



PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: Full-sized Project

Submission Date: 22 July 2009

Re-submission Date: 14 September 2009

PART I: PROJECT IDENTIFICATION

GEF PROJECT ID¹: PROJECT DURATION: 48 months

GEF AGENCY PROJECT ID: 4134

COUNTRY(IES): Turkmenistan

PROJECT TITLE: Improving Energy Efficiency in the Residential Buildings Sector of Turkmenistan

GEF AGENCY(IES): UNDP

OTHER EXECUTING PARTNER(S): Ministry of Construction, Ministry of Natural Protection, TURKMENGAS, selected velayats

GEF FOCAL AREA (S)²: Climate Change

GEF-4 STRATEGIC PROGRAM(S): CC-SP1

NAME OF PARENT PROGRAM/UMBRELLA PROJECT (if applicable): Global Umbrella Framework for Promoting Low Greenhouse Gas Emission Buildings

INDICATIVE CALENDAR*	
Milestones	Expected Dates mm/dd/yyyy
Work Program (for FSP)	11/01/2009
CEO Endorsement/Approval	12/31/2010
Agency Approval Date	01/31/2011
Implementation Start	02/01/2010
Mid-term Evaluation (if planned)	07/01/2012
Project Closing Date	12/31/2014

A. PROJECT FRAMEWORK

Project Objective: The proposed UNDP-GEF project will reduce greenhouse gas emissions by improving energy management and reducing energy consumption in the residential sector in Turkmenistan.

Project Components	Indicate whether Investment, TA, or STA ^b	Expected Outcomes	Expected Outputs	Indicative GEF Financing ^a		Indicative Co-Financing ^a		Total (\$) c = a + b
				(\$ a)	%	(\$ b)	%	
1. Energy Efficient Building Codes and Supporting Capacity	TA	*Energy consumption in new buildings is reduced significantly due to new, stricter construction codes *Authorities have the capacity to enforce new codes *Architects and engineers have the capacity to design residential buildings that will meet stricter criteria for energy performance.	*More energy efficient building codes adapted from CIS model codes *Authorities trained in the new codes enforcement. * Improved organization structures, staffing standards, capacities and accountability for agencies in charge of inspection and enforcement *Architects and engineers receive guidance on the new codes and training on compliance.	300,000	75	100,000	25	400,000
2. Demand-	TA	*Turkmengas has an	*Analysis	500,000	77	150,000	23	650,000

¹ Project ID number will be assigned by GEFSEC.

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

side management: partnership with Turkmengas		overview of the potential for savings represented by its residential end-users *Turkmengas has the capacity to identify savings in the housing that it constructs *Turkmengas has the capacity to invest in energy-saving policies and measures for its end-users	conducted on the most cost-effective means of reducing energy consumption in the residential sector. *Officials in the construction department of the company are trained in energy auditing and management in the housing stock. *Investment plan for reducing energy losses developed by the Construction Department for the housing stock that Turkmengas supplies.					
3. Improved design measures for major residential consumers	Investment and TA	* Energy-efficient design is incorporated into 5 new buildings; *Government housing developers at the national and local levels have efficient prototypes for multi-unit residential buildings that they can use for new construction	*5 multi-unit residential buildings are designed and constructed by the end of Year 3 of the project *5 prototype designs are developed and approved by the end of the project and applied in (re)construction of additional 25 buildings	800,000	9	8,000,000	91	8,800,000
4. Replication through partnerships with other developers and support for housing reforms that encourage energy efficiency	Investment and TA	*Turkmengas and local municipal/construction authorities have the capacity to work with its largest residential consumers to reduce their energy consumption *The experience of the project informs the reforms that are	*Design institutes and major housing developers are trained in and encouraged to incorporate more efficient prototypes *Private construction of 4 new EE buildings initiated by the end of the project	700,000	9	7,000,000	91	7,700,000

	ongoing in the housing market *Authorities have recommendations they can use on effective energy management in new and existing buildings	*Recommendations made to the planned privatization of housing to ensure that tenants have incentives to make building-level investments in energy savings *Recommendations from the project incorporated into the energy efficiency policies					
5. Project management			216,280	46	250,000	54	466,280
Total project costs			2,516,280	14	15,500,000	86	18,016,280

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

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

B. INDICATIVE CO-FINANCING FOR THE PROJECT BY SOURCE and by NAME (in parenthesis) if available, (\$)

Sources of Co-financing	Type of Co-financing	Project
Project Government Contribution	In-kind	500,000
Project Government Contribution	Cash	8,000,000
Private Sector	Cash	7,000,000
Total Co-financing		15,500,000

*The contribution of UNDP Turkmenistan to the project from its core funding is anticipated but not included here as the amount will be determined during the project preparation phase.

