEW:****-14%-14%-37%****(-87%)** | 4,849,704 m³/a (OLD)**NEW:****118,145 m³/a209,021 m³/a70,033 m³/a****397,198 m³/a** | 9,594 t/a (OLD)**NEW:****224 t/a397 t/a133 t/a****755 t/a** |
| **Renovated Buildings:****NEW:****148-U76-UUz-500****Total (New):**  | 8,376 m² (OLD)**NEW:****4,972 m²2,672 m²2,282 m²****9,926 m²** | 770,610 m³/a(OLD)**NEW:****269,111 m³/a143,303 m³/a 196,100 m³/a****608,513 m³/a** | -38%(OLD)**NEW:****-44%-53%-49%****(-21%)** | 292,833 m³/a(OLD)**NEW:****117,278 m³/a75,777 m³/a 95,435 m³/a****288,490 m³/a** | 549 t/a (OLD)**NEW:****223 t/a144 t/a181 t/a****548 t/a** |
| **Total GHG Emission Reduction (per year)****-87.2%** | 10,143 tCO2e/a(OLD)**1,303 tCO2e/a(NEW)** |
| **Total GHG Emission Reduction (over 20-years lifetime)****-87.2%** | 202,860 tCO2e/a(OLD)**26,056 tCO2e/a(NEW)** |

**New Baseline:**

The baseline energy demand of *new building constructions* is now being based on the calculated energy demand of the three pilot constructions (from which two are “Elite” buildings, and the third is a new panel-type apartment building). Their total annual energy demand (primary demand of natural gas in m³) is 2,538,808 m³ per year for a total building size of 63,777 m². The baseline energy consumption is estimated to be about 87% lower than for three “Elite” type buildings assumed in the ProDoc[[10]](#footnote-10).

The baseline energy demand of *renovated buildings* is now considering the measured energy demand of three pilot apartment buildings that were selected for rehabilitation in the project. Their total annual energy demand (primary demand of natural gas in m³) is 608,513 m³ per year for a total building size of 9,926 m². Their baseline energy consumption is therefore estimated to be about 21% lower than for three apartment buildings that were considered in the ProDoc[[11]](#footnote-11).

**New GHG Emission Reductions**

In addition to the baseline energy demand the project team has calculated energy savings to be realised through different measures to be applied in new as well as renovated pilot buildings.

Typical measures applied in new construction:

* Improved roofing (insulation)
* Windows with low-emission films
* Additional door-closers in building entrance areas
* Use of heat-reflective screens between the radiators and the outer wall of the building
* Automatic heating/cooling control
* Lighting in stairwells with motion-sensors
* A-class labelled equipment and home appliances (e.g. electric ovens, chillers)
* Glazing of balconies (only regular apartment blocks)

The calculated energy saving in new construction is about 15 % of the baseline energy demand. As for the three new apartment buildings, this is expected to result in direct annual GHG emission reductions of about 755 tonnes or approximately 15,094 tonnes over a 20-year lifetime of the building.

As for existing buildings, the following energy-saving measures are being considered for the rehabilitation:

* Mineral wool insulation of roofs
* Windows replacement and application of low-emission films
* Closing building entrance areas with separate doors
* Use of heat-reflective screens between the radiators and the outer wall of the building
* Lighting in stairwells with motion-sensors
* Glazing of balconies (only regular apartment blocks)

The calculated energy saving for renovated buildings is about 47 % of the baseline energy demand. As for the three existing apartment buildings, this is expected to result in annual GHG emission reductions of about 548 tonnes or approximately 10,963 tonnes over a 20-year lifetime of the building.

**The new direct total GHG emission reduction of the pilot activities to be implemented in component 3 is therefore calculated as 15,094 + 10,963 = 26,056 tonnes CO2e over a period of 20 years.**

* Current Achievements of GHG Emission Reduction Targets

Based on the actual project achievements there are no direct GHG emission reductions that can be assigned to project yet. Since several of the targeted outputs, so also the component 3 including the pilot projects are still in implementation or not started yet the final evaluation report will have to provide an assessment of actual 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: the . 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 monitored through building energy audits. 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 improved standards for new and existing 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 tough 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 component 3.

Through the project, monitoring of the direct GHG impact in demonstration buildings (through detailed energy monitoring and building energy audits) will be achieved. 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 or available at all.

### Evaluation of Results

Table 10 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 based mainly on:***

* ***Relevance***: the topic of EE in buildings is very relevant for the Turkmen government and so is the design of the project. The project reflects the need of Turkmenistan to improve energy efficiency regulations and standards for the building sector and the inadequate level of compliance of housing construction with a specific view on their energy performance. The project is further about to prepare the grounds for building energy passportisation and/or labeling of residential buildings, including methodology of building energy performance calculation and compliance responsibilities and institutional and regulatory setup for enforcement of such scheme. Although the international technical advisor and project team do not see labelling schemes appropriate for widespread implementation in Turkmenistan, showcasing energy performance documentations in pilot projects does make sense and will empower stakeholders with basic knowledge that adds value to energy-efficient properties and thereby creates strong incentives and ideally, competition among building owners to achieve energy efficiency.

Nevertheless, the new building codes, together with the ones on *Building Climatology* and *Building Thermal Engineering* to be still developed (by the way the most important ones in setting thermal requirements of buildings), are waiting governmental emplacement and their enforcement in order to become effective in the market. In the meantime, the project is to showcase good examples of energy efficiency building design in new and existing buildings combined with energy management and auditing elements (e.g. metered consumption and monitoring of gas and electricity consumption in buildings). The simple goal is to show how reading meters and possibly other data can lead to improved management of energy consumption. Notably, it is expected that such an approach will fit neatly with major initiatives on installation of meters, recently launched in Turkmenistan based on strong direct expressions of support for energy efficiency and metering from the President’s Office. Furthermore, aside from education and communication efforts to be implemented by the project team itself, the project will also develop new programs on energy efficiency to be implemented officially as part of instruction for students at the Turkmen State Institute for Architecture and Construction (TSIAC).

* ***Efficiency:*** Project Management is generally well established with an acknowledged project manager and a core team of key technical experts and international advisors.

Irina Atamuradova, Low-emission Development Component Manager at UNDP Turkmenistan, is serving as manager of the project – defining overall strategic directions, supervising three national experts responsible for project components, and overseeing the creation and implementation of work plans. She is performing these responsibilities with distinction. As both a manager and a strategist, she is a very strong asset of the project.

Ms. Atamuradova has noted that national partners and the national expert component leaders – while surely congenial, reliable, and technically very competent – have shown, to varying extents, rather weak initiative and incomplete understanding of project components. To address these shortcomings, Ms. Atamuradova has emphasized the importance of defining very clear, detailed, step-by-step work plans and timetables for each component leader. She herself has required each of the experts, in close conjunction with relevant national partners to prepare draft plans for 2014, which she has integrated into a single document and thoroughly reviewed. The full Annual Work Plan for the project was submitted to UNDP management around 20 January.

The project has also prepared letters of agreement elaborating expected commitments and timetables from key national partners (Ministry of Construction and Architecture, Ministry of Communal Affairs, Municipality of Ashgabat, the State Corporation “Turkmen Oil and Gas Construction” and the Turkmen State Institute of Architecture and Construction). These letters have been accepted in principle but to date, Ministry of Communal Affairs and TSIAC haven’t signed their letters yet.

