United Nations Development Programme
Turkey

GLOBAL ENVIRONMENT FACILITY
PROJECT DOCUMENT

Project title: Promoting Energy Efficiency in Buildings

UNDAF Outcome(s)/Indicator(s): By 2010, strengthen individual and institutional capacity for both democratic and environmental governance at local and central levels. Outcome 1.3. Strengthen management and protection of ecosystems for sustainable development (UNDP, UNIDO, FAO)/Indicator(s): capacity of National Sustainable Development Committee functions to prepare the policy papers; strategy papers developed (forestry, fisheries and others).
(Link to UNDAF outcome. If no UNDAF, leave blank)
Expected Outcome(s)/Indicator (s): Increase access to sustainable energy services/GHG emissions reduction.
(CP outcomes linked to the SRF/MYFF goal and service line)
Expected Outcome(s)/Indicator (s): Knowledge and use of energy efficiency tools and tactics improved through stronger institutions, regulations, and implementers
(CP outcomes linked to the SRF/MYFF goal and service line)
Expected Output(s)/Indicator(s): Increase in numbers/area of EE buildings, numbers of trained stakeholders, amendments to regulations and policies, and amount of GHG emissions reduced (CP outcomes linked t the SRF/MYFF goal and service line)
Implementing partner: The General Directorate of Electrical Power Resources Survey and Development Administration (EIE)
(Designated institution/Executing agency)

Project Summary: The objective of the project is to reduce energy consumption and associated GHG emissions in public buildings in Turkey by raising building energy performance standards, improving enforcement of building codes, enhancing building energy management and introducing the use of an integrated building design approach.This is envisioned to be achieved by 1) Revising and enforcing building energy performance standards 2) Introducing integrated building design approach in Turkey 3) Promoting best energy practices in the building sector and 4) Monitoring, learning, adaptive feedback and evaluation.

Programme Period: 2010 - 2015
ATLAS Award ID: 00059262
GEF Sec Project ID: 2942
PIMS: 3646
Start date: May 2010
End date: May 2014
Management Arrangement: National Implementation (NIM)
PAC Meeting date: TBD

Total resources required:	17,580,000
Total allocated:	17,580,000
• Regular (UNDP):	60,000
• Other:	
o GEF:	2,620,000
o EIE:	7,600,000
• In-kind	
o EIE:	700,000
o MoPWS:	3,000,000
o TOKI:	3,600,000

Agreed by (Government): _____

Agreed by (Implementing partners): _____

Agreed by (UNDP):_____

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List of Abbreviations

ADF	French Development Agency
APR	Annual Project Report
ATCEA	Association of Turkish Consulting Engineers and Architects
AWP	Annual Work Plan
BEP	Building Energy Performance
BREEAM	BRE Environmental Assessment Method (an accreditation system)
CEDBIK	Turkish Green Building Association
CEO	GEF Chief Executive Officer
CIS	Commonwealth of Independent States
CO	UNDP Country Office
CO_2eq	Carbon Dioxide equivalent
EBRD	European Bank for Reconstruction and Development
ECU	Executing Unit
EE	Energy Efficiency
EECB	Energy Efficiency Coordinating Board
EIE	General Directorate of Electrical Power Resources Survey and Development Administration
EITMF	Energy Information and Technology Management Facility
ESCOs	Energy Services Companies
EU	European Union
EVD	Energy Services Companies (in Turkish language)
GAZBETON	Association of Autoclaved Aerated Concrete Producers
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GoT	Government of Turkey
GTZ	German Technical Cooperation
HVAC	Heating Ventilation and Air Conditioning
IBDA	Integrated Building Design Approach
IR	Inception Report
IMSAD	Association of Turkish Building Material Producers
IZODER	Association of Thermal Insulation, Waterproofing, Sound Insulation and Fireproofing Material Producers, Suppliers and Applicators
LEED	Leadership in Energy and Environmental Design (an accreditation system)
kW	Kilowatt
kWh	Kilowatt Hour
M&E	Monitoring and Evaluation
m^2	Square Meter
MoENR	Ministry of Energy and Natural Resources
MoNE	Ministry of National Education
MoPWS	Ministry of Public Works and Settlement
NGO	Non-Governmental Organization
OECD	Organization for Economic Cooperation and Development
PDF	Project Development Facility
PIR	Project Implementation Review
PMT	Project Management Team
PMU	Project Management Unit
PSC	Project Steering Committee
PV	Photovoltaic
QPR	Quarterly Progress Report

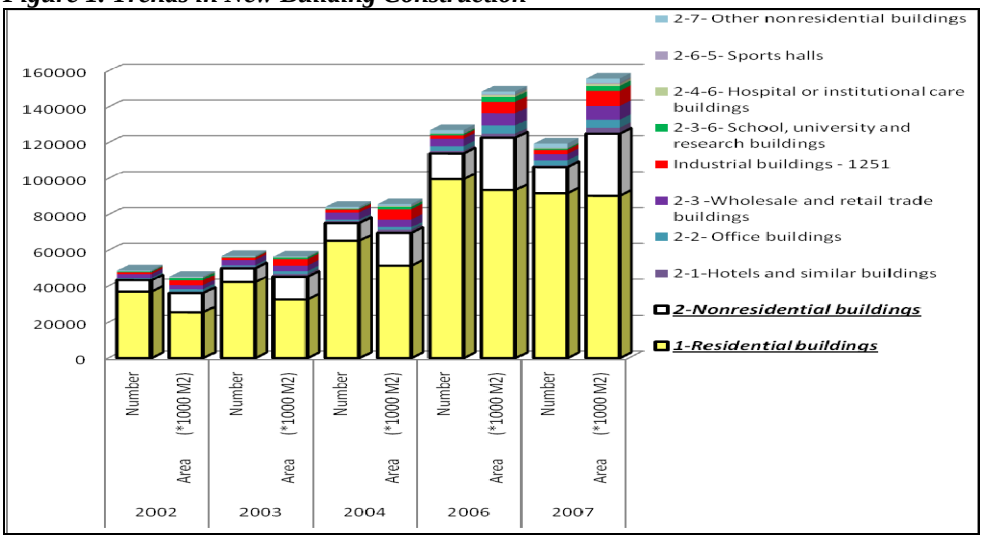
RE	Renewable Energy
REC	Regional Environment Center
RCU	UNDP Regional Co-ordination Unit
SGP	Small Grants Programme
SPO	State Planning Organization
tCO_2e	Tons of Carbon Dioxide Equivalent
TOE	Tons of Oil Equivalent
TOKI	Housing Development Administration
TPR	Tripartite Review
TSE	Turkish Standard Institute
TTMD	Turkish Society of HVAC & Sanitary Engineers
TTMOB	Union of Turkish Engineers and Architects (UCTEA)
TPR	Tripartite Review
TTR	Terminal Tripartite Review
TUIK	Turkish Statistical Institute
TUBITAK	The Scientific and Technological Research Council of Turkey
TOKI	The Housing Development Administration
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change

SECTION I: ELABORATION OF THE NARRATIVE

Part I: Situation Analysis

The total population of Turkey increased from 56.5 million in 1990 to 71.5 million by 2008. Along with the increase in population, Turkey's urbanization rate increased from 52.9% in 1990 to 74.9% in 2008[1]. As a result, the number of residential and commercial buildings in large cities has risen rapidly. In recent years, rapid urbanization has brought more people with disposable income into the major cities, and the building sector has shown significant increases in new buildings: 6% of the total historical building stock has been built in the last 7 years. To keep pace and increase housing supply at the national level, as well as to create necessary infrastructure (including educational, health care and other facilities) for the growing population, the Housing Development Administration (TOKI) n 2003-2009 built some 390,000 residential flats and a large number of other types of buildings[2]. In 2000, the Turkish Statistical Institute TUIK conducted a Building Census within 3,212 municipalities and other areas outside those municipalities but still under their responsibility. According to this census, there were 7.8 million buildings[3] in the country and the total heating area was approximately 900-1,000 million m^2. Between the 2000 census and 2008, an additional 750,000 buildings received construction permits[4], thus bringing the total number of buildings to 8.6 million, bringing the total floor area to approximately 1.7 billion m^2, not including unregistered or informal construction. According to TUIK Building Census 2000 and Annual Building Statistics on construction permits 2000-2006, the share of residential buildings stood 86%, while the remaining 14% covered non-residential buildings, including public buildings like schools and government buildings. However, residential building construction saw a slight decrease over 2006-2007, while commercial buildings and public buildings such as hospitals and schools increased (see Figure 1 below).

Figure 1. Trends in New Building Construction



Source Energy: MENR and Buildings: TUIK 2008 (2005 building data is missing)

[1] TUIK Statistics 2008

[2] This figure equals 15 cities with a population of more than 100,000. In line with large-scale urban renewal program, a total conversion work was performed for 162,886 slum houses, in 83 regions, 40,731 houses applications have been initiated in the context of social facilities. In addition, construction of a large number of various public buildings has started (e.g. 564 high schools, primary and kindergartens, 60 hospitals, 80 health centers etc.); a large part has been completed.

[3] Categories according to the purpose of buildings includes: (i) residential, (ii) residential and commercial mixed, (iii) commercial, (iii) industry, (iv) educational, cultural, social, sport, health, (v) official, (vi) religion and (vii) others.

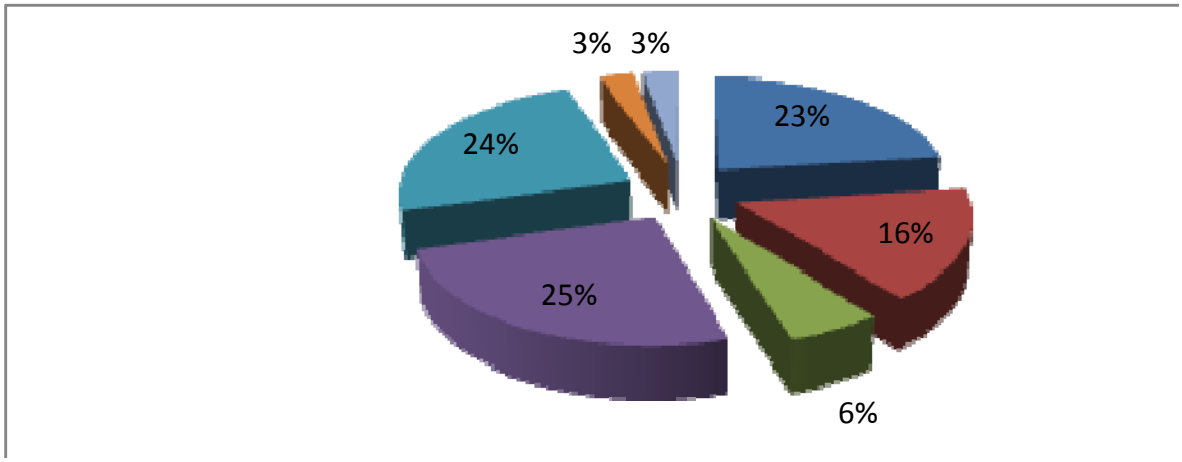
[4] TUIK Statistics Year Books,2007

Though being the world's 17th largest economy, Turkey has the lowest GDP per capita among the OECD countries, and nominal per capita income is 12% of the 2003 EU-15 average[5], while consumer spending on energy accounts for 25% of the average household budget. With the welfare increases seen in recent years, it is expected that the inefficient energy use will cause increases in the energy consumption of the country if energy efficiency does not become the practice.

Energy Situation, Buildings Sector

Turkey's primary energy consumption of approximately 106 million toe (as at 2007)[6] ranks Turkey among the 25 most energy-consuming countries in the world. Although Turkey has the lowest per capita energy consumption in OECD countries (1.35 toe per capita against 4.64 toe for OECD average)[7], the country has great potential for rapid growth rate in energy consumption due to ongoing population and economic growth (though the latter somewhat slowed during the global economic crisis), which is forecast to reach over 220 million toe by 2020. Stimulated by the welfare rise in Turkish households and offices and rapid urbanization, Turkey's annual electricity demand has tripled since 1990, reaching 198 TWh in 2008. Electricity use in the residential sector stands at 40 TWh and commercial sector at 23 TWh. Though, the largest share of the building sector's energy consumption (70% of the total energy mix) belongs to heating and hot water needs, which are met through natural gas, coal, wood and oil (see Figure 2).

Figure 2. Breakdown of Building Sector Energy Consumption, 2008



In terms of final energy consumption, the building sector represents the second-largest energy consumer accounting for 36% of the total final energy consumption in 2008 (equal to 28.3 million toe), which leads to considerable emissions of CO_2 associated with combustion of fossil fuels: according to the 2007 GHG National Inventory Data the building sector's emissions (calculated according to energy consumption) totaled 34 million tons CO_2 or 32% of the total national energy-related CO_2 emissions (106 million tons). Without change to the "business-as-usual" (BAU) scenario, the Ministry of Energy estimates the building sector's energy consumption will grow to 47.5 million toe by 2020, leading to concomitant increases in CO_2 emissions, which are expected to double. On the other hand, the building sector presents significant opportunities for cost-effective energy and CO_2 savings, estimated at some 30-50% of the current levels.

Many of Turkey's new buildings (built post-2000) are energy inefficient compared with new buildings in the EU countries having similar degree-days. Comparisons of Turkey's new buildings alongside EU countries' energy-use standards reveals that even new buildings constructed in accordance to the Standard of Thermal Insulation Requirements for Buildings , TS 825 (see the following sub-section on legal

[5] Relative Income Growth and Convergence, Kemal Dervis et al, 2008
[6] According to the State Planning Organization and MENR
[7] IEA "Key Energy Statistics", 2009

framework for details) and related implementing regulations requires at least 50% more energy for heating than their EU counterparts. This is indicative of the fact that Turkey's building codes and standards need adjustment towards more stringent energy efficiency; additionally, as described in the barrier analysis below, code enforcement needs to be stepped up, too. According to a study conducted by General Directorate of Electrical Power Resources Survey and Development Administration (EIE) in 2002, Turkey's heat consumption in standard constructions was higher than that of other EU countries. For example, Denmark's maximum allowable was 23 kWh/m^2/year, the Netherlands 34 kWh/m^2/year and the United Kingdom 35 kWh/m^2/year.[8] These figures indicate that the Turkish average heating energy requirement of 110 kWh/m^2/year is still quite high.

Legal Framework

The legal framework for building energy efficiency in Turkey is based on a number of legal acts and regulations summarized in Table 1 below, with the Building Energy Performance (BEP) Regulation and TS 825 being the key ones.

To foster energy efficiency, the Turkish government drafted an Energy Efficiency Strategy in 2004 and issued Energy Efficiency Law 5627 in May 2007. This law aims to create an adequate institutional framework for supporting energy efficiency measures, including provision of an EE Coordination Board, authorized institutions, and ongoing support for establishment of energy efficiency consulting companies (ESCOs, or EVD in Turkish). Training, audits, consultancy, monitoring activities, and other specific support and/or incentives for energy efficiency projects are regulated by this law as well. The main entity assigned responsibility for the implementation of the law is the General Directorate of Electrical Power Resources Survey and Development Administration (EIE). The provisions of the EE law specifically addressing building energy efficiency include:

- appointment of energy managers at commercial and public buildings over specified size and accreditation of ESCOs;
- implementation of minimum energy performance (MEPs) criteria for buildings;
- establishment of "Building Energy Performance Certificates"; and
- application of individual heat meters for buildings with central heating systems.

The national Standard of Thermal Insulation Requirements for Buildings TS 825, issued in June 1999, provides a backbone for national efforts to improve energy performance in buildings by limiting heat loss through the envelope (all other energy components, like lighting, cooling, are outside of its scope). TS 825 standard became mandatory in June 2000; it complies with international standards (ISO 9164 and EN 832) and:

- sets the thermal insulation requirement for new and existing buildings where renovation of at least 15% of the total area is carried out;
- defines the rules for the calculation methods of heating energy requirements in buildings and determination of the highest heating energy permitted (as annual kWh/m^2 according to heating degree days and building volume and area rates; country average of 110 kWh/m^2/year)
- divides Turkey into four climatic zones (depending on average degree-days) and limits the heat loss from the buildings in those regions (see Annex H).

The Ministry of Public Works and Settlement (MoPWS) modified the Regulation on Heat Insulation in Buildings for New Buildings (enacted May 2000, revised in 2002 and May 2008) and developed the Building Energy Performance (BEP) Regulation which was enacted in December 2008 and which will supersede the Regulation on Heat Insulation in Buildings in December 2009. In practice, the BEP supports adaptation of the European Union's Energy Performance for Buildings Directive (EPBD). With the

[8] Case Study MURE database: A Comparison of Thermal Insulation Regulations in the EU

adaptation of EPBD provisions, the requirements of the EE Law on building energy performance will be met. The BEP Regulation's main objectives are:

- To take into consideration the outdoor climate conditions, indoor requirements, local conditions, and cost;
- To define the calculation methods that can be used in evaluating the overall energy use of buildings;
- To define the performance criteria and their application principles and classify the buildings with respect to the primary energy utilization and CO_2 emissions;
- To determine the minimum energy performance (MEPs) requirements of existing buildings that will be significantly retrofit;
- To encourage use of renewable energy resources; and
- To conduct periodic inspection of heating and cooling systems.

In October 2008, the Energy Efficiency Regulation came into force to describe how ESCOs will be established, their training curricula set, and how they will be authorized. It also sets rules for EE in public buildings. Main features of the regulation are as follows;

- establishment of the Energy Efficiency Coordination Board;
- establishment of a national energy information center (in the EIE-Directorate General);
- authorization (accreditation) of entities (universities, engineering chambers) to provide applied energy manager training services to industrial enterprises and buildings; to provide training to consultants; and to accredit energy efficiency consulting firms (through consultancy certificates) to perform energy efficiency services across various end-use sectors (i.e. project preparation and implementation, energy manager training, etc.);
- certification of energy managers, to be employed by large end users (industries >1,000 toe/yr, buildings > 20,000 sq.m or >500 toe/yr, etc);
- preparing regulations for building energy performance (building energy efficiency codes), and issuance of energy identity certificate;
- preparing regulations for minimum energy performance standards (MEPS) and labeling systems for end-use appliances and equipment;
- providing financial incentives (up to 20%) for viable energy efficiency projects (<500,000 Turkish Lira, and payback period <5 years);
- providing financial incentives (20% subsidy on energy expenditures) to industries that have committed to reducing energy intensities through voluntary agreements.

The main law governing use of renewable energy is the Law No. 5346 Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy enacted May 18, 2005 This law is being modified, and it's a regulation under consideration of MoENR to allow the sale of electricity produced from renewables without having an electricity production license (for small power producers up to 500 kW of installed power). This new amendment to the Law on Utilization of Renewable Energy Resources will make renewable electricity production (e.g., solar energy) more attractive, including for application of renewables for power supply to individual buildings as a means to improve return on investment and reduce GHG emissions further.

Table 1. Energy efficiency laws and regulations applicable to buildings in Turkey

Title of the Law/Regulation	Regulates	Latest Revision
National Standard of Thermal Insulation Requirements for Buildings (TS 825)	Insulation standards for a building	May 2008 (minor revision); June 2000
Energy Efficiency Law 5627	Energy efficiency of a building	May 2007

Law on Renewables 5346	Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy	May 2005
Energy Efficiency Regulation	Authorization of ESCOs, Chambers and Universities for EE activities, Energy Managers, Training curricula of EM, Public entities EE program, etc.	October 2008
Building Energy Performance (BEP) Regulation	Energy performance of the building, its calculation, use of RE, and HVAC systems	December 2008 Will supersede Reg. on Heat Insulation in December 2009
Regulation on Heat Insulation in Buildings	Thermal performance owing to insulation	Revised August 2008 To be superseded December 2009

Institutional Framework

The **Ministry of Energy and Natural Resources (MoENR)** is the main organization responsible for formulation and implementation of general energy policies. The **General Directorate of Electrical Power Resources Survey and Development Administration (EİE**), one of the major organizations under the auspices of MoENR, has been involved in energy efficiency policy and programs, including energy audits, trainings and public awareness activities since early 1980's and is the main government entity responsible for the implementation of the EE law and by-laws, in the context of concerted/integrated collaboration mechanism with the related institutions. Additionally, EIE has been conducting energy efficiency and renewable energy projects in Turkey in cooperation with international donor organizations such as the World Bank, EU and Japan International Cooperation Agency (JICA).

