



United Nations Development Programme
Country: SYRIA
PROJECT DOCUMENT

Project Title: Energy Efficiency Building Code in the Syrian Arab Republic

UNDAF Outcome 4: UNDAF 4: The environment at the national and regional/local levels improved, through the integration of sustainable environmental management in development plans, programmes and budgets

UNDP Strategic Plan Environment and Sustainable Development Primary Outcome:

1. Strengthened national capacities to mainstream environment and energy concerns into national development plans and implementation systems.

Expected CP Outcome(s): C.1: National capacity strengthened for meeting obligations towards ratified environmental conventions (biodiversity, climate change, and desertification conventions) and national environmental legislation enforced with a particular focus on water policies

Expected CPAP Output (s): C.1.2: Energy efficiency applications in different sectors promoted

Executing Entity/Implementing Partner: Ministry of Electricity / National Energy Research Centre

Implementing Entity/Responsible Partners: N/A

Brief Description

The project objective is to reduce Syria's energy-related CO₂ emissions by reducing energy demand in the building sector. This will be accomplished through the introduction of a new performance-based energy efficiency building code, including minimum energy performance standards (MEPS) and energy-labelling of new buildings, standards for EE materials, capacity building of principal stakeholders and an appropriate compliance regime to ensure that these new requirements will be effectively implemented. The building code will also take into account geographical climatic variability within the country and will anticipate changes due to global warming, thereby adapting the construction of new buildings to reflect both the present and the expected future climate conditions.

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PIMS #: PIMS 4037

Start Date: 2 January 2011
End Date: 31 December 2014
Management Arrangements: NEX
PAC Meeting Date: 11 October 2010

Total resources required: US\$ 49,005,222
Total allocated resources (Managed by UNDP): US\$ 11,583,750

Regular: _____
Other:
o GEF: US\$ 3,460,000
o UNDP (cash): US\$ 123,750
o Government CIS (MOE) (cash): US\$ 8,000,000
o Government (In-kind): US\$ 3,500,000
o Cash managed by Government: US\$ 33,921,472

Agreed by (Government): **H.E Dr. Amer Husni Lutfi** Head of the Planning and International Cooperation Commission

26.01.2011
Date/Month/Year

Agreed by (Executing Entity/Implementing Partner): **H.E Dr. Ahmad Kussay Kayyali** Minister of Electricity On behalf of the Ministry of Electricity, the Implementing Partner/ NERC

Date/Month/Year

Agreed by (UNDP): **Ismail Ould Cheikh Ahmed** UNDP Resident Representative

Date/Month/Year



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Acronyms

ANME	National Energy Management Agency (Tunisia)
CAPEX	Capital Expenditure
CDER	Centre for the Development of Renewable Energy (Morocco)
CPAP	Country Programme Action Plan
DSM	Demand Side Management
EE	Energy Efficiency
ERC	Energy & Resources Committee
ESCO	Energy Service Company
ESRC	Environmental & Scientific Research Centre
EU	European Union
GCEA	General Commission for Environmental Affairs
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GTZ	German Organization for Technical Cooperation
GW	Gigawatt
GWh	Gigawatt-hour
HFO	Heavy Fuel Oil
HVAC	Heating, Ventilation and Air Conditioning
IFRC	International Federation of the Red Cross & Red Crescent
INC	Initial National Communication
IPMVP	International Performance Measurement and Verification Protocol
IRIN	Integrated Regional Information Network (UN OCHA)
IT	Information Technology
IW	Inception Workshop
MAED	Model for Analysis of Energy and Electricity Demand
MED-ENEC	Mediterranean Energy Efficiency in the Construction Sector programme
MEPS	Minimum Energy Performance Standards
MoE	Ministry of Electricity
Mtoe	Million Tonnes of Oil Equivalent
MV&E	Monitoring, Verification and Enforcement
MW	Megawatt
NERC	National Energy Research Centre
NCES	National Committee for Energy Studies
NG	Natural Gas
NTIC	New Technologies of Information and Communication
OPEC	Organization of Petroleum Exporting Countries.
OPEX	Operating Expenditure
PEEGT	Public Establishment for Electricity Generation & Transmission
PEDEEE	Public Establishment for Distribution & Exploitation for Electrical Energy
PIR	Project Implementation Review
RE	Renewable Energy