* ***Effectiveness***: To a large extent, problems of mismatched interests between the project and its national partners have arisen from the Project Document, which foresaw a very large role for the state concern Turkmengaz but presented the roles of other partners with less clarity. Indeed, Turkmengaz remains the named national executing partner of the project and has been reliable and supportive. It has a certain amount of influence within Turkmenistan, and is well funded. However, for the vast majority of policy and programs in the building sector, the Ministry of Construction (for new buildings) and the Ministry of Communal Services (for existing buildings) bear primary responsibility in Turkmenistan, which in turn receive their budgets and policy mandates from the Cabinet of Ministers.

Therefore, success in the project depends on support from these two ministries and the Cabinet. However, for much of the project period, such support has fallen short of required levels, especially from the Ministry of Communal Services. During the inception phase of 2012 and 2013, the project faced difficulties and delays across all of its key technical components. The delays arose in large part because the timetables and annual budgets of government partners did not match with the planned activities of the project. It is highly urgent, therefore, for the project to make significant progress in all areas in the remaining implementation period. Fortunately, it appears that the project and all of its partners have come to agreement on essentially all key plans, and the team is on target for fulfillment of an ambitious, highly detailed 2014 Annual Work Plan. This is already a significant progress compared to the previous years and will hopefully allow the project to deliver results.

As for the output themselves, the project has made good progress in key areas, in close correspondence with the 2013 and 2014 Annual Work Plans, most notably:

* Completion of revisions to the building codes “Residential Buildings” and “Roofs and Roofing” as well as associated guidance manuals, submitted on time to Ministry of Construction and Architecture in Q4 2013;
* Selection of 22 buildings in nine cities for energy audit, with installation of gas meters and hiring of a contractor, with completion due on time in Q3 2014;
* Completion of design work and initiation of construction of two new pilot EE residential buildings (9-storey, 54-unit and 12-storey 114-unit), with entry into operation due on time in Q4 2014 (third new building also remains on appointed timetable) and Q1 2015.

But implementation of other outputs has already lagged or is under threat of delay because of insufficient availability, slow responses, or absent permissions from national partners:

* Selection of authorized national organization for revision of codes “Building Thermal Engineering” and “Building Climatology” completed in Q2 2014, one quarter later than 2014 work plan. The 2014 work plan itself represents a departure from the 2013 work plan, which called for the submittal of the code to the Ministry of Construction for adoption already by the end of 2013. The reason for the delay is the unclear responsiveness for several months, and ultimately the unavailability of the thermal code’s original author, Turkmenkommuntaslama, which required engagement of a new authorial group at Turkmendovlettaslama.
* Completion of three pilot renovation projects originally scheduled for Q3 and Q4 2013, but then shifted to Q3 and Q4 2014 because of absence of necessary permissions and financing from Ministry of Communal Services. Formal Ministry approval still pending. High risks of delay for start of construction renovation on time in Q3 2014.
* Training and development of educational materials has been delayed with the delay in implementation of the renovation demonstration projects.
* Despite numerous contacts and meetings with project staff, Turkmen State Institute of Architecture and Construction has not approved collaboration on introduction of new EE curricula. Shortly before the mission of the MTE consultant TSIAC has obviously decided to sign the Letter of Agreement with UNDP; this message was conveyed during the meeting with MTE consultant and project manager in July 2014.
* The Project does not have an effective communication and awareness plan. Lack of involvement of educational institutes as TSIAC to upgrade existing tertiary education system hasn’t shown results so far. General awareness on energy and energy efficiency requirements is at overall very low, and the project has not had a clear strategy yet to tackle this issue.

As a result of these delays or shortcomings, there is still moderate risk that some of the major project outputs may not be achieved as expected or within the given timeline of the project.

**The overall evaluation of project results in respect to the above mentioned criteria is therefore to be rated as Moderately Satisfactory (MS).**

Table 10: Overall Evaluation of Project

| **Component** | **Relevance** | **Efficiency** | **Effective-ness** | **Overall** |
| --- | --- | --- | --- | --- |
| 1. Energy consumption in new buildings is reduced beyond current requirements
 | HS | MS | MS | MS |
| 1. Turkmengaz and other national agencies understand the potential for savings in its housing stock and have the capacity to identify and undertake investments in energy efficiency there.
 | S | S | MS | S |
| 1. Energy-efficient design and technologies are incorporated and visually demonstrated in new and reconstructed residential buildings.
 | S | MS | MS | MS |
| 1. Replication facilitated via development of skills, prototype designs and policies for energy efficient buildings
 | MS | MS | MU | MS |
| **Overall Rating** | **S** | **MS** | **MS** | **MS** |

### Project Impact

Promoting energy efficiency in residential buildings in Turkmenistan poses unique challenges. The country is very rich in fossil fuel resources and its political leadership provides gas and electricity essentially free of charge for residents, which does not facilitate the energy savings efforts, although rethinking takes place in this respect, since e.g. market players such as Turkmengaz ostensibly has a strong incentive to pursue energy efficiency, since it would allow them to export more of their gas at world market prices. Indeed, nowadays energy consumption is not even metered in most buildings. But under the leadership of President Gurbanguly Berdymuhamedow, Turkmenistan has recently begun to implement reforms to encourage prudent stewardship of the nation’s natural wealth and to consume energy with greater efficiency and awareness. Turkmengaz is implementing a huge gas meter programme and has committed to install approx. 700,000 of meters in the country by 2016.

Taking into consideration the specific situation of the country and its recent political will to foster energy efficiency measures to evolve in and around the building sector, as of the MTE, the project with its envisaged targets and outputs has a good prospect to create a significant impact in the country.

One of the most relevant and growing sectors in Turkmenistan is the building sector. This sector offers also the single largest and most cost-effective opportunity to improve energy efficiency (similar to other countries)[[12]](#footnote-12). Covering a wide range of new and existing building types from standard state-supported housing to modern high-comfort buildings, the project anticipates to bridge policy implementation (rather than anticipated policy proposals, as initially designed in the ProDoc) and technical best practices through its four major components:

* Revision of four national building codes.
* Promotion of energy audit, energy management, and investment in upgrades in existing buildings.
* Demonstration of best practices in new building design and renovation.
* Education and outreach.

However, at MTE stage there is still a gap in the projects anticipated targets to be met and thus creating *real* impact of project outputs.

