United Nations Development Programme
Country: Turkmenistan
PROJECT DOCUMENT

Project Title: Improving Energy Efficiency in the Residential Buildings Sector of Turkmenistan
UNDAF Outcome(s):
Outcome 3: by 2015, the system of environmentally sustainable economic management expands population’s opportunities to participate in social and economic development, especially in rural areas.

UNDP Strategic Plan Environment and Sustainable Development Primary Outcome:
Mainstreaming environment and energy.

Expected CP Outcome(s):
Outcome 3.2. Environmentally sustainable use of natural resources contributes to effectiveness of economic processes and increased quality of life.

Expected CPAP Output(s)
Output 3.2.3. Government introduces carbon reduction and energy saving technologies.

Executing Entity/Implementing Partner: State Concern “Turkmengas”
Implementing Entity/Responsible Partners: Ministry of Construction, State Concern “Oil&GasConstruction”, Municipalities, Ministry of Power and Industry

Brief Description
The proposed UNDP-GEF project will reduce greenhouse gas emissions by improving energy management and reducing energy consumption in the residential sector in Turkmenistan. The project will strengthen incentives and capacity to build highly energy-efficient buildings, develop capacity at Turkmengas 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 policies and programs.

<table>
<thead>
<tr>
<th>Programme Period:</th>
<th>2011-2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlas Award ID:</td>
<td>00061181</td>
</tr>
<tr>
<td>Project ID:</td>
<td>00077395</td>
</tr>
<tr>
<td>PIMS #</td>
<td>4134</td>
</tr>
<tr>
<td>Start date:</td>
<td>01/03/2011</td>
</tr>
<tr>
<td>End Date</td>
<td>01/03/2015</td>
</tr>
<tr>
<td>Management Arrangements</td>
<td>NEX</td>
</tr>
<tr>
<td>PAC Meeting Date</td>
<td>23 Dec 2010</td>
</tr>
<tr>
<td>Total resources required</td>
<td>$46,003,280</td>
</tr>
<tr>
<td>Total allocated resources:</td>
<td>$46,003,280</td>
</tr>
<tr>
<td>• Regular</td>
<td>$100,000</td>
</tr>
<tr>
<td>• Other:</td>
<td>$2,516,280</td>
</tr>
<tr>
<td>o GEF</td>
<td></td>
</tr>
<tr>
<td>o Govt</td>
<td>$43,387,000</td>
</tr>
<tr>
<td>o In-kind</td>
<td></td>
</tr>
<tr>
<td>o Other</td>
<td></td>
</tr>
<tr>
<td>In-kind contributions</td>
<td></td>
</tr>
</tbody>
</table>

Agreed by Turkmengas: Date/Month/Year

Agreed by (UNDP): Date/Month/Year
Table of Contents

I. SITUATION ANALYSIS 4
   Background 4
   Policy, Regulatory, and Institutional Framework 7
   Barrier Analysis 8
   Incremental analysis 10

II. STRATEGY 11
   Project objective, outcomes, outputs/activities, and key indicators 12
   Risks and Mitigating Measures 17
   Coordination with Other Initiatives 18
   Financial modality 18
   Cost-effectiveness 18
   Sustainability and Replicability 19

III. PROJECT RESULTS FRAMEWORK: 21

IV. TOTAL BUDGET AND WORKPLAN  

V. MANAGEMENT ARRANGEMENTS 24
   Monitoring Framework and Evaluation 25

VI. LEGAL CONTEXT 30

VII. ANNEXES 31
   Annex A: Risk Analysis 32
   Annex B: Letters of Commitment, Co-Financing 33
   Annex C: Terms of Reference for Key Project Staff 34
   Annex D: Capacity Assessment for Implementing Partner 42
   Annex E: Summary of Building Codes in Turkmenistan 47
   Annex F: Documentation of Stakeholder Consultation 49
### List of Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWP</td>
<td>Annual Work Plan</td>
</tr>
<tr>
<td>CEO</td>
<td>Chief Executive Officer</td>
</tr>
<tr>
<td>CIS</td>
<td>Commonwealth of Independent States</td>
</tr>
<tr>
<td>CNT</td>
<td>Construction Norms of Turkmenistan (<em>СНТ -- Строительные Нормы Туркменистана</em> in Russian)</td>
</tr>
<tr>
<td>CPAP</td>
<td>Country Programme Action Plan</td>
</tr>
<tr>
<td>EE</td>
<td>Energy Efficiency</td>
</tr>
<tr>
<td>EJ</td>
<td>exajoule</td>
</tr>
<tr>
<td>EPBD</td>
<td>EU Directive on Energy Performance in Buildings</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>FSP</td>
<td>Full-Sized Project</td>
</tr>
<tr>
<td>GEF</td>
<td>Global Environment Facility</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GHG</td>
<td>Greenhouse gas</td>
</tr>
<tr>
<td>Glavgoseexpertiz</td>
<td>Main State Expert Authority (building code design review and enforcement agency)</td>
</tr>
<tr>
<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
</tr>
<tr>
<td>NEX</td>
<td>National Execution</td>
</tr>
<tr>
<td>NPD</td>
<td>National Project Director</td>
</tr>
<tr>
<td>PIF</td>
<td>Project Identification Form</td>
</tr>
<tr>
<td>PIR</td>
<td>Project Implementation Review</td>
</tr>
<tr>
<td>PA</td>
<td>Project Assistant</td>
</tr>
<tr>
<td>PM</td>
<td>Project Manager</td>
</tr>
<tr>
<td>PMO</td>
<td>Project Management Office</td>
</tr>
<tr>
<td>POPP</td>
<td>Programme and Operations Policies and Procedures</td>
</tr>
<tr>
<td>PPG</td>
<td>Project Preparation Grant</td>
</tr>
<tr>
<td>PB</td>
<td>Project Board</td>
</tr>
<tr>
<td>QA/QC</td>
<td>Quality control/Quality assurance procedures</td>
</tr>
<tr>
<td>RE</td>
<td>Renewable Energy</td>
</tr>
<tr>
<td>STAP</td>
<td>Scientific and Technical Advisory Panel</td>
</tr>
<tr>
<td>tCO₂e</td>
<td>Tons of carbon dioxide equivalent</td>
</tr>
<tr>
<td>TMT</td>
<td>Turkmenistan New Manat</td>
</tr>
<tr>
<td>toe</td>
<td>Tons of oil equivalent</td>
</tr>
<tr>
<td>ToR</td>
<td>Terms of Reference</td>
</tr>
<tr>
<td>UNDAF</td>
<td>UN Development Assistance Framework</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
</tr>
<tr>
<td>UNDP CO</td>
<td>United Nations Development Programme Country Office</td>
</tr>
<tr>
<td>UNFCCC</td>
<td>UN Framework Convention on Climate Change</td>
</tr>
<tr>
<td>USD</td>
<td>U.S. Dollar</td>
</tr>
</tbody>
</table>
I. SITUATION ANALYSIS

Making use of energy efficient technologies and practices in new and existing buildings could save as much as 34 percent of the projected primary energy consumption by the world’s buildings by 2020. This estimate would represent a reduction of 52 to 57 EJ (3.8 to 4.7 billion tonnes of CO₂) by 2020 and a reduction of 79 to 84 EJ (5.8 to 6.9 billion tonnes of CO₂) by 2030. The potential global energy savings in buildings by 2030 are equal to the current energy consumption for all uses in Europe.¹

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. The project approach also builds on one of the key areas of the UNDP Turkmenistan Country Programme: to ensure that environmentally sustainable use of natural resources contributes to the effectiveness of economic processes and increased quality of life.

Background

Severe climate conditions in Turkmenistan make effective heating and cooling in buildings essential to well-being of the country’s 5.11 million inhabitants. Temperatures range from an average of -5°C in Northeastern Turkmenistan in January to maximum temperatures of 48-50°C in the Central and Southeast Karakum in the summer. For this reason, cooling issues in the housing stock are as important as heating issues.

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 that are needlessly high. Even before the construction boom, emissions in the residential sector totalled more than 3 million tonnes of CO₂, or nearly 10% of total CO₂ emissions from fuel combustion.² Now, these emissions play an increasing role in the overall share of greenhouse gas emissions in Turkmenistan, and the residential sector is the fourth largest source of emissions in the country. Without intervention, these emissions will continue to grow unchecked.

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 (see Figure 1 below).

Figure 1: Investment and Construction in the Residential Sector of Turkmenistan, 2008-2010 and 2011-2015 (million USD)³

² Turkmenistan: Initial National Communication on Climate Change; p. 43.
³ Figures are provided here in USD and converted at an exchange rate of 2.85 Turkmenistan New Manats (TMT) to 1 USD.
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, this refurbishment has been limited to cosmetic improvements.

For the reasons above, the proposed project will focus on improving energy efficiency in the residential sector in both new and refurbished buildings in the City of Ashgabat with the goal of putting the residential construction sector on a lower carbon trajectory.

Housing Stock

Residential buildings in Turkmenistan can be divided into three categories:

1. One- and two-story private homes, often row houses that use some traditional design knowledge about maintaining a comfortable indoor climate. These houses often use electric heating and electric air conditioners; although some of these homes, particularly in Ashgabat, receive heat from district heating systems. These buildings have largely been constructed at the initiative of the occupants, and for the very small market segment of residential villas, local companies handle design and construction.

2. Contemporary, multi-unit, high-rise apartment buildings that have been built in the past 10 years. These buildings have a reinforced concrete structure and use mineral wool insulation and a marble façade to reduce heat loss. They rely largely on free-standing, building-level, or multi-building gas boilers for heat and hot water, and building-level or multi-building chillers for cooling. These buildings are commissioned by city governments, ministries, and state enterprises, and many of them are constructed by Turkish developers, with local sub-contractors for certain aspects of the construction documents and the construction itself. These buildings represent the vast majority of new construction in the City of Ashgabat.

3. Multi-story apartment buildings built between 1960 and 1991 in “micro-districts,” which are often owned by municipalities. Construction techniques include low-rise brick and keramsite (clay aggregate) construction with a plaster façade and no roof or external wall insulation, but they also include high-rise panel construction or re-enforced concrete buildings, many of which were based on design templates from other then-Soviet republics. Many of these apartments are heated with district heating (often supplemented by electric heaters where heat delivery is unreliable) and

Source: National Program of the President of Turkmenistan for Reshaping the Living Conditions of the Population in Villages, Towns, Cities, and District Centers to the year 2020.
cooled with electric air conditioning units. This group of buildings represent the largest potential for refurbishment and reconstruction; at present, refurbishment efforts have been limited to cosmetic improvements to selected low-rise buildings in the center of Ashgabat.

New Housing Construction
The process of construction continues to be relatively centralized in Turkmenistan, and the government commissions, regulates, oversees, and provides financing for new housing. The following shaded text describes this process and the stakeholders involved, including the parallel existence of local state-owned design/construction companies and private companies, which are mostly foreign.

New Construction: Process and Stakeholders

1. The “client” (a ministry, city administration, or state enterprise) issues technical specifications for a new residential building, including parameters for resource consumption (heat, power, water) consumption. Energy efficiency is not currently considered in these parameters, although designs must conform codes on maximum heat consumption per square meter per degree-day.
2. The client announces a tender for the construction contract based on the technical specifications.
3. The proposers (public and private design firms from Turkmenistan and abroad) submit bids, which include a model, a design proposal, technical and economic specifications, and a cost proposal.
4. The Cabinet of Ministers checks the tender, a winner is announced, and a Presidential Decree is issued on the cost of the project, the square meters, the equipment to be used, and the time frame and deadline for completion.
5. The private construction company or state construction organization that wins the tender is issued a license to design and construct the residential building. If the project is a large-scale housing project of a ministry, city administration, or state enterprise, their in-house design institutes are involved at this stage. If a foreign company wins the contract, it will hire local design companies, including private companies, as subcontractors. The foreign companies oversee the overall design and construction work, while the local subcontractors (state or private) adapt their designs to local codes and conditions.
6. Regardless of origin, all designs undergo a review by Glavgosekspertiz (the state buildings inspectorate based at the Ministry of Construction). The Department of Capital Construction of the ministry, city administration, or state enterprise conducts quality control checks during construction, and at the end of construction, Glavgosekspertiz issues a summary decision that serves as an occupancy permit – without this decision, new buildings are not supposed to be occupied. Other inspection services must also endorse this document, including the building’s compliance with fire safety, seismic safety, and hygienic norms.