RECREEE	Regional Centre for Renewable Energy & Energy Efficiency (Egypt)
SASMO	Syrian Arab Standardization and Metrology Organization
PB	Project Board
SGP	GEF Small Grants Programme
SPC	State Planning Commission
SSEECPP	Supply Side Efficiency & Energy Conservation & Planning Project
SWHS	Solar Water Heating System
TOR	Terms of Reference
TPES	Tonne of Primary Energy Supply
TPR	Tripartite Project Review
TSO	Transmission System Operator
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
5YP	Five Year Plan

I. SITUATION ANALYSIS

Context and Global Significance: Environmental, Policy and Institutional

1. Supported by rapid demographic and economic growth (2.5% and 5.3% annually over the past 5 years, respectively¹), Syria's energy consumption is increasing at an annual rate of 6.3%. Electricity production capacity is increasing by 500 MW each year, costing Syria over US\$1.25 billion in new power plants, electric grid extensions and fossil fuel consumption².
2. Syria's crude oil production currently averages 17.5 Mtoe per annum (367,000 barrels/day). However, national crude oil production is in decline, with 2009 production 20% lower than that of 2006. The Ministry of Petroleum and Mineral Resources expects to produce only 240,000 barrels per day by 2025³. As a consequence of this decline and the growing demand for energy, imports of crude oil and petroleum products are growing. In 2007, they represented approximately 32% of all imports to Syria, up from just 4% in 2000⁴. Because of the country's growing dependence on imported energy, the deficit in the Ministry of Electricity's annual budget was US\$1.96 billion in 2009⁵.
3. The adverse financial impact of rising energy demand is also felt by the Government as a consequence of its extensive subsidies to some energy products, both indirectly through implicit subsidies on domestic production and directly from the budget. Diesel oil is sold well below international prices, with subsidies costing the Government around US\$9.6 billion in 2008. Heavy fuel oil (HFO) is also subsidized. The price of natural gas is fixed at about 90% of the price of HFO and is also somewhat lower than international prices. Approximately half of electricity is generated using HFO and half using natural gas, so electricity production cost is subsidized indirectly through the subsidies on the fuels.
4. It will be difficult for the country to sustain its current growth trend given the budget spent on subsidies and the expected trade deficit created by future oil imports. Overall, the trade deficit will increase to an average of US\$3 billion in 2010-11⁶. As such, Syria's declining domestic oil reserves constitute a major driver for the promotion of energy efficiency and renewable energy.
5. Syria has begun to improve national energy policy as a response to its tightening energy situation. The overall objective of Syrian energy policy is to ensure security of supply and provision of energy services to all segments of society at cost-effective and affordable prices. To accomplish this objective, Syrian energy policy is faced with serious challenges, namely expanding the gas market, sustaining national oil production, developing renewable energy, and ensuring that domestic electricity supply can meet demand.

¹ National Statistical Abstract 2009.

² Ministry of Electricity, Public Establishment of Electricity for Generation and Transmission, Annual Statistical Report 2009.

³ Ministry of Petroleum and Mineral Resources, www.sgc.gov.sy

⁴ Regional Centre for Renewable Energy and Energy Efficiency, Syria Country Report, September 2009.

⁵ Ministry of Electricity, Planning Directorate, Annual Statistical Report 2009

⁶ Economist Intelligence Unit Report, February 2010

6. Energy efficiency is perceived by the Government to be a central component of energy demand management, particularly given the high energy intensity in Syria of 0.92 toe per US\$1,000 GDP⁷, i.e. about 1.75 times higher than the Middle East average and about 5.75 times higher than that of neighbouring Turkey. This high energy intensity can be largely attributed to inefficiencies in the use of energy, and there is certainly considerable scope for further savings to be achieved through investments in energy efficient practices. The commercial and residential sectors show particular potential for cost-effective EE improvements due to a history of subsidized energy and the lack of implemented energy-efficient building standards.
7. The Tenth Five-Year-Plan, which runs until the end of 2010, outlines several general principles for improving energy efficiency, including⁸:
 - Efficiency improvement in electricity production
 - The implementation of demand side management strategies
 - The use of integrated resource planning strategies
 - Energy price reform
 - Regulations governing appliances and building thermal insulation