* First, newly refined building codes need to be actually approved by the Government and thus become mandatory and enforced. Although the political commitment seems to literally become stronger in favour of energy efficiency policy the approval of the ongoing and newly developed codes remains with the Government and thus effective approval uncertain. Although, since the codes will be accompanied by official guidance manuals that will follow each of the four codes (intended to help building designers to understand the codes, their calculation methods, and various design solutions needed to achieve compliance), they will help increasing the awareness among technical experts and eventually also with governmental stakeholders.
* Demonstration projects will show that through improved design energy savings of at least 15 % - 40 % (for new buildings) and 45 % - 55 % (for renovated buildings) are realistic to be achieved compared to a baseline. However, it can be also argued that energy efficiency levels to be achieved by the demonstration projects are not energy efficient enough when comparing specific energy consumptions of showcase buildings with today’s common practice, even in countries in the region with similar climate. However, the country is doing its first steps in addressing the issue of building energy efficiency and thus moving slowly, but hopefully steadily into an era that will put greater emphasis into an energetically optimised and comfortable building stock.
* The project impact in the long term would be improved if energy efficiency considerations would become mandatory for all new and reconstructed buildings financed from public funds. Energy efficient reconstruction of existing building stock is practically none existent due to low awareness, missing legislative background and standards enforced, low technical capacity of design institutes, and scarce sources of financing. Increasing the impact would consequently need to result in a broader national plan that would still call for significant direct investment, but would also include other key elements – such as support for implementation and periodic revision of building codes, training, etc. – essentially, all the current activities of the project but expanded and extended into the future, with the substantive added element of direct state investment.
* 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 GHG emission savings is substantial. Achievement of the quantitative targets of the project for gas savings and avoided GHG emissions will depend on activities and outcomes that reach the Turkmen construction sector on a broad scale – revised building code requirements, education on building design, and programs for building renovation and energy management of existing buildings. Results in all of these areas remain pending as of the MTE stage, with significant remaining uncertainties.

**Considering the project impact that the GEF project has already created on the level of governmental stakeholders but with several uncertainties still remaining in respect to their effective implementation the Project is therefore rated Satisfactory.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Highly Satisfactory** | **Satisfactory** | **Moderately Satisfactory** | **Moderately Unsatisfactory** | **Unsatisfactory** | **Highly Unsatisfactory** |
|  | **S** |  |  |  |  |

### Prospects of Sustainability

The project has been designed to deliver sustainable impact in Turkmenistan. Sustainability will arise if the improved framework conditions for energy efficiency that the country’s government with the help of the Project will initiate, are effectively enforced. Prospects of sustainability are therefore:

* Government is starting to realise that energy efficiency improvements will benefit the country also in economic terms. Usually, consumers and utilities get the strongest benefits of energy efficiency since their operating costs are being reduced (and indeed, often the “owner-user-dilemma” is referred to the interest conflict between housing owners/developers and residents in getting the benefits of energy cost savings). In Turkmenistan, consumers and Turkmengaz would not get strong benefits from an energy efficiency investment program. The main beneficiary of an investment program will be the state itself – as it ultimately receives gas revenue (and thus Turkmengaz itself is a state agency profiting as well).
* Awareness will have to grow continuously among governmental stakeholders, architects and design institutes as well as end-users. The project can add value added in this respect and thus contribute to fasten this process.
* Cross-cutting capacity measures, such as the development of policy recommendations and testing of key measures, such as an incentive program for high-efficiency buildings and a system of energy passports for buildings, will encourage the incorporation energy efficiency concepts into government policies and measures
* New technologies (renewables, energy efficiency) and suppliers of these technologies will have to continuously emerge 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[[13]](#footnote-13)***.

* Under Component 2, the project will prepare broad recommendations on energy management for the whole country, more or less as foreseen in the Project Document. These recommendations will focus on how to make national metering programs most effective using levels of technology and analysis appropriate for particular buildings. Furthermore, in order further to support national-scale initiatives on energy management, the project will support a study tour, probably to Croatia, for officials and national experts, to creating political will and a sense among key parties that wide implementation energy management is achievable and worthwhile.

Sustainability of Outcome 2 is rated ***Moderately Likely***.

* Under Component 3, the energy efficient pilot buildings, both new and reconstructed, will incorporate measures and techniques that can be replicated by housing developers and construction companies in the future, and the energy passports on the pilot buildings will provide a visual demonstration of the life-cycle savings that are possible. It is to be expected that a real economic effect only via large-scale implementation of energy efficiency measures can happen, especially insofar as widespread implementation means reduction of unit costs of chosen solutions. The majority of buildings in Turkmenistan of the U-148, U-76, and Uz-500 series were built in the Soviet era and even today, U-148 and U-76 continue to be built in Ashgabat and around Turkmenistan. There remains still a large potential for the typical apartment building and the new series of “Elite” buildings to enforce stronger energy efficiency measures (with even higher savings), but this will depend on an effective energy efficiency building code.

Sustainability of Outcome 3 is rated ***Moderately Likely***.

* Under Component 4, strengthening the capacity of architects and engineers to design more efficient buildings is expected to result in cost-effective techniques that these professionals will continue to use in their businesses. The component involves efforts in education of professionals and communication about project activity to interested parties and the general public, in support of implementation and replication of the technical achievements of the other three components. Furthermore, the project will also develop new programs on energy efficiency to be implemented officially as part of instruction for students at the TSIAC. One is the inclusion of energy-efficiency sections within existing disciplines of architecture, gas/heat supply, and industrial/urban planning at TSIAC; and another component is the creation (at later stage) of a self-standing discipline on energy efficiency. Yet, the project hasn’t shown progress in this respect and due to reluctant commitment of TSIAC and so far lagging behind the expectations, outcome of this activity is uncertain.

Sustainability of Outcome 4 is rated ***Moderately Unlikely***.

**Project sustainability is rated Moderately Likely.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Likely** | **Moderately Likely** | **Moderately Unlikely** | **Unlikely** |
|  | **ML** |  |  |

### Identification and management of risks (Adaptive Management)

During the inception stage project related risks have been identified. In general, the nature and content of the risks did not change to major extent. However, the project team has taken several adaptive measures to minimise or reduce risks. The updated evaluation and rating of risks and their mitigation strategy is provided in the following table.