Note: Due to the tight time frame for construction, some detailed design work is done concurrently with construction on other parts of the building. Currently, multi-unit high-rise buildings are constructed in 12 to 30 months.

Refurbishment of Existing Housing
Data on reconstruction of the housing stock are more difficult to compile, because these initiatives are not done on the basis of individual projects or contracts. Currently, refurbishment is done for cosmetic benefits; i.e., to promote urban renewal, and it primarily involves re-doing the building façade and installing a new roof. Currently, opportunities to provide more efficient window and roof and external wall insulation are not being realized. Refurbishment efforts are currently concentrated in a “reconstruction” zone in Ashgabat and are expected to expand in the future.

---

Sources:

---
Climate Change Adaptation Considerations

Scenarios developed for long-term expected climate change in Turkmenistan have indicated that if CO$_2$ concentrations double by the middle of this century from a base year of 1990, average annual temperature is expected to increase from 4.6 to 6.1 degrees Celsius, depending on the GCM and IPCC scenario used. While the models do not agree on the seasonal distribution of the temperature increase, the direction of the impact (an increase) is consistent across all of model runs. For this reason, buildings that emphasize comfort and efficient use of resource in relatively extreme temperatures should also be seen as an adaptation measure to climate change in Turkmenistan.

Policy, Regulatory, and Institutional Framework

National Policies

Currently, the government is launching reforms in both the housing sector and in energy efficiency. In housing, the National Program of the President of Turkmenistan for Reshaping the Living Conditions of the Population in Villages, Towns, Cities, and District Centers to the year 2020 and the National Strategy of Socio-Economic Development of Turkmenistan to the year 2030 both set targets for increasing average living space by increasing investment in residential construction (in many cases moving families from single-family dwellings into multi-unit apartment buildings). Presidential initiatives are also supporting privatization of the housing stock through mortgage schemes for new apartment owners, which typically involve a tripartite agreement with the buyer, the city administration, and the bank, which generally offers a loan term of 30 years and an annual interest rate of 1%.

In the energy sector, the National Strategy mentioned above targets improving the efficiency of the oil and gas sector, and the Government has been investing accordingly. To date, the government and the state-owned energy enterprise Turkmengas have focused mainly on supply-side savings in energy; however, discussions with stakeholders during project identification and preparation indicated that there is high-level interest in pursuing demand-side opportunities to reduce energy consumption. Currently, there is an immediate need for both assistance in reducing the amount of end-use energy consumption and for longer-term partnerships that will lay an institutional and programmatic foundation for a lower-carbon trajectory in the buildings sector.

Policy/Legal Framework for Energy Efficiency

In the area of energy efficiency, an Energy Working Group has been formed with support from UNDP and the Government of the United Kingdom, and the working group will oversee the development of a National Sustainable Energy Strategy and Action Plan (to be submitted for consideration as a Presidential Decree in 2010) and a Law on Energy Efficiency and Renewable Energy (to be submitted for consideration in 2011). Currently, there are no laws that explicitly address the sustainable use of energy.

The two laws that are most important to the residential sector at present are the 1992 Presidential Decree (No. 598) “On Free Consumption by the Population of Turkmenistan of Electric Power, Gas, and Water” and the 2003 Presidential Decree that extended the 1992 decree through the year 2020. These decrees mean that both natural gas and power are free up to a certain point for residential customers. In spite of the obvious disincentive for end-users to make efforts to reduce energy consumption, there is a clear incentive for the government to reduce end-use consumption of natural gas: exports of natural gas provide valuable revenues to the state budget, while internal consumption is financed mostly by the government. Therefore, any natural gas saved through energy efficiency can be exported, and the

5 Electricity is free up to 35 kWh/person/month. Additional kilowatt-hours cost approximately 0.004 USD.
difference is between no revenue (or even subsidy costs and negative revenue) and international market prices.

**Regulatory Framework**
The current building code for residential buildings, CHT 3.04.03-94, was last revised in 1994. A series of associated codes apply to buildings in the residential sector, and a list of all of these relevant codes is included in Annex E of this document. While the residential building code is relatively old, research and analysis conducted during the project preparation period found that, controlling for climate conditions, the code was actually comparable to “good practice” codes in Europe in terms of the maximum amount of heat consumption permitted per square meter per degree-day. However, the code does not mention the energy performance of buildings per se, and there are currently no incentives to construct buildings that exceed these performance requirements. While codes are enforced through a design review and site checks, no actual auditing is carried out to determine the energy performance of new buildings in practice. Finally, the maximum allowable heating consumption applies only to new buildings or existing buildings undergoing capital reconstruction, but not to buildings undergoing capital repairs, such as roof and façade replacement, which would provide key opportunities to reduce energy consumption significantly.

**Barrier Analysis**
In the relatively undeveloped energy market in Turkmenistan, there are numerous potential barriers that must be addressed in order to bring about actual investments in more energy-efficient housing. Over the course of project identification and later in project preparation and stakeholder meetings, a number of barriers were identified. The barriers are divided into four main categories:

1) Legal/regulatory/policy barriers – demand-side barriers in the legal, regulatory, and policy framework that restricted incentives to invest in energy efficiency.
2) Institutional barriers – demand-side barriers that restricted incentives to initiate investments in efficiency buildings. restricting the level of demand for EE/RE technology and services.
3) Awareness barriers – lack of information and knowledge regarding general benefits of energy savings and specific opportunities for savings.
4) Capacity barriers – barriers restricting the ability of stakeholders to identify and realize investments in energy-efficient residential buildings.

Table 2 below summarizes these barriers and the corresponding project response.

Table 2: Barriers to Efficient Housing and Proposed Project Responses

<table>
<thead>
<tr>
<th>Description</th>
<th>Barrier Type</th>
<th>Priority</th>
<th>Project response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payment for gas and power is made by the state (e.g. Turkmengas provides “free” gas for residential buildings), which leads to a principal-agent problem.</td>
<td>Institutional / Awareness</td>
<td>High</td>
<td>Component 2 works specifically with the &quot;principal&quot; (Turkmengas) to identify investments that will be cost-effective and focuses on Turkmengas, the stakeholder that (1) has the ability to make changes and investments; and (2) stands to benefit economically from these investments.</td>
</tr>
<tr>
<td>Lack of legal framework to promote energy efficiency</td>
<td>Legal/ Regulatory</td>
<td>High</td>
<td>This component will be addressed by UK-initiated project to support the development of a Law on Energy Efficiency and Renewable Energy.</td>
</tr>
<tr>
<td>Description</td>
<td>Barrier Type</td>
<td>Priority</td>
<td>Project response</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>-------------------------</td>
<td>----------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Lack of specific policies and programs to improve energy efficiency</td>
<td>Legal/Regulatory</td>
<td>High</td>
<td>This component will be addressed by the UK-initiated project to support the development of a National Sustainable Energy Strategy and Action Plan (in the form of a presidential decree).</td>
</tr>
<tr>
<td>Lack of energy performance guidelines for existing buildings undergoing capital repairs, or <em>kapremont</em> (i.e., reconstruction of the building envelope).</td>
<td>Regulatory</td>
<td>High</td>
<td>This component will be addressed in part by the UK-initiated project to support the development of a Law on Energy Efficiency and Renewable Energy. Component 3 of the project will work with buildings undergoing reconstruction and will be performance data and hands-on experience that will inform the planned guidelines.</td>
</tr>
<tr>
<td>Lack of awareness of the potential to save energy by improving efficiency in the housing stock.</td>
<td>Awareness</td>
<td>High</td>
<td>Components 1, 2, and 4 provide specific training and outreach for stakeholders involved in the commissioning, tendering, design, construction, and oversight process.</td>
</tr>
<tr>
<td>Architects, engineers, and policy-makers are unaware of techniques that could be applied to exceed the energy performance of current codes applying to new buildings.</td>
<td>Awareness</td>
<td>Medium-High</td>
<td>Component 3 provides specific examples of efficient buildings by working through the commissioning, design, construction, and occupancy phase of new residential buildings that are significantly more efficient than code requirements. Components 1, 2 and 4 provide training to key stakeholders on building more efficient housing in training programs that are tailored to specific groups of professionals involved in residential housing.</td>
</tr>
<tr>
<td>Architects, engineers, and policy-makers are unaware of techniques that could be applied to exceed the energy performance of current codes applying to existing buildings</td>
<td>Awareness</td>
<td>Medium-High</td>
<td>Component 3 provides specific examples of efficient buildings by working through the commissioning, design, construction, and occupancy phase of reconstructed residential buildings that significantly improve their energy performance. Components 1, 2 and 4 provide training to key stakeholders on building more efficient housing in training programs that are tailored to specific groups of professionals involved in residential housing.</td>
</tr>
<tr>
<td>Absence of energy performance data from the housing stock (and the building stock more generally)</td>
<td>Awareness/Capacity</td>
<td>Medium-High</td>
<td>Component 2 will provide specific information for the housing stock of a key state enterprise that will allow its leadership to make decisions on how to improve its efficiency. Component 3 will provide information from new and reconstructed high-efficiency buildings.</td>
</tr>
<tr>
<td>Description</td>
<td>Barrier Type</td>
<td>Priority</td>
<td>Project response</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>--------------</td>
<td>----------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Absence of energy auditors who can conduct energy audits and identify opportunities to reduce energy consumption in residential buildings</td>
<td>Capacity</td>
<td>Medium</td>
<td>Components 1, 2 and 4 will provide training to key stakeholders on the importance of and role of energy audits in energy management. In addition, Component 2 will provide hands-on training.</td>
</tr>
</tbody>
</table>

Nearly all of the barriers are demand-side barriers; i.e., there is no market “pull” for energy efficiency designs, products, and services. This is not surprising given the overall low level of awareness of the economic benefits of energy efficiency, which has resulted in a system that has not emphasized energy performance and has not provided any incentives to develop capacity in this area.

Another notable finding from the barrier analysis is the absence of energy performance data from the housing stock (and from the building stock more generally). Heat consumption data from meters at the boiler-house level are useful only where there are building-level boilers (relatively unusual cases limited to the newest buildings), but they are not meaningful for buildings on the district heating system, where transmission and distribution losses reduce the actual amount of heat delivered, and where under-heated apartments may be using electric heaters to supplement district heating. Some limited metering data were collected in the course of project preparation from very new buildings, but in the absence of a certification or passport program and without auditing equipment or expertise, it is extremely difficult to quantify the potential for savings in new and existing buildings and to target particular sub-sectors for potential savings.

Two potential barriers turned out not to be as significant as they initially appeared:

1. The fact that energy is essentially free-of-charge to the population, while removing incentives for occupants to monitor and/or reduce energy consumption, turned out to be a manifestation of a principal-agent problem. It was identified that Turkmengas, which supplies gas to residences, has a strong financial incentive to reduce energy consumption in the residential sector, as it can export any gas that it saves.

2. A lack of investment in energy-efficient buildings did not turn out to be related to a lack of financing, as the government has consistently invested in the housing stock and in home financing, and government entities can announce tenders in a way that does not discriminate against more expensive, more efficient buildings. Instead, interviews with stakeholders revealed that the underlying barrier in this area was one of awareness – no connection was made between design improvements, resource efficiency, and reduced operating costs.

**Incremental analysis**

**Business As Usual (BAU) Scenario**

In new construction, there has been some limited progress in energy performance in residential buildings due to the evolution of the materials used and the construction techniques used at present; e.g. switching away from wooden frame single-glazed windows, the use of additional external materials with some insulating properties in high-end buildings, and others. In the absence of the project, it is assumed that this progress would continue at the present rate; i.e., far below the technical potential for residential buildings.

In renovated buildings, the lost potential is even greater. Retrofits that provide only cosmetic improvements to the buildings (e.g. re-plastering and roof repairs) will generate limited reductions in consumption, but they overlook the substantial potential gains from changes in the heating system and through improved insulation of the building envelope.
Under the BAU scenario, the government would not have sufficient capacity to develop and enact specific measures, such as energy passports or energy efficiency incentive programmes. While some general energy efficiency legislation is likely to be passed during the project period, the government would be unlikely to have the capacity to commission or develop the supporting regulations and incentives or to update its building codes on a periodic basis. Therefore, there would be little incentive for designers and engineers to produce efficient designs for new and existing buildings. Furthermore, in the absence of auditing equipment and capacity, policy-makers would not have a sense of current performance of various types of new and existing buildings.