As per the provisions of Article 4 of the Energy Efficiency Law, an **Energy Efficiency Coordination Board (EECB)** has been established and is functional. Among its other responsibilities, the Board is to "prepare national energy efficiency strategies, plans and programs, assess their effectiveness, coordinate their revision as necessary and taking and implementing new measures". Furthermore, it can "establish ad hoc specialty commissions by the participation from the relevant public agencies and institutions, universities, private sector and civil society organizations, with expenses covered from the EIE's budget, under the functions assigned to the Board and where it deems necessary". EIE shall also monitor the implementation of the decisions made by the Board and provide secretariat services. The EECB is chaired by Undersecretary of MoENR.

The **Ministry of Public Works and Settlement (MoPWS)** is responsible for design project preparation, construction and major repairs of public buildings, construction of housing in conformity with the principles of housing policy, taking necessary measures for the manufacturing and use of standardized construction materials in the most economic way for the country's requirements; setting standards for master plans of various scales and for urban infrastructure projects; preparing and publishing regulations, directives, ordinances, model contracts, terms of references and annual unit prices for building materials and construction services. This Ministry is responsible for implementation and monitoring of the BEP regulation.

Housing Development Administration (TOKİ) - is government agency set up to increase housing production at national level; TOKI supports the construction industry related to housing construction or those who are involved in this field. It is also subcontracting any research, projects and commitments, where deemed necessary. Since 1984, TOKİ has been acting effectively in providing affordable housing for the low and middle-income groups through innovative financial mechanisms. It has provided housing loans to approximately 1.2 million housing units by the end of 2004. As part of the proposed project,

TOKİ will realize a school project which will use integrated building design approach to create a model energy efficient building for subsequent nationwide replication through its construction activities.

Union of Turkish Engineers and Architects (UCTEA) - is a corporate body and a professional organization defined in the form of a public institution and as of December 31, 2008, the number of Chambers has increased to 23, while the number of members reached 342.996. Graduates of some 70 related academic disciplines in engineering, architecture and city planning are members of the Chambers of UCTEA. The Union is a member of the Energy Efficiency Coordination Board.

Associations of building material producers (**IMSAD**) –a range of non-governmental organizations operate in Turkey representing the interests of the local manufacturers of various construction materials. These could provide valuable contributions to the project, including in EE studies, trainings, awareness raising activities.

Barriers to Promotion of Energy Efficient Buildings

Even though Turkey has gone a long way to create a regulatory environment favorable for investments in EE buildings, there are still a number of critical barriers hampering further development of the market. GEF support is requested in order to remove these barriers, thereby stimulating take-off of the market for EE buildings.

Insufficient scope and/or "ambition" of the current EE regulations – Thermal Insulation Requirements for Buildings Standard TS 825 and related implementing regulations address predominantly heating energy conservation – designed to allow for at least 50% more energy consumption for heating that their EU counterparts, while overlooking such important elements as cooling, lighting, ventilation, indoor thermal comfort, use of renewable sources of energy. In addition, special attention is required in hot and dry climatic areas of Turkey for less energy consumption in summer. Therefore, the current approach is not sufficient to improve the real energy balance of the buildings especially in hot and dry climatic areas of Turkey. Further, under the existing legislation (e.g., TS 825), building design documents do not need to show small (but vital) details for energy efficiency. For example, the insulation details, prevention of thermal bypass or thermal bridging, and other architectural details related to the thermal performance of a building are not required to be included in the drawings. Therefore, building constructors must attempt to comply with the specification for insulation (for example) without having a "detail"[9] to guide them. This leads to ineffective construction techniques, lack of monitoring, and ultimately, inefficient energy use by the building. Also, the current regulations apply primarily to new buildings (i.e. post 2000) and building renovations over 15% of the original building, which may be missing out on important EE opportunities available. According to a survey conducted by EIE in 1998 and updated in 2008, only 18% of all Turkey's existing buildings were found to have multi-pane glazing and only 16% of buildings had roof insulation, which is indicative of the scope of EE potential in the existing (i.e. pre-2000 when TS 825 came into force) building stock. The project addresses these barriers by (i) setting up an institutional mechanism for regular review of building codes; (ii) revising and enhancing building energy performance standards to reflect international best-practices; (iii) developing an effective mechanism for implementation and monitoring of proposed EE policies and programs.

Inadequate level of compliance with the current regulations - during project formulation discussions with stakeholders[10], it was contemplate that countrywide code compliance rate was an estimated 25-30% and that, even in buildings where compliance with insulation requirements is being sought, untrained laborers cannot ensure proper mounting of the insulation. Additionally, some insulation materials do not meet the criteria stated on the product packaging and the methods to install the insulation are frequently field-

[9] In architectural drawings, a "detail" drawing allows a contractor to view a small section of the building so that understanding of the component and its installed relationship to other components is clear.
[10] Found in discussions with IZODER and other key stakeholders of insulation manufacturers.

designed (if architectural details for insulation mounting are not included in the project documents). According to reports from engineers and architects, some locally-made equipment performs at levels estimated at half that stated by the manufacturers. This project addresses these barriers by (i) building capacity of key stakeholders (such as architects, private and municipal inspectors, and installers) to enable them to meet the requirements of the regulations; (ii) performing market evaluations and facilitating testing and certification of construction materials and equipment, and (iii) by providing demonstration buildings that lend replicable technologies, tactics, and architectural "details".

Low awareness of cost-effective opportunities for improving energy performance in buildings, including through IBDA – currently, architects and engineers perform their tasks without synchronizing efforts at the project's outset. This old method of architectural practice, known as "stove-piped design" does not allow the multiple disciplines (such as architecture and engineering) to be integrated at project outset, and therefore, synergistic benefits in the building's energy budget are not realized. This also means that there is no consideration of bioclimatic features, building orientation, or use of passive or active energy-saving tactics including use of renewable energy. Architectural education in Turkey does not typically teach energy efficiency approaches or Integrated Building Design Approach (IBDA), and few trainings are aimed at working professionals. In general, building designers and builders are "on their own" in how to implement the new energy efficiency laws and related by-laws. This project addresses these barriers by (i) providing training to practicing architects and engineering professionals, (ii) introducing new curricula for pre-professionals, and (iii) integrating multiple disciplines like architects and engineers at the building project inception via the demonstration buildings.

Lack of replicable investment models in energy efficient buildings - despite a few demonstrations[11], the practice of emphasizing energy efficiency in buildings is still relatively new in Turkey with the associated limited experience and trust of the building's performance and financial viability. Financing EE building projects is not common in Turkey. There is no incentive scheme for buildings and households yet in Turkey due to many reasons. For instance, the payback periods of EE projects may be long and there is not yet a finance mechanism developed for the building sector. Additionally, tenant-owner return-on-investment ratios are not clear so the economic viability of the EE investments to owners or householders is not understood. Recently, a number of public and commercial banks, which are intermediaries of international donors such as the World Bank, EBRD, French Development Agency (ADF) and others, expressed interest in financing viable EE buildings and ESCOs activities in Turkey. This project will help advance this interest by (i) illustrating financial attractiveness of investments in EE buildings, (ii) recommending financial mechanisms (including incentives) adapted to the Turkish condition, as well as by (iii) providing replicable demonstration buildings that will include a series of low-cost and high-cost measures (including, renewable sources of energy) which have a reasonable combined payback period and will help off-set any additional costs-to-build.

Weak energy management – under the existing regulations in Turkey energy managers are required to be employed by large end users (industries consuming over 1,000 toe of energy per year, or in buildings larger than 20,000 sq.m or using over 500 toe of energy per year). Since 2006, EIE has been running a training course for building energy managers, however but its scope and coverage are inadequate to the fully meet the demand in the market in response to the EE law and revisions of building codes. Further, necessary tools to facilitate better energy management in buildings are generally lacking. The project address this barrier by (i) revising and enhancing the current training course delivered by EIE and authorized bodies, (ii) adapting and/or developing modeling tools, procedures for data collection and reporting, and (iii) compiling market assessments for available technologies and practices.

[11] Such as a small house built by Diyarbakır municipality, a working office built in Hacettepe University, and a small visitor demonstration building built in EIE premises.

The following table provides a summary of the key barriers identified alongside the proposed interventions under the project:

Table 2. Barriers and removal strategy

Identified barriers	Proposed project interventions
Insufficient scope and/or "ambition" of the current EE regulations	Outputs 1.1, 3.1, 3.2, 3.3
Inadequate level of compliance with the current regulations	Outputs 1.3, 2.3, 3.1, 3.2
Low awareness of cost-effective opportunities for improving energy performance in buildings, including through IBDA	Outputs 1.3, 2.1-2.3, 3.1, 4.1
Lack of replicable investment models in energy efficient buildings	Outputs 1.4, 2.3
Weak energy management	Outputs 1.3, 3.1-3.3

Part II: Strategy

Project Objective, Outcomes and Activities

The objective of the project is to reduce energy consumption and associated GHG emissions in buildings in Turkey by raising building energy performance standards, improving enforcement of building codes, enhancing building energy management and introducing the use of an integrated building design approach. This objective is envisioned to be achieved by four outcomes: (1) improved energy efficiency in new and existing buildings by revising, enhancing and improving enforcement of building energy performance standards; (2) cost-effective energy efficiency solutions showcased by introducing and adapting an integrated building design approach in Turkey and demonstrating the concept in two new buildings; (3) new tools developed and introduced to facilitate compliance with higher energy efficiency standards and promote best energy management practices, and (4) project results integrated into standard practice in the building sector by monitoring, quantifying and sharing the results with the relevant stakeholders.

Outcome 1: Improved energy efficiency in new and existing buildings through stronger regulations, institutions and implementers

Despite recent advances in building codes and regulations in Turkey, there is still much room for upgrading building energy efficiency codes and improving enforcement to align with international best practices. Further, to remain effective, these codes have to be regularly upgraded as technologies improve and costs of energy-efficient features and equipment decline. Such mechanisms for regular update of building codes are lacking, while relevant institutions and implementers require strengthening. This project seeks to address these barriers by:

1.1 Establishing an EE Working Group and revising two existing building codes (BEP and TS 825) and other relevant norms and standards to enhance their coverage (e.g. to include cooling, lighting, ventilation, indoor thermal comfort), improve energy performance and incorporate IBDA; developing two calculation methodologies (for heating and cooling) and MEPS for new buildings, and implementation tactics for insulation and inspections;

1.2 Developing for endorsement by EECB of an EE program for new and existing buildings with a Roadmap for EE in new and existing buildings that includes recommendations for improvement and better implementation of key regulations and an Action Plan with prioritized energy efficiency measures;

1.3 Developing an information management system linked with EITMF project, relevant methodology and indicators for measuring, monitoring and evaluating the improvement of energy efficiency in building sector and EE benchmarks for various building types, and delivering necessary trainings for EIE and MoPWS staff who will operate the system;

1.4 Enhancing the capacity of building inspectorates to assess compliance and enforce new building codes, including delivery of a dedicated training program for private and municipal inspectors;

1.5 Developing and introducing Turkish Certification System for buildings (similar to Leadership in Energy and Environmental Design LEED, BRE Environmental Assessment Method BREEAM, or Energy Passports) for all new public buildings and large renovations in order to facilitate compliance with the codes;

1.6 Establishing a Finance Working Group to develop recommendations for financial mechanisms (including incentives and support for the building sector) that encourage both the government and the private sector to finance EE and RE activities in buildings; presenting the recommendations to the EECB;

1.7 Revising the existing curricula for students of architecture and engineering and shape the architectural design guidance aimed at key implementation agents in order to incorporate IBDA and enhance EE aspects;

1.8 Delivering trainings and capacity-buildings for designers, architects, building inspectors, and building energy managers on compliance with the new and revised regulations;

1.9 Enhancing and delivering the EIE Training Program for Energy Managers and authorized ESCOs in accreditation and certification of Energy Managers.

Comments:
In its recommendation for code revisions, the EE Working Group will draw on the experiences of EU member states, the US and other countries, as relevant. The working group will consider the possibility of using a "technical solutions" compliance path, in which a building design earns points for the use of approved technologies. While this approach has not been used in Turkey, it has been employed successfully in France and the US, and it offers more flexibility for the designer and no modeling calculations, making it possibly the most straightforward of all the approaches to building codes to enforce. The EE Working Group will develop a proposal for Building EE Policies to be implemented mainly by MoPWS and MoENR and improved BEP and other related regulations to be submitted to the EECB. Improved architectural guidance and calculation methodologies for pre-professionals will also be developed and will include training curricula and modules in EE building performance and a field survey to identify existing EE buildings in Turkey.

Typically, in both old and new EU member states, a phased introduction of building energy performance certification has been applied with implementation occurring over 5-10 years, following steps that begin with voluntary certification of new buildings. Turkey's plan for introducing Energy Certificates of new buildings, including public buildings, begins with certification but will be phased over several years with different strategies and priorities. However, new public buildings are considered a high-priority sector for initiation of the energy certificates. The two demonstration buildings will showcase phased implementation as found in other new EU members' states.

Chambers of Architects under the Union of Turkish Engineers and Architects (UCTEA) will disseminate training in IBDA through the architectural training courses for professionals, while some universities (ODTU and ITU) have plans to initiate training through their architecture departments. In addition to the university training programs' dissemination, EIE has committed to training stakeholders in the use of IBDA.

The project will offer seminars to introduce the new efficient codes and use of IBDA to the design, implementation, and inspection communities to ensure EE design and EE compliance. These courses will focus specifically on the new energy codes themselves — EE building energy performance calculation, IBDA, possible measures, building certificates, and existing regulations and their implementation. This activity will target project designers, building inspectors, and building energy managers who will use principles of IBDA and energy efficiency. At the same time, this activity will support training for architects and engineers already working in design institutes, faculty in schools of architecture and construction, construction firms, and chief architects at the municipal and regional levels. These sessions will have to cover the following topics: theoretical information on the thermal behavior of buildings and materials characteristics; practical information on materials uses and technologies, passive solar design, thermal simulation of buildings, energy efficient design of new buildings, and energy efficient renovation of existing buildings.

EIE has been delivering the Building Energy Manager Training Program since 2006 and presently certifies the trainees under the current energy efficiency law. EIE has also stared to authorized the ESCOs, Chambers of Engineers and universities to conduct EM trainings since July 2009. By the end of 2008, 25 trainings have been accomplished through which about 500 energy managers have participated from the private and public sectors of stakeholders who are engaged in building, designing, or managing commercial buildings, and public buildings over 20,000 m^2 in size or using 500 toe/year of energy and 10,000 m2 in size or using 250 toe/year, respectively. The project will propose improvements to the Energy Manager Trainings and additions to the current curricula for the building sector, and recommendations for accreditation of Energy Manager Certificates.

The project will use the resources of a newly-formed Finance Working Group to devise financing mechanisms and incentives that are relevant to the key stakeholder groups: architects, engineers, building owners, public building operators, and banks. Participation of the Ministry of Finance in the Working Group will ensure relevant inputs into financial strategies practical to Turkey. Also financing organizations (such as banks and representatives of national and international donors) will be invited to participate in this group.

Outcome 2: Cost-effective energy efficiency solutions showcased through integrated building design approach (IBDA) application in two demo buildings

Initial studies conducted during the project preparatory phase illustrated that there was little knowledge of IBDA and that awareness of viable EE demonstrations in buildings was limited. This outcome will focus on generating an IBDA that is relevant and adapted to the Turkish situation and climate zones; and that is illustrated through provision of two demonstration buildings. Key project partners, TOKI, EIE, and the Ministry of National Education (MoNE) will collaborate to provide one new building that is a public school (6,000 m^2), and one training unit of MoPWS (1,500 m^2) for demonstration of IBDA. Although both demo sites are from public sector, the experience gained by TOKI and MoPWS will be easily replicable to other types of buildings (residential and commercial) throughout the country constructed by their partner-contractors who will also participate in the project. Selection of public buildings for demonstration is also justified by the fact that this will enable easier access to the premises for stakeholders and general public, as well as easier monitoring of the buildings' performance. Also, location of the buildings in Ankara will facilitate immediate replication through increased visibility which mobilize policy and decision makers to change existing regulations and availability of similar climatic conditions across the bulk of Turkey.

An integrated building design approach (IBDA), as promoted by this project, is a process of design that integrates climatic conditions, the capture and the conservation of the free solar and internal gains, the efficient and comprehensive reduction of all heat losses through walls and ventilation, the accurate control of all external energy introduced for providing thermal comfort, light, and hot water, and – last but not

least – user awareness of new behaviors regarding energy use and good operations and maintenance practices. The ultimate goal of applying IBDA is to achieve high performance and multiple benefits at a lower cost than the total for all the components combined if these were considered separately. The project will address this by:

2.1 Developing an IBDA adapted to the Turkish conditions and climate zones so that practicing architects and engineers can understand the code and produce designs that comply with IBDA and new laws;

2.2 Preparing an IBDA handbook and providing trainings for architects and engineers in IBDA;

2.3 Elaborating an implementation strategy and plan for EECB endorsement to have IBDA mandatory for all new public buildings in Turkey by 2013;

2.4 Site, plan, and construct two demonstration buildings (a school and a testing and training laboratory) to illustrate compliance with the new laws, practical use of renewable energy, and use of IBDA;

2.5 Monitoring demo buildings energy performance and quantifying energy and financial savings, CO_2 emission reductions;

Principles of the Demonstration Buildings:

The architectural design/construction company that has produced construction documents for and managed all on-site construction activities for other similar schools in Turkey, TOKI, will provide all construction documents and specifications for the demonstration school and its existing baseline "sister" schools so that the team assembled for the demonstration building can introduce energy-use goals, establish proper building orientation on the site to take best advantage of the micro-climate, decide which building skin details to revise, and specify the technologies to be used. TOKI's and MoNE's architects and engineers will become part of the team for the proposed demonstration building project so that future designs will be impacted and a true "multiplier effect" be achieved. MoPWS will provide a second new building demonstration located in Ankara (climate zone 3, see SECTION IV Part VI) that will be used as training and materials testing laboratory for country-wide trainings and construction materials testing of the MoPWS carrying out EE implementation. Although both demo sites are from public sector, the experience gained by TOKI and MoPWS will be easily replicable to other types of buildings (residential and commercial) throughout the country constructed by their partner-contractors who will also participate in the project. Selection of public buildings for demonstration is also justified by the fact that this will enable easier access to the premises for stakeholders and general public, as well as easier monitoring of the buildings' performance.

Scope of the Demonstration Building 1 (TOKI, MoNE):

Description: This demonstration building is a public primary school of 6,000 m2 located in climate zone 3. The demonstration building 1 will be derived from an already-existing new building type that will undergo orientation, architectural design and detailing changes, and equipment enhancements, so the process may be considered to be a "holistic retrofit to a yet-to-be-constructed building". Through this demonstration building's monitoring, the direct project energy savings and GHG reductions will be assessed and reported.

The only downside to selection of this demonstration building is that the school has already been designed and construction documents completed, as IBDA can best be illustrated when construction documents are not complete. However, subsequent discussions with the project stakeholders revealed that re-orientation on the site was possible and further that design and detail refinements could be made to ensure that the demonstration building would be more efficient than those already-built school-models. While not "blank page" design using IBDA, this single acquiescence would lend a realistic demonstration building with comparable baselines. Therefore, for the purposes of this project, IBDA in the demonstration building 1 will be a holistic retrofit to existing construction documents for a new building, or simply "IBDA/holistic retrofit" for short.

Experience from a number of IBDA projects in Central and Eastern Europe and the CIS has documented 20-40% energy savings with an investment payback of 2 to 5 years in different types of buildings. Owing to Turkey's inefficient, aging school building stock, energy experts have predicted that investments in energy efficiency in these buildings could save approximately 40% of the energy over the investment lifecycles.