Table 11: Update of risk mitigation strategy

| **At Inception Stage** | **At MTE Stage** |
| --- | --- |
| **Project Risks** | **Rating[[14]](#footnote-14)** | **Rational for the rating** | **Updated Rating** | **Rational for rating / Risk Mitigation Strategy** |
| Lack of governmental commitment to revise and introduce more stringent building codes and other regulations supporting energy efficiency | **L - M** | The government has demonstrated strong interest in housing reforms and in climate change mitigation; it understands that building codes represent a straightforward and effective means of reducing end-use consumption in the housing sector. However, there is no binding formal commitment of the government to adopt new regulations supporting energy efficiency.  | **L - M** | The reasoning for the rating has not changed significantly. In the meantime the co-operation with government stakeholders is showing more firm results and thus their commitment seems stronger. But risk of final non-performance still there.Mitigation Strategy:Approach top level policy and decision makers and inform them about project achievements and benefits of strengthened building codes and new energy efficiency regulations. |
| Low incentives among housing developers to introduce more efficient designs and energy-saving measures | **L** | All developers have to comply with building codes, which will continue to become more rigorous over time, and because the financial incentive developed under the project will reward developers who produce significantly more efficient buildings. | **L**  | There is a very strong authority hierarchy in the country. Legal implications are therefore immediately taken into action.Review the system of building codes enforcement and propose an effective system of compliance control (published energy passports of newly re/constructed buildings, control system of energy passport correctness). |
| Lack of funding to support investments in the housing sector and to finance pilot projects | **L** | Although there are no long-term binding investment plans for construction of new housing estates and reconstruction of existing buildings, the government annually approves investments for building re/construction. It is expected that this practice will continue in the future as well, since housing development and improvement is a country priority. A general agreement on financing of pilot projects is in place. | **L - M** | Although there is no formal plan approved for the investment in new/renovated construction, the government through Ministry of Construction has approved funds for the new pilot buildings. Whereas the financing of investments in existing (renovated) buildings has been not approved yet.Letter of Agreements (LoA) were signed with Min. of Construction, Municipality of Ashgabat and State Corporation “Turkmen Oil and Gas Construction”. Ministry of Communal hasn’t signed the LoA yet, why the perceived risk is slightly higher than at Inception Stage. |
| Lack of funding for replication of pilot projects | **M** | The willingness to finance replication of re/construction of energy efficient housing will critically depend on the level and affordability of incremental costs. The lower the incremental costs will be the higher will be the probability and scale of replication. | **M** | Affordability of incremental costs for EE measures is one issue, another one is commitment of funding institutions. Cabinet of Ministers is the main decision-maker, in overall their commitment will be also measures on performance of this project to decide about replicability.During design of re/constructed buildings focus not only on energy performance and energy and GHG savings targets, but balance energy savings with incremental costs – and keep incremental costs at minimum if possible. |
| Incremental costs of pilot projects, especially in case of newly constructed buildings will be unnecessarily high (and correspondingly costs of GHG emission reductions in USD/ton of CO2 as well) | **M** | Newly constructed pilot buildings are currently planned to be based on already existing and approved typical building design which reduces the potential to fully implement Integrated Building Design. | **M** | Work and agree with building developers/investors to develop a completely new design of a pilot building with a target to minimize incremental costs and achieve the target of 25% energy savings.Select an experienced international energy efficiency building architect/expert based on demonstrated experience not only in design and construction of energy efficient housing, but in the same time of housing with minimal incremental costs. |
| Replication factor of pilot buildings and sustainability of project results will be limited | **L - M** | In addition to financing of incremental costs, the replication and sustainability of project results will heavily depend on capacity of local architects and designers to fully implement improved building design – i.e. their capacity to design energy efficient buildings with minimal incremental costs. | **M** | Capacity and awareness raising activities are key to replicate the project results. Remaining project period will have to focus the training of local architects, designers and engineers in EE building code compliance and improved building design. Yet there seems so far reluctance of stakeholders such as TSIAC to engage. |

*Other potential risks can be currently assessed as follows:*

* *Delay in the schedule set for the pilot building construction and overall delay in project finalization*: Pilot buildings are planned to be constructed in Ashgabat. Energy efficient designs of three new demonstration buildings are already completed and reviewed by International consultant on building design. While 2 of them will be finishing construction before the end of 2014 (actual plan: October), the third one will complete construction by February 2015.

In case of renovated buildings, there is a delay caused at the three pilot retrofits selected and confirmed by the Ministry of Communal Services. Specifications and design of renovation projects also completed, however it’s not clear when budget approval and start of construction will take place (or if at all). So, there remains a critical risk of finalizing the pilot projects in 2014 (in fact this does not seem to be realistic at all anymore), which also leads to the conclusion that the foreseen project end date is at high risk not to be met, since there is the need to monitor and evaluate the effectiveness of energy efficiency measures applied to pilot buildings in terms of energy savings, user behavior, etc. A minimum of 6 months extension due to this delay is expected to be required.

* *GHG emission reductions are much lower than initially foreseen*: as mentioned in chapter 3.3.1.1 above, it was required to adapt the GHG mitigation targets that the project is able to achieve from the initial assumptions made in the ProDoc/CEO Endorsement Document. The result is that the anticipated direct GHG emission reductions are going to be far lower (-74 %) than forecasted, with a low, but prevailing risk to be even lower, in case parts or all of the remaining pilot projects are not going to be implemented.

**Adaptive Management**

The project has had to exercise adaptive management extensively throughout the entire project period, with delays arising from various factors as noted above. The project has, with the notably active participation of the highest level of management at UNDP, worked as hard as possible to engage national partners where participation and support have been needed but lacking. This work includes regular contact and meetings; preparation of detailed letters of support for co-signature; engagement of Turkmengaz to exert its persuasive influence on other agencies; and other advocacy.

For the most part, major changes of course have not been deemed necessary in the components themselves. The most significant change, which was facilitated by the International Chief Technical Advisor with oversight by the UNDP/GEF Regional Technical Advisor, was with (1) shifting the focus of Component 1 away from incentives and long-term transformation of the enabling environment for building codes, and toward the immediate adoption of new and revised building codes themselves, (2) as well as the concept of development of a national investment plan for EE improvements to buildings. The project has recognized that even with the strongest technical justification, advocacy for such a plan would likely face a difficult path to approval by the Cabinet of Ministers of Turkmenistan, with even the very term “investment plan” likely to trigger skepticism and resistance. Instead, the project team intends to elaborate a broader national plan that would still call for significant direct investment, but would also include other key elements such as support for implementation and periodic revision of building codes, training, and so on – essentially, all the current activities of the project but expanded and extended into the future, with the substantive added element of direct state investment.

**Adaptive management is rated Satisfactory.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Highly Satisfactory** | **Satisfactory** | **Moderately Satisfactory** | **Moderately Unsatisfactory** | **Unsatisfactory** | **Highly Unsatisfactory** |
|  | **S** |  |  |  |  |