Turkmengas, the state concern that pays for most of the gas provided to residential buildings, would be likely to undertake steps to reduce losses in its system, such as repairing pipelines, but it would not be able to assess the potential for reducing losses in end use and would not be able to identify and prioritize potential investments in the buildings sector.

Finally, architects and engineers would continue to lack experience with energy efficient design and construction techniques. As a result, even if a market for these types of buildings were to develop, local architects and engineers would be at a distinct disadvantage.

From an energy and climate perspective, the energy consumption of residential buildings would remain relatively high, and new buildings constructed and renovated according to current practice would lock in a higher carbon trajectory.

**GEF Scenario**

The proposed project seeks to introduce efficient designs and technologies in the residential sector of Turkmenistan. The project would result in substantial gains in these areas due to the following:

- Incentive programmes for cities to commission highly-efficient buildings
- An assessment of Turkmengas housing stock, an assessment of the potential to save gas in the residential sector, and an integrated plan for these investments.
- The construction of at least 3 new buildings that are at least 25% more efficient than code requirements and 3 reconstructed buildings that are at least 38% more efficient than current consumptions levels by the use of integrated design principles and efficient techniques, materials, and technologies.
- Guidelines for efficient reconstruction in common building prototypes and training for engineers and architects, including students in those professions.

Under the GEF scenario, the expected annual emissions reductions would be approximately 111,576 - 123,565 tonnes of CO₂e per year, for a total reduction of 2,231,526 – 2,471,295 tonnes of CO₂e over the 20-year assumed lifetime. Further elaboration on the emissions reduction estimated under the BAU and the GEF scenarios is provided in Annex F of the GEF Request for CEO endorsement.

**II. STRATEGY**

**Project rationale and policy conformity**

The proposed project will reduce greenhouse gas emissions in Turkmenistan by improving energy management and reducing energy consumption in the residential sector in Turkmenistan. Currently, new and 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 to work in two ways:

1. Capture immediate benefits in the housing sector given the current institutional arrangements and energy market. These activities will focus on work with key partners who are already paying for energy and who are working to improve policies and measures.

2. Lay the groundwork for continued growth in EE housing programs (and EE buildings programs more generally). These activities will focus on awareness and capacity building measures, so that the government, the population, and other stakeholders can take advantage of the increasing market-based opportunities and incentives for EE that will come with future reforms.

The project falls under GEF-4 Strategic objective CC – 1 “To promote energy-efficient technologies and practices in the appliances and buildings”. It aims at promoting energy efficient technologies and practices in the building sector of Turkmenistan with a focus on new and existing residential buildings. The project will be implemented under the UNDP-led GEF Global Framework for Promoting Low Carbon Buildings with a primary 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 the region (Armenia, Kyrgyzstan, Uzbekistan and Turkey) and good practice building codes and standards work done in other CIS countries.

The proposed project is fully consistent with Turkmenistan’s plans in the housing sector, in the area of energy sector reform and development, and in the general field of socio-economic development (see “Background” Section above).

Country eligibility and country drivenness
Turkmenistan is eligible for GEF funds because of its ratification of the UNFCCC and its status as a GEF member country. The project has been endorsed by the GEF Operational Focal Point for Turkmenistan.

The project developed due to 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. More specifically, the fuel savings generated by the project directly support Outcome 3.2 of the 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).

Project objective, outcomes, outputs/activities, and key indicators

Outcome 1: Energy Efficient Building Codes and Supporting Capacity
As the current building code already mandates energy performance and new building construction techniques appear to result in compliant buildings, this component will focus on encouraging the design and construction of highly-efficient buildings based on regional best practice while attempting to promote the adoption of more stringent codes in the near to medium term. Through training and an incentive program providing bonuses to design institutes, it is expected that the City of Ashgabat (and possibly other entities commissioning buildings) could commission buildings that would use 25% less energy than compared to current baseline performance.

Output 1.1: Incentive program for highly-efficient buildings
Activity 1.1.1: Appointment of a working group on an incentive program for very efficient buildings (i.e., buildings that reduce energy consumption for heating and cooling by at least 25% over current building code requirements).

Activity 1.1.2: Development of a program to reward design institutes for very efficient designs by incorporating information on EE design incentive programs in the Eurasian region and elsewhere.

Activity 1.1.3: Presentation of the draft program to key stakeholders through a half-day workshop.

Activity 1.1.4: Development of a final version of the program for presentation to key decision-makers.

Output 1.2: Training for authorities in enforcement and design review under more efficient building requirements.

Activity 1.2.1: Compilation of a report on building codes development, best practices, and trends in the CIS and the EU.

Activity 1.2.2: Organization and provision of a 2-day training for 30 Glavgosekspertiz staff on building envelope evaluation, design review, and best practice in compliance.

Activity 1.2.3: Development of recommendations, in consultation with the International Consultants, for improved organization structures, staffing standards, capacities and accountability for agencies in charge of inspection and enforcement.

Activity 1.2.4: Development of a roadmap for scheduled building codes review and revision that explores more stringent requirements for energy performance in buildings.

Output 1.3: Policy tool to encourage more efficient residential construction

Activity 1.3.1: Commissioning and publication of a report on the potential for energy savings in the building sector if building heat performance standards were expanded to apply to existing buildings undergoing capital renovation (i.e. significant remodelling and refurbishment).

Activity 1.3.2: Commissioning and publication of a report on the potential benefits of the introduction of an energy passport system for new and reconstructed buildings in Ashgabat and a roadmap for implementation.

Activity 1.3.3: Presentation of project reports on policy tools to key decision-makers through a half-day workshop, including the findings from Output 1.1, and Activities 1.3.1 and 1.3.2.

Output 1.4: Guidance on the incentive programs and training on compliance

Activity 1.4.1: Development of guidance materials for architects and construction engineers on meeting a high-efficiency standard (i.e. 25% over current codes).

Activity 1.4.2: Selection of 20 candidates for training in meeting the standards.

Activity 1.4.3: Provision of training for 20 architects and engineers at design institutes on how to meet a 25% improved performance standard in a one-day workshop.

### Key Results

- Incentive program for highly-efficient buildings developed for Ashgabat.
- At least 30 relevant authorities trained in enforcement and design review of more efficient codes.
- At least one policy tool to encourage more efficient residential construction is developed and introduced in Ashgabat.
- At least 20 architects and engineers trained in compliance with an improved performance standard.

**Outcome 2: Demand-side management partnership developed with Turkmengas**
As a key state enterprise, Turkmengas is responsible for providing gas to residential customers at virtually no charge. The management of the company is focusing on resource efficiency and is aware of supply-side opportunities to improve its efficiency and save gas that can then be exported. However, awareness of demand-side opportunities to reduce gas consumption at the operational level of enterprise is relatively low, and there is a lack of information about its potential.

Turkmengas will be making a sizable contribution to the project in the form of energy metering. Therefore, GEF-funded activities focus on providing key information for decision-makers, thereby raising their awareness of demand-side savings and their ability to pursue investments in energy efficiency. They also focus on the housing stock that is managed and/or commissioned by Turkmengas, which is a natural starting point for resource savings that can be realized by the company.

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

*Activity 2.1.1:* Identification of basic savings options for both residential heating and residential cooling, in conjunction with the International Consultants, based on standard practice.

*Activity 2.1.2:* Procurement of auditing equipment for use in assessing (Note: this equipment will also be used in Activity 3.2.2. and the training components of Output 4.2).

*Activity 2.1.3:* Conduct of demonstration audits in cooperation with the Construction Department of Turkmengas for at least 25 buildings in the company’s housing stock.

*Activity 2.1.4:* Drafting and publication of a study that will identify cost-saving options in the housing stock, including a discussion of these options based on price, cost-effectiveness, payback period, applicability, and impact.

**Output 2.2:** Officials in the Construction Department of Turkmengas are trained in energy auditing and management in the housing stock.

*Activity 2.2.1:* Organization and provision of hands-on training for company staff on integrated resources planning and demand-side management, using the results of audits conducted in Activity 2.1.3 and company data on energy expenditures in its housing stock and data from metering.

*Activity 2.2.2:* Organization and conduct of a study tour to observe best-practice, demand-side management programs abroad.

*Activity 2.2.3:* Provision of support to the Construction Department in drafting an *Integrated Resources Plan* for the energy needs of the housing stock owned and/or managed by Turkmengas that treats energy efficiency as an energy resource.

**Output 2.3:** Investment plan for reducing energy losses developed by the Construction Department for the housing stock that Turkmengas supplies.

*Activity 2.3.1:* Development of a draft of an investment plan in conjunction with the IC DSM, the CTA, and the project technical staff.

*Activity 2.3.2:* Review and discussion of the plan.

*Activity 2.3.3:* Presentation of the investment plan to Turkmengas management.

<table>
<thead>
<tr>
<th>Key Results</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cost-benefit study of options for reducing energy consumption in the residential sector.</td>
</tr>
<tr>
<td></td>
<td>Officials at Turkmengas trained in energy auditing and energy management in of housing stock owned and managed by the company.</td>
</tr>
<tr>
<td></td>
<td>Investment plan for reducing losses in the housing stock produced and</td>
</tr>
</tbody>
</table>
Outcome 3: Improved design measures for major residential consumers

This component will include both new buildings and capital repairs on existing buildings in order to maximize its impact on the residential construction market in Ashgabat. 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. Protocols for introducing highly-efficient measures are recommended rather than prototypes because of the diverse, international group of construction companies that are involved and the single-tender system in the case of new buildings and because of the widely diverse nature of the housing stock involved in the case of buildings undergoing capital reconstruction.

Output 3.1: Construction of three new multi-unit residential buildings with significantly improved energy performance (i.e., energy consumption that is at least 25% lower than currently mandated codes).

Activity 3.1.1.: Support for site identification.
Activity 3.1.2.: Estimation of baseline performance for typical buildings under similar conditions.
Activity 3.1.3: Provision of support for drafting the technical specifications for the tender (as needed).
Activity 3.1.4: Work with the developers to oversee design/design review and provide input as necessary.
Activity 3.1.5: Provision of oversight and support in the permitting and procurement process.
Activity 3.1.6: Provision of oversight in the construction process.
Activity 3.1.7: Monitoring and evaluation of building performance.

Output 3.2: Reconstruction of three multi-unit residential buildings resulting in significantly improved energy performance (i.e., energy consumption that is at least 38% lower than current energy consumption).

Activity 3.2.1: Support for site identification.
Activity 3.2.2: Conduct of baseline audits to determine the energy performance of the buildings selected for retrofits.
Activity 3.2.3: Support for the development of technical specifications for the tender.
Activity 3.2.4: Support for the development and design review process.
Activity 3.2.5: Provision of oversight and support in the permitting and procurement process.
Activity 3.2.6: Conduct of ex post monitoring and evaluation of building performance.

Output 3.3: Development and application of model energy passports for pilot buildings

Activity 3.3.1: Development of a model energy passport based on international best practice and regional conditions.
Activity 3.3.2: Completion of energy passports for all pilot buildings in Outputs 3.1 and 3.2., including the conduct of performance audits where necessary.
Activity 3.3.3: Training provided for selected stakeholders (enforcement officials, facilities managers, developers, and policy-makers) on the model passport, how to apply it to new and existing buildings, how to interpret it, and its use in EE programmes in other countries.
Activity 3.3.4: Publication of a brochure explaining the model passport and the passports used in the project and distribution of the brochure to policy-makers and city and regional administrations.

<table>
<thead>
<tr>
<th>Key Results</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Three multi-unit new residential buildings constructed with significantly improved energy efficiency (i.e., energy consumption that is at least 25% lower than currently mandated codes).</td>
</tr>
<tr>
<td></td>
<td>• Three multi-unit existing residential buildings renovated with significant reduction in energy use (i.e., energy consumption that is at least 38% lower than current energy consumption)</td>
</tr>
<tr>
<td></td>
<td>• Model energy passport developed and energy passports completed for each pilot building.</td>
</tr>
</tbody>
</table>

Outcome 4: Replication through partnerships with other developers and support for housing reforms that encourage energy efficiency

This component will work to expand the use of energy-efficient techniques to the broader housing market and to "mainstream" energy efficiency considerations into construction and housing policy decisions.