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

	Previous Project Preparation Amount (a) ³	Project (b)	Total c = a + b	Agency Fee
GEF financing	-	2,516,280	2,516,280	251,628
Co-financing	-	15,500,000	15,500,000	
Total		18,016,280	18,016,280	251,628

PART II: PROJECT JUSTIFICATION

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

Background: Turkmenistan is somewhat unusual among the transition economies in that it is beginning to undertake many of its economic reforms only now. Significant oil and gas resources and income from energy exports have supported a system where energy resources have been practically without cost to the population: both natural gas and power are free up to a certain point for residential customers.⁴ As a result, there is no incentive for end-users in the residential sector to reduce the consumption of energy, and greenhouse gas emissions in the residential sector are the third largest source of emissions in the country. In addition, the absence of heat meters and controls in buildings on district heating networks means that end-users could not control their consumption even if they had an incentive, and some buildings are over-

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

⁴ Electricity is free up to 35 kWt/person/month. Additional kilowatts cost approximately 0.004 USD.

heated, while others are under-heated.

Residential buildings in Turkmenistan can be divided into three sectors: 1) One- and two-story private homes, often row houses, that use traditional knowledge about maintaining a pleasant indoor climate, often with electric heating; 2) contemporary large-scale high-rise apartment buildings that make up the “construction boom” that use mineral wool insulation on walls to reduce heat loss and largely rely on free-standing gas boilers for heat and hot water; and 3) multi-story apartment buildings built between 1960 and 1991 in “micro-districts,” which are often owned by municipalities, including buildings built using panel construction, brick, keramsite, and iron-cement materials -- many of these buildings constructed in the 1980s were built from designs developed at design institutes in Uzbekistan and Tajikistan. [Draft Heating Strategy for Turkmenistan, 2006, KLF & BE/MVV and Rambøll Danmark A/S]. The current building code for residential buildings -- CHT 3.04.03-94 – was last revised in 1994.

Currently, the government is launching reforms in both the housing sector and in the use of energy. In housing, the National Development Programme involves increasing residential construction (in many cases moving families from single-family dwellings into multi-unit apartment buildings) to meet the demands of a growing population, increasing square footage per capita to improve standards of living, and privatizing nearly all of the housing stock (the current target is to privatize 90% of the housing stock by 2010). However, without energy efficiency incentives and technologies, residents will not be able to control their consumption, and the introduction of heating tariffs could place a significant strain on the population. Ambitious housing reforms may shift the burden of reducing consumption onto those who are least able to undertake energy-saving measures.

In the energy sector, the government is now interested in the development of emission reduction projects and in improving the efficiency of its oil and gas sector. 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 difference is between no revenue (or even subsidy costs and negative revenue) and international market prices. The government participated in an inter-ministerial dialogue on climate change in January 2009 to discuss how to address climate change issues, and other discussions have been held this year regarding carbon finance as a means of funding energy efficiency. So far, the government and the state-owned energy enterprise Turkmengas have focused mainly on supply-side savings in energy. Currently, there is an immediate need for 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.

Project approach:

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 and improved 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 policy 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 reform.

Component 1 is designed to support the introduction of energy efficient building codes and the capacity to implement and enforce them. Building codes are particularly important because they will “build in” a higher level of energy performance in the housing sector without the need for individual decisions on the part of builders and residents. They will also lower the potential fuel cost burden for residents as tariffs are increased. This component will take advantage of good practice in improved building codes in other Central Asian countries that share a similar regulatory structure and tradition. Activities will include the development and approval of new appropriate building codes including provisions for mandatory minimum energy performance standards for the residential sector and training for practicing engineers and architects and for architecture and engineering students on code compliance, including the implementation of a new post-secondary curriculum in energy-efficient construction. **Special emphasize will be made on strengthening the enforcement**

of new building codes at building design, construction and commissioning stages (i.e. through additional training and guidance to governmental inspectors involved in compliance check).