# Conclusions and Recommendations

## Conclusions

The EE Buildings Project has been operational for about 30 months (out of planned 48 months) since it has been kicked-off, with about 36% 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 moderately satisfactory progress primarily since beginning of 2014 only. Achievements per Outcome 1 are not fully fit into the Project’s implementation timelines due to delay in progressing the finalization of the revised international building codes. The new building codes, together with the ones on *Building Climatology* and *Building Thermal Engineering* to be still developed, are waiting governmental emplacement and their enforcement in order to become effective in the market.; the final version is pending and yet unclear when the remaining building codes will be available.
* Otherwise, most of the log frame indicators are generally still on track, considering their time for finalisation throughout the remaining period of project implementation. Special attention is currently paid to the pilot projects (Component 3) as it is the most complex task involving several stakeholders from Ministry of Construction, Ministry of Communal Services and City of Ashgabad. Current status is that the project will implement 6 demonstration projects, from which 3 will be new housing developments (2 “Elite” style high-end buildings, 1 apartment block), and three building renovations (apartment blocks from different construction periods). As a direct result of the project implementation, so far about USD 0.28 million GEF co-financing (out of USD 0.8 million) was leveraged.
* Although the project is not fully on track regarding implementation of EE legislation and standards, the relevance of the EE topic is high for the Turkmen government and project stakeholders are principally committed to proceed with the activities they committed themselves to. Stronger co-ordination between decision-makers with support of the Project Management and Project Board 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:
	+ **The Basis for legislative framework improvements on building energy efficiency has been provided:**
		- Revision of four national building codes. Technical enhancements to these codes include elimination of outdated minimal levels of permitted thermal efficiency, as well as new calculation methods, new regulations on cooling efficiency, and inclusion of new documentation and rating requirements.
		- New codes to be considered for update: *Residential Buildings, Roofs and Roofing, Building Climatology, and Building Thermal Engineering.* Work on the first two codes has proceeded with only slight delays relative to the timetable set forth in the 2013 Annual Work Plan. Revised versions are scheduled to be submitted for final approval by summer 2014.
		- Revision of *Building Climatology* remains on its original timetable, with the revision process planned throughout 2014 and development of a final document to be completed by the end of the year. Work on *Building Thermal Engineering*, which is the most important of the four codes in terms of energy efficiency, has been delayed by approximately one full year because of scheduling and budgeting issues at the Ministry of Construction. Discussions about what revisions should be done on this code (or indeed, whether a whole new code on energy efficiency should be developed instead) occupied some time in 2013 as well.
		- It appears that the plans of the project and Ministry are in good order for 2014. According to the updated schedule, *Building Thermal Engineering* will be revised and a final version developed by the end of 2014. Each of the four codes will be followed by an official guidance manual intended to help building designers to understand the codes, their calculation methods, and various design solutions needed to achieve compliance. This schedule is contained both in the team’s Annual Work Plan and in the joint work plan to be submitted with a letter of agreement to the Ministry of Construction for approval.
		- Component 1, according to the Project Document, also will seek to develop and implement an energy-performance documentation system called the Energy Passport. Energy Passports, which are widely used in conjunction with building energy codes in Russia and Central Asia, are essentially standardized documents with embedded calculations to assess energy performance and demonstrate code compliance. Energy Passports also involve a rating system, based on percent deviation from code requirements for new buildings. The project is on track to fulfill its projected outputs for Energy Passports in direct conjunction with revision of *Building Thermal Engineering*, which will define the system and all its elements.
		- The project document and the Annual Work Plan for 2014 foresee the development of recommendations regarding labeling in conjunction with Passports in Turkmenistan. The purpose of energy-related labeling, ultimately, is to deliver information to market stakeholders – especially buyers and renters of buildings – so that they can distinguish among buildings in terms of their energy performance, and ultimately, favor energy-efficient buildings over inefficient ones. Empowering stakeholders with basic knowledge adds value to energy-efficient properties and thereby creates strong incentives and ideally, competition among building owners to achieve energy efficiency.
		- However, it appears that labeling of buildings is not appropriate for widespread implementation in Turkmenistan. Market conditions do not justify labeling as an instrument to create such incentives. First of all, heat, gas, and electricity are practically free for most of the population. Furthermore, the market for real estate is not so well developed as to be responsive to new information about energy performance. One possible way for labeling to be meaningful in Turkmenistan is therefore for promotion of certain showcase buildings.
	+ **Demonstration buildings to use energy efficient design and construction principles are partly on the way**
		- Respective design works in the demonstration buildings in Ashgabad are completed and the building is commissioned.
		- Letter of Agreement has been signed with the Ministry of Construction and Architecture to implement Joint Action Plan for revision of building codes and development of guidance manuals to building codes.
		- Letter of Agreement has been also signed with the Municipality of Ashgabad (Department of Capital Construction) and the State Corporation “Turkmen Oil and Gas Construction” concerning the application of energy efficiency measures in the construction of pilot buildings.
		- Demonstration buildings for development of energy management plan were selected and agreed upon with Ministry of Communal Services. The buildings were inspected, and the availability of energy meters analyzed.
		- Co-financing was committed by State Corporation “Turkmengas” for more 800 thousand gas meters in residential buildings. This will help to initiate a broad metering programme in residential buildings in the future.
	+ **Public outreach, awareness and training activities on integrated building design are on the way**
		- Training on energy efficient design, engineering equipment and maintenance of energy efficient buildings was delivered for forty architects and engineers.
		- Further educational and professional development needs pertaining to energy efficiency building design to backup further amendment of university curricula to be assessed
		- Recommendations on (i) applicability of the building energy efficiency rating system, and (ii) technical assistance on building energy efficiency can be seen as elements to foster EE assessment of newly constructed buildings.
		- Regular communication on project activities was established with high-level officials at Ministry of Construction and Architecture, Ministry of Communal Services, Municipality of Ashgabat, and leading design agencies.
		- Lesson learned reports of similar projects were studied. Recommendations to include energy efficient aspects to the tendering requirements of residential buildings were developed and delivered to the Cabinet of Ministers of Turkmenistan.
		- Public outreach activities:
			* Presentation of energy efficient measures and energy savings potential of new and renovated pilot buildings made at the Conference within International Construction Exhibition in Ashgabat in August 2013
			* Project folder and general information material about the project activities were developed and distributed.
			* The project is part of the common initiative of UNDP-GEF Projects being implemented on Buildings Energy Efficiency in Central Asia (Kazakhstan, Kyrgyzstan, Turkmenistan, and Uzbekistan) and Armenia published on the website ([www.beeca.net](http://www.beeca.net)). The network is providing valuable inputs to the EE building design and sharing experiences among the countries.
* 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 initially foreseen to be December 2015. There are some significant delays expected for the finalization of the pilot projects from today’s point of view, which make an extension of the project duration useful, especially in respect to monitoring results and achievements in terms of energy savings, and impact on user comfort.

## Recommendations

**Recommendation 1: Legislation framework has been developing with the support of the Project, but focus is needed to achieve government adoptions of new Turkmen Building Code and linking it with an investment planning and new national strategy on energy efficiency in buildings.**

* Delivering key movement on Outcome #1 is one of the main targets of this Project. Its success will very much determine the success of the whole project and its future market transformation impact in providing the path for a more energy efficient construction regime in the country.
* Therefore, UNDP country office together with Project Management should maintain high-level involvement at governmental and prime ministers’ level to force the project partners to attain the agreed outputs. For instance, providing government stakeholders with a clear idea about the need for improving the energy efficiency performance of the country’s building sector is seen crucial. A major driving point might the fact that based on increased efficiency on the domestic market it will be possible in the long-run to sell more natural gas to foreign countries – with a main advantage to increase the comfort of living of the own population.
* An effective implementation and enforcement mechanism to apply the new building codes on the construction market will be the key for success. A detailed timeframe for adoption of new building code, technical standards (GOSTs) and supporting manuals will depend on the Government and the speed at which the proposed codes will be finally approved and become effective in the country. UNDP support and intervention on higher level (e.g. Cabinet of Ministers) should be proactively sought to better engage among all project partners and beneficiaries on government level (mainly the involved ministries and design institutes).
* Furthermore, the project should follow closely the situation with the review of other EE building codes in the region and learn from best-practice implemented in other countries.
* Perhaps the most important part of Component 2 is the **development of investment plans for increasing energy efficiency in buildings in Turkmenistan**. As articulated in the project document, this part of Component 2 calls for the project to assist Turkmengaz in developing a demand-side management (DSM) program for energy efficiency in the building sector. If Turkmengaz reduces the volume of gas it supplies for free to domestic consumers, then it will have more gas to export at world market prices. Thus, Turkmengaz apparently has a strong incentive to pursue energy efficiency. Given all this, Turkmengaz can be a partner, but ultimately, a meaningful investment program requires approval at the Cabinet level and implementation in buildings at the Ministry level.
* The government needs to create and approve a plan for annual allocation of state budget funds for energy efficiency in buildings, especially with regard to existing building stock.  This allocation should be spent mostly on actual measures to improve efficiency in real buildings – insulation, windows, enclosed entryways, better controls, solar protection, better water heaters and other equipment, etc.  The scale of this program should be large, ideally covering the country’s entire building stock over the course of, say, two decades.
* The project’s role is to provide the technical basis for identifying what measures should be included.  This technical basis would come primarily from energy audits, as well as other research on best available technology and practices.  Then the project would also help to elaborate and justify the annual allocation of budget funds, probably through the work of a hired consultant on economic analysis.
* The planned output for this activity shall be a comprehensive set of recommendations by the project team, which would form the basis of a national plan, plus follow-up support for refinement of the plan itself.