Output 4.1: Protocols for EE retrofits in prototype buildings (that include [1] a standard list of design techniques, materials, and technologies related to heating, cooling, and lighting that can serve as a reference for design institutes and studios; and [2] a recommended approach for early collaborative work with the principal architect, civil engineer, and HVAC engineer) for the three most common prototype residential designs

Activity 4.1.1: Field research and interviews to ascertain the design prototypes with the highest potential replication impact.

Activity 4.1.2: Compilation of design documentation and information on measures for at least three prototype designs.

Activity 4.1.3: Development of draft protocols for EE construction and/or retrofitting for at least three prototype designs.

Activity 4.1.4: Discussion of draft protocols with practicing architects and developers.

Activity 4.1.5: Refinement of the draft protocols based on comments and feedback

Activity 4.1.6: Publication of the protocols

Activity 4.1.7: Dissemination of the protocols to all design institutes and housing developers, particularly velayats

Activity 4.1.8: Monitoring of the application of the protocols through review of permitting documentation and field interviews

Output 4.2: Design institutes, major housing developers, and post-secondary students in architecture and construction engineering trained in efficient building design.

Activity 4.2.1: Organization of Training for 20 practicing architects and engineers, including adaptation of training materials and development of a training format.

Activity 4.2.2: Organization of Training for 100 students of architecture and construction engineering, including adaptation of training materials, the development of a training format, and packaging of training for the use in post-secondary academic curricula. Training will include an overview of design techniques, materials, and technologies related to heating, cooling, and lighting.
Activity 4.2.3: Organization of a national competition will be held for design institutes and studios submitting designs for highly-efficient buildings (including a category for submissions by students) meeting a standard of energy performance of at least 30% higher efficiency than in current codes.

Activity 4.2.4: Appointment of a advisory committee to judge submissions.

Activity 4.2.5: Arrangement of an awards ceremony and an exhibit, with accompanying brochure, that will ensure high visibility for the best designs.

Activity 4.2.6: Organization and conduct of an international study tour to expose a selected group of architects and engineers to existing best practice in housing stock management and highly-efficient buildings, with an emphasis on best practice buildings facing similar climatic demands.

Output 4.3: Recommendations from the project are incorporated into energy efficiency policies and programs, including recommendations to mainstream energy efficiency into housing policy.

Activity 4.3.1: Ongoing communication between project personnel with the Energy Working Group and with key stakeholders, such as the Ministry of Construction and government institutions responsible for developing and implementing policies related to energy efficiency.

Activity 4.3.2: Preparation of 3-5 executive reports on key policy issues addressed under the project (e.g. demand-side management programs, mainstreaming energy efficiency issues into housing policy and urban planning, economic benefits of efficient buildings programs, etc.).

Activity 4.3.3: Organization of high-level briefings for policy-makers to review the executive reports.

Activity 4.3.4: Publication of project findings and lessons learned to serve as “good practice” guidance for subsequent EE policies and programs in Turkmenistan.

Activity 4.3.5: Distribution of executive reports, and project lessons learned to the administration in other regions of the country and to other state entities that develop and manage a substantial amount of housing stock.

<table>
<thead>
<tr>
<th>Key Output Results</th>
<th>Protocols for EE retrofits in the three most common prototype residential building designs developed and applied in at least 25 buildings.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At least 30 experts at design institutes and major housing developers trained in energy efficiency retrofit protocols</td>
</tr>
<tr>
<td></td>
<td>At least 100 students in the fields of architecture and construction engineering trained in efficient building techniques</td>
</tr>
<tr>
<td></td>
<td>Recommendations from the project incorporated into energy efficiency policies and programs, particularly draft legislation on energy efficiency</td>
</tr>
<tr>
<td></td>
<td>Lessons learned published and distributed to all regional administrations in Turkmenistan and national government entities that serve as housing authorities</td>
</tr>
</tbody>
</table>

**Risks and Mitigating Measures**

The table below provides an overview of project risks and measures taken to mitigate these risks.

<table>
<thead>
<tr>
<th>Risk</th>
<th>Rating</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of governmental</td>
<td>L</td>
<td>This risk is considered low. The government has</td>
</tr>
</tbody>
</table>
commitment to revise and introduce more stringent energy efficient building norms and standards
demonstrated strong interest in housing reforms, resource efficiency, and climate change mitigation; it understands that building codes represent a straightforward and effective means of reducing end-use consumption in the housing sector.

Low incentives among housing developers to introduce more efficient designs and energy-saving measures
L-M This risk is also considered as low to medium because all developers have to comply with building codes, which will continue to become more rigorous over time, and because the financial incentive program developed under the project will reward developers who produce significantly more efficient designs.

Lack of funding to support investments in the housing sector
L This risk is deemed as being low because of the government’s income from oil and gas revenues, their National Development Programme in the housing construction sector, and -- perhaps most indicatively -- their track record of investments in construction in the residential sector over time.

Coordination with Other Initiatives
In Turkmenistan, the project will cooperate with all stakeholders cited in the RCE and UNDP project document. On policy issues, the project will also cooperate with the UK-initiated project to develop a Law on Energy Efficiency and Renewable Energy and a National Energy Efficiency Action Plan through the Energy Working Group that it has convened.

Regionally, the proposed project will coordinate with Green Buildings activities undertaken by UNDP-GEF and with other UNDP-GEF efficient buildings projects in the region. It will also communicate with UNEP’s Sustainable Buildings and Climate Initiative (UNEP-SBCI), which is active at the regional level. Finally the project will maintain regular communication with the EU-funded Inogate project entitled Energy Savings in Buildings (ESIB), which provides technical assistance to promote efficient buildings in 10 countries. While this program will have a presence in Turkmenistan it is run regionally and provides a relatively small allocation for work in individual countries; nonetheless, the proposed UNDP-GEF project will ensure that technical assistance activities are not duplicated.

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

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 project is expected to result in the following:

- Direct emission reductions of 202,866 tCO\textsubscript{2}e over a 20-year lifetime through the new and retrofitted efficient buildings that will be designed and (re)constructed.
- Direct energy savings equivalent to 5,133,535\text{m}^3 of natural gas per year, or 102,670,709\text{m}^3 of natural gas over a 20-year assumed building lifetime.
The project exhibits cost-effectiveness in that it leverages existing trends in investment by the Ministry of Construction, the state concern Turkmengas, and other government agencies in the housing sector and provides these stakeholders with the tools to make these investments significantly more energy efficient.

Based on the estimated direct emission reductions from the GEF project activities, the cost per tonne of abatement would be USD 12.40/tCO₂e for GEF funding; when indirect emission reductions are included, the cost is estimated at USD 1.11 - USD 1.13/tCO₂e.

Information on how the emission reductions were calculated is provided in Annex F of the GEF Request for CEO Endorsement.

**Sustainability and Replicability**

**Sustainability**
The focus on capacity building in the project will ensure the sustainability of project results in the following ways:

- Strengthening the capacity of housing developers to oversee efficient building practices will 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 will provide the ministry with a strategic means for keeping actual building performance higher than it would be otherwise and will give staff the expertise to enforce future, even more stringent versions of the codes.
- The demand-side partnership with Turkmengas will provide it with information that will allow it 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.
- Strengthening the capacity of architects and engineers to design more efficient buildings will result in cost-effective techniques that these professionals will continue to use 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.
- The development of EE protocols for prototype buildings will allow for broad replication of EE measures when retrofitting and/or constructing buildings, bring them to a national audience, and avoid the need to develop these measures individually for each project.
- 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 of EE concepts into government policies and measures.

**Replicability**
By using locally-available materials and straightforward design techniques that are also affordable and do not add substantially to the cost of the building, the demonstration is expected to be replicated because of market pull. There are both demand-side and supply-side components of the strategy.

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.

On the demand side: (1) Close cooperation with the Ministry of Construction, the implementing partner which oversees government-funded construction in the residential sector, 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 – both through training and outreach to developers and a competition for engineers and architects -- will increase the demand for buildings with lower operating costs; and (3) Incentive programs for highly-efficient residential buildings will create a very strong incentive to design more efficient buildings.
III. **PROJECT RESULTS FRAMEWORK:**

This project will contribute to achieving the following Country Programme Outcome as defined in CPAP or CPD: **Outcome 3.2** Environmentally sustainable use of natural resources contributes to effectiveness of economic processes and increased quality of life.

**Country Programme Outcome Indicators:**
1. Comprehensive policy framework is in place regulating long-term measures for sustainable use of energy resources and promotion of alternatives/renewables
2. No. of residential buildings apply energy efficient practices and technology
3. No. of carbon finance projects developed and generate alternative revenue in the energy intensive sectors
4. No. of municipalities started practicing energy efficient public lighting
5. No. of pilot projects are in place promoting alternative and renewable sources of energy

**Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one):**
1. Mainstreaming environment and energy
2. Catalyzing environmental finance
3. Promote climate change adaptation
4. Expanding access to environmental and energy services for the poor.

**Applicable GEF Strategic Objective and Program:** CC-SP1

**Applicable GEF Expected Outcomes:** Favourable Conditions for Market Development in Terms of: Policy, Finance, Business Models, Information and Technology

**Applicable GEF Outcome Indicators:** Number of buildings programmes supported

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Baseline</th>
<th>Targets End of Project</th>
<th>Source of verification</th>
<th>Risks and Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Objective</strong>&lt;sup&gt;6&lt;/sup&gt; (equivalent to output in ATLAS)</td>
<td>Tonnes CO&lt;sub&gt;2&lt;/sub&gt;eq per year reduced (direct reductions)</td>
<td>0 (No reductions currently planned in the buildings sector)</td>
<td>10,143 tCO&lt;sub&gt;2&lt;/sub&gt;e</td>
<td>Audit data, Project reports PIRs</td>
</tr>
<tr>
<td></td>
<td>Tonnes CO&lt;sub&gt;2&lt;/sub&gt;eq reduced over the lifetime of the EE measures introduced (direct reductions)</td>
<td>0 (No reductions currently planned in the buildings sector)</td>
<td>202,866 tCO&lt;sub&gt;2&lt;/sub&gt;e</td>
<td>Mid-term evaluation, Final evaluation</td>
</tr>
<tr>
<td></td>
<td>1000m&lt;sup&gt;3&lt;/sup&gt; natural gas saved annually as a direct result of this project</td>
<td>0 (No savings programs currently underway)</td>
<td>5,133,535 thousand m&lt;sup&gt;3&lt;/sup&gt; natural gas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Co-financing leveraged</td>
<td>0 (No money currently spent on energy efficient construction)</td>
<td>USD 43,387,000 for technical assistance and investments in efficient buildings</td>
<td></td>
</tr>
<tr>
<td><strong>Outcome 1</strong>&lt;sup&gt;7&lt;/sup&gt; (equivalent to activity in ATLAS)</td>
<td>1.1 Incentive Program for highly efficient buildings developed</td>
<td>No incentives currently exist to build residential buildings that exceed current building codes.</td>
<td>Incentive program researched and language drafted in the first 18 months of implementation.</td>
<td>Project documentation, including text of Incentive Program</td>
</tr>
</tbody>
</table>

---

<sup>6</sup> Objective (Atlas output) monitored quarterly ERBM and annually in APR/PIR

<sup>7</sup> All outcomes monitored annually in the APR/PIR. It is highly recommended not to have more than 4 outcomes.
<table>
<thead>
<tr>
<th>Energy Efficiency Building Codes and Supporting Capacity Strengthened</th>
<th>1.2 Authorities trained in enforcement and design review for more efficient codes.</th>
<th>No training geared towards enforcing above-average EE standards in the residential sector exists.</th>
<th>Training developed and provided to at least 30 Glavgoexpertiz staff by the end of Year 2 of the project.</th>
<th>Documentation of training, supporting materials, participant feedback.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3 At least one policy tool to encourage more efficient residential construction is developed and introduced.</td>
<td>No policy tools to encourage EE residential construction have been developed or introduced in Turkmenistan.</td>
<td>At least one policy tool developed and introduced by the end of Year 4.</td>
<td>Project-related publications.</td>
<td></td>
</tr>
<tr>
<td>1.4 Guidance on the incentive programs and training on compliance developed and provided to architects and engineers.</td>
<td>No architects or engineers trained to meet above-average EE standards in the residential sector.</td>
<td>Training developed and provided by the end of Year 2 of the project to at least 20 architects and/or engineers.</td>
<td>Mid-term and final evaluations.</td>
<td></td>
</tr>
</tbody>
</table>