Energy Demand in Syria

8. Syria's energy demand continues to grow rapidly. In 2005, total energy demand was 15.3 Mtoe, distributed among five sectors as shown in Figure 1⁹. In terms of energy use and GHG emissions, the relevance of the building sector is clear. Energy consumption in the residential and service sector was 4.4 Mtoe in 2005, accounting for approximately 30% of total final energy consumption and representing about one-third of all energy-related CO₂ emissions and two-thirds of halocarbon emissions¹⁰. The causes of such high values include a combination of poor thermal insulation and, more generally, the lack of EE design in the building envelope; growing equipment uptake (notably air conditioning units) driven by economic growth and the associated wealth improvement of households; and behavioural reasons linked to lack of awareness of EE benefits and the existence of substantial energy subsidies. Recent energy demand projections for Syria up to the year 2030 indicate that the prominence of the building sector will remain unchanged throughout the period unless significant energy efficiency interventions are undertaken. Under a business-as-usual scenario, the buildings sector will continue to account for 29% of total final energy demand in 2030, growing in absolute terms from 4.4 Mtoe per year in 2005 to 16 Mtoe¹¹ in 2030 (for more detailed projections, please see Annex 9). For electricity consumption, households account for over 40% of total consumption – i.e. almost 11 TWh per year (Figure 2)¹².

⁷ MED-ENEC Market Analysis and Capacity Assessment – Syria 2006

⁸ State Planning Commission (SPC), 10th 5 Year Plan Document, 2005

⁹ National Committee for Energy Studies, 2010

¹⁰ IPCC Fourth Assessment Report, Working Group III, Chapter 6, p.392

¹¹ National Committee for Energy Studies, 2010. Projection of Future Final Energy Demand for Syria for the Period 2005-2030. Council of the Prime Minister (report under publication).

¹² National Committee for Energy Studies, 2010

Figure 1: Distribution of Final Energy Demand in Syria by Sector (2005)

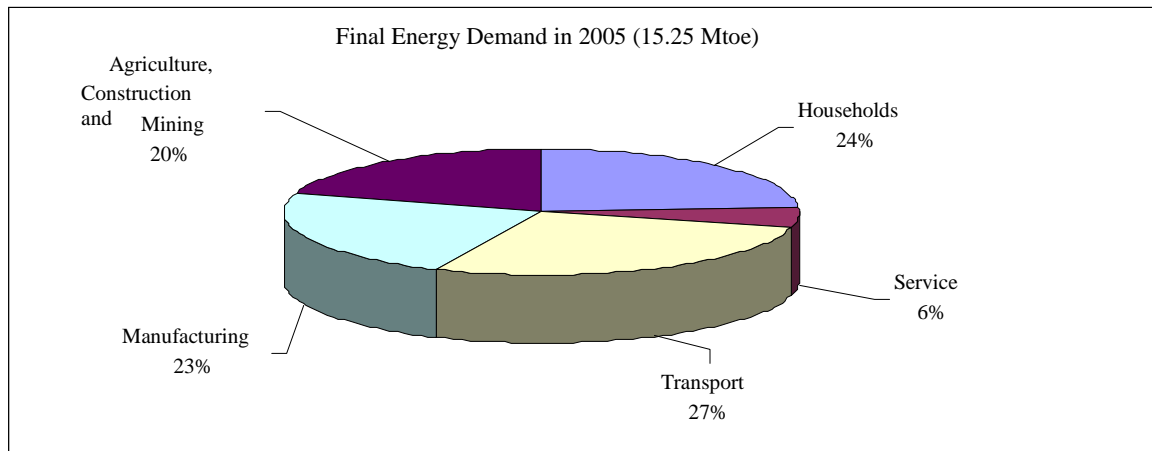
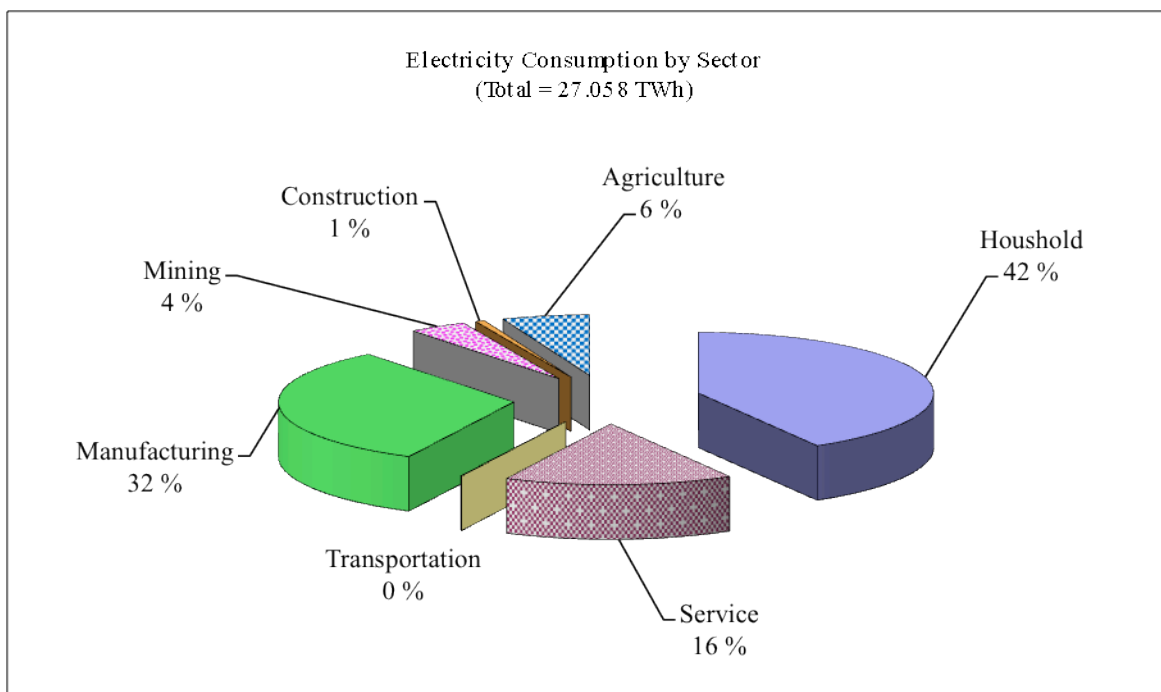