**Recommendation 2: Ensure that institutional bodies to take energy efficiency forward and market awareness is created in the longer term**

* A mandatory building EE legislation considering minimum energy performance standards is required in Turkmenistan (similar to other countries in the region) 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 (by-)laws and regulations will be required and thus public bodies to be created/assigned with specific tasks; although this development is at very early stage in Turkmenistan so far and will need more time and efforts to create basic awareness among governmental and institutional stakeholders, building design and construction experts acting on the market, and the general public (mainly residents and users of buildings). Challenges laying ahead are related to the adoption of appropriate energy auditing/passportization mechanism, energy monitoring and performance-based billing systems, building materials and equipment labelling/certification, building inspection and design approval mechanisms.
* Basic assessments and information on the energy use in buildings (not only residential, but also public and private service buildings) will be required to better understand the quantitative and qualitative use of energy in buildings across different building types (and also old and new buildings). The level of information is quite weak and initial baseline assessments are being conducted within the Project through a set of energy audits in selected buildings; without such basic analysis, strategies to utilize the potential of energy efficiency conditions in the Turkmen building sector cannot be elaborated, since firm information on the actual quality of buildings in would be factually not available.
* Since the Project is supporting this process by providing basic energy audit, building assessments and studies (e.g. such as indicators and benchmarks on energy efficiency in the building sector available through energy audits and simple energy management methods introduced), institutional building for developing a country building statistics and information base for building energy consumption in Turkmenistan should be envisaged in the longer term, knowing that such institutions do not exist currently (and probably will not in the near future).

**Recommendation 3: Monitoring of project results and GHG emission reductions to be followed-up and results visualised:**

* GHG emission reduction targets had to be significantly amended due to wrong assumptions made in the baseline calculations provided in the ProDoc.
* As a result, GHG emission monitoring is to be continuously reviewed and updated 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 six pilot projects that are monitored regarding energy consumption. 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 eventually continued after project termination through a suitable public entity and staff to be trained by project GHG experts.
	+ Monitoring of energy consumption in buildings and promotion of best practices might motivate building developers, design institutes and finally residents, to understand how energy use in buildings will affect the building design and user behaviour during their operation and how users can benefit of the information generated.
	+ 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, in cases where pilot projects are to be finished soon, even longer (until end of project or even thereafter). Continuous monitoring after project termination is recommended but depending on available equipment and budget.
	+ Dissemination of evaluation results and benefits achieved is a key – The project may focus on storytelling to visualize best-practice examples in buildings. Another possibility is to organize information events for governmental stakeholders, building developers and residents to further attract attention to energy use in buildings.
* The project has a good prospect to finalize all its key activities by its planned termination in December 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 mid-2015.
* A no-cost project extension at least until May 2016 will be required just to allow monitoring and evaluating real achievements of the pilot buildings over the whole heating period.

**Recommendation 4: Project needs to monitor results effectively with the given timeline and to keep track of possible risks that need to be managed:**

* 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. Effective adaptations on the work programme and some of its components have been introduced during the Inception phase and have shown significant advantage compared to initial project design (following ProDoc) – example: the activities under component 1 that resulted in the development of new building codes (rather than providing initial recommendations).
* The Project Results Framework that was adapted and presented in the Inception Report seems to remain valid at the MTE stage. However, as moving forward, the project management needs to ensure an effective monitoring and keeping track of the missing bits in order to align the limited time frame for finalization of the work programme with the budget provisions, the given personal resources and towards the GHG emission reduction achievements to be evaluated.
* Nevertheless, in terms of timing, the overall finalization of the project is expected to require a non-cost project extension in the range of 1 to 1.5 years. The extension will be required since several of the pilot demonstrations are either still ongoing or haven’t started so far (in case of rehabilitation of buildings proposed by Ministry of Communal Services), which creates a general performance risk. From a technical perspective, it is highly recommended to initiate a detailed results monitoring (including review of energy performance, metering, interviews with residents about the level of satisfaction and evaluation of comfort aspects, etc.) and evaluate these results for future replication activities properly (i.e. at least for period of 12 months after finalization of pilot projects).
* Since the project still faces a medium risk that some pilot projects (especially rehabilitation of existing apartment blocks owned by Ministry of Construction) might not materialize, it might be useful to think about other activities that will create significant GHG emission reduction impact in the future. The project should pursue to initiate and build current activities upon a larger-scale energy management programme (e.g. based on activities that were already started in Ashgabat) that will allow to convince high-level decision makers and technical experts from the building sector to better understand the need for metering & monitoring of energy consumption in buildings to better target energy efficiency programmes in the future.
* A budget revision in line with a possible project extension will be required throughout the second implementation period of the project, although it seems that a draft budget revision done at MTE stage will allow the project funds to stay within the initial budgetary limits of each project component.

**Recommendation 5: Introduce a higher level of public outreach and institutionalise public awareness measures in the frame of the country’s policy framework**

* The Project must improve the current level of information dissemination and public awareness creation activities throughout the remaining project period. EERB needs therefore to start to draft a ToR based on the marketing strategy.
* The project team is in the need of additional marketing & communications expert (most support to be hired for improving the marketing and communication performance of the project in general). Knowing that the role of media and possibilities to implemented a widespread awareness and communication campaign are partly restricted, nevertheless the task will be to develop a marketing and communication strategy that is in line with the PR and communication means provided by and through Turkmengaz and the Ministry of Construction (and other national institutions, as deemed necessary), but should effectively address the relevance of the EE topic to national stakeholders and the general public. Elements of a marketing strategy have been developed by the International Chief Technical Advisor in early 2014, but haven’t been taken any further so far.
* Considering the limited possibilities to publish project results and achievements through own channels (such as project website, which is not deemed effective due to low general visibility), co-operations should be sought with national media and should be able to share several substantial success stories and provide general awareness topics throughout the remaining project period. This plan also will make the EERB project in Turkmenistan more consistent with other projects throughout the region, which are already actively documenting their projects’ successes via publications, Internet, and mass media.
* Furthermore, in terms of networking and know-how exchange, the Project shall maintain its good communication basis with other on-going international projects supporting the building EE in the ECA region (e.g. UNDP-GEF Projects being implemented on Buildings Energy Efficiency in Central Asia (Kazakhstan, Kyrgyzstan, Uzbekistan and Armenia) or projects supported by EU, World Bank and Asian Development Bank as well as regional or international projects (such as ESIB INOGATE, etc.).

## Lessons Learned

The GEF Project has provided value added to the development of energy efficiency framework in Turkmenistan so far by providing additional quality into the political and administrative decision-making process.