**Outcome 2**
(equivalent to activity in ATLAS)
Demand-side management partnership with Turkmenas implemented

<table>
<thead>
<tr>
<th>2.1 Analysis conducted on the most cost-effective means of reducing energy consumption in the residential sector.</th>
<th>No comprehensive analysis has considered end-use efficiency in the residential sector; no comprehensive data on sectoral consumption available.</th>
<th>Analysis of cost-effective means of reducing end-use residential energy consumption is completed and results are shared with policy-makers and decision-makers in the housing sector by the end of 18 months.</th>
<th>Project reports and publications</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2: Officials in the construction department of the company are trained in energy auditing and management in the housing stock.</td>
<td>Construction Department staff do not have capacity to carry out audits. Energy audits are not currently conducted and equipment is not available for auditing; no knowledge of energy performance in unmetered buildings.</td>
<td>Equipment is procured and relevant staff are trained successfully in energy auditing (measured as staff able to audit existing housing stock and generate data on energy performance in the buildings they audit) by the end of Year 2.</td>
<td>Procurement records Data logs Training materials and documentation Mid-term and final evaluations</td>
</tr>
<tr>
<td>2.3: Investment plan for reducing energy losses developed by the Construction Department for the housing stock that Turkmenas supplies.</td>
<td>Turkmenas does not address energy losses in end-use sectors and does not have the planning tools to do so.</td>
<td>An investment plan is developed and presented to Company Management by the end of Year 3.</td>
<td>Assumes that interest and cooperation on the side of Turkmenas will remain strong (risk that interest in saving fuel that can be exported will decrease is LOW).</td>
</tr>
</tbody>
</table>

**Outcome 3**
(equivalent to activity in ATLAS)

<table>
<thead>
<tr>
<th>3.1: Three new multi-unit residential buildings with significantly improved energy</th>
<th>No residential buildings have been constructed in Ashgabat that significantly exceed</th>
<th>Three new multi-unit residential buildings with significantly improved energy performance (i.e. total energy consumption that is at least 25% lower</th>
<th>Construction documentation, permits, and deeds.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2: Development of the energy audit.</td>
<td>No comprehensive audit of energy usage in the residential sector has been conducted.</td>
<td>An energy audit is conducted and results are shared with policy-makers and decision-makers in the housing sector by the end of Year 2.</td>
<td>Project reports and publications</td>
</tr>
<tr>
<td>3.3: Desktop analysis of energy losses in the residential sector.</td>
<td>No comprehensive analysis of energy losses in the residential sector has been conducted.</td>
<td>A desktop analysis of energy losses in the residential sector is conducted and results are shared with policy-makers and decision-makers in the housing sector by the end of Year 2.</td>
<td>Procurement records Data logs Training materials and documentation Mid-term and final evaluations</td>
</tr>
</tbody>
</table>

UNDP Environmental Finance Services
<table>
<thead>
<tr>
<th>Improved Design Measures for Major Residential Consumers Implemented</th>
<th>performance are designed and constructed by the end of Year 4 of the project.</th>
<th>mandated energy performance.</th>
<th>than current code requirements) are designed and constructed by the end of Year 4 of the project.</th>
<th>Energy audit data and energy labels.</th>
<th>Ashgabat).</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2 Three multi-unit residential buildings are re-contructed with significantly improved energy performance by the end of Year 4 of the project.</td>
<td>No residential buildings in Ashgabat have been reconstructed or renovated to significantly exceed mandated energy performance).</td>
<td>Three multi-unit residential buildings are re-contructed with significantly improved energy performance (i.e., total energy consumption that is at least 38% lower than current consumption) by the end of Year 4 of the project.</td>
<td>Model passport.</td>
<td>Model passport.</td>
<td></td>
</tr>
<tr>
<td>3.3 Model energy passport developed and applied in pilot buildings.</td>
<td>Energy passports and labels for buildings do not exist in Turkmenistan.</td>
<td>A model energy passport is developed by Year 4 in the project and applied in all pilot buildings in the project by the end of 54 months of implementation, or 6 months after the commissioning of the pilot buildings if later.</td>
<td>Other project documentation.</td>
<td>Other project documentation.</td>
<td></td>
</tr>
<tr>
<td>Outcome 4 (equivalent to activity in ATLAS) Replication through partnerships with other developers and support for housing reforms that encourage energy efficiency</td>
<td>4.1 Protocols for EE retrofits in the three most common prototype residential building designs developed and applied in at least 25 buildings.</td>
<td>No EE protocols exist for residential buildings of any kind in Turkmenistan.</td>
<td>Protocols for EE retrofits in the three most common prototype residential building designs developed by the end of Year 2 of the project and applied in at least 25 buildings by the end of the project.</td>
<td>Protocol documentation</td>
<td>Protocol documentation and supporting materials</td>
</tr>
<tr>
<td>4.2: Design institutes and major housing developers are trained in and encouraged to incorporate energy efficiency protocols for the most common residential prototype designs.</td>
<td>Design institutes do not currently address energy performance when working on housing construction or retrofits, and housing developers do not explicitly request EE measures in tenders.</td>
<td>At least 30 design institute employees and housing developers receive training in EE concepts and protocols for common prototype designs by the end of Year 3 of the project.</td>
<td>Training documentation and supporting materials</td>
<td>Training documentation and supporting materials</td>
<td></td>
</tr>
<tr>
<td>4.3: Recommendations from the project are incorporated into energy efficiency policies and programs.</td>
<td>While resource efficiency and sustainability are stated national priorities, Turkmenistan does not currently have explicit policies and/or programmes to support EE.</td>
<td>At least one of the policies or programmatic innovations from the project will be incorporated into a sectoral policy or program by the end of the project.</td>
<td>Government records</td>
<td>Government records</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mid-term and final evaluations.</td>
<td>Mid-term and final evaluations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Assumes that EE policy will develop and that decision-makers will be willing to incorporate key project findings (risk is LOW-MEDIUM but mitigated by the approach of mainstreaming EE policies and measures into other sector policies, which provides more opportunities for intervention).</td>
<td>Assumes that EE policy will develop and that decision-makers will be willing to incorporate key project findings (risk is LOW-MEDIUM but mitigated by the approach of mainstreaming EE policies and measures into other sector policies, which provides more opportunities for intervention).</td>
</tr>
</tbody>
</table>
IV. Management Arrangements

The Project Board is responsible for making management decisions for a project in particular when guidance is required by the Project Manager. The Project Board 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.

In order to ensure UNDP’s ultimate accountability for the project results, Project Board decisions will be made in accordance to standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition. In case consensus cannot be reached within the Board, the final decision shall rest with the UNDP Project Manager.

Potential members of the Project Board are reviewed and recommended for approval during the PAC meeting. Representatives of other stakeholders can be included in the Board as appropriate. The Board contains three distinct roles, including:

1) **An Executive:** individual representing the project ownership to chair the group.
2) **Senior Supplier:** individual or group representing the interests of the parties concerned which provide funding for specific cost sharing projects and/or technical expertise to the project. The Senior Supplier’s primary function within the Board is to provide guidance regarding the technical feasibility of the project.
3) **Senior Beneficiary**: individual or group of individuals representing the interests of those who will ultimately benefit from the project. The Senior Beneficiary’s primary function within the Board is to ensure the realization of project results from the perspective of project beneficiaries.

4) The **Project Assurance** role supports the Project Board Executive by carrying out objective and independent project oversight and monitoring functions. The Project Manager and Project Assurance roles should never be held by the same individual for the same project.

**Project Manager**: The Project Manager has the authority to run the project on a day-to-day basis on behalf of the Implementing Partner within the constraints laid down by the Board. The Project Manager’s prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost.

**Project Support**: The Project Support role provides project administration, management and technical support to the Project Manager as required by the needs of the individual project or Project Manager.

**Executing Agency**: The project will be executed by the State Concern “Turkmengas” following UNDP guidelines for nationally-executed (NEX) projects. Turkmengas, 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 will play a key role in Components 1, 3, and 4, particularly in codes work and capacity building and training. The Ministry and Turkmengas are considered to be the senior beneficiaries of the project.

Other government bodies that will be involved in project implementation include (1) the Turkmenistan Polytechnical Institute, which is responsible for training architects, HVAC engineers, and construction engineers; and (2) the local administration in Ashgabat (for both new residential construction and reconstruction), and possibly in additional cities.

### Monitoring Framework and Evaluation

The project will be monitored through the following M&E activities. The M&E budget is provided in the table below.

<table>
<thead>
<tr>
<th>Type of M&amp;E activity</th>
<th>Responsible Parties</th>
<th>Time frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inception Workshop</td>
<td>• Project Manager</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• UNDP Turkmenistan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• UNDP GEF</td>
<td>Within first two months of project start up</td>
</tr>
<tr>
<td>Inception Report</td>
<td>• Project Team</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• UNDP Turkmenistan</td>
<td>Immediately following the inception workshop</td>
</tr>
<tr>
<td>Development of a Methodology for Measuring Building Performance and Related Emissions Reduction</td>
<td>• Oversight by GEF Technical Advisor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Short-term international consultant</td>
<td>Immediately following the inception workshop</td>
</tr>
<tr>
<td>Measurement of Means of Verification for Project Purpose Indicators</td>
<td>• Project Manager will oversee commissioning of specific studies and institutions and delegate responsibilities to relevant team members</td>
<td>At project inception, at the mid-term, and at the end of the project</td>
</tr>
<tr>
<td>Type of M&amp;E activity</td>
<td>Responsible Parties</td>
<td>Time frame</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Measurement of Means of Verification for Project Progress and Performance (measured on an annual basis) | • Oversight by Project GEF Technical Advisor and Project Manager  
• Measurements by UNDP Turkmenistan staff and the national implementing agency | Annually prior to APR/PIR and to the definition of annual work plans         |
| APR and PIR                                                                         | • Project Team  
• UNDP Turkmenistan  
• UNDP-GEF                                                                                     | Annually                                                                 |
| TPR and TPR report                                                                  | • Government Counterparts  
• UNDP Turkmenistan  
• Project team  
• UNDP-GEF Regional Coordinating Unit                                                              | Each year, upon receipt of APR                                             |
| Steering Committee Meetings                                                         | • Project Manager  
• UNDP Turkmenistan                                                                                       | Following Project inception workshop and subsequently at least once a year |
| Periodic status reports                                                              | • Project team                                                                                          | To be determined by Project team and UNDP CO                               |
| Technical reports                                                                    | • Project team  
• External consultants as needed                                                                               | To be determined by Project Team and UNDP-CO                                |
| Mid-term External Evaluation                                                        | • Project team  
• UNDP Turkmenistan  
• UNDP-GEF Regional Coordinating Unit  
• External Consultants (i.e. evaluation team)                                           | At the mid-point of project implementation.                                 |
| Final External Evaluation                                                            | • Project team,  
• UNDP Turkmenistan  
• UNDP-GEF Regional Coordinating Unit                                                                 | At the end of project implementation                                       |
| Terminal Report                                                                      | • Project team  
• UNDP Turkmenistan  
• External Consultant                                                                                   | At least one month before the end of the project                           |
| Lessons learned                                                                      | • Project team  
• UNDP-GEF Regional Coordinating Unit (suggested formats for documenting best practices, etc) | Annually                                                                    |
| Audit                                                                               | • UNDP Turkmenistan  
• Project team                                                                                         | Annually                                                                    |
| Visits to field sites (UNDP staff travel costs to be charged to IA fees)              | • UNDP Turkmenistan  
• UNDP-GEF Regional Coordinating Unit (as appropriate)  
• Government representatives                                                              | Annually                                                                    |
Project start:

A Project Inception Workshop will be held within the first 2 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and programme advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.

The Inception Workshop should address a number of key issues including:

a) Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RCU staff vis à vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.

b) Based on the project results framework and the relevant GEF Tracking Tool if appropriate, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.

c) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.

d) Discuss financial reporting procedures and obligations, and arrangements for annual audit.

e) Plan and schedule Project Board meetings. Roles and responsibilities of all project organisation structures should be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.