Component 2 addresses the unique principal-agent problem in energy efficiency in Turkmenistan.⁵ Currently, builders have no incentive to build in energy-efficient design, because they do not pay for the energy consumed by their buildings, and because a more efficient building will not be more attractive to buyers, who do not pay for energy. Occupants – both in public and in private flats – do not have any incentive to buy efficient appliances or conserve energy in other ways, again because in the vast majority of cases they do not pay for the energy they use. This arrangement also means that the two most successful methods of addressing the principal-agent problem – shared savings projects and performance-based contracting – cannot be used with owners or occupants in the housing sector in Turkmenistan, because 1) neither group pays for the energy it consumes; and 2) a lack of hard price constraints means that energy savings do not translate into financial savings for either party.

However, an analysis of relationships in the housing sector does show that there is a key partner for whom there is currently an incentive to reduce energy use: Turkmengas. In addition to providing heat for the residential sector, Turkmengas is also a significant housing developer for its employees and for others. Therefore, activities under this component will be geared towards developing the capacity to undertake demand-side management at Turkmengas. Activities will include training and support for the construction department of Turkmengas; a survey of building stock and identification of most cost-effective measures for both new and existing buildings; a training program for auditors; the development of an investment analysis considering the cost-effectiveness of various measures for the housing stock; and the preparation of an investment plan to realize the most cost-effective savings in the housing sector and re-invest some of these savings into additional energy efficiency measures⁶.

Component 3 is designed to reduce demand in new residential construction by introducing improved design measures for major residential consumers. This component will build upon the relationship with Turkmengas and leverage its role as a housing provider. In addition, it will also work with selected ministries and a municipality or municipalities. This component also takes advantage of the use among public sector builders of “prototype” designs, or a standard design that can be modified to meet site requirements. The availability of low-energy prototypes will allow more efficient buildings to be introduced very quickly on a wide scale. Activities will include consultations on low-cost, high-efficiency measures that will utilize local materials and be appropriate for climatic conditions; support in tendering and documentation for the energy-efficient buildings; construction of the buildings; development of prototype designs based on lessons from the efficient housing constructed in Year 3; and the publication of a guidebook on the prototype designs for the construction and design offices of major public housing developers (ministries, state enterprises, municipalities).

Component 4 builds upon the experiences from component 3 to replicating results with other developers, including those in the private sector. It also focuses on integrating energy efficiency considerations and incentives into the government’s program of housing reform. Activities include workshops for architects and engineers at the design departments of major housing providers (ministries, state enterprises, municipalities, and private companies); an analysis of privatization programs and the institutional framework they will introduce; legal analysis of tenancy/co-op/and condominium laws and how they may support or hinder building-level EE investments; a policy analysis of how energy-efficient buildings can best be encouraged through state and local housing funds; policy and legal recommendations submitted to housing authorities on how best to support EE investments; general project lessons and policy recommendations shared in Turkmenistan and Central Asia more broadly; a roundtable with policy-makers; and on-going guidance to authorities with drafting housing and energy efficiency reforms.

B. DESCRIBE THE CONSISTENCY OF THE PROJECT WITH NATIONAL/REGIONAL PRIORITIES/PLANS: The proposed project is fully consistent with Turkmenistan’s plans in the housing sector, in the area of energy sector

⁵ The “principal-agent problem” in energy efficiency specifically refers to the situation where an efficient technology is not implemented because neither the owner of a facility nor the occupant has sufficient incentive to do so.

⁶ The cost of this component includes instrumental measurement of building energy performance by qualified technical experts, which is the type of expertise which is not existent in Turkmenistan (both experts and equipment) and will therefore need to be outsourced to international consultants.

reform and development, and in the general field of socio-economic development (see “Background” Section above for details).

C. DESCRIBE THE CONSISTENCY OF THE PROJECT WITH GEF STRATEGIES AND STRATEGIC PROGRAMS: The program is directly aligned with the GEF Strategic Program 2 under the climate change objective of increasing energy efficiency in the buildings sector by increasing the market penetration of energy efficient technologies and by improving the adoption and implementation of energy efficient standards. The project forms an integral part of the UNDP-led GEF Global Framework for Promoting Low Carbon Buildings with a primarily focus on two thematic approached promoted by the Global Framework: a) Promotion and increased uptake of High Quality Building Codes and Standards; and b) Public Buildings and Municipalities as Promoters of Energy Efficiency. The coordination offered by the global program will help Turkmenistan to learn from experiences and best practices from countries with similar EE building projects in Central Asia (Kazakhstan, Kyrgyzstan, and Uzbekistan) and globally.