Figure 2: Electricity Consumption in Syria (2005)

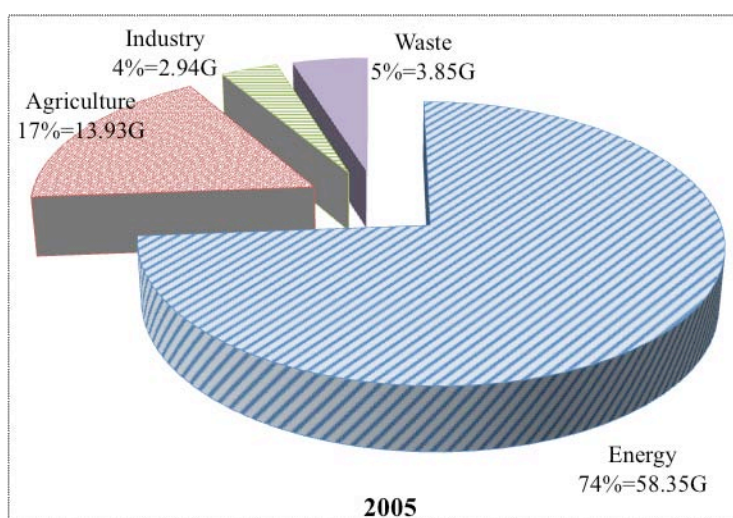


Greenhouse Gas Emissions in Syria

- The GHG inventory for Syria is currently being prepared within the framework of the ongoing “Enabling Activities for the Preparation of Syria's Initial National Communication to the UNFCCC”, carried out in collaboration with the United Nations Development Programme (UNDP) and supported by the GEF.

10. Total GHG emissions from Syria, excluding the LULUCF sector, increased from 52.7 Mt CO_{2eq} in 1994 to 79.1 Mt in 2005, representing an average annual growth rate of 3.76%¹³. Energy-related emissions, which now account for three-quarters of all GHG emissions (Figure 3), are growing slightly more rapidly (3.91% per year over the same period), driven in significant part by the building sector. It is projected that the total emissions from the building sector will grow from 22 to 69 Mt CO_{2eq} per year between 2005 and 2030, an average annual growth rate of 4.6%. These emissions are dominated by electricity consumption and direct combustion of fossil fuels for various heating applications. Within the buildings sector, electricity consumption accounts for 57% of GHG emissions, fossil fuels for 38% and biomass for 5%.

Figure 3: GHG Emissions by Sector (2005, in Gg CO_{2eq} = Mt CO_{2eq})



Main Features of Syrian National Energy Policy

11. To manage Syria's energy challenges, the Government is considering the following general implementation measures:
- Reducing technical losses and illegal consumption
 - Improving energy efficiency
 - Encouraging the use of renewable energy
 - Establishing a cost-oriented pricing policy
 - Saving oil and substituting it with gas
 - Attracting foreign investment in the oil, gas and power sectors
12. No numerical targets for energy efficiency in the Tenth Five-Year Plan were set. Nonetheless, the general principles set out in the Plan were given more rigorous form in the package of laws subsequently issued (described in detail below). The overall national policy relating to energy efficiency was recently re-emphasized in the recommendations of the National Energy Conference held in March 2010:

¹³ Initial National Communication, GHG Inventory Report, 2009

- Rationalization of consumption, improving the effectiveness of energy use and raising public awareness of energy efficiency issues.
- Reducing total electricity losses to 20% by the end of the Eleventh Five-Year Plan in 2015, and to 10% by 2030.
- Providing administrative support and incentives for using energy efficient lamps and appliances.
- Using thermal insulation and solar water heaters, especially in new residential buildings, and providing support to administrative units to undertake the needed measures.
- The introduction of green building codes and standards.
- Improving curricula in engineering faculties and technical institutions to place greater emphasis on energy efficiency.
- Enhancing the activities of research centres to find new solutions to generate and invest in feasible, socially accepted and environmentally-friendly energy efficiency and renewable energy measures.
- Supporting the implementation of CDM projects by easing administrative requirements.

13. The Government is also in the process of relaxing the state monopoly on the power sector, accompanied by efforts to reinforce the transmission and distribution networks and to improve the quality of customer services. Grid losses are estimated to be 26% of total electricity production (17% technical losses, 2% uncertainty at meters and 7% illegal use), equivalent to unnecessary generation of 9.1 TWh of electricity and 5.6 Mt of CO_{2eq} in 2005¹⁴.

14. The Government has recently issued a number of laws, many of them inspired by the findings of the Demand-Side Management (DSM) study that was carried out in 2004 as a part of the GEF-UNDP Supply Side Efficiency and Energy Conservation and Planning Project (SSECP):

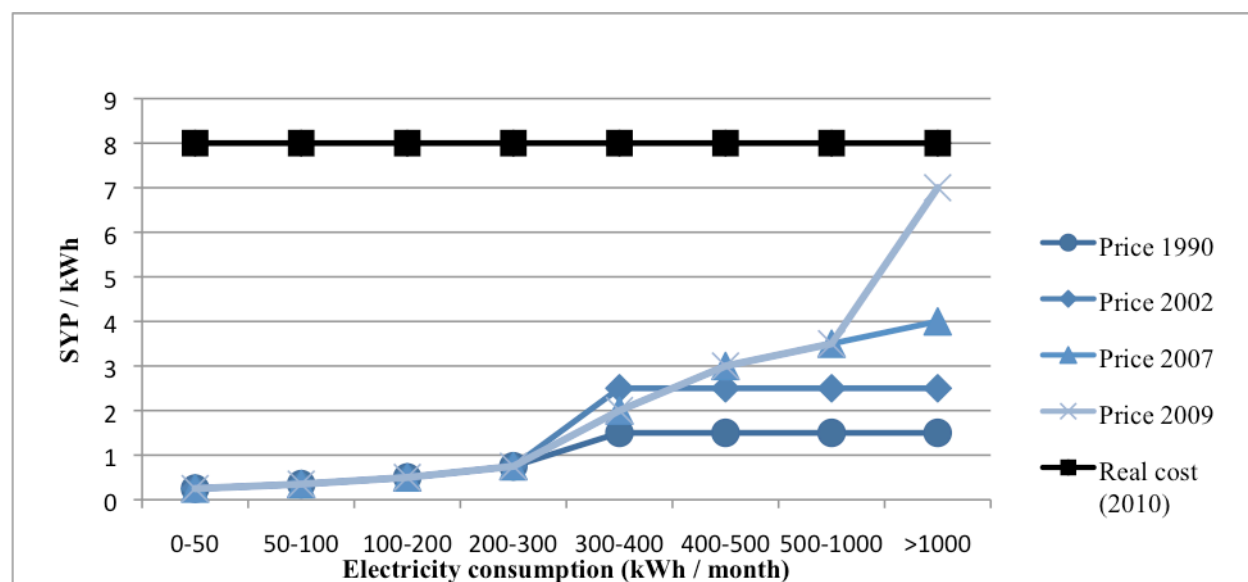
- The Thermal Insulation Code (TIC), defining the minimal thermal performance of building elements, was issued by a circular from the Prime Minister in November 2007. The circular indicated that the Code should be considered by all licensing entities starting from January 2008. However, the TIC was not considered as mandatory in the licensing process until the issuance of the Law No.3 on “Energy Conservation and Efficiency, and Renewable Energy” in March 2009, with the associated by-laws following in September 2009. The actual implementation of the TIC in the licensing process was ordered by a circular in January 2010. However, effective implementation of the TIC has not yet been observed due to a lack of capacity that is currently being addressed by NERC through a programme to support the practical application of the TIC, including country-wide training of engineers and architects, designing a thermal calculation software package, and issuing technical guidelines. Implementation of the TIC is expected to achieve 32% energy savings in the building sector, with an estimated payback period of 15 years with current prices of fuel, electricity and construction materials.