Since MoNE has confirmed its willingness to adopt steps and measures taken in the demonstration building 1 for subsequent school constructions, the success of the demonstration building will make an impact in this sector. With this construction under the project control by providing a reliable, replicable, monitored example for new schools construction that will be widely promoted through MoNE, the new school demonstration building will showcase the savings potential of the IBDA/holistic retrofit for educational buildings in Turkey and the economy as a whole.

The demonstration building 1 will generate an Energy Certificate for the demonstration building 1, supported by accurate and reliable baseline comparison data from the other buildings on-site and will pioneer the process of passportization by noting any infrastructure or institutional obstacles found during the demonstration building's Energy Certificate. The training and demonstration of the application of the Energy Certificate will be useful after the demonstration building 1 since all processes, terms of reference, normative values, and institutional roles and frameworks for generation of certificates are not yet in place. The demonstration building 1 will leverage other previously-completed programs in energy efficiency by comparing those with the IBDA/holistic retrofit results and improving next phases of those programs, based on this comparison. By leveraging existing programs, providing new products, being supported by EIE, MoPWS, MoNE, and TOKI for incremental learning curves and mass procurement leverage, and using lessons learned, the demonstration building will see co-financing to cover the incremental costs of its energy efficient technology options.

The choice of a typical school of 6,000 m2 as the demonstration building 1 makes it optimal for replication since this type of educational building is prevailing in the new school construction across the country, which shows an average annual growth rate of 10%. The building will be designed with strong support by the MoNE who has managed other school projects under its roster of current construction for educational facilities.

With its location in Ankara, the demonstration building will showcase the energy- and cost-saving potential of IBDA/holistic retrofit in education buildings because designers will be able to study the thermal behavior of the building, monitor the effects of an IBDA/holistic retrofit for savings due to building positioning and use of micro-climate, and verify modeling done pre-construction under the quality control, testing and certification of EE materials and equipment proposed under this project. The newly-trained auditors will be able to chart the overall impact of integrated building operations and equipment systems to capture lessons learned.

Measures and Their Scope: The construction documents for this building are completed, however, the team will work to generate an IBDA/holistic retrofit which will suggest changes to the orientation, construction documents, and specifications that include, but are not limited to, the following: IBDA/holistic retrofit, a mix of no-cost, low-cost tactics, and a range of EE/RE technologies and tactics, both active and passive. Specific technologies and tactics to be used in the demonstration building 1 include: building positioning, orientation, micro-climate features, factory-sealed low-e windows and doors, wall and roof insulation, prevention of thermal bypass and/or bridging, advanced lighting technologies (e.g., CFLs), light shelves, and RE units. The proposed technologies were selected because they represent a mix of "state of the art" and "state of the shelf" (i.e., products readily-available in Turkey) technologies or materials.

From the standpoint of capacity-building of key stakeholders who will be "multipliers" for the IBDA/holistic retrofit, the demonstration building's technologies/tactics will aid local architects and engineers seeking to use an IBDA. Since the demonstration building 1 will require new details for window installation, insulation, thermal isolation, and a host of other details necessary to prevent thermal bypass or thermal bridging, these crucial elements will be utilized in subsequent buildings until they become "standard details". In practice, the demonstration building's technologies/tactics will illustrate insulation, better windows, and heating systems to show architects and engineers how to comply with the new codes, norms, and newly-defined energy performance standards.

In awareness-raising, the demonstration building's successful proving of EE technologies/tactics will highlight the savings from strategic use of use of insulation, better windows, and enhanced heating systems that directly impact energy bills and realization of cost savings. The outreach campaign undertaken in this project will foreshadow the demonstration building's success so that articles about the demonstration building 1 will find a ready audience within the general public and knowledgeable stakeholders, as policymakers were identified as key target groups for awareness-raising.

Early experience with EE buildings in other countries found that these can be slightly more expensive than standard buildings to design and build. Over time, EE building design became more than just the result of applying one or more isolated technologies. Instead, it is has become an integrated whole-building process that requires advocacy and action on the part of the design team throughout the entire project development process. A demonstration building designed with an IBDA/holistic retrofit will prove its worth in time and effort to undertake, as it is will conserve 40% or more in energy costs over a conventional school.

Any incremental costs of the demonstration building's technologies/tactics will be cost-shared by GEF and project partners. With replication, TOKI can reduce equipment or materials costs through economies-of-scale achievable through mass procurement.

Broadly, the activities to be undertaken for provision of the demonstration building 1 are:

- Receive the construction documents and specifications from TOKI and assemble the project design team which will consist of the "architects-of-record" (i.e., MoPWS, MoNE and TOKI), the team from MoPWS, EIE, TOKI, MoNE local architects and engineers, and international experts in IBDA and EE buildings;
- Agree all the measures, tactics, and technologies to be used and agree the design details and construction practices to be revised during the demonstration building project;
- Through collaboration and training, revise the details, specify the technologies, and engineer the installation of all EE, RE, and IBDA tactics and technologies for the building, producing a comprehensive set of construction documents by which the demonstration building may be priced and built;
- Manage the bidding process and let the bid for construction, ensuring that no "or equal" provisions12 be made for items considered key to the energy efficiency of the final building;
- Oversee and manage construction on the building site to ensure that all proposed changes to the BAU scenario of construction be undertaken and to provide field supervision of the workers who will be charged with building to the new details and specifications;
- Provide monitoring and ongoing evaluation of the building's progress as well as the building's operations upon completion, noting "lessons learned" so that these techniques may be widely disseminated; and

[12] "Or equal" substitutions are typical in standard building bids to gain best pricing, however, for items considered specialty items, particularly, EE or RE technologies, "or equal" substitutions must not be allowed or else higher energy efficiency may be compromised.

- Working with the originally-assembled team of TOKI, the team from MoPWS, EIE, TOKI, MoNE local architects and engineers, and international experts in IBDA and EE buildings, replicate the results of the demonstration buildings in subsequent building designs for schools, service buildings and other public buildings to be built by TOKI and MoPWS by generating training, publicizing the results, and disseminating relevant details to other new buildings.

Scope of the Demonstration Building 2 (MoPWS):

Description: This demonstration building 2, located in the Ankara climate zone 3, will serve as a Technology and Information Management Center of MoPWS. This building of 1500 m2 will be constructed as part of the MoPWS' existing laboratories to be used for trainings and seminars. This building is selected also from Ankara to show the viability of the project result to the policy and decision making bodies. Also technical staff of these organizations to be involved in this projects is based in Ankara. In addition, the third region is very representative for Turkey with the aspects of large coverage and climate conditions. The design and construction documents for this building are not yet begun so the team will work to generate a true IBDA which will suggest proper orientation, construction documents, and specifications that include, but are not limited to, the following: IBDA, a mix of no-cost, low-cost tactics, and a range of EE/RE technologies and tactics, both active and passive. Specific technologies and tactics to be used in the demonstration building 2 include: building positioning, orientation, micro-climate features, EE windows and doors, wall and roof insulation, prevention of thermal bypass and/or bridging, advanced lighting technologies (e.g., CFLs), light shelves, and RE as possible. The proposed technologies were selected because they represent a mix of "state of the art" and "state of the shelf" (i.e., products readily-available in Turkey) technologies or materials.

MoPWS will test all new materials and equipment within this laboratory. MoPWS will transfer the experiences gained from the demonstration building 2, and show its commitment to comply with the BEP and TS 825 and follow implementation by strengthening the testing and inspection system which has been subject to weak enforcement.

Broadly, the activities to be undertaken for provision of the demonstration building 2 are:

- Agree the goals of the demonstration building and its energy budget;
- Agree all the measures, tactics, and technologies to be used and agree the design details and construction practices to be designed/used during the demonstration building project;
- Through collaboration and training, design the building, its details, specify the technologies, and engineer the installation of all EE, RE, and IBDA tactics and technologies for the building, producing a comprehensive set of CDs by which the demonstration building may be priced and built;
- Manage the bidding process and let the bid for construction, ensuring that no "or equal" provisions13 be made for items considered key to the energy efficiency of the final building;
- Oversee and manage construction on the building site to ensure that all proposed changes to the BAU scenario of construction be undertaken and to provide field supervision of the workers who will be charged with building to the new details and specifications;
- Provide monitoring and ongoing evaluation of the building's progress as well as the building's operations upon completion, noting "lessons learned" so that these techniques may be widely disseminated; and
- Working with the team of architects and engineers, and international experts in IBDA and EE buildings, replicate the results of the demonstration buildings in subsequent building designs for

[13] "Or equal" substitutions are typical in standard building bids to gain best pricing, however, for items considered specialty items, particularly, EE or RE technologies, "or equal" substitutions must not be allowed or else the energy efficiency cannot be ensured.

public buildings to be built by EIE generating training, publicizing the results, and disseminating relevant details to other new buildings.

Outcome 3: New tools developed and introduced to facilitate compliance with higher energy efficiency standards and application of integrated building design approach in buildings

Initial studies conducted during the project preparatory phase showed that there were insufficient tools for carrying out EE, complying with the BEP, and following the IBDA. There was no standardized verification process for building energy performance in existing buildings by which to report progress to EIE and MoPWS. This activity will focus on supplying the tools and support services that will allow for sharing experiences and reporting progress through:

3.1 Adapting selected modeling software for assessing a building's energy use for the use of EIE and MoPWS, and generating new calculation tools that architects, engineers, and constructors may use for new and existing buildings;

3.2 Generating a standardized procedure for verification to allow data collection, measurements, and collation of building energy performance with a universal database;

3.3 Surveying and evaluating the marketplace for both domestically available and locally made equipment and materials and undertaking an analysis of "state-of-the-art" and "state-of-the-shelf" technologies available for use in constructions in the Turkish market[14]; evaluating cost-effectiveness and financial viability of the technologies in the Turkish market; facilitating testing and certification of construction materials and equipment;

3.4 Updating EIE and MoPWS websites and providing online support services for key stakeholders to report progress, record lessons learned, and share experiences;

Comments:

New calculation tools for architects, engineers, and constructors to assess building energy use and EE levels in a building will be developed. Additionally, a standardized procedure for verification to allow data collection, measurements, and collation of building energy performance with a universal database will be developed. With this activity, a model for measuring and verifying building data will be developed and benchmarks of the data will be ensured.

The survey and analysis will reveal disparities between specified capacities of equipment, and actual capacities of equipment, as these items are tested in the materials and equipment laboratory to be set up by MoPWS for this purpose. All technologies to be used for enhancement of the IBDA concept and EE will be evaluated for cost-effectiveness and financial viability.

International experience gained from large-scale national programs like EnergyStar in the US has shown that real-time support for project implementers can help disseminate project results and encourage market transformation. This project intends to revise and align existing websites of EIE and MoPWS so that databases may share information and metrics as well as provide support to key stakeholders. Lessons learned and case studies devised will also be available through these websites.

Outcome 4: Building energy consumption, energy savings, and other results of the project monitored, evaluated and reported

[14] Shorter payback period measures may be bundled with medium-to-long-term technologies that may incur more first-cost (or learning curve cost to engineer) but which may lend a more artful solution to creating an energy efficient building. IPCC 2007 recommendations for low-cost, large-mitigation potential measures will also be considered.

Initial studies conducted during the project preparatory phase illustrated that there was no methodology used in Turkey for monitoring or measuring the indirect or direct savings or GHG emissions reductions from EE buildings. There was also a need to quantify the increased demand for EE buildings that may result to create a *market push* within the real estate market. The project will address these deficiencies by:

4.1 Developing a methodology for monitoring and measuring energy and GHG savings from IBDA, the demonstration buildings, and revised regulations using the adapted software and new calculation methods;

4.2 Establishing a control group of buildings for comparing the performance of the project demonstrations and assessing the impacts of the technological intervention;

4.3 Calculating energy savings and emissions reductions from the project and preparing a report on the measurement of savings to EECB;

4.4 Undertaking market monitoring for new buildings and technologies to assess the potential increase in demand characterized in a report which will guide and inform potential new businesses seeking the new market for EE goods and services in Turkey;

4.5 Producing two independent evaluations – mid-term and final – to give full account of project results in all dimensions.

4.6 Capturing lessons from this project and other national and regional EE projects and preparing a Lessons Learned Report to inform future building EE policies in Turkey.

Comments:
Activities will be conducted early in the project in order to support the dissemination of efficient technologies and practices in the building sector. Because of the relatively centralized nature of the public building program for schools undertaken through MoNE ad TOKI, policies such as life-cycle costing in tendering and bulk procurement could have a relatively large effect on standard practices.

Market monitoring activities undertaken will focus on providing two sets of information: 1) findings from the project itself that result from day-to-day monitoring and independent evaluations of changes in the market for EE products and services; and 2) information to potential businesses seeking to provide such products or services in the Turkish market. Monitoring and evaluation activities will explicitly consider energy savings, economic savings, resultant reductions in greenhouse gas emissions, and non-energy benefits such as user satisfaction and outcomes to the extent that they can be measured.

Project Risks and Assumptions

As stipulated by the GEF Climate Change Focal Area Strategy, the key indicators of success under Strategic Priority SP1 "Energy Efficiency in Buildings" will be "the tons of CO_2 avoided, the adoption of energy efficiency standards and the estimated quantity of energy saved." These key indicators are fully reflected in the project design and built into the project's logical framework.

Risk	Rating	Mitigation
Enabling policy framework for the secondary regulations and calculations are not implemented at the desired speed	Low	The project will work directly with the government entities responsible for approving the respective regulations, which will help ensure potential concerns are addressed timely to prevent delays in approval and implementation. Further. EU accession agenda defined in the *National Programme for the Adoption of the Acquis* will contribute to timely implementation of BEP and other related regulations.

Risk	Rating	Mitigation
International economic crisis may lead to an overall slowdown of construction activity and therefore impact GHG emission reduction estimates	Medium	Even though the global crisis is going to have its toll on the Turkish economy, construction is likely to remain a relatively high priority due to the growing population and urbanization trends. Reduction of operational budgets through improved energy performance of buildings will provide additional attraction for the building sector at the time of economic crisis. Finally, the GHG emission reduction estimates are based on fairly conservative assumptions that factor in a slowdown in building stock growth over the coming years, which will help assure the estimated GHG benefits are achievable through the proposed GEF intervention.
Integrated building design approach does not get sufficient uptake due to lack of understanding or replication	Low	The project will mitigate this risk by engaging key organizations in the project design and stakeholder training programs from the outset. Commitment from key organizations (EIE and MoPWS) to mandate the use of IBDA for all new public buildings and renovations via the revised building code and regulations will ensure immediate replication in the public sector. Additionally, TOKI's experience with the demo buildings will enable it to replicate those practices in the residential (private) sector construction.
Building codes may not be enforced effectively	Medium	The project will mitigate this risk by providing a training program aimed at municipal and private building inspectors to ensure their understanding of compliance requirements with new laws. The project will further address the enforcement risk by applying an energy performance certificate scheme with certificates tested and applied by trained inspectors. A new information management system for measuring, monitoring and evaluating EE improvements in the building sector will allow inspectors to input results and the new real-time website support will assist in answering enforcement questions. Turkey's drive toward joining EU will provide further impetus toward improving building energy codes enforcement and compliance.

Expected Global, National and Local Benefits

On a global level, the project will facilitate a "carbon neutral" path for sustainable development. The anticipated global environmental benefits are: a) GHG emission reductions owing to lower energy consumption by energy efficient buildings; and b) eventual additional GHG emission reduction gains achieved by the multiplier effect seen from TOKI's replication of the EE and RE measures undertaken in the demonstration school, as they build more schools and apartment buildings using these tactics. The main national and local benefits are expected to be economic costs savings and reduced dependency/expenditures on imported energy; reduced local pollution produced by conventional energy sources; and enhanced consulting or employment opportunities in EE, RE, and green buildings. Table 3 illustrates the benefits of energy efficiency improvement and associated CO_2 emission reduction in buildings and examples of the key indicators.

Table 3: Benefits from energy efficiency improvement and associated CO_2 emission reductions in buildings

Category	Non-Energy Benefits	Examples of Indicators	Geographical Scope of the Benefit	Importance for the Project
Health effects	Reduced morbidity	Avoided hospital admissions, medicines prescribed, restricted activity days, productivity loss.	Local, national	High
	Reduced physiological effects	Learning and productivity benefits due to better concentration.	Local	High
Ecological effects	Reduction of outdoor air pollution	Similar to reduced morbidity but this category is broader including, for	Local, national, global	Low

Category	Non-Energy Benefits	Examples of Indicators	Geographical Scope of the Benefit	Importance for the Project
		instance, avoided damage to building constructions.		
	Construction and demolition waste benefits	Waste rate reduced.	Local, national	Low
Economic effects	Lower energy bills	Decrease in fuel and energy expenditures.	Local,National	High
	Employment creation and new business opportunities	Sales of efficient construction materials and design services.	Local, national	Medium
	Rate subsidies avoided	Decrease in amount of subsidized bill of energy	Local,	Medium
	Decrease energy imports	Fuel dependency rate and required foreign currency of the country to meet energy demand decrease	National	High
	Avoided costs to support human health, working environment, and building facilities	Avoided costs of mortality, hospital admissions, medicines prescribed, restricted activity days, insurance costs, productivity loss, building maintenance.	Local, national	High
Social effects	Increased comfort	Normalizing of humidity and temperature indicators; air purity.	Local	High
	Increased awareness	(Conscious) reductions in energy consumption; higher demand for energy efficiency measures.	Local, national	High

Project Rationale and GEF Policy Conformity

The project is consistent with the Climate Change focal area Strategic Program 1: "Promoting Energy Efficiency in Residential and Commercial" by promoting energy efficiency in commercial buildings. It will (a) help Turkey to upgrade and enforce the energy performance standards for buildings by strengthening stakeholders; (b) support the adoption of an integrated building design approach through information, awareness-raising, and demonstration, and (c) promote energy efficiency in new buildings by providing valuable feedback and lessons learned. The project falls under the UNDP-led *GEF Global Framework for Promoting Low Carbon Buildings* with a primary focus on two thematic approaches promoted by the Framework: a) Promotion and increased uptake of high quality building codes and standards – by introducing and enforcing mandatory energy efficient building codes; and b) Developing and promoting energy efficient building technologies, building materials and construction practices – by piloting integrated building design. The coordination platform offered by the global framework will help Turkey learn from experiences and best practices from countries with similar on-going energy-efficient building projects, including relevant GEF projects in the region (Kyrgyzstan, Uzbekistan) and good practice building codes and standards work done in other countries.

Country Ownership: Country Eligibility and Country Drivenness

Turkey qualifies for GEF financing in that it has ratified the United Nations Framework Convention on Climate Change on February 5, 2009, and it receives development assistance from UNDP's core resources.

The proposed project is in-line with the stated energy policy of Turkey to ensure adequate, reliable and cost-effective energy supply to support the targeted economic growth and social developments, while also protecting the environment and public health from pollution arising from energy production and consumption. It also complements the Energy Efficiency Strategy which was adopted by MoENR in June 2004 to define measures for improving energy efficiency in the final energy end-use sectors in Turkey, including buildings. By May 2007, the Government of Turkey had formulated the Energy Efficiency Law (Law no. 5627) to increase efficiency in use of energy resources, avoid waste, ease the burden of energy costs on the economy, and protect the environment.

The EE Law and associated regulation for the efficient use of energy resources (October 2008) recommended (among other things) establishing an Energy Efficiency Coordination Board (EECB), a system of providing training and certification of energy managers for buildings of 20,000 m^2 in size or using more than 500 toe/yr (these limits will be half that for public buildings), undertaking national awareness-raising, and preparing building energy performance, codes, and standards.

Sustainability (including financial sustainability)

To facilitate sustainable market transformation towards energy efficiency in buildings, there is a need for parallel, mutually-supporting measures that can create a sustainable demand through an enabling policy framework and which build the confidence of the market on the new technologies. Anecdotal information gained during project preparation suggests that researchers in Turkey estimate a 5-8% increase in the cost of construction for an energy efficient building over a "plain vanilla" building. It is proposed that an "integrated building design approach" will help designers find synergies to reduce first-cost use of newer technologies while "right-sizing" or "down-sizing" over-sized equipment. Ultimately, government's commitment to mandating the use of IBDA as part of the building regulations, combined with capacity building and training interventions by the present project, as well as compilation and wide dissemination of lessons learned, are expected to ensure the sustainability of the project achievements beyond the project lifetime.