D. JUSTIFY THE TYPE OF FINANCING SUPPORT PROVIDED WITH THE GEF RESOURCES: GEF support will be delivered in the form of technical assistance, which is considered the most suitable modality for grant delivery given the nature of barriers to be addressed and the proposed interventions (particularly institutional capacity development and partnerships and training for public entities).

E. OUTLINE THE COORDINATION WITH OTHER RELATED INITIATIVES: The project will coordinate closely with the following initiatives and stakeholders:

- a. *Government initiatives:* All components of the project, and particularly Component 4, will involve government agencies at the local and national level involved in housing and housing reform. Components 2 and 3 will involve close coordination with the state-owned enterprise Turkmengas. Component 1 will involve working closely with the Ministry of Construction, which is responsible for building codes. And lessons learned from the project will be shared with all key government stakeholders at both the national level, including the Ministry of Economy, the Ministry of Nature Protection, and the Ministry of the Power Industry, and at the regional (*velayat*) and local level with the respective authorities.
- b. *Other initiatives in Turkmenistan:* The project will also work with private developers and construction agencies through Component 4 (and through the guidance activities in Component 1). It will also coordinate with donor-funded climate and energy activities. Specifically, the project will work closely with the efforts by the Government of the United Kingdom to support the development of a Law on Energy Efficiency and an Energy Efficiency Programme for Turkmenistan. It will also coordinate efforts funded by the European Commission to provide support for energy efficiency in Central Asia through its EURAID/ENPI program and with other donors active in the energy and climate sectors who were consulted in the development of this proposal. The project components related to post-secondary curriculum will coordinate with TACIS-TEMPUS support for strengthening higher education in Turkmenistan. The project design and approach also draw upon lessons learned from the UNDP-GEF medium-size project “Turkmenistan – Improving the Energy Efficiency of Heat and Hot Water Supply,” which closed in 2006.

Other stakeholders will include researchers in the buildings and climate sectors, engineers and architects, relevant educational institutions such as the Turkmen Polytechnic Institute, and the residents of the buildings themselves and any relevant associations of renters or owners.

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

Under a **Business as Usual Scenario**, the government would continue to pursue its national program in the housing sector, and public and private housing would be constructed at the following rate:

Table 1: Project volume of public and private construction* in Turkmenistan

	2010	2011	2012	2013	2010-2013	2008-2020
Public (thousand m ²)	150.9	147.6	154.9	165.3	618.7	1997
Private (thousand m ²)	244.2	246.4	248.7	253.4	992.7	3225.4

Total (thousand m ²)	395.1	394	403.6	418.7	1611.4	5222.4
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*“Public buildings” refer to residential buildings being funded from national housing program and “private buildings” refers to construction of residential buildings undertaken by private investors.

However, several types of barriers would continue to result in energy-intensive buildings and behaviours throughout the residential sector, and the privatization of the housing sector would place a large burden on the population to control energy consumption without providing them with the necessary tools to do so. Significant barriers would include – but not be limited – to the following:

- **Policy barriers:** Relatively weak energy standards in residential building codes; no policies to introduce energy efficiency into the residential sector or targets for energy savings. Without GEF assistance, the Government will not introduce and won't have sufficient capacity to enforce new more energy efficient building standards. Policy barriers will be addressed under Component 1 of the project.
- **Market barriers:** Lack of incentives for end-users to reduce consumption. An analysis of relationships in the Turkmen housing sector showed that there is only one key partner with strong incentive to reduce energy use: Turkmengas. Component 2 of the project was designed to help Turkmengas realize and implement most cost-effective savings in the housing sector and re-invest some of these savings into additional energy efficiency measures
- **Knowledge barriers:** Lack of information for decision-makers on energy consumption in the building sector and on the cost-effectiveness of low-energy designs and technologies. Low awareness among building designers/developers/users of efficient design principles and low-cost measures. Limited information on energy issues for policy-makers in the housing and socio-economic development sectors. The “knowledge barriers” will be addressed through Component 3 and 4 which support demonstration, promotion and replication of energy efficient building design via the development and introduction of “low-energy prototype buildings”.