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

* Best practice from international approaches are a valuable input for developing the energy efficiency framework in Turkmenistan, especially with support and experience of national & international experts provided.
* Building Energy Performance regulation and corresponding implementation and enforcement in Turkmenistan is still in a very early stage (and to large extent not implemented yet). 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 State Design Institutes and residential building developers demonstrates that energy efficiency measures in construction projects can be accommodated in the initial design. Yet, there is low awareness and experience in the evaluation of cost-effectiveness and acceptance due to proper calculation and monitoring of costs and benefits (such as decreased energy costs, improved living standard or comfort). This awareness will have to be built with continuous information and pilot measures and based on an improved building code regime that will also consider minimum energy performance targets at a certain stage.
* 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 behaviour 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.
* As with all UNDP/GEF projects, success depends directly on the support of key national partners in the form of staff availability, budget for agreed co-financing, and political will. In the case of this project, such support has been present in certain areas but not in others, leading to delays and uncertainty. UNDP in Turkmenistan must emphasize government “ownership” of projects and their activities – that is, government agencies should feel that the project’s priorities reflect their own priorities, and that fulfillment arises from activities planned and executed in a truly joint way

In addition, the following lessons learned were highlighted during the mission and in discussions with project team members, involved experts and stakeholders:

* Highly detailed annual work plans, in which project outcomes each have numerous associated outputs, and the outputs in turn have numerous associated steps and timetables, have been a useful tool for planning, management, and tracking of results.
* The concepts of energy management and demand-side management are complex and inherently elusive to explain in all languages. Clarification of these concepts has led to significant progress in framing of project activity.
* In the case of demand-side management, the original Project Document identified an unusual and promising apparent alignment of interests, in which Turkmengaz had an incentive to invest in end-use energy efficiency in Turkmenistan, thereby reducing the quantity of gas provided for free to citizens and increasing gas available for export for profit. Nevertheless, in several respects, this view does not match with institutional conditions in Turkmenistan.
* The Cabinet of Ministers, not Turkmengaz itself, is responsible for investment decisions via the state budget.
* In Turkmenistan, consumers and Turkmengaz would not get strong benefits from an investment/DSM program. The main beneficiary of an investment program would be the state itself – as it ultimately receives gas revenue (Turkmengaz itself is a state agency).
* The responsibility for new construction lies with the Ministry of Construction and the responsibility for renovating existing building stock lies with the Ministry of Communal Services.
* Therefore, any program to promote energy efficiency in national building stock would require investment decisions by the Cabinet about the state budget on the whole, rather than by Turkmengaz alone.

# Annexes

# Annex 1: Mission Terms of Reference

**Terms of Reference for Mid-term Evaluation**

1. **POSITION INFORMATION**

|  |  |
| --- | --- |
| **Position Title:** | International Consultant on Mid-Term Evaluation of UNDP/GEF project |
| **Type:** | Individual Contract (IC) |
| **Project Title:** | Improving Energy Efficiency in the Residential Buildings Sector of Turkmenistan |
| **Duration of the service:** | 20 working days in the period from April 2014 to August 2014 |
| **Duty station:** | Home-based with one mission to Ashkhabad, covering 5 working days |
| **Reports to:** | Programme Specialist on Environment |

1. **INTRODUCTION**

The objective of the UNDP/GEF project on improving energy efficiency in residential buildings in Turkmenistan is to reduce greenhouse gas emissions by improving energy management and reducing energy consumption in the residential sector in Turkmenistan.

The project has been designed to:

* strengthen building codes and associated normative documents on energy efficiency in buildings, develop capacity at Turkmengas State Corporation and other state entities to identify end-use energy savings in their housing stock and implement investments to reduce end-use energy consumption,
* introduce improved highly-efficient design measures to major housing designers and developers, and
* replicate these measures through protocols for energy-saving measures in prototype buildings and through mainstreaming EE issues into state construction and housing policies and programs.

The project seeks to reduce energy consumption and associated greenhouse gases in residential sector in Turkmenistan and is structured into four project components:

* Energy efficient building codes and supporting capacity strengthening
* Demand-side management : partnership with Turkmengas State Corporation
* Improved design measures for major residential building designers and developers
* Replication through partnership with other developers and support for policies that encourage energy efficiency

At present, neither new construction nor refurbishment projects consider the energy performance of the buildings involved. The buildings being constructed and refurbished now without any attention to energy efficiency are effectively “locking in” patterns of energy consumption – and associated greenhouse gas emissions -- for the next several decades at needlessly high levels. Even before the construction boom, emissions in the residential sector totaled more than 3 million tonnes of CO2, or nearly 10% of total CO2 emissions from fuel combustion. Now, these emissions play an increasing role in the overall share of greenhouse gas emissions in Turkmenistan, and the residential sector is the third largest source of emissions in the country. Without intervention, these emissions will continue to grow unchecked.

1. **OBJECTIVES OF THE EVALUATION**

This mid-term evaluation is initiated by UNDP in Turkmenistan and will be conducted in accordance with established UNDP-GEF procedures.

The overall purpose of the evaluation is to assess the efficiency of the project, identify potential project design problems, assess progress towards the achievement of objectives, identify and document lessons-learned and to make recommendations to improve the project.

The mid-term evaluation serves as an agent of change and plays a critical role in supporting accountability. Its main objectives are:

1. To strengthen the adaptive management and monitoring functions of the Project;
2. To ensure accountability for the achievement of the UNDP/GEF objective;
3. To enhance organizational and development learning;
4. To enable informed decision-making;

The mid-term review will assess the overall performance of the project against the baseline data set atthe beginning of the project.

1. **Evaluation Audience**

This mid-term evaluation of the UNDP/GEF Project is initiated by UNDP as the GEF Implementing Agency. It aims to determine progress being made towards the achievement of outcomes and will identify course corrective actions, if needed.

It aims to provide managers with strategy and policy options for more effectively and efficiently achieving the project’s expected results and for replicating the results. It also provides the basis for learning and accountability for managers and stakeholders.

The Evaluation will highlight issues requiring decisions and actions, and will present initial lessons learned about project design, implementation and management.

1. **Scope of the Evaluation**

The scope of the evaluation is expected to cover the following:

* Review of the status of the project activities and the possibility of achieving all the outcomes in the given timeframe, taking into consideration the speed at which the project is proceeding. Review of the effectiveness of the project implementation and the use of its financial resources, including adaptive management applied for the revision of the project implementation mechanisms and other actions to overcome the obstacles identified during the implementation of the project,
* Review the current monitoring procedures and methodologies in place,
* Assessment of co-financing and leveraged resources,
* Provide recommendations for actions necessary for the long-term sustainability and replicability of the achievements,
* Provide recommendations on any changes needed, including the finalization of a concrete action plan to address the eventual pending needs or possible corrective action.

Project concept and design

The evaluator will assess the project design. He/she should review the problem addressed by the project and the project strategy, encompassing an assessment of the appropriateness of the objectives, outcomes, outputs, planned activities and inputs as compared to cost-effective alternatives. The executing modality and managerial arrangements should also be judged. The evaluator will assess the achievement of indicators and review the work plan, planned duration and budget of the project.

Implementation

The evaluation 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 assessed. In particular, the evaluation is to assess the Project team’s use of adaptive management in project implementation.

Project outputs, outcomes and impact

The evaluation will assess the outputs, outcomes and impacts achieved by the project as well as the likely sustainability of project results. This should encompass the following:

Attainment of objectives and planned results:

* Evaluate how, and to what extent, the stated project objectives are being achieved, taking into account the “achievement indicators”. In addition, the evaluatorwill assess the indicators matrix for its utility indetermining sustainability and replicability impact.