Replicability

Replication is an integral component of the project design, and significant emphasis has been placed on information and capacity building related activities. Building on the successful energy efficient building demonstrations by the project, TOKI will be able to replicate best practices to its building activities (both in public and private sectors) by amending critical design elements, details and approaches to align with EE and RE lessons from this project.

Replicability of the project outputs beyond TOKI operations will be ensured through capturing and dissemination of lessons learned and best practices, as well as dedicated capacity building activities aimed at key segments of the buildings market.

Part III: Project Management Arrangements

The project will be executed by the General Directorate of Electrical Power Resources Survey and Development Administration (EIE), following UNDP guidelines for nationally-executed projects. The Executing Agency will sign the project document with UNDP and will be accountable to UNDP for the disbursement of funds and the achievement of the project goals, according to the approved work plan. In particular, the Executing Agency will be responsible for the following functions:

- coordinating activities to ensure the delivery of agreed outcomes with project partners and other ministries and public administration;
- certifying expenditures in-line with approved budgets and work-plans;
- facilitating, monitoring and reporting on the inputs and delivery of outputs;
- coordinating interventions financed by GEF/UNDP with other parallel interventions;
- approval of Terms of Reference for consultants and tender documents; and reporting to UNDP on project delivery and impact.

The Executing Unit (ECU) will consist of the representatives of the EIE, MoPWS, MoNE, and TOKI and the Project Team. The members of the ECU will take necessary actions within their areas of responsibility of their respective organization under the guidance of the PSC and support provided by the PMU. The ECU will also consult and work with other relevant stakeholders on specific issues and on request or for its own purposes, can invite any expert or authority member to participate in the meetings. The ECU will meet at least once a month. The EIE shall be authorized to make the final decision in case of dispute. The decisions will be submitted to the approval of PSC through PMU. More specifically, the role of the ECU will be to:

- implementing respective project activities, including organizing and reporting local meetings, purchasing items, working with experts/consultants on-site, etc.;
- reporting and providing feed-back to the PMU and partner organizations; and
- negotiating with stakeholders at site level and ensuring effective networking among them.

The project will establish a Project Steering Committee (PSC), and a Project Management Unit (PMU) at the inception of the project. It will be composed of the EIE, MoPWS, MENR, MoEF, UNDP/Turkey, SPO, TOKI, MoNE, Chambers of Engineers and Architects. The PSC will meet at least every six months and will be convened and supported logistically by the PMU. The PSC will be chaired by the EIE and will provide overall guidance for the project throughout its implementation. Specifically, the PSC will be responsible for:

- achieving co-ordination among the various government agencies;
- guiding the program implementation process to ensure alignment with national and international policies, plans and strategies;
- ensuring that activities are fully integrated with other developmental initiatives;
- overseeing work of implementation units, monitoring progress and approving reports;
- overseeing the financial management and production of financial reports;
- monitoring the effectiveness of project implementation; and
- preparing regular report-backs for the representing Departments/Institutions.

The administration of the project will be carried out by a Project Management Unit (PMU) under the overall guidance of the PSC. The PMU will be based in Ankara and will report to EIE under its Division of Planning under the Energy Efficiency Resources Survey Department or other division/department assigned by EİE. The PMU will be composed of Project Manager and a Project Assistant/Financial Officer. The Project Manager, which will be jointly assigned by the member organizations in ECU and

externally hired by UNDP for the project period, will be a natural member of the PMU. He/she, will be supported by a Project Assistant/Financial Officer. More specifically, the role of the PMU will be to:

- ensuring the overall project management and monitoring according to UNDP rules on managing UNDP/GEF projects;
- facilitating communication and networking among key stakeholders including PSC;
- organizing the meetings of the PSC; and
- supporting the relevant stakeholders.

Figure 3 illustrates the relationship of Project Partners and Management. Figure 5 illustrates the stakeholder involvement in project implementation.

Figure 3. Diagram of Project Partners and Management

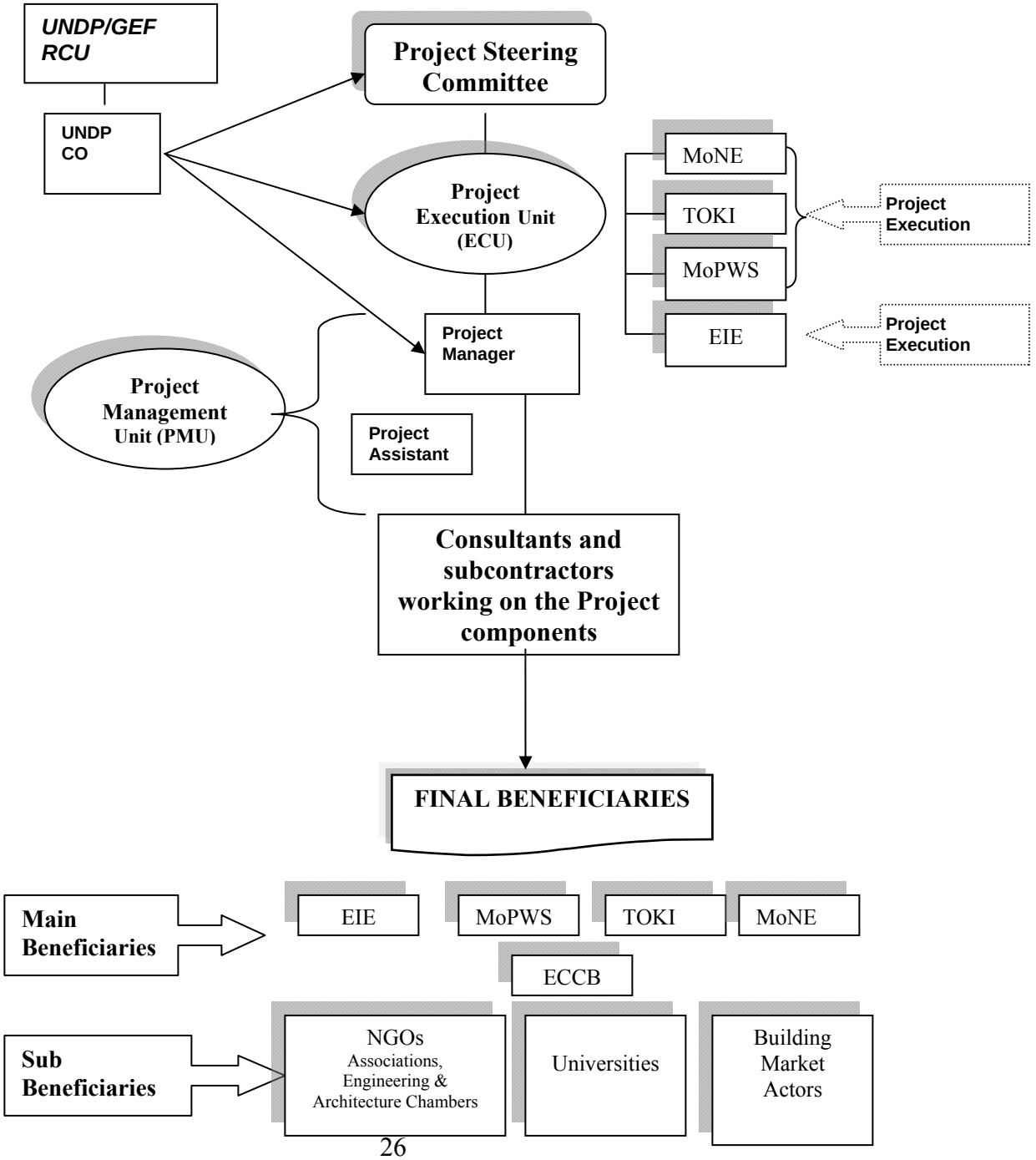
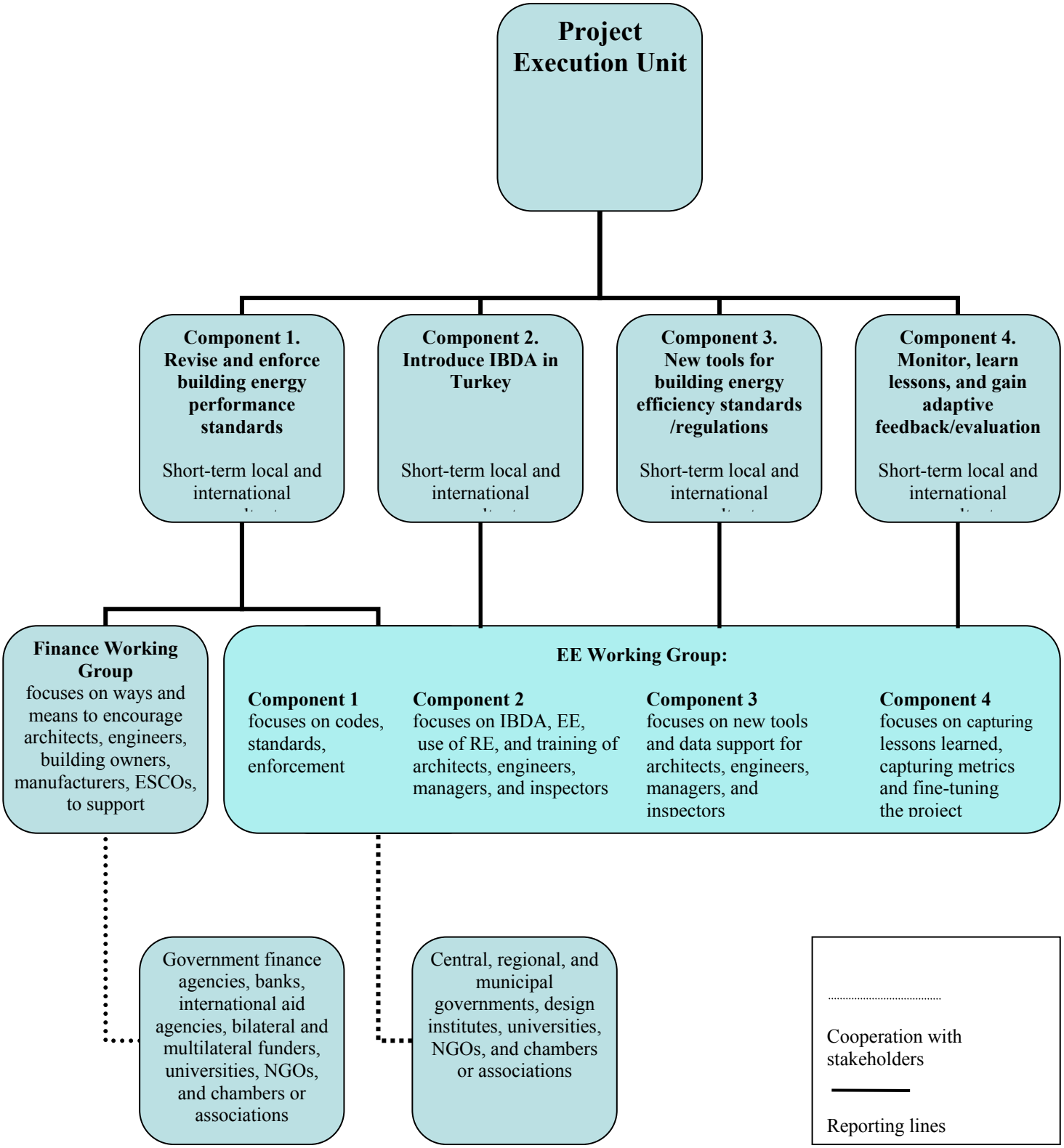


Figure 4 Stakeholder Involvement in Project Implementation via Two Working Groups (a Finance Working Group and a single EE Working Group contributing to all components)



Stakeholder Involvement

The **Ministry of Energy and Natural Resources (MoENR)** is the main organization responsible for formulation and implementation of general energy policies. The **General Directorate of Electrical Power Resources Survey and Development Administration (EİE**), one of the major organizations under the auspices of MoENR, has been involved in energy efficiency policy and programs, including energy audits, trainings and public awareness activities since early 1980's and is the main government entity responsible for the implementation of the EE law and by-laws, in the context of concerted/integrated collaboration mechanism with the related institutions. Additionally, EIE has been conducting energy efficiency and renewable energy projects in Turkey in cooperation with international donor organizations such as the World Bank, EU and Japan International Cooperation Agency (JICA).

As per the provisions of Article 4 of the Energy Efficiency Law, an **Energy Efficiency Coordination Board (EECB)** has been established and is functional. Among its other responsibilities, the Board is to "prepare national energy efficiency strategies, plans and programs, assess their effectiveness, coordinate their revision as necessary and taking and implementing new measures". Furthermore, it can "establish ad hoc specialty commissions by the participation from the relevant public agencies and institutions, universities, private sector and civil society organizations, with expenses covered from the EIE's budget, under the functions assigned to the Board and where it deems necessary". EIE shall also monitor the implementation of the decisions made by the Board and provide secretariat services. The EECB is chaired by Undersecretary of MoENR.

The Ministry of Public Works and Settlement (MoPWS) is responsible for design project preparation, construction and major repairs of public buildings, construction of housing in conformity with the principles of housing policy, taking necessary measures for the manufacturing and use of standardized construction materials in the most economic way for the country's requirements; setting standards for master plans of various scales and for urban infrastructure projects; preparing and publishing regulations, directives, ordinances, model contracts, terms of references and annual unit prices for building materials and construction services. This Ministry is responsible for implementation and monitoring of BEP regulation.

Housing Development Administration- TOKİ is government agency set up to increase housing production at national level; TOKI supports the construction industry related to housing construction or those who are involved in this field. It is also subcontracting any research, projects and commitments, where deemed necessary. Since 1984, TOKİ has been acting effectively in providing affordable housing for the low and middle-income groups through innovative financial mechanisms. It has provided housing loans to approximately 1.2 million housing units by the end of 2004. As part of the proposed project, TOKİ will realize a school project which will use integrated building design approach to create a model energy efficient building for subsequent nationwide replication through its construction activities.

Union of Turkish Engineers and Architects UCTEA - is a corporate body and a professional organization defined in the form of a public institution and as of December 31, 2008, the number of Chambers has increased to 23, while the number of members reached 342.996. Graduates of some 70 related academic disciplines in engineering, architecture and city planning are members of the Chambers of UCTEA. The Union is a member of the Energy Efficiency Coordination Board.

Associations of building material producers (IMSAD)–a range of non-governmental organizations operate in Turkey representing the interests of the local manufacturers of various construction materials. These could provide valuable contributions to the project, including in EE studies, trainings, awareness raising activities.

See ***Section IV, Part III "Stakeholder Involvement Plan"***.

Part IV: Monitoring and Evaluation Plan

The following sections outline the principle components of the Monitoring and Evaluation Plan and indicative cost estimates related to M&E activities. The project's Monitoring and Evaluation Plan will be presented and finalized at the Project's Inception Report following a collective fine-tuning of indicators, means of verification, and the full definition of project staff's M&E responsibilities.

Monitoring and Reporting

Project Inception Phase

A project inception workshop (IW) will be conducted with the full project team, relevant government counterparts, co-financing partners, the UNDP-CO and representation from the UNDP-GEF Regional Coordinating Unit, as appropriate.

The inception workshop is to assist the project team to understand and take ownership of the project's goals and objectives, as well as finalize preparation of the project's first annual work plan on the basis of the project's logframe matrix. This will include reviewing the logframe (indicators, means of verification, assumptions), imparting additional detail as needed, and on the basis of this exercise finalize the Annual Work Plan (AWP) with precise and measurable performance indicators consistent with the expected outcomes of the project.

In addition, the inception workshop is to: (i) introduce project staff with the UNDP-GEF expanded team, which will support the project during its implementation, namely the CO and responsible Regional Coordinating Unit staff; (ii) detail the roles, support services and complementary responsibilities of UNDP-CO and RCU staff vis a vis the project team; (iii) provide a detailed overview of UNDP-GEF reporting and monitoring and evaluation (M&E) requirements, with particular emphasis on the Annual Project Implementation Reviews (PIRs) and related documentation, Tripartite Review Meetings, as well as mid-term and final evaluations. Equally, the IW will provide an opportunity to inform the project team on UNDP project related budgetary planning, budget reviews, and mandatory budget rephasings.

The IW will also provide an opportunity for all parties to understand their 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 and decision-making structures will be discussed again, as needed, in order to clarify each party's responsibilities during the project's implementation phase.

Monitoring responsibilities and events

A detailed schedule of project review meetings will be developed by the project management, in consultation with project implementation partners and stakeholder representatives, and incorporated in the project inception report. Such a schedule will include: (i) tentative time frames for Tripartite Reviews, Steering Committee Meetings, (or relevant advisory and/or coordination mechanisms) and (ii) project related Monitoring and Evaluation activities.

Day to day monitoring of implementation progress will be the responsibility of the project manager based on the project's Annual Workplan and its indicators. The Project Team will inform the UNDP-CO of any delays or difficulties faced during implementation so that appropriate support or corrective measures can be adopted in a timely and remedial fashion.

Periodic monitoring of implementation progress will be undertaken by the Project Steering Committee and/or UNDP-CO through quarterly meetings with the project team or more frequently as deemed necessary. This will allow parties to take stock and to troubleshoot any problems pertaining to the project in a timely fashion to ensure smooth implementation of project activities.

UNDP Country Offices and UNDP-GEF RCUs, as appropriate, will conduct yearly visits to projects that have field sites, or more often based on an agreed upon scheduled to be detailed in the project's Inception

Report / Annual Workplan to assess project progress. Any other member of the Steering Committee can also accompany, as decided by the PSC. A Field Visit Report will be prepared by the CO and circulated no less than one month after the visit to the project team, all PSC members, and UNDP-GEF.

Annual Monitoring will occur through the Tripartite Review (TPR). This is the highest policy-level meeting of the parties directly involved in the implementation of the project. The project will be subject to Tripartite Review (TPR) at least once every year. The first such meeting will be held within the first twelve months from the start of full implementation. The project proponent will prepare an Annual Project Report/Project Implementation Review (APR/PIR) and submit it to UNDP-CO and the UNDP-GEF regional office at least two weeks prior to the TPR for review and comments.

The APR/PIR will be used as one of the basic documents for discussions in the TPR meeting. The project proponent will present the APR/PIR to the TPR, highlighting policy issues and recommendations for the decision of the TPR participants. The project proponent also informs the participants of any agreement reached by stakeholders during the APR/PIR preparation on how to resolve operational issues. Separate reviews of each project component may also be conducted if necessary.

The Terminal Tripartite Review (TPR) is held in the last month of project operations. The project proponent is responsible for preparing the Terminal Report and submitting it to UNDP-CO and UNDP/GEF's Regional Coordinating Unit. It shall be prepared in draft at least two months in advance of the TTR in order to allow review, and will serve as the basis for discussions in the TTR. The terminal tripartite review considers the implementation of the project as a whole, paying particular attention to whether the project has achieved its stated objectives and contributed to the broader environmental objective. It decides whether any actions are still necessary, particularly in relation to sustainability of project results, and acts as a vehicle through which lessons learnt can be captured to feed into other projects under implementation or formulation.

Measurement of impact indicators related to global benefits will occur according to the schedules defined in the Inception Workshop. The measurement of these will be facilitated by subcontracts or retainers with relevant institutions or through specific studies that are to form part of the projects activities (e.g. measurement of carbon benefits or through surveys for capacity building efforts).

The TPR has the authority to suspend disbursement if project performance benchmarks are not met. Benchmarks will be developed at the Inception Workshop, based on the performance and impact indicators defined in the projects logical framework matrix.

Project Monitoring Reporting

The Project Coordinator, in conjunction with the UNDP-GEF extended team, will be responsible for the preparation and submission of the following reports that form part of the monitoring process. Items (a) through (e) are mandatory standard requirements, while (f) through (h) need to be considered on a project by project basis.