¹⁴ Initial National Communication, GHG Inventory Report, 2009

- Law No. 18 on “Minimum Energy Performance Standards for Home Appliances in the Residential, Commercial and Service Sectors” was issued by the President of Syria in October 2008, with the associated by-laws following in September 2009.

15. The Government is also in the process of reforming energy tariffs. It intends to gradually reduce energy subsidies and to move towards international market prices. Over the past 20 years, energy prices have increased substantially through a series of Prime Ministerial Decrees (No. 1225/12-12-1990, 1140/14-05-2002, 1421/30-08-2007) and the Corrective Decree 974/30-04-2009 (Figure 4). This has especially affected the industrial sector, where energy prices have increased by a factor of 6 or more over the past 20 years. Commerce and residential consumers consuming more than 1 MWh/month have seen similar rises, but the majority of residential consumers have been relatively protected by subsidized electricity prices. The National Energy Conference that took place in early 2010 noted an ambition to pursue household price reform further, though with consideration for the social impacts on low-income residents.

Figure 4: Evolution of Electricity Tariffs in the Residential Sector



Source: Ministry of Electricity / Public Establishment for Distribution and Exploitation of Electrical Energy (PEDEEE), Annual Report 2009.

Threats, root causes

16. Until recently, energy demand management was not a priority for the Syrian Government. For a long time, as in many oil producing developing countries, energy prices have been heavily subsidized, removing incentives for energy conservation and energy efficiency and resulting in a general lack of interest and awareness of consumers in energy conservation. As a consequence, buildings have been built with little concern for their energy performance, and EE building design capacities, as well as a market for EE building materials, equipment and appliances, have not developed. Key players such as professionals (architects for external

design, mechanical engineers for thermal design, and builders), local manufacturers, importers, official technical bureaus and real estate developers find it difficult to invest time, money and resources in a sector where the demand for EE buildings is still low and uneven. Despite the Thermal Code being made mandatory in March 2009, the building sector market remains largely untapped from an EE perspective due to a number of barriers. Generically, these include:

- Awareness and information barriers
- Legal and regulatory barriers
- Institutional capacity barriers
- Other institutional barriers
- Cost barriers
- Behavioural barriers
- Product availability barriers

All of these barriers are discussed below, taking Syria's specific economic and social context into consideration.

Long-term barriers and solutions

17. **Awareness and information barriers.** Extensive consultations with stakeholders during project preparation show that a key barrier to the development of the EE buildings market is the lack of awareness and trust of stakeholders, especially building owners and tenants, that investing more or paying a higher rent for an EE building will effectively yield financial returns through energy savings. As a consequence, the demand for EE buildings is very low and the EE market has little possibility to develop. Since so few buildings are insulated in Syria, the vast majority of buyers and tenants are not used to asking about the energy costs of the building units they are purchasing or renting. This creates a situation where real estate developers are in turn reluctant to spend extra money for EE improvements that are not requested by buyers. A general lack of information also prevents building industry professionals (such as architects and engineers) and decision makers (such as real estate developers) from understanding the benefits and potential market opportunities of energy efficiency. As a result, most operators/investors look only at the upfront investment costs, rather than the total (life-cycle) cost of ownership over a longer period. The project will address this barrier through awareness raising among decision-makers and end-users regarding the long-term energy costs of buildings, and making these energy costs visible to decision-makers (building users, contractors) through energy labelling.

18. **Legal and regulatory barriers.** Law No.8/2003 established the National Energy Research Centre (NERC) and endowed it with a broad scope of responsibilities and authorities in the EE & RE field, including the legal authority to impose EE regulations in the building sector. This allowed the Government of Syria to pass Law No.3, which provides the legal basis for the implementation of the Thermal Insulation Code, and Law No.18 on minimum energy performance standards for home appliances. It should, however, be noted that these prescriptive laws constitute only a first step towards the implementation of a comprehensive EE building programme. Clear implementation arrangements, a robust **Monitoring,**

Verification and Enforcement (MV&E) regime including effective capacity building, regulation, verification procedures and penalties still need to be put in place, and technical requirements of the Thermal Code need to be revised. There is also a need to upgrade the Code to a new performance-based EE building code, of which the existing prescriptive Code will form a part.