Achievement of outputs and activities:

* Assess the scope, quality and usefulness of the project outputs produced so far in relation to its expected results.
* Assess the feasibility and effectiveness of the work plan in implementing the components of the project.
* Assess the quality, appropriateness and timeliness of the project concepts, project proposals, progress reports with regard to:

*In addition to a descriptive assessment, all criteria should be rated using the following divisions:* Highly Satisfactory, Satisfactory, Marginally Satisfactory, Unsatisfactory *with an explanation of the rating.*

1. **DELIVERABLES**

The main product expected from the mid-term evaluation is a comprehensive report following the structure in Annex I and including the Table attached in Annex II on the assessment of co-financing.

1. **EVALUATION METHODOLOGY**

An outline of an evaluation approach is provided below. However, it should be made clear that the evaluator is responsible for revising the approach as necessary. Any changes should be in-line with international criteria and professional norms and standards. They must be also cleared by UNDP before being applied by the evaluation team.

The evaluation must provide evidence-based information that is credible, reliable and useful. It must be easily understood by project partners and applicable to the remaining period of project duration.

The mid-term evaluation will be based on information obtained from reviewing relevant documents, such as the project document, project brief, Annual Project Reports/Project Implementation Reports (APR/PIRs), minutes of Project Board Meetings, Project Technical Reports and minutes from relevant meetings.

The evaluator should also rely on information gathered through meetings and interviews with target beneficiaries and project staff, including government officials and/or consultants. Interviews should include the State Corporation “Turkmengas”, Ministry of Construction, Ministry of Communal Services, Ashgabat Municipality, UNDP and key stakeholders. The methodology that will be used by the evaluator should be presented in detail in the report. It shall include scrupulous information on documentation review, interviews held, field visits, participatory techniques and other approaches for the gathering and analysis of data.

The evaluation should provide as much gender-disaggregated data as possible.

The methodology to be used by the evaluator should be presented in the report in detail. It shall include information on:

* Documentation reviewed;
* Interviews;
* Field visits;
* Questionnaires;
* Participatory techniques and other approaches for the gathering and analysis of data.

Although the evaluator should feel free to discuss with the authorities concerned all matters relevant to his/herassignment, he/sheis not authorized to make any commitment or statement on behalf of UNDP or GEF or the project management.

1. **IMPLEMENTATION ARRANGEMENTS**

UNDP Turkmenistan will contract the consultant and be responsible for liaising with the project team to set up stakeholder interviews and coordinate meetings with the Government Officials. The Project Management Unit will provide the evaluator with relevant project documentation and will accompany the evaluator in the meetings, as deemed necessary. The mid-term evaluation will be reviewed by the UNDP Country Office and by the UNDP-GEF Regional Technical Advisor, and will be formally approved for submission to the Global Environment Facility by the Regional Technical Advisor.

1. **TIMING AND DURATION**

The evaluation consultancy will be for 18 working days within the period of 45 days and the activities of the evaluator are broken down as follows:

|  |  |
| --- | --- |
| **Activity** | **Timeframe**  |
| Desk review | 5 working days |
| Meetings with the stakeholders | 5 working days |
| Writing draft report | 8 working days |
| Finalization of the evaluation report (incorporating comments received on first draft) | 2 working days |

1. **PAYMENT CONDITIONS**

This is a lump sum contract that should include costs of consultancy and travel costs required to produce the above deliverables. The final schedule will be agreed upon in the beginning of consultancy.

Payment will be released in one installment: 100% upon timely submission of respective deliverables and their acceptance by the Programme Specialist on Environment.

1. **REQUIRED QUALIFICATIONS**

The mid-term evaluation will be carried out by an independent consultant whohas not participated in the project preparation and/or implementation and does not have any conflict of interest with project-related activities. This may apply equally to evaluators who are associated with organizations, or entities that are, or have been, involved in the delivery of the project. Any previous association with the project, the executing of national implementing agency or other partners/stakeholders 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.

The independent consultant will be responsible for drafting and finalizing the report.

Required qualifications:

* Advanced university degree in in the field of energy, environment, engineering, architecture or construction and/or related discipline;
* At least seven years of work experience in the field of energy efficiency and five years’ work in practical experience on energy efficiency policies and programs (in the building sector in particular);
* Experience in practical experience in implementation and energy monitoring of energy-efficiency buildings an asset;
* Previous evaluation experience of GEF-funded energy-efficiency projects, preferably with the United Nations system;
* Familiarity with Results Based Management (RBM) approach;
* Familiarity with issues related to the UNFCCC;
* Familiarity with greenhouse gas emission reduction calculations;
* Conceptual thinking and analytical skills;
* Excellent English communication skills; strong writing and analytical skills coupled with experience in monitoring and evaluation techniques. Skill in written and spoken Russian is strongly preferred;
* Computer literacy

# Annex 2: MTE Mission Schedule (21-25 July 2014)



1. Incl. In-kind contributions [↑](#footnote-ref-1)
2. Guidance for Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects, UNDP-GEF Directorate, 2014 [↑](#footnote-ref-2)
3. Source: ProDoc [↑](#footnote-ref-3)
4. Summary of assessments provided in the ProDoc [↑](#footnote-ref-4)
5. [↑](#footnote-ref-5)
6. The Inception Report was referring to a mistake in the savings calculation provided in the ProDoc. Although the ProDoc mentioned a *38* % savings, the IR was talking about a *48* % saving that had to be revised due to “arithmetic calculation mistakes” to 44 %. [↑](#footnote-ref-6)
7. Total consumption assumed 723,118 m3 natural gas for heat and hot water and 5,731,154 m3 natural gas (primary energy) for cooling and electricity used for other needs (lighting, appliances). [↑](#footnote-ref-7)
8. For renovated pilot buildings, total energy consumption comprised of natural gas consumption for heating (41,250 m3) and electricity consumption for hot water heating and for air conditioning (the equivalent of 215,620 m3). [↑](#footnote-ref-8)
9. Assumption used to validate the ProDoc figures: heat value of gas for heating: 8 kWh/m³, heat value for cooling is approx. 2.6 kWh/m³ for new “Elite” type of buildings and approx. 4 kWh/m³ for other apartment buildings (Source: Arslan Zomov, Energy Audit expert). [↑](#footnote-ref-9)
10. Comparison of specific gas demand: OLD baseline: 317 m³ per m² building area and year; NEW baseline: 39 m³ per m² building area and year. VARIATION: -87% [↑](#footnote-ref-10)
11. Comparison of specific gas demand: OLD baseline: 92 m³ per m² building area and year; NEW baseline: 61 m³ per m² building area and year. VARIATION: -34% [↑](#footnote-ref-11)
12. According to ProDoc, in 2004, natural gas consumption in the residential sector comprised 44% of all greenhouse emissions from natural gas in the country; from 2000-2007, residential consumption of natural gas increased by 35%. [↑](#footnote-ref-12)
13. Rating scale includes: Likely (L): no or negligible risks, Moderately Likely (ML): moderate risks, Moderately Unlikely (MU): significant risks, and Unlikely (U): severe risks. [↑](#footnote-ref-13)
14. Rating of risks: L – Low, M – Medium, H - High [↑](#footnote-ref-14)