Inception Report (IR)

A Project Inception Report will be prepared immediately following the Inception Workshop. It will include a detailed First Year/ Annual Work Plan divided in quarterly time-frames detailing the activities and progress indicators that will guide implementation during the first year of the project. This Work Plan would include the dates of specific field visits, support missions from the UNDP-CO or the Regional Coordinating Unit (RCU) or consultants, as well as time-frames for meetings of the project's decision making structures. The Report will also include a detailed project budget for the first full year of implementation, prepared on the basis of the Annual Work Plan, and including any monitoring and evaluation requirements to effectively measure project performance during the targeted 12 months time-frame.

The Inception Report will include a more detailed narrative on the institutional roles, responsibilities, coordinating actions and feedback mechanisms of project related partners. In addition, a section will be

included on progress to date on project establishment and start-up activities and an update of any changed external conditions that may effect project implementation.

After finalized, the report will be circulated to the project counterparts who will be given a period of one calendar month in which to respond with comments or queries. Prior to this circulation of the IR, the UNDP Country Office and UNDP-GEF's Regional Coordinating Unit will review the document.

Annual Project Report (APR)

The APR is a UNDP requirement and part of UNDP's Country Office central oversight, monitoring and project management. It is a self -assessment report by project management to the CO and provides input to the country office reporting process and the ROAR, as well as forming a key input to the Tripartite Project Review. An APR will be prepared on an annual basis prior to the Tripartite Project Review, to reflect progress achieved in meeting the project's Annual Work Plan and assess performance of the project in contributing to intended outcomes through outputs and partnership work.

Project Implementation Review (PIR)

The PIR is an annual monitoring process mandated by the GEF. It has become an essential management and monitoring tool for project managers and offers the main vehicle for extracting lessons from ongoing projects. Once the project has been under implementation for a year, a Project Implementation Report must be completed by the CO together with the project team. The PIR is typically prepared immediately after the end of the GEF's financial year (June) and ideally prior to the TPR. The PIR should then be discussed in the TPR so that the result would be a PIR that has been agreed upon by the project, the executing agency, UNDP CO and the concerned RTA.

The individual PIRs are collected, reviewed and analyzed by the RTAs prior to sending them to the focal area clusters at the UNDP/GEF headquarters. The focal area clusters supported by the UNDP/GEF M&E Unit analyze the PIRs by focal area, theme and region for common issues/results and lessons. The TAs and PTAs play a key role in this consolidating analysis.

The focal area PIRs are then discussed in the GEF Interagency Focal Area Task Forces in or around November each year and consolidated reports by focal area are collated by the GEF Independent M&E Unit based on the Task Force findings.

The GEF M&E Unit provides the scope and content of the PIR. In light of the similarities of both APR and PIR, UNDP/GEF has prepared a harmonized format for reference, which is available from UNDP/GEF's M&E Unit.

(d) Quarterly Progress Reports

Short reports outlining main updates in project progress will be provided quarterly to the local UNDP Country Office and the UNDP-GEF regional office by the project team.

(e) Project Terminal Report

During the last three months of the project the project team will prepare the Project Terminal Report. This comprehensive report will summarize all activities, achievements and outputs of the Project, lessons learnt, objectives met, or not achieved, structures and systems implemented, etc. and will be the definitive statement of the Project's activities during its lifetime. 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 activities.

(f) Periodic Thematic Reports (project specific – optional)

As and when called for by UNDP, UNDP-GEF or the Implementing Partner, the project team will prepare Specific Thematic Reports, focusing on specific issues or areas of activity. The request for a Thematic Report will be provided to the project team in written form by UNDP and will clearly state the issue or activities that need to be reported on. These reports can be used as a form of lessons learnt exercise, specific oversight in key areas, or as troubleshooting exercises to evaluate and overcome obstacles and

difficulties encountered. UNDP is requested to minimize its requests for Thematic Reports, and when such are necessary will allow reasonable timeframes for their preparation by the project team

(g) Technical Reports (project specific- optional)

Technical Reports are detailed documents covering specific areas of analysis or scientific specializations within the overall project. As part of the Inception Report, the project team will prepare a draft Reports List, detailing the technical reports that are expected to be prepared on key areas of activity during the course of the Project, and tentative due dates. Where necessary this Reports List will be revised and updated, and included in subsequent APRs. Technical Reports may also be prepared by external consultants and should be comprehensive, specialized analyses of clearly defined areas of research within the framework of the project and its sites. These technical reports will represent, as appropriate, the project's substantive contribution to specific areas, and will be used in efforts to disseminate relevant information and best practices at local, national and international levels.

(h) Project publications (project specific- optional)

Project publications will form a key method of crystallizing and disseminating the results and achievements of the Project. These publications may be scientific or informational texts on the activities and achievements of the Project, in the form of journal articles, multimedia publications, etc. These publications can be based on Technical Reports, depending upon the relevance, scientific worth, etc. of these Reports, or may be summaries or compilations of a series of Technical Reports and other research. The project team will determine if any of the Technical Reports merit formal publication, and will also (in consultation with UNDP, the government and other relevant stakeholder groups) plan and produce these Publications in a consistent and recognizable format. Project resources will need to be defined and allocated for these activities as appropriate and in a manner commensurate with the project's budget.

Independent Evaluations

The project is subject to at least two independent external evaluations as follows:

Mid-term Evaluation

An independent Mid-Term Evaluation will be undertaken at the end of the second year of implementation. The Mid-Term Evaluation will determine progress being made towards 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.

Final Evaluation

An independent Final Evaluation will take place three months prior to the terminal tripartite review meeting, and will focus on the same issues as the mid-term evaluation. The final evaluation will also look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals. The Final Evaluation should also provide recommendations for follow-up activities. 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.

Audit Clause

The Government will provide the Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP (including GEF) funds

according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted by a legally recognized independent auditor.

Learning and Knowledge Sharing

Results from the project will be disseminated within and beyond the project intervention zone through a number of existing information sharing networks and forums. In addition:

The project will participate, as relevant and appropriate, in UNDP/GEF sponsored networks, organized for senior personnel working on projects that share common characteristics.

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. Identifying and analyzing lessons learned is an on-going process and the need to communicate such lessons as one of the project's central contributions is a requirement to be delivered not less frequently than once every 12 months. UNDP/GEF shall provide a format and assist the project team in categorizing, documenting and reporting the lessons learned. To this end a percentage of project resources will also need to be allocated for these activities.

The indicative M&E budget is provided in the table below. The M&E plan will be finalized at the Project Inception Meeting following a collective fine-tuning of indicators, means of verification, and the full definition of project staff M&E responsibilities.

Table 4: Indicative Monitoring and Evaluation Work Plan and Budget

Type of M&E Activity	Responsible Parties	Budget US$	Time Frame
Inception Workshop and Report	• EIE, Project Manager (PM) • UNDP CO • UNDP/GEF RCU • Int. Project Adviser (IPA)	10,000	Within first two months of project start up
Design of a methodology to measure building energy performance and associated GHG emission reductions	• PM (with inputs by an international expert)	7,000	Immediately following IW
Measurement of indicators' values	• PM with inputs by required experts to conduct the studies • Oversight by UNDP CO and RCU	90,000	Baseline measurements to be finalized immediately following IW; Subsequently on an annual basis prior to APR/PIR
APR and PIR	• Project Manager • UNDP CO and RCU • UNDP-GEF	None	Annually
Annual meetings	• EIE • UNDP CO • Project Manager	None	Every year, upon receipt of APR
Project Steering Committee Meetings	• EIE, UNDP CO • Project Manager	None	Biannually, following the inception workshop
Periodic status reports	• Project team	None	To be determined by Project team and UNDP CO at the outset project operations
Technical reports	• Project team • Hired consultants as needed	t.b.d	To be determined by Project Team and UNDP-CO during implementation
Mid-term External	• External evaluation team	34,000	At the mid-point of project

Type of M&E Activity	Responsible Parties	Budget US$	Time Frame
Evaluation	supported by the EIE, PMU and UNDP- CO		implementation.
Final External Evaluation	• External evaluation team supported by the EIE, PMU and UNDP- CO	34,000	At the end of project implementation
Terminal Report	• Project team • UNDP-CO	None	At least one month before the end of the project
Lessons learned	• Project team	None	Yearly
Audit	• UNDP-CO • Project team	4,000	Yearly
Visits to field sites (UNDP staff travel costs to be charged to IA fees)	• UNDP Country Office • UNDP-GEF RCU (as appl.) • Government representatives	Paid from IA fees and operational budget	Yearly
TOTAL INDICATIVE COST (*excluding project team staff time and UNDP staff and travel expenses)*		US$ 179,000	

Part V: Legal Context

This Project Document shall be the instrument referred to as such in Article I of the Standard Basic Assistance Agreement between the Government of Turkey and the United Nations Development Programme, signed by the parties on 19 January 1987. The host country-implementing agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the government co-operating agency described in that Agreement

The UNDP Resident Representative in Turkey is authorized to effect in writing the following types of revision to this Project Document, provided that he/she has verified the agreement thereto by the UNDP-GEF Unit and is assured that the other signatories to the Project Document have no objection to the proposed changes:

- Revision of, or addition to, any of the annexes to the Project Document;
- Revisions which do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the rearrangement of the inputs already agreed to or by cost increases due to inflation;
- Mandatory annual revisions which re-phase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility; and
- Inclusion of additional annexes and attachments only as set out here in the Project Document.

Section II: Strategic Results Framework and GEF Increment

Part I: Incremental Cost Analysis

Global Environmental Objective
The global environmental objective of the project is the reduction of GHG emissions by reducing energy consumption in the building sector by 69 million tCO2e in direct and indirect emissions reductions calculated over 20 years of buildings useful lifetime. This amount has been calculated by using a model of the Turkish building total stock (m^2) increase every year.

Baseline
Though BEP regulation is already in force (as of December 2009), initial reactions received from the key market players indicate that further improvement are needed due to gaps, inconsistencies with market conditions and existing structures identified once the actual implementation has started. The analysis of the new building standards and energy performance regulations, compliance levels, design procedures and energy management practice in buildings has revealed, however, that the country is still lagging behind EU standards and there is still room for improvement, as explained in the analysis above. In the absence of the proposed GEF intervention, i.e. under the business-as-usual scenario, the available potential in reducing energy consumption in buildings in Turkey would be realized at a slower pace and to a comparatively smaller scope. The key assumptions of the baseline scenario are:

1. *The pace and comprehensiveness of improvements in the national energy-efficiency building code and enforcement*. The current construction norms and standards for buildings are mandated by two key regulatory mechanisms (BEP and TS 825) by December 5, 2009. Presently, with energy security (reliability) issues and growing energy prices, and also new environment created by new Energy Efficiency Law, it is likely that the level of concern in Turkey will be strong enough in the short-term period, likely within 2-3 years, to initiate the demand-side measures including the minor improvement of building regulations enforcement and implementation. Therefore it is likely that in the business-as-usual case the building codes will be updated to solve implementation problems within 2-3 years, i.e. by 2013. The question is however how much they would be strengthened. Based on the EU experience, the update usually takes place each 5-10 years and energy-efficiency requirement improvement is 10-20%/decade. Based on this experience, it is assumed that *starting in 2013*, heating energy requirement in new buildings defined in building codes in Turkey will be *decreased by around 10%*, i.e. down to an average of *100 kWh/m^2/y* (since there is a significant efficiency potential, the maximum from other countries' experience was assumed).
2. *The compliance rate for building codes*. Relatively low compliance of buildings with building codes is a worldwide problem encountered not only in developing and transition economies but also in developed ones. Since there are no official statistics on code compliance in Turkey, informal consultations with key market players have been used to come up with the following assumptions: around 40% of buildings are assumed to be in full compliance with the current code (i.e. specific energy consumption for heating at an average of 110 kWh/m^2/y); 35% of buildings are in minor non-compliance (SEC 10% higher than the code requirement) and 25% in major non-compliance (SEC 50% higher than the code requirement). With the 10% improvement in code requirement in 2013, the compliance rate is expected to initially drop to 30% full compliance, 40% minor non-compliance, 30% major non-compliance (due to more stringent code requirements and lack of capacity building for all market players), before improving to 60% full compliance, 25% minor non-compliance, 15% major non-compliance by 2017.

3. *Building stock growth*. Reflecting the impacts of the global economic crisis and building on the recovery projections for the Turkish economy[15], as well as the TUIK building sector statistics for the past seven years, the business-as-usual building stock model is assumed to see 3% contraction in residential construction and zero growth per year in non-residential segment in 2009-2011, followed by zero growth in residential and 3% growth in non-residential segment in 2012-2014.

The above baseline scenario, therefore, conservatively assumes certain degree of improvements to be achieved in buildings energy efficiency through implementation of the TS-825 standard, though at a later stage and to a lesser degree as compared with the proposed GEF intervention. The resultant GHG emissions scenario is a continued growth in annual emission rates from the current 45 million tons CO2eq per year to over 52 million tons CO2eq by 2015 and over 66 million tons CO2eq by 2025 (refer to Section IV Part V for projections of GHG emissions under baseline and alternative scenarios). As can be seen from comparison of the baseline scenario to the GEF alternative, potential significant global environmental benefits in terms of CO2 emissions reductions from enhanced building energy codes, improved compliance, energy management and IBDA in the buildings sector in Turkey will not be realized without the GEF support.

Alternative (Project) Case

The GEF Project Scenario relies on a set of actions being undertaken to improve energy performance in buildings (enhancement of current energy performance standards, improvements in enforcement, integrated building design approach, demo buildings and improved energy management in existing buildings), which are forecast to drive energy demand of the building stock down, thus reducing the associated CO_2 emissions below the business-as-usual trend line.

With the GEF support the current building codes and regulations will be enhanced, resulting in a 15% reduction of average energy requirement for heating from the current 110 kWh/m^2/year to 94 kWh/m^2/year by 2012. The more stringent code requirements are expected to initially bring code compliance down to 25% full compliance, 50% minor non-compliance, 25% major non-compliance by 2012. However, the project-supported capacity building and technical assistance will contribute to subsequent improvements in compliance to 70% full compliance, 15% minor non-compliance, 15% major non-compliance by 2014.

Application of an integrated building design approach in new buildings has been estimated to enable at least 40% reduction in energy requirement for heating from the current 110 kWh/m^2/year to 66 kWh/m^2/year. Moderate penetration rates have been assumed for IBDA adoption by the different segments: starting from 1% of annual construction volume in the residential segment in 2012 gradually increasing to 5.4% by 2024; starting from 2% in 2012 and up to 25% of annual non-residential construction by 2025; all public sector non-residential construction starting in 2013 will use IBDA.

The combined impacts of the project-supported interventions and ensuing replications within 10 years of GEF project influence period are estimated to enable cumulative energy savings in the Turkish building sector to the tune of 529,153 GWh (calculated over 20 years of useful lifetime of investments). Thus, the GEF alternative GHG scenario shows considerable deviation below the baseline and is estimated at around 69 million tons CO_2eq of cumulative emission reductions (over 20 years), assuming CO_2eq emission factor of 0.163 tCO_2eq/MWh and GEF causality factor of 80% (refer to Section IV Part V for estimation of GHG emissions reductions).

[15] Economist Intelligence Unit (EIU) estimates Turkish economy has contracted by 5.9% in 2009, and forecasts growth at 3.4% in 2010, and 4% for 2011-2014 annually.

Systems Boundary
For estimating the GHG reduction potential of the project, GHG emissions resulting from burning fossil fuels for energy generation have been taken into account.

The indirect emissions from fuel production and transportation activities as well as the net impact of other GHGs have not been considered due to the high uncertainties associated with these calculations.

Table 5: Summary of the Incremental Cost Analysis

Outcome 1: Improved energy efficiency in new buildings due to stronger institutions, regulations, and implementers	**Baseline:** Limited knowledge and capacity on the part of key agents to regularly revise and implement new laws or engender energy efficiency in new buildings.	**Alternative:** Key project implementers and agents are able to carry out the new laws and ensure integration of EE solutions in new buildings.	**GEF Increment:** Technical assistance. Estimated GEF costs $867,000. **Estimated global benefits:** Indirect, resulting from the combined impact of the project components.
Outcome 2: Cost-effective energy efficiency solutions showcased through integrated building design approach application in two demo buildings	**Baseline:** Absence of an integrated building design approach that will support EE/RE and the new laws in buildings.	**Alternative:** Demonstration buildings that provide design, practical, detailing, and construction tactics that support EE and use of an integrated buildings design approach in Turkey.	**GEF Increment:** Technical assistance. Estimated GEF costs $772,450. **Estimated global benefits:** Direct GHG benefits of 1,076 tCO_2eq. Indirect GHG benefits in the range of 2-69 $MtCO_2eq$, resulting from the combined impact and replication of the project components.
Outcome 3: New tools developed and introduced to facilitate compliance with higher energy efficiency standards and application of integrated building design approach in buildings	**Baseline:** Insufficient tools for use by key stakeholders and implementers to support compliance with new regulations.	**Alternative:** Enhanced capacity of key stakeholders to deliver EE buildings and services, leading to the sustainable market growth.	**GEF Increment:** Technical assistance. Estimated GEF costs $536,600. **Estimated global benefits:** Indirect, resulting from the combined impact of the project components.
Outcome 4: Building energy consumption, improved energy efficiency, energy savings, GHG emissions, and other results of the project monitored, evaluated, and reported	**Baseline:** Insufficient information for adaptive management and project's final results and lessons learned not captured and institutionalized for further market promotion.	**Alternative:** Adequate information for adaptive management. Project's final results and lessons learned captured and institutionalized for further market promotion.	**GEF Increment:** Technical assistance. Estimated GEF costs $181,950. **Estimated global benefits:** Indirect, resulting from the combined impact of the project components.
Project Management	N/A	N/A	**GEF Increment:** Estimated GEF costs: USD 262,200
Total:	Building energy performance regulations will be seeing some improvements, though of a limited scope, and eventual energy efficiency gains will take longer to realize due to lack of capacity, information, replicable demonstrations for code	Specific energy consumption for building heating will decrease substantially compared to the baseline. Building code enhancements to include other components of building energy use, coupled with targeted capacity building and replicable demonstrations	**GEF Increment:** Technical assistance + project financing. Estimated GEF costs: USD 2,620,000 **Estimated global benefits:** 69 million tCO_2eq in GHG emission reductions over 20 years of investment lifetimes as direct and indirect GHG reduction impact of the enhancement of building codes, capacity building and demo building

	compliance.	of energy efficiency gains will ensure sustainable market growth for "green" buildings.	constructed during the project implementation.