19. **Institutional capacity barriers.** The Ministry of Electricity is now required to develop, through NERC, the corresponding decrees and regulations that will mandate EE standards for new constructions, but it lacks the necessary regulatory experience to draft these decrees. Therefore, without additional capacity building of the staff at the Ministry, the regulatory barriers will largely remain. The Government agencies leading the preparation of new EE building standards and practices have limited technical experience in EE construction techniques. This is particularly true for NERC, which will be responsible for preparing the EE Building Code and advising SASMO on the definition of EE standards. To assure that new EE regulations will be adapted to the needs of the different stakeholders in the building sector, NERC's expertise in energy issues needs to be complemented by expertise in construction techniques, administrative processes and environmental management. To fulfil its responsibilities related to the preparation of the EE Building Code and activation of inter-ministerial collaboration, NERC needs to develop its technical capabilities and collaborate with the Ministries of Housing and Construction, Local Administration and Environment. Enforcement mechanisms at the municipal level represent another weak link that must be addressed. Local authorities often lack the technical and human resources to properly enforce building regulations, due to inefficient inspection/supervision and lack of knowledge and experienced personnel. The Engineering Syndicate, which guarantees the conformity of the building design with technical regulations through verifications performed by architects and mechanical engineers, also lacks sufficiently trained professionals in EE (although it has recently started a plan to provide training for its members). This lack of adequately trained human resources creates bottlenecks in the licensing and implementing process that creates incentives for negative informal agreements to by-pass the regulations.
20. **Other institutional barriers.** The Government has established a National Energy Committee in which national energy policy issues are discussed at the ministerial level. The Energy Committee is headed by the Minister of Petroleum and Mineral Resources and is composed of the Ministries of Irrigation, Electricity, Industry, Administrative Development, and the Cabinet Secretary. When needed, the Ministry of Transport and the head of the Nuclear Energy Commission are invited to attend the Energy Committee meetings, but they are not permanent members. The Committee recommends new draft laws and new strategies related to the energy sector and submits them to the Prime Minister to be issued. While this Energy Committee serves as a forum to discuss energy-related matters, it also presents a challenge, as the support of key ministries – such as the Ministries of Housing and Construction, Local Administration, Finance, Environment, Economy and Trade – that are not members of the Energy Committee will be critical for the success of any EE policy for buildings. Another barrier is the weak linkage between the public and private sectors. There is no platform to engage public and private stakeholders in a policy dialogue on a national energy efficiency programme. Without extensive consultations with professional associations representing architects, builders, real estate developers and suppliers, the efforts of the

Government to introduce EE legislation for new buildings will have limited chances of success.

21. **Cost barriers.** The additional upfront investment associated with EE measures can represent a financial and/or psychological barrier for cost-conscious investors and final clients who may not understand or have insufficient trust in the return on investment and long-term financial benefits of EE in buildings. This is particularly true in the housing sector, which is very sensitive to price. Two-thirds of dwellings are considered conventional or economic (low cost), including social housing projects and rural area private housing projects, where the price is critically tailored to be acceptable to low-income clients¹⁵. Limited access to finance is another barrier, as the Syrian banking sector is not risk-taking: to provide a loan, financing institutions (public and private banks) require from low-income clients a high level of guarantee that usually cannot be met. This applies especially to the private banks (12 private commercial banks partnered to foreign financing institutions) that have recently entered the Syrian market¹⁶. Finally, the current energy subsidies artificially extend the payback period of any EE investment for the end-user, which has an adverse impact on the attractiveness of EE investments.
22. **Behavioural barriers.** The Government, and particularly the Ministry of Electricity, is promoting energy conservation behaviour through an information campaign in newspapers and on TV, providing recommendations on how to reduce electricity bills. However, the impact of this campaign has been limited and energy inefficient behaviour still widely prevails. This is mainly due to:
 - Traditional careless behaviour and lack of awareness.
 - A tendency to ignore simple behavioural changes (such as closing doors and windows in wintertime) to improve energy conservation.
 - Illegal housing (estimated to account for more than 10% of dwellings)¹⁷ and related unpaid electricity consumption.
23. **Product availability barriers.** Building components and construction supplies that meet energy efficiency requirements are available only in limited quantities. This is partly due to the lack of internal demand among Syrian builders, and partly due to the lack of standards, causing cheaper and less efficient products to prevail in the market. Finally, building contractors and workers lack training and experience in installing EE materials and equipment, leading to the use of inadequate materials and improper installation. Although compliance with the Thermal Insulation Code is mandatory since the issuance of Law No.3 in March 2009, and despite a January 2010 ordinance blocking the licensing process at Engineering Syndicate level in the case of non-conformity of the building design, effective implementation of the Thermal Code is still very limited. Unless the barriers above are successfully addressed, it is doubtful that new buildings will comply with new EE building regulations.