An Inception Workshop report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

Quarterly:

- Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform.

- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Note that for UNDP GEF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes, or capitalization of ESCOs are automatically classified as critical on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical).

- Based on the information recorded in Atlas, a Project Progress Reports (PPR) can be generated in the Executive Snapshot.

- Other ATLAS logs can be used to monitor issues, lessons learned etc... The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

Annually:

- Annual Project Review/Project Implementation Reports (APR/PIR): This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements.

The APR/PIR includes, but is not limited to, reporting on the following:

- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
- Project outputs delivered per project outcome (annual).
- Lesson learned/good practice.
- AWP and other expenditure reports
- Risk and adaptive management
- ATLAS QPR
Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

Periodic Monitoring through site visits:
UNDP CO and the UNDP RCU will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Board may also join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP RCU and will be circulated no less than one month after the visit to the project team and Project Board members.

Mid-term of project cycle:
The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation (insert date). The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project’s term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Center (ERC).

The relevant GEF Focal Area Tracking Tools will also be completed during the mid-term evaluation cycle.

End of Project:
An independent Final Evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The final evaluation will focus on the delivery of the project’s results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.

The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Center (ERC).

The relevant GEF Focal Area Tracking Tools will also be completed during the final evaluation.

During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project’s results.

Learning and knowledge sharing:
Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums.
The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects.

Finally, there will be a two-way flow of information between this project and other projects of a similar focus.
V. Legal Context

This document together with the CPAP signed by the Government and UNDP which is incorporated by reference constitute together a Project Document as referred to in the SBAA [or other appropriate governing agreement] and all CPAP provisions apply to this document.

Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP’s property in the implementing partner’s custody, rests with the implementing partner.

The implementing partner shall:

a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;

b) assume all risks and liabilities related to the implementing partner’s security, and the full implementation of the security plan.

UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.
VI. ANNEXES

Annex A. Risk Analysis
Annex B. Letters of Commitment, Co-Financing
Annex C. Terms of Reference
Annex D. Capacity Assessment
Annex E: Summary of Building Codes in Turkmenistan
Annex F: AHP Analysis of Barriers for the Project
Annex G: Documentation of Project Stakeholder Consultation
Annex A: Risk Analysis

To be inserted following GEF CEO Endorsement and prior to signature.
Annex B: Letters of Commitment, Co-Financing

These letters are appended separately.
Annex C: Terms of Reference for Key Project Staff

PM 1. Project Manager

I. Position information

Duration: 5 years

Under the direct supervision of the UNDP CO Environment & Energy Unit, the Project Manager is responsible for the day-to-day management and implementation of the UNDP-GEF project, including all project administrative and reporting matters. All work of the Project Manager will be carried out in line with the Country Programme Action Plan and in full compliance with the UNDP Rules and Regulations. The management and coordination process will be pursued through undertaking appropriate actions in programme formulation, implementation and evaluation. Strong emphasis will be made on ensuring cohesion with other UNDP programmes.

II. Functions

(i) Be able to manage the Project implementation during the Project implementation in accordance with approved Project Document;
(ii) Be responsible for management of all Project activity, staff, consultants and etc., for timely implementation of requirements on M&E;
(iii) Be able to assemble a team for and manage the activity of the Project Management Unit (PMU), consisting of the Project Assistant and National/International Experts;
(iv) Be accountable to the UNDP Country Office, but also work closely with the National Project Coordinator appointed by the Implementing Partner;
(v) Coordinate his/her work as necessary with the UNDP Energy and Environment practice staff and communicate project results that may be useful for other UNDP projects;
(vi) Conduct ongoing analysis of project implementation and communicate with all parties involved in order to address implementation issues quickly and effectively;
(vii) Take the lead on the preparation and distribution of project documentation, including mandatory reporting for UNDP and GEF, including the oversight of documentation prepared for project meetings;
(viii) Support the visibility of the project among decision-makers, stakeholders, and the public.
(ix) Coordinate project activities with other relevant activities and initiatives of the Government and donor organizations active in Turkmenistan;
(x) Provide technical and organizational support to participating institutions during project start-up; and
(xi) Submit updates, press releases, and project reports regularly to the project website and to the UNDP CO website.

III. Outputs

Expected outputs:

- Successful and timely project implementation in accordance with objectives, schedule and planned budget.
• The quality of work of the Project Manager will be assessed by successful achievement of general objectives of the project, in particular:
  o Preparation of annual Project reports, Project Implementation Reviews, working plans and other relevant Project documents;
  o Documents on awareness and outreach campaigns.

IV. Remuneration

Remuneration is to be made on monthly basis according to Contract after approval of a monthly report by the UNDP CO Head of Environment & Energy Unit.

V. Required qualifications/Competences

Education: University degree in economics, finance, business administration and management, biology, energy or relevant field. Candidates with an advanced degree in the sciences (MSc., PhD, Candidate/Doctor of Sciences, etc.) are preferred

Experience: Work experience in project management of not less than 3-5 years; work on international project management is an advantage

Languages: Excellent knowledge of Local Languages and English

Other skills:
  • Strong interpersonal and communication skills
  • Able to take decisions and manage in an institutional operating environment where external factors may change
  • Strong computer skills (Microsoft Office, Internet, e-mail)

PM 2. Project Assistant (PA)

I. Position Information

Duration: 5 years

The Project Assistant will work under the direct supervision of the National Project Coordinator and provide assistance to project implementation in the mobilization of inputs, the organization of training activities and financial management and reporting.

II. Functions

The Administrative and Finance Assistant will be responsible of the following duties:

(i) Prepare all payment requests, financial record-keeping and preparation of financial reports required in line with NEX financial rules and procedures
(ii) Provide assistance to the recruitment and procurement processes, checking for conformity with UNDP and the Government rules and procedures
(iii) Provide assistance to the organization of in-country training activities, ensuring logistical arrangements
(iv) Make internal and external travel arrangements for project personnel
(v) Maintain equipment ledgers and other management archives for the project
(vi) Provide routine translation/interpretation during project meetings and draft correspondence as required
(vii) Maintain project electronic and hard-copy filing systems
(viii) Other duties which may be required

Qualifications
Education: University Degree, some training in business and/or administration desirable (finance or accounting)
Experience: At least five years administrative experience
Skills: Good organizational skills
        Good computer skills, including spreadsheet and database experience
Languages: Fluent in Local Language and English

PM 3. Accountant

I. Position Information
Duration: 5 years (part-time)

The Accountant will oversee the bookkeeping for the project and will prepare all necessary documentation for audits and financial reporting.

Qualifications
Education: Professional qualification in accounting
Experience: At least five years experience; experience with international projects is an advantage
Skills: Accounting software
Languages: Fluent in Local Language and proficient in English

PM 4. Procurement Specialist
I. Position Information
Duration: 5 years (part-time)

The Procurement specialist will oversee all tendering and procurement of project-funded equipment, materials, and services.

Qualifications
Education: Professional qualification in financial management, university degree in a relevant field preferred.
Experience: At least five years experience; experience with international projects is an advantage
Languages: Fluent in Local Language and proficient in English

Local Consultants
LC 1. Energy Efficiency Specialist

**Job Content:**

(i) Provide economic analyses of project measures for policy-makers and stakeholders
(ii) Assess the potential impact of project measures
(iii) Provide research and input on the development of a financial incentive for highly-efficient building design
(iv) Estimate the potential impact of an energy passport system for Turkmenistan.
(v) Present findings to policy-makers and other stakeholders in a format that is understandable and easy to use.

**Qualifications:**
At least fifteen (5) years of working experience in energy economics, energy engineering, or a related field;  
- Academic qualification in the field of economics and/or engineering. 
- Practical experience in the economic analysis of policies and measures  
-- Knowledge of English is an advantage

LC 2. Senior Architect/Designer

**Job Content:**
Consult on application of energy efficient design in the demo buildings, provide on-site consultations and monitor the application of the planned measures, act as trainer during training workshops for architects and engineers on efficient building design. Other duties are as follows:

(i) Provide recommendations on application of Integrated Building Design (in close collaboration with international consultants
(ii) prepare tender documentation for building construction work with guidance from the IC Architect
(iii) ensure technical oversight over the process of construction of three new residential buildings and three reconstructed buildings
(iv) contribute to the development of educational curricula for university and act as trainer during training workshops for architects and engineers on integrated building design (IBD)
(v) provide technical expertise and input on the development of the incentive program for highly-efficient buildings
(vi) provide input on the ongoing process of strengthening building codes and compliance with them.

**Qualifications:**
At least fifteen (15) years of working experience as a certified architect or building designer
- Academic qualification in the field of engineering, architecture, or construction.
- Practical experience in residential construction.
- Working experience in other countries is an asset
- Good knowledge of building codes and other relevant norms and standards;
- Knowledge of English is an advantage.

LC 3. Senior Curriculum / Training Specialist

Job Content:
Contribute to the design of new training curricula and guide on EE building design and participate as a trainer in roll-out of the programme in first stage (along with relevant international experts).

Qualifications:
At least 10 years of working experience as a specialist in the field of building codes and construction
- Academic qualification in the field of energy, engineering, architecture, or construction.
--Experience with curriculum development and teaching

LC 4. Senior Energy and GHG Monitoring Specialist

Job Content:
Review and analyze existing information sources; effectiveness of collection, assessment, and use of data on energy consumption in buildings and develop recommendations on institutional and technical aspects for establishment of a unified energy consumption and GHG monitoring system in buildings.

Qualifications:
- At least ten (10) years of working experience as a specialist in the field of GHG emission reduction and climate change impacts;
- Academic qualification in environmental science, energy, or economics, with specialization in GHG emissions related aspects. He/she shall have knowledge of economics and/or energy economics;
- Practical experience in implementation and monitoring of pilot and demonstration projects, working experience in developing countries and CIS countries is an asset;
- Practical experience in financial and economic analysis and GHG emission reduction and carbon trade issues;
- Good ability in partnering and networking;

International Consultants


Job Content:
Provide leadership, oversight, and training for local experts on all project-related policy measures, such as the incentive for highly-efficient building design, the proposed introduction of an energy passport system, building codes development over the longer term, and others.

Propose the structure of project–related reports in these areas, and assist with trainings and presentations.

Share, on an ongoing basis, international best practice in efficient buildings policies and measures, including building codes.

**Qualifications:**
- At least fifteen (15) years of working experience as a specialist in the field of building codes and efficient buildings;
- Academic qualification in the field of energy, engineering, architecture, or construction.
- Practical experience in implementation and monitoring of model building codes
- Working experience in CIS countries in the area of building codes is a significant advantage
- Strong awareness of international best practice in the field of building codes
- Proficiency in English; preferably proficiency in written Russian (spoken Russian an advantage).

**IC 2. Architect (Expert)**

**Job Content:**
(i) Guidance and recommendations on the development of an incentives program for efficient buildings (5%)
(ii) Technical oversight over efficient building pilot projects construction/renovation and monitoring, including consultant coordination and site inspections for all demo buildings (70%)
(iii) Act as trainer for training workshops for architects and engineers on efficient design, as well as for EE buildings educational curricula in universities (15%)
(iv) Provide guidance and oversight for EE protocols for prototype building design retrofits (10%)

**Qualifications:**
- At least ten (10) years of working experience as a specialist in the field of design and construction of energy efficient buildings,
- Academic qualification in building construction energy, preferably with specialization design and construction of residential buildings. He/she must have knowledge of integrated building design and high-performance buildings;
- Sound practical experience in implementation and monitoring of pilot and demonstration projects related to design and construction of EE in buildings;
- Proficiency in English, excellent analytical and presentation skills;
- Excellent interpersonal and cross-cultural communication skills;
- Previous experience of working in CIS countries on EE buildings projects will be an asset.
IC 3. Demand Side Management Expert

Job Content:
(i) Provide advice on the detailed work plan necessary to produce the deliverables in Component 2 of the project
(ii) Provide ongoing support to and written feedback on the integrated resources plan for Turkmengas.
(iii) Oversee the identification of cost-effective demand-side investments and the calculation of their economic and environmental benefits
(iv) Act as trainer for LCs and for Turkmengas staff on integrated resources planning and demand-side management.
(v) Provide advice on presenting results and recommendations to key actors in the sector

Qualifications:
- At least a Masters Degree in energy engineering, economics, or another relevant field;
- At least 10 years experience in integrated resources planning and demand-side management, preferably with direct experience in working with utilities / energy companies.
- Fluency in written and spoken English;
- Excellent time-management and organizational skills;

IC 4. GHG Monitoring Specialist for Buildings

Job Content
- Develop recommendations for a GHG and energy use monitoring plan for the project
- Support the development of the monitoring system, including a measurement plan and overall monitoring plan for the duration of the project
- Make recommendations on monitoring and analytical techniques and provide support and training to local project staff and contractors as necessary
- Ensure that the baseline is effectively covered and that energy performance is measured in relation to a control group of buildings that reflect the target building stock in the project.