Part II: Logical Framework Analysis (Project Results Framework)

Project Strategy	Indicator	Baseline	Target	Sources of Verification	Important Assumptions
Objective of the Project: To reduce energy consumption and associated GHG emissions in buildings in Turkey by raising building energy performance standards, improving enforcement of building codes, enhancing building energy management and introducing the use of an integrated building design approach	Average thermal energy consumption in new buildings compared to baseline	110 kWh/m^2/year	66 kWh/m^2/year for buildings built with IBDA	National energy statistics and project GHG monitoring system	Costs of EE and RE technology and materials do not increase Dynamics of construction of new buildings remain within the forecast range
	Cumulative CO_2 emission reductions from new buildings to be built during project lifetime (2010-2015) against the baseline	0 tCO_2	2 million tCO_2		
Outcome 1: Improved energy efficiency in new and existing buildings through stronger regulations, institutions and implementers	The content and status of new policies, programs, and implementers supporting implementation of EE and RE in buildings	Legislation, institutions, and implementers to support enhancement of building energy efficiency needs to be strengthened	New legal and regulatory provisions, strengthened institutions, and better supporting compliance checking, enforcement and outreach programs adopted for enhanced EE in new buildings	Official publications and project's Mid-Term and Final evaluations	Continuing commitment of the key public authorities and government entities to develop and implement effective EE buildings policies and practices Adequate data will be available from the market
Output 1.1 Institutional mechanism for regular revision of building energy performance, including EE program and roadmap	• Clearly defined roles, responsibilities, actions and targets for regular revision of building codes	Mechanism and approaches for building code revision need streamlining	Two working groups (EE WG and Finance WG) formed; EE program and roadmap designed that provide key institutions and EECB clear roles, responsibilities, and common metrics to monitor EE improvements in buildings	EE Program for New Buildings with Roadmap and Recommendations for EECB Database for use by EIE and MoPWS Project reports	Working group studies and activities welcomed by relevant institutions, other stakeholders and EECB EE program suggested or new buildings is actionable and acceptable to key relevant agencies Acceptance and cooperation on the part of

Project Strategy	Indicator	Baseline	Target	Sources of Verification	Important Assumptions
					the various government agencies to use a universal database
Output 1.2 Two existing building energy performance codes and other relevant norms and standards revised and implemented	Approval of revised codes defining minimum energy performance standards (MEPS)	Building codes and relevant norms are not established	Two building codes upgraded, MEPS for new buildings defined	New codes, MEPS, as reported by MoPWS	Acceptance and cooperation on the part of the various government agencies to amend and/or add information to secondary regulations
Output 1.3 Enhanced capacity for compliance with the new regulations, including energy performance certificate scheme	Ability of architects and engineers to comply with more energy efficient codes by integrating better designs in buildings Content, acceptance, and status of the Certification Systems	Current designs do not emphasize energy efficiency and are above international standards for energy consumption No energy performance certificate scheme introduced	Submitted designs meet and exceed the requirements of more efficient codes by the end of the project At least 50% of key stakeholders have information about the energy performance certificate scheme	Review of prototype efficient designs. Survey of first-time acceptance rate for and statistics on building commissioning Monitoring reports and final evaluation of the impact of the certification scheme initiated.	Willingness of the targeted public authorities, academics, and implementers to benefit from the training and the supporting studies Interest of the private sector stakeholders to cooperate in the development, organization and dissemination of the labeling scheme for buildings
Output 1.4 Financial mechanisms (including incentives and support for the building sector) developed and presented to EECB	Increasing numbers of funding agencies, banks, and ODA donors seek to support EE buildings in Turkey	No market growth of EE buildings due to reality and perception of cost-to-benefits inequity	At least one innovative finance mechanism developed for each key target group: architects & engineers, building owners, ESCOs, and building inspectors	Anecdotal information received through surveys of banks, lenders, and funders	Key funding institutions and/or government of Turkey agree on financing mechanisms
Outcome 2: Cost-effective energy efficiency solutions showcased through integrated building design approach application in two demo buildings	Implementation of demo constructions with IBDA resulting in significant energy improvements	Limited market growth of buildings built with IBDA	Two IBDA demo constructions of 7,500 m^2 commissioned and using at least 40% less energy than in BAU	Issued Building BEP Identity Certificates for new buildings Calculations on the basis of the available	Continuing commitment of the key public authorities and government entities to develop and implement effective EE buildings

Project Strategy	Indicator	Baseline	Target	Sources of Verification	Important Assumptions
				market data and assumed baseline development Official energy statistics	policies and practices
Output 2.1 IBDA developed for Turkish climatic conditions, including implementation strategy and action plan;	Adoption of IBDA for new constructions in different sectors	Limited application of IBDA	IBDA mandated for use in all new public buildings as of 2013	Strategy and implementation plan for IBDA endorsed by stakeholders Decision of the government on use of IBDA in public buildings	Willingness of the government to accept the implementation strategy
Output 2.2 IBDA promoted to building sector professionals and key stakeholders	Content, acceptance, and status of the training	Limited knowledge or use of IBDA	100% of architectural and engineering students are taught IBDA, 50% of architects and engineers report high level of confidence, awareness and use of IBDA	Surveys of construction documentation Guide on IBDA for architects and engineers	Interest of the universities to cooperate in the development, organization and dissemination of IBDA and EE principles
Output 2.3 Two demonstration buildings commissioned, showcasing IBDA and compliance with new energy codes	Energy performance of IBDA-enhanced demo buildings at least 50% better than country average of 110 kWh/m^2/y	New buildings (whose heat requirement is an average 110 kWh/m^2) are not built with IBDA enhanced with EE and RE	Two demonstration buildings built to use no more than 66 kWh/m^2/y in energy for heating	Demo buildings' planning and construction documentation Project reports, records of energy audits	Demonstration buildings are built as designed
Outcome 3: New tools developed and introduced to facilitate compliance with higher energy efficiency standards and	Required data, verification processes, and website utilization and relevance to key stakeholders	Tools and calculation methodologies are insufficient, no collation of relevant baseline data is	Over 50% of trained key stakeholders use new tools, websites, and IBDA	Project progress reports	Continuing commitment of the key public authorities and government entities to disseminate and provide

Project Strategy	Indicator	Baseline	Target	Sources of Verification	Important Assumptions
application of integrated building design approach in buildings		possible			training in use of new tools for EE and IBDA in buildings
Output 3.1 New calculation tools that architects, engineers, and constructors may use for compliance with the laws	Availability of required data and agreement on the verification process	Accurate calculation tools for key stakeholders needs to be strengthened	Over 50% of trained key stakeholders use the calculation tools, including modeling software	Project progress reports Two new calculation tools	Reporting of existing building energy performance is consistent and well-understood by key stakeholders
Output 3.2 Standardized procedures for data collection, measurements, and collation of building energy performance designed and trained;	Availability of required data and agreement on the verification process	Standardized processes for key stakeholders needs to be strengthened	Over 50% of trained key stakeholders use the verification procedures	Written Verification Procedure, sample test reports	Reporting of existing building energy performance is consistent and well-understood by key stakeholders
Output 3.3 Facility for online support services for key stakeholders and evaluation of cost-effectiveness and financial viability of the technologies in the Turkish market	Impact of the content of the website on key stakeholders Availability of market report on EE equipment	No website relevant to IBDA with regularly updated content on EE information and experiences available and market analyses	Over 50% of key stakeholders find the websites useful and actively upload information relevant to EE buildings as well as take advantage of online training ,market analyses report cover all material which has more than 20 % market share	Project progress reports Enhanced EIE and MoPWS Web sites Online information and training modules accessed Market report	Interest of the key stakeholders, and ministries to cooperate in the development and assessment of the impact of the websites, cooperation of market actors
Outcome 4: Building energy consumption, energy savings, and other results of the project monitored, evaluated, and reported	The status of recommendations contributing to institutional sustainability	Insufficient institutional mechanisms in place to ensure sustainability of project results	Project recommendations to ensure institutional sustainability adopted	Project final evaluation Annual project reports GHG assessment reports	Successful completion of the prior project activities Adequate data will be available from the stakeholders and the market

Project Strategy	Indicator	Baseline	Target	Sources of Verification	Important Assumptions
Output 4.1 Methodology for monitoring and measuring project savings from IBDA, the demonstration buildings, and improved implementation of the regulations devised and implemented	Acceptance and reliability of the methodology for monitoring and measuring the impacts	No baseline information on the market, energy, GHG or financial impacts of EE, BEP compliance, or IBDA	An accepted and agreed methodology that is useful to key stakeholders for the assessments and monitoring	Monitoring Methodology and Plan Reports of Control Group of buildings for assessing the impacts of technological interventions Project progress reports	Ongoing monitoring and recording of the impact of the project and barriers faced
Output 4.2 Evaluation of project results and knowledge sharing	Status of the mid-term and final report	No consolidation of the results and lessons learned	Final project report consolidating the results and lesson learned from the implementation of the project	Project progress reports and final evaluation	Ongoing monitoring and recording of the impact of the project and barriers faced

SECTION III: TOTAL PROJECT BUDGET AND WORK PLAN

The total costs of the proposed project have been estimated at US$ 17,580,000 (without the PDF and unconfirmed co-financing), of which total the GEF is requested to cover the incremental costs of US$ 2,620,000 to share the technical assistance cost in capacity building, policy and market development, demonstrating the use of IBDA and energy efficient techniques , business models training, travel, local and international expert support project management and the project monitoring and evaluation.

The confirmed co-financing of US$ 14,960,000 is expected to be provided by the EIE, TOKI, MoPWS and UNDP for the ongoing construction program, training, demonstration building and project management.

Table III-1 Project Financing

Outcome	GEF US$	Cofinancing US$	Total US$
Outcome 1: Improved energy efficiency in new and existing buildings through stronger regulations, institutions and implementers	867,000	1,322,000	2,189,000
Outcome 2: Cost-effective energy efficiency solutions showcased through integrated building design approach application in two demo buildings	772,450	12,010,000	12,782,450
Outcome 3: New tools developed and introduced to facilitate compliance with higher energy efficiency standards and application of integrated building design approach in buildings	536,600	247,000	783,600
Outcome 4: Building energy consumption, energy savings, and other results of the project monitored, evaluated, and reported	181,950	169,000	350,950
Project management	262,000	1,212,000	1,474,000
GRAND TOTAL	**2,620,000**	**14,960,000**	**17,580,000**

Table III-2 Summary of Co-Financing [16]

Name of Co-Financier (Source)	Classification	Type	Amount	Description	Status
EIE	Government	In-kind	US$ 700,000	Staff time and in-kind contribution to host meetings, project office, transport, etc.	Confirmed
EIE	Government	In-cash	US$ 7,600,000	Training and Construction	Confirmed
MoPWS	Government	In-kind	US$ 3,000,000	Staff time, in-kind contribution to host meetings, etc., and provision of architectural and engineering expertise, provision of land and new demonstration building's construction costs	Confirmed

[16] In all the tables, converting Turkish lira to USD has been done.

Name of Co-Financier (Source)	Classification	Type	Amount	Description	Status
TOKI	Government	In-kind	US$ 3,600,000	Staff time, in-kind contribution to host meetings, etc., provision of architectural and engineering expertise, provision of land and construction costs for the new demonstration	Confirmed
UNDP-Turkey		In-Cash	US$ 60,000	Project Management, Travel, Office Costs etc.	Confirmed
Sub-Total Co-Financing			**US$ 14,960,000**		

Total Project Workplan and Budget in Atlas

Award ID:	00059262
Award Title:	PIMS 3646 Turkey – Promoting Energy Efficiency in Buildings
Business Unit:	00074059
Project Title:	PIMS 3646 Turkey – Promoting Energy Efficiency in Buildings
Implementing Partner (Executing Agency)	General Directorate of Electrical Power Resources Survey and Development Administration (EIE)

GEF Outcome/Atlas Activity	Responsible Party / Implementing Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Total (USD)	Budget notes
OUTCOME 1: Revise and enforce building energy performance standards	**UNDP**	**62000**	**GEF**	71200	International Consultants	56,250	67,500	67,500	90,000	69,750	351,000	1
				71300	Local Consultants	60,000	80,000	70,000	70,000	59,000	339,000	2
				72100	Contractual services	10,000	25,000	25,000	10,000	5,000	75,000	3
				71600	Travel	10,000	20,000	19,000	15,000	14,500	78,500	4
				74200	Audiovisual & Printing Production	3,500	3,500	3,500	3500	3500	17,500	5
				74500	Miscellaneous Expenses	1,200	1,200	1,200	1,200	1,200	6,000	6
					Total Outcome 1	**140,950**	**197,200**	**186,200**	**189,700**	**152,950**	**867,000**	
OUTCOME 2: Introduced integrated building design in Turkey	**UNDP**	**62000**	**GEF**	71200	International Consultants	33,750	157,500	90,000	33,750	18,000	333,000	7
				71300	Local Consultants	30,000	85,000	80,000	50,000	20,000	265,000	8
				72100	Contractual services	5,000	20,000	10,000	5,000	5,000	45,000	9
				71600	Travel	10,000	47,500	23,750	14,750	9,000	105,000	10
				74200	Audiovisual & Printing Production	2,220	8,850	5,550	2,220	1,110	19,950	11
				74500	Miscellaneous Expenses	900	900	900	900	900	4,500	12
					Total Outcome 2	**81,870**	**319,750**	**210,200**	**106,620**	**54,010**	**772,450**	
OUTCOME 3: Promote best energy practices in the building sector	**UNDP**	**62000**	**GEF**	71200	International Consultants	22,500	100,000	63,000	39,500	13,500	238,500	13
				71300	Local Consultants	12,000	50,000	28,000	30,000	17,000	137,000	14
				72100	Contractual services	4,000	14,000	7,500	7,500	7,000	40,000	15
				71600	Travel	10,000	20,000	14,000	10,000	7,000	61,000	16
				72200	Equipment & Furniture	7,000	13,000	13,000	5,000	2,000	40,000	17

GEF Outcome/Atlas Activity	Responsible Party / Implementing Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Total (USD)	Budget notes
				74200	Audiovisual & Printing Production	1,000	2,000	5,000	3000	4000	15,000	18
				74500	Miscellaneous Expenses	1,000	1,000	1,000	1,000	1,100	5,100	19
					Total Outcome 3	**57,500**	**200,000**	**131,500**	**96,000**	**51,600**	**536,600**	
OUTCOME 4: Monitoring, learning, adaptive feedback and evaluation	**UNDP**	**62000**	**GEF**	71200	International Consultants	4,500	11,250	18,000	13,500	29,250	76,500	20
				71300	Local Consultants	16,000	20,000	20,000	20,000	20,000	96,000	21
				72100	Contractual services	400	400	400	400	400	2,000	22
				71600	Travel	1,000	1,000	1,000	1,000	1,000	5,000	23
				72500	Supplies	100	100	100	100	100	500	
				74200	Audiovisual & Printing Production	200	200	200	200	200	1,000	24
				74500	Miscellaneous Expenses	200	200	200	200	150	950	25
					Total Outcome 4	**22,400**	**33,150**	**39,900**	**35,400**	**51,100**	**181,950**	
Project Management	**UNDP**	**62000**	**GEF**	71300	Local Consul(PM)	17,375	34,750	34,750	34,750	17,375	139,000	26
				71300	Local Consul(PA)	10,400	20,800	20,800	20,800	10,400	83,200	27
				71600	Travel	1,500	4,500	3,500	3,000	1,500	14,000	28
				72200	Equipment & Furniture	16,000	4,000	2,800	2,000	1,000	25,800	29
					Sub-total	**45,275**	**64,050**	**61,850**	**60,550**	**30,275**	**262,000**	
		4000	**UNDP**	71600	Travel	6000	6000	6000	6000	6000	30,000	30
				72200	Equipment & Furniture	3000	1500	500	500	500	6,000	31
				72400	Communication & Audio Visual Equip.	3000	1000	1000	500	500	6,000	32
				74200	Audio Visual Productions	2000	2000	2000	1000	1000	8,000	33
				74500	Misc Expenses	2500	2500	2500	1500	1000	10,000	34
					Sub-total	**16,500**	**13,000**	**12,000**	**9,500**	**9,000**	**60,000**	
					Total Management	**61,775**	**77,050**	**73,850**	**70,050**	**39,275**	**322,000**	
					Total Budget:	**364,495**	**827,150**	**641,650**	**497,770**	**348,935**	**2,680,000**	

Summary of funds:

Source	Amount Year 1	Amount Year 2	Amount Year 3	Amount Year 4	Amount Year 5	Total
GEF	347,995	814,150	629,650	488,270	339,935	2,620,000
UNDP	16,500	13,000	12,000	9,500	9,000	60,000
EIE	1,102,427	2,579,177	1,994,693	1,546,810	1,076,893	8,300,000
MoPWS	398,468	932,233	720,973	559,088	389,239	3,000,000
TOKI	478,161	1,118,679	865,168	670,905	467,086	3,600,000
TOTAL	**2,343,551**	**5,457,240**	**4,222,484**	**3,274,573**	**2,282,153**	**17,580,000**

Budget notes:

General Cost Factors:

- Short-term national consultants (NC) are budgeted at $1000 per week.
- International consultants (IC) are budgeted at $ 2250 per week.
- DSA's are budgeted at $ 200 per day.
- Local Flight Tickets are budgeted at $ 200 per round trip.
- International Flight Tickets are budgeted at $ 1000 per round trip.
- This is based on UNDP standard costs.

Outcome 1:

1. 156 Man/weeks of international short term consultant support (156 M/w x $2250: $351,000) – The consultant will be hired to guide the PMU and the national consultant throughout the revision and enforcement of codes.
2. 339 Man/weeks of local short term consultant support (339 M/w x $1000: $339,000) - The consultant will be hired to support the revision and enforcement of codes by providing local knowledge and perspective.
3. Sub-contract with companies for the meetings, trainings, workshops etc. (15 Meetings x $5000 = $75,000))
4. 10 local and 10 international flights (10 flights x $200, plus $800 total per diem = $1,000 per trip) + (10 flights x $1000 airfare plus $5800 total per diem = $6,800 per international trip)
5. Printing and reproduction of $500 for copies over 4 years represents 5,000 black and white copies at 10 cents per page: plus $17,000 of 6,800 pieces printed material at $2.50 each color print
6. $1200 is budgeted for miscellaneous expenses. The precise costs of the workshops are difficult to anticipate. The project will look for cost-savings wherever possible, particularly in relation to travel.

Outcome 2:

7. 148 Man/weeks of international short term consultant support (148 M/w x $2,250: $333,000) – The consultant will be hired to guide the PMU and the national consultant through the introduction of IBDA in Turkey.
8. 265 Man/weeks of local short term consultant support (265 M/w x $1000: $265,000) - The consultant will be hired to support the introduction of IBDA in Turkey by reviewing the situation in the country and providing local knowledge.
9. Sub-contract with companies for the meetings, trainings, workshops etc. (9 Meetings x $5000 = $45,000)

10. 16 local and 13 international flights (16 flights x $200, plus $800 total per diem = $1,000 per local trip = $16,000) + (13 flights x $1000 airfare plus $5800 total per diem = $6,800 per international trip = $89,000)
11. Printing and Production Audio Visual materials including graphic design (5 Graphic Designs and printing x $ 3,000 = $15,000) + (1 CD Design and copying x $4,950 = $4,950)
12. $4,500 is budgeted for miscellaneous expenses. The precise costs of the workshops are difficult to anticipate. The project will look for cost-savings wherever possible, particularly in relation to travel.

Outcome 3:

13. 106 Man/weeks of international short term consultant support (105 M/w x $2,250: $238,500) – The consultant will be hired to guide the PMU and the national consultant through the promotion of best energy practices in the building sector.
14. 137 Man/weeks of local short term consultant support (137 M/w x $1000: $137,000) - The consultant will be hired to support the promotion of best energy practices in the building sector by reviewing the situation in the country and providing local knowledge.
15. 40 Man/weeks of local short term consultant support (40 M/w x $1000: $40,000)
16. 6 local and 8 international flights (6 flights x $200, plus $800 total per diem = $1,000 per local trip = $6,000) + (8 flights x $1000 airfare plus $5800 total per diem = $6,800 per international trip = $55,000)
17. Equipment and Furniture to be purchased for the demonstration buildings (20 lots x $2,000 = $40,000)
18. Printing and Production Audio Visual materials including graphic design (5 Graphic Designs and printing x $ 3,000 = $15,000)t
19. $5,100 is budgeted for miscellaneous expenses. The precise costs of the workshops are difficult to anticipate. The project will look for cost-savings wherever possible, particularly in relation to travel.

Outcome 4:

20. 34 Man/weeks of international short term consultant support (34 M/w x $2250: $76,500) – Consultants will be hired to undertake mid-term and final evaluation, as well as to guide the PMU and the national consultant through the monitoring, learning, adaptive feedback.
21. 96 Man/weeks of local short term consultant support (96 M/w x $1000: $96,000) - The consultant will be hired to support the monitoring, learning, adaptive feedback and evaluation.
22. Service Contract with companies for the monitoring meeting support costs (5 Meetings x $400 = $2,000)
23. 4 local and 2 international flights (4 flights x $200 = $800, plus, 4 days DSA x $200 = $800 = $1,600) + (2 flights x $1000 airfare = $2,000 ,plus, 7 days DSA x $200= $1,400= $2,400) = $5,000
24. Printing and reproduction of 1,000 copies per year over 5 year x 10 cents per page = $1,000
25. $950 is budgeted for miscellaneous expenses. The precise costs of the workshops are difficult to anticipate. The project will look for cost-savings wherever possible, particularly in relation to travel.