Under the **GEF Project scenario**, energy efficiency will be integrated into national housing policy, and efficient designs will be developed and commissioned throughout the housing market by both public and private housing developers. Furthermore, socio-economic and housing reforms will be informed by energy efficiency considerations, allowing the government to identify cost-effective, large-scale means of reducing energy consumption in the housing sector while minimizing the burden on individual home-owners.

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

Risk	Rating	Mitigation
Lack of governmental commitment to revise and introduce more stringent energy efficient building norms and standards	L	This risk is considered low. The government has demonstrated strong interest in housing reforms and in climate change mitigation and 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 design and energy-saving measures	M	This risk is also considered as low to medium because all developers will have to comply with more-efficient building codes. To mitigate this risk, the project will work with major housing developers as Turkmengas, which also must pay for the energy consumed in its housing, will strengthen its ability to reduce operating costs and save money. Finally, the policy advisory components of the project will focus on introducing incentives for builders, such as making financing from housing funds contingent upon meeting certain energy performance standards.
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 history of construction in the residential sector over time.

H. DESCRIBE, IF POSSIBLE, THE EXPECTED COST-EFFECTIVENESS OF THE PROJECT: Estimated direct reductions in CO₂ emissions from the proposed project total at least 450,000 tons CO₂ a year, assuming that the project will (1) Introduce norms by the end of Year 3 that are at least 15% more efficient than the current building codes; and (2) Directly oversee the construction or capital reconstruction of 20% of publicly-constructed residential buildings (measured in m²) constructed in Years 3 and 4 of the project and 10% of the buildings privately-constructed or reconstructed in Year 4 of the project (measured in m²) with assumed savings of 30% and an assumed “lifetime” of

20 years (See Table 2). This would result in cumulative emission reductions over project life-time a 10-year post-project influence period of at least 3 mln tons CO₂. These figures would result in a cost per ton mitigated of approximately USD 0.8 for the GEF contribution or USD6/ton for the total funding. More detailed scenarios and estimates based on monitoring of the current performance of selected types of residential buildings in Turkmenistan's varying climatic conditions, will be developed in the course of project preparation.

Table 2: Estimates of project emission reduction

	Target	Energy saving impact, kWh/m ² /year	Energy saving impact, kWh/m ² /building life-cycle*	Construction by the end of Project, m ²	GHG mitigation impact by the end of the project, tCO ₂ **	Total construction during project lifetime and 10 year after its completion (based on Table 1), m ²	GHG mitigation impact over the project life-time and 10 yrs influence period, tCO ₂ ***
New EE Building codes	15% more efficient than BAU	25	500	Year 3: 403,000 Year 4: 418,000	410,500	5,222,000	1,305,500
Promoting EE building design	30% more efficient than new codes	50	1,000	Year 3: 32,000 Year 4: 55,000	43,500	3,610,000	1,804,000
TOTAL					454,000		3,110,000

*Assumed building life-time of 20 years

** Assumed CO₂ conversion factor: 0.5 tCO₂/MWh

*** Assumed replication factor of 100% for public buildings (it is mandatory to apply prototype design) and 50% in private construction

I. JUSTIFY THE COMPARATIVE ADVANTAGE OF GEF AGENCY: The proposed intervention is in line with UNDP comparative advantages as presented in the GEF comparative advantage matrix. The project is focused on local capacity building and transferring energy efficiency know-how and tools to the local level decision-makers and end-users. Capacity building at the local and regional levels is seen as a prerequisite to market transformation and effective energy demand management.

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

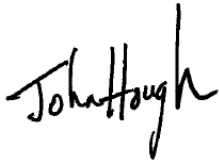
A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):
(Please attach the [country endorsement letter\(s\)](#) or [regional endorsement letter\(s\)](#) with this template).

NAME	POSITION	MINISTRY	DATE (Month, day, year)
Makhtumkuli AKMURADOV	Minister	Ministry of Nature Protection	21 May 2009

B. GEF AGENCY(IES) CERTIFICATION

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

Agency Coordinator, Agency name	Signature	Date (Month, day, year)	Project Contact Person	Telephone	Email Address
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John Hough UNDP/ GEF Officer-in- Charge		September 14, 2009	Marina Olshanskaya	+420-259- 337-285	marina.olshanskaya@undp.org
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