Qualifications
- At least five (5) years of working experience as a specialist in the field of GHG emission reduction and climate change impacts;
- Academic qualification in environmental science, energy, or economics, with specialization in GHG emissions related aspects. He/she shall have knowledge of economics and/or energy economics;
- Practical experience in implementation and monitoring of pilot and demonstration projects, working experience in developing countries and CIS countries is an asset;
- Practical experience in financial and economic analysis and GHG emission reduction and carbon trade issues;
- Good ability in partnering and networking;
• Proficiency in English, excellent analytical and drafting skills; preferably knowledge of written and spoken Russian and/or Turkmen language;
• Excellent interpersonal and cross-cultural communication skills;
Annex D: Capacity Assessment for Implementing Partner

Review of selected government procedures

1. Turkmen National Budget Formulation and Implementation

The Turkmen National Budget (hereinafter, TNB) is formulated and implemented based on the Law of Turkmenistan "On the Budget System" adopted by the Mejlis of Turkmenistan in 1996, as well as other regulations of Turkmenistan. TNB is formulated annually and its main parameters are laid down in the annually adopted Law on the State Budget for the next financial year. The financial year is a period from January 1 to December 31.

TNB includes the centralized budget (hereinafter, CB) and local budgets (hereinafter, LB).

TNB revenues are formed from payments, by natural persons and legal entities, of taxes, charges and other compulsory payments, earnings from other sources established by the Tax Code of Turkmenistan (introduced in November 2004), laws and other legal acts of Turkmenistan (e.g. the Law "On Licensing of Some Activities", on rental payments, on customs duties and fees, etc.). TNB revenues are distributed between the CB and LB (fully secured revenues – taxes from the population, property taxes, local taxes, et al., as well as partially secured revenues – VAT, excise duties, et al.). Some of the CB revenues are channeled to LB, in order to provide for even economic, social and cultural development of the regions.

TNB expenditures consist of current expenses, which provide for the activities of the public authorities, local executive authorities and local governments, welfare expenditures and expenditures for funding investment and innovation activities.

TNB preparation and drafting is organized by the Ministry of Finance of Turkmenistan (hereinafter, MFT). TNB preparation starts at least 5 months prior to the beginning of the budget year. The ministry of economy and development of Turkmenistan, together with the Institute for Strategic Planning and Economic Development and the Central Bank of Turkmenistan, determine the main macroeconomic indicators for the budget year. MFT sends budget forms and budget drafting guidelines to all ministries, agencies, local executive authorities and other participants of the budget process. Ministries and agencies, other public authorities, hakims of velayats and the city of Ashgabat submit, 4 months prior to the budget year, their draft consolidated financial plans and estimates. MFT performs economic appraisal and adjusts submitted draft consolidated financial plans and estimates, analyzes, with participation of interested public authorities, the macroeconomic situation, develops financial strategy for the budget year, assesses real sources of revenues, and gives opinion on all types of budget expenditures.

Two months prior to the beginning of the budget year, MFT submits draft TNB, together with the explanatory note, to the Cabinet of Ministers of Turkmenistan (CMT) for their consideration, as well as informs ministries and agencies, other public authorities, hakims of velayats (Heads of Regional Administrations) and the city of Ashgabat of the relevant indicators stipulated for them in the draft TNB. CMT considers the draft TNB and submits it to the President of Turkmenistan who, no less than a month before the beginning of the budget year, submits the draft TNB to the Mejlis for its consideration and approval.

The draft TNB submitted to the Mejlis is supplemented with the Turkmenistan’s Chamber of Control opinion on the planned TNB with the explanatory note on the execution of the TNB of the previous and the current financial years.

Mejlis is entitled to make adjustments to the draft law concerning reductions or increases in the expenditure, subject to the availability of funding sources. Mejlis approves the Law on TNB for the budget
year specifying TNB total revenues and expenditures, TNB deficit (surplus), sources of deficit financing, CB total revenues and expenditures specifying main financing sources and expenditure items; payments to the CB and allotments from CB to ministries and agencies; LB total amounts and amounts of subsidies and subventions; standard assessments from CB to LB; the list of secured items in case of imposing expenditure cuts. The law on TNB takes effect from the beginning of the financial year.

CMT organizes TNB implementation through MFT, ministries and agencies, other public authorities, local executive authorities and local governments. CB and LB cash implementation is carried out by the MFT Treasury Department and its local offices. Servicing of treasury bills is performed by authorized banks. CB and LB are executed in accordance with the procedure established by the TNB formulation and implementation guidelines.

Spending of budgetary funds is carried out by ministries and agencies within the current norms and limits for each type of expenditure. The balance of unexpended funds at the end of the year is entered in the revenues of relevant budgets.

The President of Turkmenistan is entitled to make amendments to the TNB during the financial year and within the budget deficit approved by the Law. Hakims of velayats and the city of Ashgabat are entitled to adjust the indicators of local budgets, provided the balance of their income and expenditure is observed.

Additional revenues earned in the course of the CB implementation, as well as surpluses at the end of the financial year, are used by the CMT for funding economic and social development measures. Additional revenues earned in the course of LB implementation, as well as surpluses at the end of the financial year, remain at the disposal of local executive authorities and local governments. CB surplus is channeled to the Stabilization Fund of Turkmenistan (established in October 2008).

Organizations and institutions funded from the budget submit, in accordance with the established procedure, quarterly reports on their execution of budgets of expenditure and implementation of the TNB. Ministries and agencies submit to the MFT quarterly consolidated accounting reports and financial statements; and economic entities based on the state ownership, which are under the charge of local executive authorities, submit to the local financial bodies quarterly reports on results of their economic activities. Based on the results of the financial year, MFT draws up the TNB performance report and the report on the results of financial activities of economic entities based on the state ownership, and by 30 April following the reporting financial year, submits them to the CMT. TNB implementation is organized by the MFT.

2. Public Sector Accounting System

The Public sector accounting system is based on the Law of Turkmenistan “On Accounting” (adopted in December 1996), Regulation “On Accounting and Reporting in Turkmenistan” (Decree of the President of Turkmenistan of 25 January 1994, #1659), and a number of other legal and regulatory acts of Turkmenistan. The above Law determines the single principles of organizing and keeping of accounts, establishes accounting and reporting requirements, regulates relationships on accounting issues. The Law applies to all enterprises (organizations) located in the territory of Turkmenistan, including the foreign ones, as well as their branch and representative offices and other subdivisions.

There are some differences between the institutions and organizations funded from the state budget and the self-sustained ones with regard to accounting and charts of accounts. MFT is the body carrying out public regulation of accounting and providing for the development and implementation of the government policies in the area of accounting and reporting. Its main functions include providing for accounting and financial reporting methodology, formulation of a single accounting policy that meets generally accepted international standards, approval of accounting and reporting forms and accounting standards.
Accounts are kept in the Turkmenistan’s national currency. Accounting for transactions in foreign currency is carried out using conversion at the foreign exchange rate established by the Interbank Foreign Exchange Market, which is effective at the time the transaction is effected.

An enterprise (organization) develops its accounting systems according to the established accounting standards and other legal and regulatory acts of Turkmenistan, on the basis of specifics of its activities, structure and other characteristics. The accounting system adopted by an enterprise (organization) is approved by its manager and systematically used year after year. Changes in the enterprise’s (organization’s) accounting system are allowed from the beginning of the financial year, if its activity terms are significantly changed, as well as in cases of changes in the legal and regulatory acts of Turkmenistan. Accounting is carried out using double entry in accounts specified in the chart of accounts. The manager of an enterprise (organization) is responsible for organizing accounting in accordance with the approved accounting standards and other legal and regulatory acts of Turkmenistan.

3. Internal Control Mechanisms

Internal control in an enterprise (organization) is exercised in accordance with the legislative acts of Turkmenistan and decisions of the enterprise (organization) owner. In accordance with the Laws of Turkmenistan “On Enterprises” and “On Joint Stock Companies,” an enterprise can exercise internal control based on the decision of the general meeting, as well as by involving an independent auditor. At the same time, according to the Law “On Auditing,” control is exercised over financial activities of enterprises subject to compulsory auditing.

Ministries and agencies of Turkmenistan have within their structure an internal service—supervision and auditing department (division) – which exercises internal supervision of activities of the Ministry, as well as its constituent enterprises and organizations. MFT supervision and auditing department exercises state financial control over all state authorities, as well as inspection and auditing of financial activities of enterprises, organizations and institutions, develops the methodology for organizing and implementing the departmental supervision, as well as exercises control over performance by ministries and agencies of intradepartmental supervisory functions.

4. Auditing and Supervision

Auditing is carried out in accordance with the Law “On Auditing” (adopted in 1996), which determines the legal foundation for auditing in Turkmenistan. Entities subject to auditing are enterprises, organizations and institutions, irrespectively of their legal form, as well as citizens, including foreigners and stateless persons, who engage in entrepreneurial activities without establishing a legal entity, and who must keep accounts according to law of Turkmenistan and prepare financial statements, which are audited or provided with auditing services.

Auditing can be compulsory and self-initiated. Compulsory auditing is one carried out by auditors or auditing organizations with respect to banks, lending institutions, exchanges, insurance agencies, investment institutions, joint-stock and business companies, enterprises with foreign investments, their affiliates and representative offices, as well as subsidiaries.

With regard to other entities subject to auditing, compulsory auditing is carried out in cases specified by the law or international agreements of Turkmenistan.

Self-initiated auditing is carried out at will of an entity or an owner. In order to organize internal inspections of financial and economic activities, the legislative acts of Turkmenistan provide for establishment of internal control services in some institutions and organizations.

Auditing is carried out on a contractual basis.
An auditing contract is concluded, in accordance with the established procedure, between an individually working auditor or an auditing agency on the one hand, and entities subject to auditing on the other. In carrying out audits and drawing-up audit reports, auditors are independent of the entity under auditing, of any other third party, as well as of owners and managers of auditing agencies in which they work.

An auditor is selected and appointed each calendar year by the owner(s) from among the auditors registered in the state register.

An auditor is considered appointed from the date the auditing contract is signed with him or with the auditing agency where he works, and he carries out his activities until the next owners’ meeting on auditor appointment. MFT provides coordination and methodological guidance and supervision over independent auditing activities, grants licenses to independent auditors and auditing organizations.


Financial reporting of an enterprise (organization) is a system of indicators reflecting its property and financial status, as well as its financial performance over the reporting period. Financial reporting is compiled on the quarterly basis. Financial reporting of an enterprise (organization) includes:

- Enterprise’s balance sheet (form #1);
- Statement on financial performance and its use (form #2);
- Cash flow statement (form #4)
- Annex to the balance sheet (form #5);
- Explanatory note to the financial statement;
- Auditor’s conclusion (as part of annual financial reporting) for enterprises and organizations subject to compulsory auditing;
- Breakdown of accounts receivable and payable;
- Enterprise’s production cost report for goods (works, services) – form #5-c.

In addition, state-owned organizations and enterprises enclose:

- Data on intradepartmental accounts receivable and payable;
- Data on intradepartmental offsets of debts.

Financial reporting is signed by the manager of an enterprise (organization) and chief accountant or his deputy. Financial reporting is compiled for a reporting year. A reporting year is considered the period from 1 January to 31 December inclusive. Quarterly reporting is an interim one and is compiled by cumulative total from the beginning of the reporting year.

An enterprise (organization) submits its financial reporting to the state statistics and state tax authorities, the founder, participant or owner, in accordance with the constituent documents. Financial reporting is submitted to state authorities and governing bodies, local executive authorities and local governments, and other users in accordance with the procedure determined by the legal and regulatory acts of Turkmenistan. Date of submission of financial reports by an enterprise (organization) is established by the MFT. Financial reporting prepared using computerized systems must be submitted in hard-copy form.