Project Management:

26. 139 Man/weeks of Project Manager (139M/w x $1,000: $139,000).
27. 208 Man/weeks of Project Assistant (208 M/w x $400: $83,200).
28. 14 local flights (2 flights x $200, plus $800 total per diem = $1,000 per local trip = $14,000)

29. Equipment and furniture of average $600 per piece of 43 pieces = $25,800
30. 30 local flights (2 flights x $200, plus $800 total per diem = $1,000 per local trip = $30,000)
31. Equipment and furniture of average $600 per piece of 10 pieces = $6,000
32. Communication and AV equipment of average $600 per piece of 10 pieces = $6,000
33. AV production of two video records of $4,000 each =$8,000
34. $10,000 is budgeted for miscellaneous expenses. The precise costs of the workshops are difficult to anticipate. The project will look for cost-savings wherever possible, particularly in relation to travel.

Table III-3. Draft Timeline of the Outputs

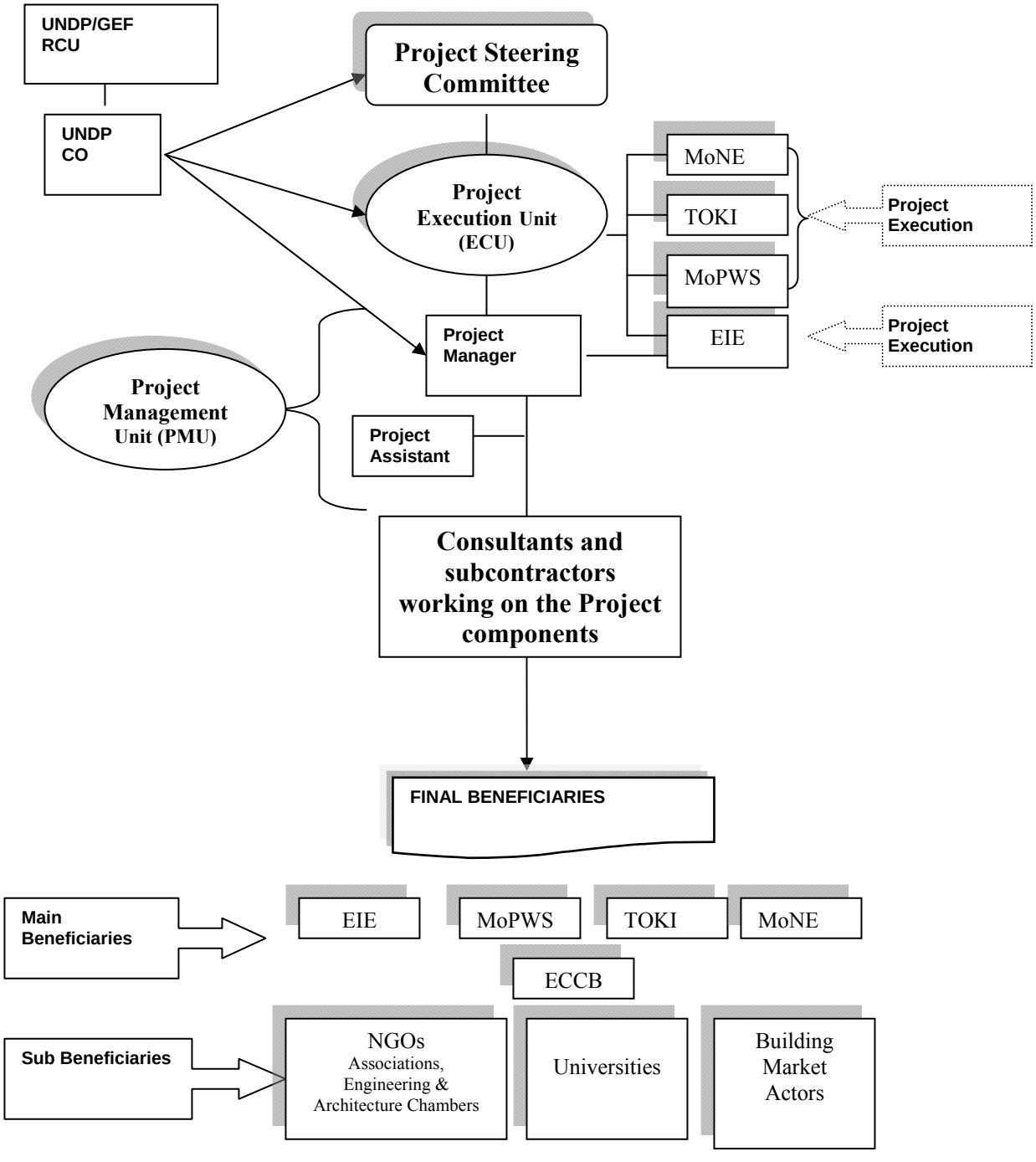
Outcome	Output	Y 1	Y 2	Y 3	Y 4	Y 5
Outcome 1: Improved energy efficiency in new and existing buildings through stronger regulations, institutions and implementers	1.1 Institutional mechanism for regular revision of building energy performance, including EE program and roadmap;	**X**	**X**			
	1.2 Two existing building energy performance codes and other relevant norms and standards revised and implemented;	**X**	**X**	**X**	**X**	**X**
	1.3 Enhanced capacity for compliance with the new regulations, including energy performance certificate scheme	**X**	**X**	**X**	**X**	**X**
	1.4 Financial mechanisms (including incentives and support for the building sector) developed and presented to EECB.		**X**			
Outcome 2: Cost-effective energy efficiency solutions showcased through integrated building design approach application in two demo public buildings	2.1 IBDA developed for Turkish climatic conditions, including implementation strategy and plan	**X**	**X**			
	2.2 IBDA promoted to building sector professionals and key stakeholders;	**X**	**X**	**X**	**X**	**X**
	2.3 Two demonstration buildings commissioned, showcasing IBDA and compliance with new energy codes;		**X**	**X**	**X**	
Outcome 3: New tools developed and introduced to facilitate compliance with higher energy efficiency standards and application of integrated building design approach in buildings	3.1 New calculation tools that architects, engineers, and constructors may use for compliance with the laws;	**X**	**X**			
	3.2 Standardized procedures for data collection, measurements, and collation of building energy performance;	**X**	**X**	**X**	**X**	**X**
	3.3 Facility for online support services for key stakeholders		**X**	**X**	**X**	**X**
Outcome 4: Building energy consumption, energy savings, and other results of the project monitored, evaluated, and reported	4.1 Methodology for monitoring and measuring project savings from IBDA, the demonstration buildings, and improved implementation of the regulations devised and implemented;	**X**	**X**	**X**		
	4.2 Evaluation of project results and knowledge sharing			**X**	**X**	**X**

SECTION IV: ADDITIONAL INFORMATION

Part I: Other Agreements

The endorsement and co-financing letters presented in a separate appendix.

Part II: Organigram of Project



Part III: Stakeholder Involvement Plan

The list of the key stakeholders sought to be involved are summarized in the table below, together with the description of their envisaged role and way of involvement. Several of these organizations have been already consulted in different elements of the project.

Depending on their contribution expected, some of the stakeholders will join the PSC, while others can continue to serve as project advisors, contractors or other implementing partners. Some of them can join Working groups to be established in the project to contribute the project outcomes.

Table IV-1 Stakeholder Involvement Plan

Stakeholder	Envisaged Role in the Project
Government Institutions	
The General Directorate of Electrical Power Resources Survey and Development Administration (EIE)	Co-financing, Executing Agency Coordination of inputs and efforts among stakeholder, The Executing Agency will sign the grant agreement with UNDP and will be accountable to UNDP for the disbursement of funds and the achievement of the project goals, according to the approved work plan. EIE is responsible for the implementation and coordination of the energy efficiency and renewable energy programs and carries out trainings, energy auditing, legislation preparation and public awareness raising campaigns for enhancing energy efficiency in all end-use sectors. In this project EİE will integrate the project activities into nationwide initiatives on EE
The Ministry of Public Works and Settlement (MoPWS)	Co-financing, executing partner MoPWS is responsible project preparation, construction and major repairs of public buildings, construction of housing in conformity with the principles of housing policy, taking necessary measures for the manufacturing and use of standardized construction materials in the most economic way for the country's requirements; Setting standards for master plans of various scales and for urban infrastructure projects; Preparing and publishing regulations, directives, ordinances, model contracts, terms of references and annual unit prices for building materials and construction services. The MoPWS is enforced Energy Performance Building Regulation December 5, 2008. In the project MoPWS will realize a demonstration project to develop and promote integrated building design approach for Turkey, participate in policy development and implementation, training and public awareness activities and will integrate project activities and results to new buildings of Turkey to enhance EE in building sector.
Housing Development Administration (HDA)-TOKİ	Co-financing, executing partner TOKİ is government agency to solve the housing problem and to increase housing production at national level and supports the construction industry related to housing construction or those who are involved in this field. It is also subcontracting any research, projects and commitments, where deemed necessary;

	In the project TOKİ will realize a school project which uses integrated building design approach to create a model; cost effective, most energy efficient and producing, using and selling RE, participating in training and public awareness activities, TOKİ will integrate the project activities and results into nationwide constructions and market transformation with making gradual changes in their bid specifications to be used in building constructions.
The Ministry of National Education (MONE)	Executing partner Responsible national education and development of school infrastructure nationwide with central project office. A key partner to integrate the project activities and results into nationwide new energy efficient school projects.
Ministry of Energy and Natural Resources (MENR)	The main duties of MENR are to determine the energy and natural resources requirements of Turkey, development and implementation of national energy policies, plans and programs, implementing polices to improve efficient and clean use of energy and natural resources. Undersecretary of MENR is chairing EECB. Project findings to be reflected to EE legislation and energy projections of the Country by MENR.
Energy Efficiency Coordination Board (EECB)	EECB is chaired by the deputy undersecretary of MENR. EECBs main functions are to prepare EE strategies, decide on EE policies and assign responsibilities for implementation. The project will develop EE program for new and existing buildings with roadmap and recommendations for ECCB to adopt in the EE strategy of the country.
Ministry of Environment and Forestry (MoEF)	The MoEF is responsible for legislation on air quality, of course integrating the issues of climate change/GHG emissions. A National Communication on climate change (which is an obligation laid down in the UNFCCC) has been prepared and was issued in January 2007 by the MoEF. The Coordination Board on Climate Change (CBCC) has been established under the coordination of MoEF to define strategies and implementation for GHG emission policies. One of the outcomes of the project is to improvement of EE and GHG emissions in new buildings. The project will prepare a methodology for monitoring and measuring direct and indirect financial effects of savings and GHG emission, calculate the direct and indirect financial, energy, and GHG savings and Report on Measurement of Savings to Turkey's Coordination Board on Climate Change (CBCC).
Other Academic and Research Institutions	Other Academic and Research Institutions, including the ODTU MATPUM, ITU, 9 Eylul University, Cukurova University, MoNE technician schools. This project will provide training to practicing architects and engineering professionals introduce new curricula for pre-professionals, and integrating both practices at project inception. Working groups will be established to bring academics and professionals interested/involved in integrated building design approach to promote these project studies to their students and colleagues and ensure sustainability of the educational (curriculum) changes in Turkish professional training systems mainly in universities.
NGOs	Several National NGOs involved in EE can play a major role in the outreach of EE

	measures and practices to the Turkish construction markets. Some of the NGOs can also provide in-kind contribution in the demonstration projects by supplying construction materials, training and awareness activities.
Union of Turkish Engineers and Architects UCTEA- TMMOB	TMMOB was established in 1954 by a law as a corporate body and a professional organization defined as a public institution. The Union has 23 Chambers and 280,300 registered members throughout the country. TMMOB is one of the members of the Energy Efficiency Coordination Board. Furthermore, two Chambers of TMMOB, the Mechanical Engineers and Electrical Engineers were indicated as the authorized organizations to carry out energy management trainings and to assign and monitor ESCOs by EE Law. In this project TMMOB will be in the Working groups established with different chambers representatives. TMMOB can provide in-kind contribution to increase awareness and arrange trainings for the members who are professionals interested/involved in project studies on integrated building design approach.
Association of Thermal Insulation, Waterproofing, Sound Insulation and Fireproofing Material Producers, Suppliers and Applicators IZODER	IZODER is a non-governmental society with good experience and contribution in EE studies. This Association is expected to provide training support and in-kind contribution for demonstration project as supplying insulation materials from member producers.
IMSAD, the Association of Turkish Building Material Producers	IMSAD is a non-governmental society recently involved in EE studies. This Association is expected to provide training and awareness support and in-kind contribution for demonstration project as supplying construction materials from member producers.
Association of Autoclaved Aerated Concrete Producers (GAZBETON)	GAZBETON is a non-governmental society with good experience and contribution in EE studies. This Association is expected to provide training support and in-kind contribution for demonstration project as supplying wall materials from member producers.
Turkish Society of HVAC & Sanitary Engineers (TTMD)	TTMD has been founded at 1992 for the purpose of "developing HVAC & Sanitary engineering" and has nearly 1800 members. TTTMD is a sort of platform that gathers professionals such as designers, implementers, academicians, manufacturers, representatives and operators for the purpose of developing HVAC & Sanitary sector. This Association is expected to provide training and awareness support in the project.
Association of Turkish Consulting Engineers and Architects (ATCEA)	ATCEA was founded in 1980 as an NGO. The Association became a member of FIDIC in 1987 and EFCA in 2001 and it is the only representative body of both organizations in Turkey. ATCEA's mission is to promote Technical Consultancy services that cover fields of activity of independent consulting engineering and architecture profession; to increase business opportunities through development of their professional and institutional capacities, to represent members. This Association is expected to contribute to demonstration project at the design stage and provide supports training and awareness for their members on EE building and IBD approach.
Turkish Green Building Association (CEDBIK)	CEDBIK was founded at 2007 to build the infrastructure that would enable green building design and construction, and encourage eco-material fabrication. The new association will probably be a key stakeholder of the project on training and awareness-raising.
Private Commercial Sector	Private Sector will play a major role in investing EE Building.

	TOKİ, MoPWS and MoNE which are stimulating building market with an important number of building construction, will ensure market transformation towards to EE in building sector while working with the private construction entrepreneurs and construction material manufacturers. Their involvement and interest will be ensured to the project with conferences and seminars.
Public Media	Channel for public awareness raising and marketing activities.

Part IV: Terms of Reference for Key Project Personnel

Project Steering Committee (PSC)

Duties and Responsibilities

The Project Steering Committee (PSC) is the main body to supervise the project implementation in accordance with UNDP rules and regulations and referring to the specific objectives and the outcomes of the project with their agreed performance indicators;

The main functions of the PSC are:

- General monitoring of the project progress in meeting of its objectives and outcomes and ensuring that they continue to be in line with the national development objectives;
- Facilitating the co-operation between the different Government entities and project partners, whose inputs are required for successful implementation of the project, ensuring access to the required information and resolving eventual conflict situations raising during the project implementation when trying to meet its outcomes and stated targets;
- Supporting the elaboration, processing and adoption of the required institutional, legal and regulatory changes to support the project objectives and overcoming of the related barriers;
- Facilitating and supporting other measures to minimize the identified risks to project success, remove bottlenecks and resolve eventual conflicts;
- Approval of the annual work plans and progress reports, the first plan being prepared at the outset of project implementation;
- Approval of the project management arrangements; and
- Approval of any amendments to be made in the project strategy that may arise due to changing circumstances, after the careful analysis and discussion of the ways to solve problems.

PSC Structure and Reimbursement of Costs

The PSC will be chaired by the National Project Coordinator or the EIE GD, if different. The PSC will include a representative from each of the key Ministries and Agencies involved in the project, a representative of UNDP and, as applicable, representatives of project's other co financing partners. Other members can be invited by the decision of the PSC, however by taking care that the PSC still remains operational by its size. The project manager will participate as a non-voting member in the PSC meetings. When and as needed, the meetings of the PSC can be extended to Control Group meetings

The costs of the PSC's work shall be considered as the Government's or other project partners' voluntary in-kind contribution to the project and shall not be paid separately by the project. Members of the PSC are also not eligible to receive any monetary compensation from their work as experts or advisers to the project.

Meetings

It is suggested that the PSC will meet at least twice a year, including the annual TPR meeting. A tentative schedule of the PSC meetings will be agreed as a part of the annual work plans, and all representatives of the PSC should be notified again in writing 14 days prior to the agreed date of the meeting. The meeting will be organized provided that the executing agency, UNDP and at least 2/3 of the other members of the PSC can confirm their attendance. The project manager shall distribute all materials associated with the meeting agenda at least 5 working days in prior to the meeting.

National Project Coordinator

As a representative the Government and project's executing agency, EİE, the National Project Coordinator is having the main responsibility to ensure that the project is executed in accordance with the project document and the UNDP guidelines for nationally executed projects.

His/her main duties and responsibilities include:

- Supervising the work of the Project Manager through meetings at regular intervals to receive project progress reports and provide guidance on policy issues;
- Certifying the annual and, as applicable, quarterly work plans, financial reports and requests for advance of funds, ensuring their accuracy and consistency with the project document and its agreed amendments;
- Authorizing the project contracts, following the approval of UNDP;
- Unless otherwise agreed, chairing the Project Steering Committee and representing the project in other required meetings;
- Taking the lead in developing linkages with the relevant authorities at national, and local level and supporting the project in resolving any institutional or policy related conflicts that may emerge during its implementation;

Project Manager (Full-Time Local)

Duties and responsibilities:

Operational project management in accordance with the project document and the UNDP guidelines and procedures for nationally executed projects, including:

- General coordination, management and supervision of project implementation;
- Managing the procurement and the project budget under the supervision of the Executing Agency and with support from UNDP to assure timely involvement of local and international experts, organization of training and public outreach, purchase of required equipment etc. in accordance with UNDP rules and procedures;
- Submission of annual Project Implementation Reviews and other required progress reports to the PSC, Executing Agency and the UNDP in accordance with the section "Monitoring and Evaluation" of the project document;
- Ensuring effective dissemination of and access to information on project activities and results, (including an regularly updated project website) among the project partners;
- Supervising and coordinating the contracts of the experts working for the project;
- Communicating with international investors and financial organizations to define fields of cooperation and attracting additional financing in order to fulfill the project objectives;
- Communicating with national stakeholder active in building sector to define fields of cooperation and attracting additional financing and in-kind contributions in order to fulfill the project objectives; and
- Ensuring successful completion of the project in accordance with the stated outcomes and performance indicators summarized in the project's logframe matrix and within the planned schedule and budget otherwise.

Expected Qualifications:

- Turkish Nationality and/or settled in Turkey
- Advance university degree and at least 15 years of professional experience in the EE buildings which the project is dealing with, including good knowledge of the national also international experiences, state of the art approaches and best practices in energy efficiency in building sector and energy efficient building design and their sustainable promotion (by applying different policy measures. etc.)
- Experience in managing projects of similar complexity and nature, including demonstrated capacity to actively explore new, innovative implementation in EE buildings;
- Demonstrated experience and success on the engagement of and working with the private sector and NGOs, creating partnerships and leveraging financing for activities of common interest;

- Good analytical and problem solving skills and the related ability to adaptive management with prompt action on the conclusion and recommendations coming out from the project's regular monitoring and self-assessment activities as well as from periodical external evaluations;
- Ability and demonstrated success to work in a team, to effectively organize it works and to motivate its members and other project counterparts to effectively work towards the project's objective and expected outcomes.
- Good communication skills and competence in handling project's external relations at all levels; and
- Fluency in English and Turkish languages.
- Familiarity and prior experience with the specific UNDP and GEF requirements are considered as assets

Project Assistant (Full-Time Local)

Duties and responsibilities:

Supporting the project manager in the implementation of the project, including:

- Responsibility for logistics and administrative support of the project implementation, including administrative management of the project budget, required procurement support etc.
- Maintaining the business and financial documentation up to date, in accordance with UNDP and other project reporting requirements;
- Organizing meetings, business correspondence and other communication with the project partners;
- Supporting the project outreach and PR activities in general, including keeping of the project web-site up to date;
- Managing the projects files and supporting the project manager in preparing the required financial and other reports required for monitoring and supervision of the project progress;
- Supporting the project manager in managing the contracts, in organizing correspondence and in ensuring effective implementation of the project otherwise.