6. Capacity and qualification of the staff dealing with above issues

The capacity of the MFT staff dealing with issues of state budget planning and execution, issues of supervision, development of accounting, reporting and auditing policies is reinforced with highly skilled personnel year by year. The qualifications of the staff dealing with the above issues is as follows:
completed post-secondary education, certification, and several years of experience of working in the profession. In addition, MFT regularly sends its staff members to other countries for study courses.
Annex E: Summary of Building Codes in Turkmenistan

In Turkmenistan, there exist a number of building technical regulations (СНТ: Строительные Нормы Туркменистана – Construction Norms of Turkmenistan - CNT) concerning construction and heating of buildings. The technical standards are based on the former Soviet technical norms, so called СНиПs (СНИП - Строительные Нормы и Правила - Building Standards and Regulations), which have been transformed into Turkmen jurisdiction between 1994 and 1998.

Construction technical codes with impact on residential building energy efficiency include the following main regulations - Construction Norms of Turkmenistan/CNT:

- СНТ 3.04.03-94 on Residential Buildings,
- СНТ 3.05.02-94 on Heating, Ventilation and Air-Conditioning,
- СНТ 3.05.04-94 on District Heating Networks,
- СНТ 3.04.07-94 on Office and Residential Buildings,
- СНТ 2.01.01-98 on Building Climatology, and
- СНТ 2.01.03-98 on Building Thermal Engineering

The СНТ 2.01.03-98 norm on building thermal engineering (Строительная теплотехника) is one of the key building codes concerning building level energy efficiency. This norm regulates among others also thermal resistance value (R-value) of different building structures. (R-value is a reciprocal of a U-value - thermal conductivity, which is used in EU norms.)

Examples of minimum R-values required by this norm for new buildings of minimum three floors developed after year 2000 show the table 1. For lower buildings and for reconstruction of buildings apply somewhat less strict R-values.

Table 1: Building Envelope Thermal Resistance Minimum Values

<table>
<thead>
<tr>
<th>Buildings and facilities</th>
<th>Heating Degree-days [°C · day]</th>
<th>Building Envelope Thermal Resistance Minimum Values</th>
<th>R₀ [m² · °C/W]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Wall</td>
<td>Roofes and ceilings above corridors</td>
</tr>
<tr>
<td>Residential buildings, hospitals, schools, dormitories</td>
<td>2000</td>
<td>2.1</td>
<td>3.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000</td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td>6000</td>
<td>3.5</td>
<td>5.2</td>
</tr>
<tr>
<td></td>
<td>8000</td>
<td>4.2</td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>10000</td>
<td>4.9</td>
<td>7.2</td>
</tr>
<tr>
<td></td>
<td>12000</td>
<td>5.6</td>
<td>8.2</td>
</tr>
<tr>
<td>Other buildings, office and residential buildings, except for premises with higher indoor humidity</td>
<td>2000</td>
<td>1.6</td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000</td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td>6000</td>
<td>3.0</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>8000</td>
<td>3.6</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td>10000</td>
<td>4.2</td>
<td>5.6</td>
</tr>
<tr>
<td></td>
<td>12000</td>
<td>4.8</td>
<td>6.4</td>
</tr>
<tr>
<td>Buildings operated in dry and normal conditions</td>
<td>2000</td>
<td>1.4</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>6000</td>
<td>2.2</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>8000</td>
<td>2.6</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>10000</td>
<td>3.0</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>12000</td>
<td>3.4</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Source: CHT 2.01.03-98 Строительная теплотехника – Turkmen Code on Building Thermal Engineering, Table 1b, page 9
Comparison of minimum R-values of key building structures of residential buildings as required by the Turkmen norm CHT 2.01.03-98 with an EU harmonized Czech technical norm on Thermal Protection of Buildings ČSN 73 0540-2:2007 is illustrated in a Table 2.

Table 2: Comparison of Turkmen and EU (Czech) minimum R-values

<table>
<thead>
<tr>
<th></th>
<th>Czech (EU harmonized) norm ČSN 73 0540-2:2007 R [m². K/ W]</th>
<th>Turkmen norm CHT 2.01.03-98 R [m². K/ W]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roof</td>
<td>4,17</td>
<td>3,7 (4,2)</td>
</tr>
<tr>
<td>Wall</td>
<td>2,6/3,3</td>
<td>2,8</td>
</tr>
<tr>
<td>Window</td>
<td>0,58</td>
<td>0,45</td>
</tr>
</tbody>
</table>

Source: ČSN 73 0540-2:2007, CHT 2.01.03-98, comparison for new buildings, 4000 heating degreedays

Note: The higher R-value of the thermal resistance, the more energy efficient and better insulated the building structure is.

The comparison shows that the Turkmen building code CHT 2.01.03-98 on building thermal engineering requires thermal resistance R-values that are slightly lower (i.e. less demanding), but very well comparable with the Czech EU harmonized norm on Thermal Protection of Buildings ČSN 73 0540-2:2007.
Annex F: Documentation of Stakeholder Consultation

INCEPTION WORKSHOP
Improving Energy Efficiency in Residential Building Sector in Turkmenistan (PPG)
20 April 2010
Summary Notes

Inception Workshop on Energy Efficiency project (preparation phase) has been attended by representatives from ministries and agencies: Ministry of Construction of Turkmenistan, State Concern “TurkmenGas”, Central Public Utilities agency, State Concern “TurkmenEnergo”, Ministry of Nature Protection as well as by UNDP experts and by Ms. Marina Olshanskaya, Regional Technical Specialist for Climate Change for the Energy and Environment Practice from UNDP Bratislava Regional Centre.

Mr. Rovshen Nurmuhammedov, National Programme Officer, UNDP Turkmenistan, opened the meeting by introducing the main purposes and activities of the project, its main goals, scope of work and results to be achieved during the preparatory stage of the project. Programme Officer stressed that the main goal of the future full-sized project is to stimulate in Turkmenistan the energy efficiency concept of the residential buildings sector through improvement of existing construction norms and standards, demonstration of integrated approach at the initial residential building project plan, building institutional capacity of the national architectural, construction, public utilizes, energy ministries and other state organizations.

Then, participants have been presented with activities to be undertake during the initial phase of the project which are to collect baseline data, conduct analysis of information gap, institutional capacity assessment for promotion of energy efficiency in the residential sector, preparation of stakeholder analysis and stakeholder involvement plan and design demonstration projects. (An elaborative plan and description of the initial phase has been distributed to the participants earlier for their information).

Ms. Olshanskaya has further elaborated the project goals, mechanisms and best-practices from similar project which have been implemented by UNDP in Central Asia and Eastern Europe. During the presentation it has been stressed that an important aspect for a successful for project implementation is close interest and cooperation from concerned state ministries and agencies, particularly those state entities which contract for construction of residential houses.

Representatives from state agencies were quite positive and expressed their interest in participation in the project. A representative from “TurkmenEnergo” stated that the project is a very timely initiative and offered his agency’s support and assistance for the project, in particular, as it concerns to the relevant data and statistics needed for the collection of project baseline data. The representative has also briefed the audience regarding “TurkmenEnergo” plans to develop a sound climate change compliant national strategies and policies. There also a number of investment plans which are being envisioned by Turkmen Government, which are related to alternative sources of energy, solar and wind generated energy projects.

A specialist from the State Concern “TurkmenGas” has also supported the idea of the project, stating that his agency’s interest in the project lies in the concept of decreasing the consumption of gas in the residential sector by applying international best-practices in energy
saving methods with a view of exporting the saved gas to world markets which would bring additional financial inflows to Turkmenistan.

The municipal public utilities representative supported the idea of the project and noted that the most important part of the project is building capacity among partners involved in the project.

Other state participants also expressed their support for the project and voiced readiness for active partnering during the initial phase as well as during implementation of full-seized project.
Список участников вводного семинара
«Улучшение эффективности использования энергоресурсов в жилищном секторе Туркменистана»
20 апреля 2010 г.
Гостиница «Гранд Туркмен», г. Ашхабат

<table>
<thead>
<tr>
<th>№</th>
<th>Ф.И.О.</th>
<th>Место работы, должность</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Курбанов Баймурат</td>
<td>Консультант, ПРООН</td>
</tr>
<tr>
<td>2</td>
<td>Курбанов Язмурат</td>
<td>Генеральный директор, Туркмен Довлет Таслама, Министерство Строительства</td>
</tr>
<tr>
<td>3</td>
<td>Бабаев Бегмурат</td>
<td>Главный специалист по охране окружающей среды, Государственный Концерн Туркмен Газ</td>
</tr>
<tr>
<td>4</td>
<td>Лукьяненко Ася</td>
<td>Ведущий инженер, Туркмен Комун Таслама</td>
</tr>
<tr>
<td>5</td>
<td>Шмидт Вадим</td>
<td>Начальник ПТУ, Туркмен Энерго</td>
</tr>
<tr>
<td>6</td>
<td>Аллабердыев Гурбангельды</td>
<td>Ведущий инженер, Министерство Охраны Природы</td>
</tr>
<tr>
<td>7</td>
<td>Атамурадова Ирина</td>
<td>Консультант по изменению климата, Министерство Охраны Природы</td>
</tr>
<tr>
<td>8</td>
<td>Экяев Мухаммед</td>
<td>Начальник управления, Министерство Строительства</td>
</tr>
<tr>
<td>9</td>
<td>Нурмухамедов Ровшен</td>
<td>Руководитель программы ПРООН в Туркменистане в области охраны окружающей среды</td>
</tr>
<tr>
<td>10</td>
<td>Хаджиев Джемшид</td>
<td>Программный Ассистент, ПРООН</td>
</tr>
<tr>
<td>11</td>
<td>Ольшанская Марина</td>
<td>Эксперт, ПРООН</td>
</tr>
</tbody>
</table>
UNDAF Outcome (s)/Indicator (s):
Outcome #3: by 2015, the system of environmentally sustainable economic management expands population’s opportunities to participate in social and economic development, especially in rural areas.

CPAP Outcome (s)/Indicator (s):
Outcome #3.2. Environmentally sustainable use of natural resources contributes to effectiveness of economic processes and increased quality of life.

CPAP Output (s)/Indicator (s):
Output 3.2.3. Government introduces carbon reduction and energy saving technologies.

Executing Entity/Implementing Partner: State Concern “Turkmengas”
Implementing entity/Responsible Partner: Ministry of Construction, State Concern “Oil & Gas Construction”, Municipalities, Ministry of Power and Industry

<table>
<thead>
<tr>
<th>Programme Period:</th>
<th>2011-2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlas Award ID:</td>
<td>00061181</td>
</tr>
<tr>
<td>Project ID:</td>
<td>00077395</td>
</tr>
<tr>
<td>PIMS #</td>
<td>4134</td>
</tr>
<tr>
<td>Start date:</td>
<td>01/06/2011</td>
</tr>
<tr>
<td>End Date</td>
<td>31/03/2015</td>
</tr>
<tr>
<td>Management Arrangements</td>
<td>NEX</td>
</tr>
<tr>
<td>PAC Meeting Date</td>
<td>23 Dec 2010</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total resources required</th>
<th>$46,003,280</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total allocated resources:</td>
<td>$46,003,280</td>
</tr>
<tr>
<td>• Regular</td>
<td>$100,000</td>
</tr>
<tr>
<td>• Other:</td>
<td></td>
</tr>
<tr>
<td>○ GEF</td>
<td>$2,516,280</td>
</tr>
<tr>
<td>○ Govt.</td>
<td>$43,387,000</td>
</tr>
<tr>
<td>○ In-kind</td>
<td></td>
</tr>
<tr>
<td>○ Other</td>
<td></td>
</tr>
</tbody>
</table>

In-kind contributions

Agreed by Turkmengas

<table>
<thead>
<tr>
<th>NAME</th>
<th>SIGNATURE</th>
<th>Date/Month/Year</th>
</tr>
</thead>
</table>

Agreed by (UNDP):

<table>
<thead>
<tr>
<th>NAME</th>
<th>SIGNATURE</th>
<th>Date/Month/Year</th>
</tr>
</thead>
</table>