Expected Qualifications:

- Turkish Nationality and/or settled in Turkey
- An University degree
- Fluent in English and Turkish
- Demonstrated experience and success of work in a similar position
- Good administration and interpersonal skills
- Ability to work effectively under pressure
- Good computer skills

International Project Adviser(s) (Part-Time)

Duties and Responsibilities:

Support UNDP and the project management to monitor the progress of the project and its different subcomponents, and, as needed, build the capacity of the local experts working for the project to successfully implement the project activities ensuring that they comply with the agreed benchmarks and success indicators of the project as well as international best practices and lessons learnt.

The specific responsibilities include, among others to:

- support the local project team in organizing the implementation of the different sub-components of the project at the inception phase and after that, including support to the project manager in the preparation of the project inception report and the annual work plans, drafting of Terms of Reference for the national and, as needed, additional international experts and subcontractors, required tender documents etc;

- Support the project manager in supervising the work of the contracted individual experts and companies, including review of the feasibility studies and the technical design, financing and implementation arrangements of the planned pilot projects;
- support the project manager in arranging co-operation with the current project partners and, as applicable, in establishing new, additional national and/or international partnerships to support the project goals and objectives;
- Support the local project team in monitoring and evaluating the performance and outcome of the pilot projects under implementation;
- Monitor the progress of the project and participate in developing periodic progress reviews and, as applicable, the annual Project Implementation Reviews;
- Train personally or, as needed, organize other training for the local stakeholders to successfully implement the project and to meet its capacity building objectives; and
- Provide advice on the required institutional, legal and regulatory changes to support the reaching of the stated outcomes of the project and provide other required advice on the successful implementation of the specific project subcomponents and activities by drawing from the international lessons learnt and best practices.

Expected Qualifications:

- A university degree in the area the project is dealing with;
- Demonstrated experience and success in supporting similar projects (or its subcomponents) in other GEF programme countries;
- Good knowledge of the international experiences, state of the art approaches and best practices in the specific areas the project and its subcomponents are dealing with;
- Good analytical skills and effective communication and training skills and competence in handling external relations at all levels;
- Ability to work in a team and to motivate other team members and counterparts;
- Fluency in English, including the ability to draft and edit required project documentation
- Familiarity with the specific UNDP and GEF requirements is considered as an asset.

Table IV-2: Local and International Consultants

Position Titles	***Estimated person weeks***	***USD / person week***	***Tasks to be Performed***
For Project Management LOCAL			
Project Manager	139	1,000	Executing of operational project management in accordance with the project document and the UNDP guidelines and procedures for nationally executed projects. General coordination, management and supervision of project implementation
Project Assistant	208	400	Take care of logistics and administrative support of the all project implementation and activities, and support the project manager, keep the records of the project. documents and spending.
Subtotal	**347**		

For Technical Assistance LOCAL			
Energy Efficiency Expert for Buildings	178	1,000	Propose EE building policies, programs, designs, and methods adopted or under development for this project. Assist in the technical and financial feasibility analysis of different EE policies or practices in Turkish market for buildings. In collaboration with the international and local experts working for outcome 2, assist in the introduction of an integrated building design approach for Turkey.
Energy Efficiency Architecture Design Expert	126	1,000	Review and analyze current EE building design practices in Turkey together with the existing institutional and other arrangements for their implementation, and identify possible gaps and improvement needs. In collaboration with the experts working for outcome 2, assist and support the teams designing the energy efficient demonstration building..
Training Expert for Energy Efficiency in Buildings	109	1,000	Train personally or, as needed, organize other training for the local stakeholders to successfully implement the project and to meet its capacity building objectives. Organize and provide training to the key stakeholders to further develop and implement the adopted practices, methods, or materials
GHG and Climate Change Expert	111	1,000	Monitor, track, and suggest methods by which to calculate key metrics of GHG emissions saved as a result of this project. Provide reporting to the mid-term, final evaluation, and general information collection and report drafting according to UNDP/GEF M&E requirements.
Public Awareness and Marketing Expert Specialized in EE	100	1,000	Propose methods for undertaking specific consumer surveys for collecting information about the key drivers or barriers in undertaking EE in new buildings as well as the impact of the public awareness-raising and marketing activities supported by the project. Lead development of the communications strategy. Identify key stakeholders Support establishment and further development of the project web-site.
EE Construction Expert	66	1,000	Provide construction details, as needed, for the guidance on integrated building design approach.
Renewable Energy Expert for Buildings	22	1,000	Suggest practical methods and means by which to undertake RE in buildings.
Web Designer	50	1,000	Establish and develop the project web-site and create ways to keep it updated and relevant to the targeted customers and project partners.
Evaluation Expert(s) for Mid-Term and Final Evaluations	30	1,000	Support the project's mid-term and final evaluation and related stakeholder consultations, information

			collection and report drafting.
Other Local Experts and Subcontractors	49	1,000	Provide complementary support for and/or actual implementation of the projects public outreach, market monitoring and other related activities.
Subtotal	**841**		
For Technical Assistance INTERNATIONAL			
International Project Advisor	41	2,250	Support the local project team in organizing the implementation of the different sub-components of the project. Support the project manager in supervising the work of the contracted individual experts and companies.
Energy Efficiency Architecture Design Expert	40	2,250	Support the local project team in organizing the implementation of the different sub-components of the project at the inception phase and beyond. Support the local project team in monitoring and evaluating the performance and outcome of the pilot projects under implementation.
Training Expert in Energy Efficiency Buildings	45	2,250	Monitor, report and organize training and guidance to the local stakeholders on the international EE building designs and methods adopted or under development and on the lessons learned and best practices as regards their implementation.
Expert in Buildings Energy Efficiency Policy	35	2,250	Review and analyze current EE building policies in Turkey together with the existing institutional and other arrangements for their implementation, and identify possible gaps and improvement needs.
Expert of Verification and Monitoring of Energy Efficiency	30	2,250	Compile and summarize information on the availability and capacity of the existing materials or methods labs in Turkey (government, private sector and/or manufacturer in-house) to be used for enhanced product testing and compliance checking with regards to materials, equipment, and methods for EE buildings.
EE Modeling and Design Software Expert	50	2,250	Coordinate with the project managers and experts to devise EE modeling software that supports areas considered of key value to this project. Provide training in software use
EE Market Assessment and Survey Instrument Designer	20	2,250	Design survey instruments for undertaking specific stakeholder surveys for collecting information about the key drivers or barriers in undertaking EE in new buildings as well as the impact of the public awareness-raising and marketing activities supported by the project.
GHG and Climate Change Expert	22	2,250	Monitor, track, and suggest methods by which to calculate key metrics of GHG emissions saved as a result of this project. Provide reporting to the mid-term, final evaluation, and general information collection and report drafting according to UNDP/GEF M&E requirements.
Public Awareness-Raising and Marketing Expert	20	2,250	Generate a communications strategy for the project. Support the finalization of the stakeholder involvement

			plan.
Evaluation Expert(s) for Mid-Term and Final Evaluations	22	2,250	Support the project's mid-term and final evaluation and related stakeholder consultations, information collection and report drafting according to UNDP/GEF M&E requirements.
Other International Experts and Contractors	18	2,250	Provide complementary support for and/or actual implementation of the projects public outreach, market monitoring and other related activities
Subtotal	**343**		

Part V: Greenhouse Gas Emission Reductions

This section calculates the CO_2 emission reductions[17] associated with the implementation of the present GEF project based on the GEF Manual for Calculating GHG Benefits of GEF Projects: Energy Efficiency and Renewable Energy Projects. The annex sets out the methodology and explains key assumptions for calculation of the *project direct* and *indirect* CO_2 emission reductions.

A. Project direct emission reductions

The project will support investments into construction of two energy efficient buildings (a school and an energy information and training center) following IBDA principles. As a result of these activities, direct emission reductions totaling **1,076 tons** of CO_2eq will be achieved over 20 years of the buildings useful lifetime. The estimate is calculated based on the following formula and assumptions:

*CO_2 direct = E * L * C; where*

- C – CO_2 emission factor, i.e. 0.163 tCO_2eq/MWh (calculated based on fuel mix used for heating in buildings and IPCC default CO_2 emission factors (Table G-1)). Since the actual emission factors of the fuel mix are by definition higher than the IPCC defaults, the proposed combined emission factor is conservative.
- L – average useful lifetime of new buildings, 20 years; and
- E – annual energy saving, i.e. the difference between baseline energy consumption per square meter in a typical public building (110 kWh/m^2/year) and the targeted level (66 kWh/m^2/year) multiplied by the area of two pilot buildings (6,000 m^2 and 1,500 m^2).

Table V-1: CO_2 emission factors for building heating energy mix

Energy Source	Share in fuel mix, %	IPCC default emission factor, tCO_2eq/MWh
Natural gas	51	0.20
Coal	13	0.34
Fuel oil	2	0.27
LPG	6	0.23
REs	28	0

Table V-2: Direct project emission reductions

Demo site area, m^2	Baseline energy use, MWh/m^2/y	GEF alternative energy use, MWh/m^2/y	Annual energy saving, MWh	CO_2 emission factor, tCO_2eq/MWh	Annual direct emission reductions, tCO_2eq/y	Total project direct emission reductions, tCO_2eq
a	b	c	d=a*(b-c)	e	f=d*e	g=f*20
7,500	0.11	0.066	330	0.163	53.8	1,076

B. Direct post-project emission reductions

The project does not include activities that would result in direct post-project greenhouse gas emission reductions.

C. Indirect emission reductions (bottom-up)

Using the GEF *bottom-up* methodology, indirect emission reductions attributable to the project are estimated at **2 million tons** of CO_2eq calculated over 20 years of useful lifetime of the investments. The GEF bottom-up approach implies the replication of the project methodology and investments to other buildings in Turkey and is calculated per following formula:

[17] The only greenhouse gas associated with energy services covered by the GEF project is carbon dioxide.

*CO_2 indirect BU = CO_2 direct * RF, where*

- CO_2 direct = estimate for total direct emission reductions
- RF = replication factor

The direct CO_2 emission reductions were estimated in the previous section at 1,076 tCO_2eq. The replication factor was arrived at using the following assumption: in the absence of available long-term fixed plans by the MoNE or MoPWS for construction of educational and other public facilities (similar to the project demos), it is conservatively assumed that at least 2000 new similar public facilities (or about 15% of the projected construction in the public segment for the period) are going to be built over 10 years after GEF project completion using the methodology applied by this project in the demo buildings; thus, applying the above formula:

1,076 tCO_2eq * 2,000 = **2,151,600 tons CO_2eq**.

D. Indirect emission reductions (top-down)

Using the GEF *top-down methodology*, indirect emission reductions attributable to the project have been estimated at around **69 million tons** of CO_2eq over 20 years of useful lifetime of the buildings.

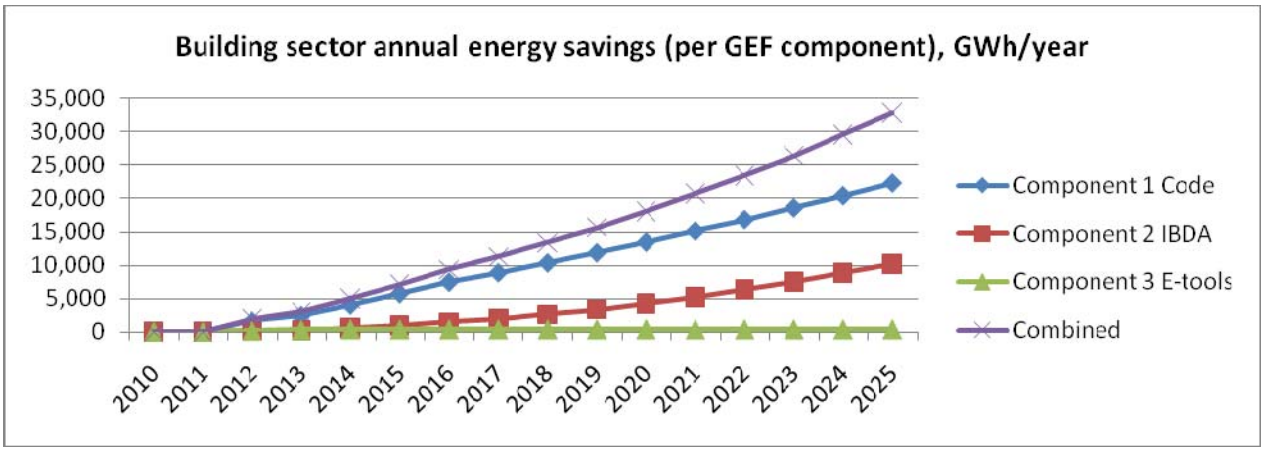
The GEF top-down assesses indirect GHG impacts by estimating the combined market potential for the proposed approach or technology within the 10 years after the project lifetime and is calculated per following formula:

*CO_2 indirect TD = P10 * CF, where*

- P10 = technical and economic potential for GHG savings with the respective application within 10 years after the project;
- CF = GEF causality factor.

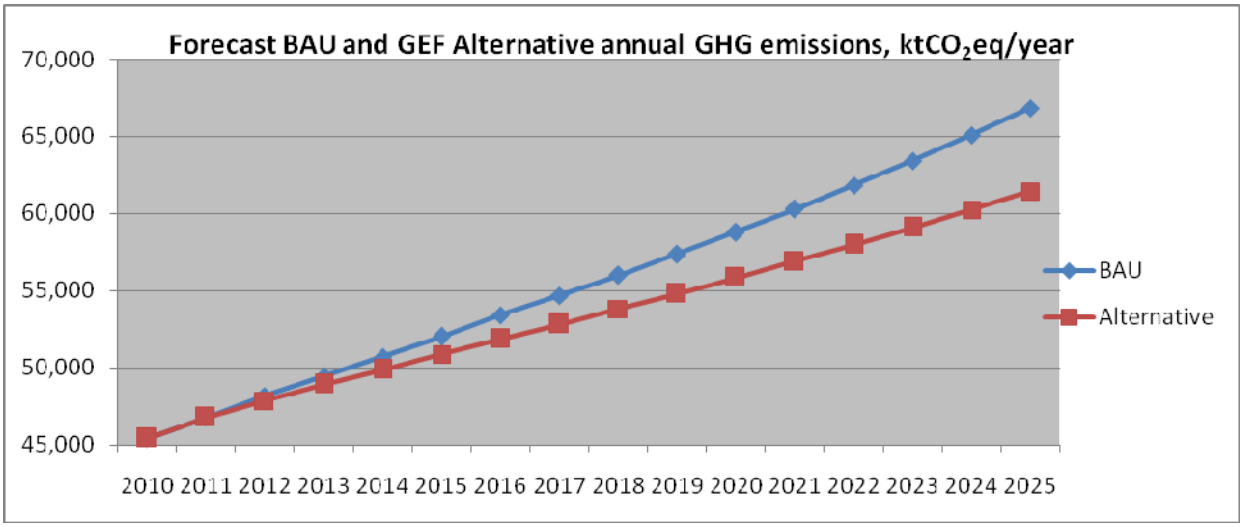
The market potential for energy savings and GHG emission reductions has been estimated based on the forecast of Turkish building stock dynamics and the following key assumtions.With the GEF support the current building codes and regulations will be enhanced, resulting in a 15% reduction of average energy requirement for heating from the current 110 kWh/m^2/year to 94 kWh/m^2/year by 2012. The more stringent code requirements are expected to initially bring code compliance down to 25% full compliance, 50% minor non-compliance, 25% major non-compliance by 2012. However, the project-supported capacity building and technical assistance will contribute to subsequent improvements in compliance to 70% full compliance, 15% minor non-compliance, 15% major non-compliance by 2014.

Application of an integrated building design approach in new buildings has been estimated to enable at least 40% reduction in energy requirement for heating from the current 110 kWh/m^2/year to 66 kWh/m^2/year. Moderate penetration rates have been assumed for IBDA adoption by the different segments: starting from 1% of annual construction volume in the residential segment in 2012 gradually increasing to 5.4% by 2024; starting from 2% in 2012 and up to 25% of annual non-residential construction by 2024; all public sector non-residential construction starting in 2013 will use IBDA.
The annual energy savings in the Turkish building stock to be built in 2010-2025 resulting from the three project components are presented in the graph below. The combined impacts of the project-supported interventions and ensuing replications within 10 years of GEF project influence period (2016-2025) are estimated to enable cumulative energy savings in the Turkish building sector to the tune of 529,153 GWh (calculated over 20 years of useful lifetime of the buildings constructed over the influence period).



Thus, the resulting GEF alternative GHG emissions scenario shows considerable deviation below the baseline (see graph below) and is estimated at around 69 million tons CO_2eq of cumulative emission reductions (over 20 years of buildings lifetimes), assuming CO_2eq emission factor of 0.16 tCO_2eq/MWh and GEF causality factor of 80%:

529,153 GWh * 0.163 tCO_2eq/MWh *0.8 = 69,001,551 tons CO_2eq.



The GEF causality factor 4 (80%, GEF contribution is dominant, but some of this reduction can be attributed to the baseline) is used, since some degree of improvements in energy efficiency in buildings has already been taken into account when constructing the dynamic baseline for Turkish building stock and business-as-usual policy developments (e.g. 10% improvement in code requirements by 2013, etc.).

Total Project Emission Reductions

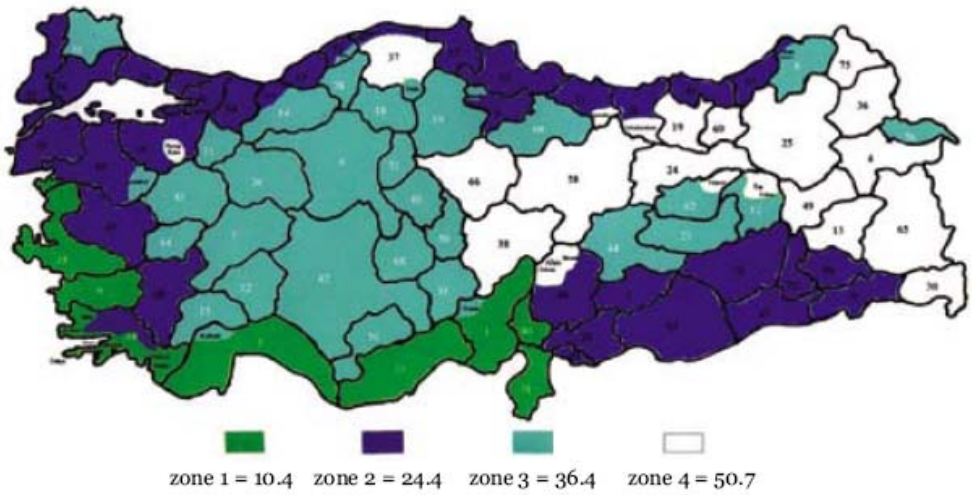
Direct Emission Reductions: the project investment in two demonstration buildings (a school and an information center) during the project's implementation phase will result in direct greenhouse gas emission reductions. As a result of these activities during the project implementation period of four years, direct greenhouse gas emission reductions totaling ***1,076 tons of CO_2eq*** will be achieved over 20 years of useful lifetime of the buildings. In the non-GEF case, these energy needs would be satisfied by heating energy generation capacity with an emission factor of ***0.163 tCO_2/MWh***. The project does not foresee any activities that would result in direct post-project greenhouse gas emissions.

Indirect Emissions Reductions: Using the GEF bottom-up methodology, indirect emission reductions attributable to the project have been estimated at ***2 million tons of CO_2eq*** over 20 years of useful lifetime of the buildings. This figure assumes a replication factor of ***2000*** (i.e. 2000 news schools and other public buildings built using integrated building design approach) over 10 post-project years of GEF influence (2016-2025). Using the GEF top-down methodology,

indirect emission reductions from new buildings constructions over the GEF inluence period (2016-2015) attributable to the project are exsimate at ***69 million tons of CO_2eq*** calculated over 20 years of useful lifetime of the buildings.

Part VI. Climatic zoning in Turkey as per TS 825 standard

According to TS 825 Heat Insulation Standards in Buildings, Turkey is divided into 4 main climatic zones based on the number of heating degree-days. The following map shows building heating requirements based on a climatic zone. As can be seen, most of the country is located in zones 3 and 4.



Source: TSE, 2006