¹⁵ Statistical Abstract 2009.

¹⁶ Ministry of Finance Annual Report 2009; Oxford Business Group, Syria Country Business Intelligence Report 2009.

¹⁷ Statistical Abstract 2009

Stakeholder and baseline analysis

Stakeholder Analysis

24. The project interacts with the areas of responsibilities of several Government institutions, including the Ministry of Electricity, the National Energy Research Centre (NERC), the Syrian Arab Standardization and Metrology Organization (SASMO), the Ministry of Housing, the Ministry of Finance and the Ministry of Local Administration. These and other key stakeholders of the project are discussed in further detail below.
25. The **Ministry of Electricity** exercises a state monopoly over the electricity generation, transmission and distribution systems through two public entities: the Public Establishment of Electricity for Generation and Transmission (PEEGT) is responsible for the generation and transmission of electricity through 11 Generating Companies, while the Public Establishment for Distribution and Exploitation of Electrical Energy (PEDEEE) buys the electricity from the PEEGT to sell it to end-users. The Ministry is responsible for defining Government policy on energy efficiency and for developing and proposing legislative acts for implementing EE measures. It also works in close collaboration with the Ministry of Oil and Natural Resources to increase the share of gas in electricity generation.
26. Under the umbrella of the Ministry of Electricity, the **National Energy Research Centre (NERC)** supports the development of energy efficiency policy and the Government's strategic interventions in this area. In response to increasing energy prices and growing dependency on imported energy, energy efficiency has received increasing attention during the past years. NERC was established according to Law No.8/17-06-2003. The law defined NERC's main responsibilities, including the following:
- To carry out research to support the formulation of strategies, policies and long term plans to maximize the benefits from available energy resources.
 - To carry out a survey of new and renewable energy resources, evaluate them and suggest the best plan to develop the use of them.
 - To execute pilot projects in the renewable energy field.
 - To propose Syrian standards for renewable energy equipment and systems.
 - To carry out research to improve energy efficiency on the distribution and demand side in a cost-effective manner.
 - To establish the needed labs and experimental research stations for developing renewable energy resources.
27. Law No. 3 explicitly assigns responsibility and authority to NERC for developing and implementing the Government's EE programme, including EE building standards and codes. As a financially autonomous public entity, NERC has considerable flexibility in implementing innovative public-private partnerships. NERC is the executing agency for a number of donor-funded EE projects (GTZ, UNDP-GEF) and will play a leading role in the process of preparing, issuing and then monitoring the new EE Building Code. This evolution of NERC's mission has come in response to the close linkage between some RE and EE technologies (e.g. solar water heaters), and the need by public authorities to assign the responsibilities for EE public programmes to a single entity. This evolutionary process

parallels the situation in Tunisia, where the National Renewable Energy Agency (ANER) morphed into the National Energy Management Agency (ANME) by including both RE and EE in its mission statement, and Morocco, where the government's ownership of and preparedness for EE projects is illustrated by the law that broadens the Centre for the Development of Renewable Energy (CDER) mission to include energy efficiency.

28. The **Syrian Arab Standardization and Metrology Organization (SASMO)** was established in 1969 under the Ministry of Industry. SASMO is responsible for: a) setting and confirming the standards of all commodities and products; b) setting the specifications related to the standardization terms, definitions and methods of taking samples and ways of testing; c) popularizing the latest standards; d) setting rules for quality assurance and granting conformity certification and organizing the mechanism for issuing and use of these certificates; and e) seeking membership in the international and regional organizations for metrology and standardization. It is the only official entity in Syria mandated to develop and approve standards.
29. Established in 2003, the **Ministry of Housing and Construction** is responsible for issuing technical norms and specifications for the construction and building sector; observing the activities of the Engineering Syndicate and Contractors Union; and training technical supervisors. It also has other mandates related to water supply and wastewater management and treatment. The Ministry is responsible for almost all social housing projects of the Government, which account for 11% of the total volume of construction activities in Syria. The Ministry of Housing and Construction recognizes that Syria's building sector development is closely associated with NERC's effort to promote the concept of an EE building code as a part of a broader effort of the Ministry to improve and streamline the building sector standards and other regulations in Syria. The Ministry has begun to support energy efficiency initiatives through an EE pilot housing project implemented in 2009 for young people in Kudsaya (in cooperation with NERC and the MED-ENEC programme).
30. The main functions of the **Ministry of Local Administration** are: 1) observing the implementation of the local administration law and its by-laws in all administrative units; 2) following up the execution of the local projects and evaluating them; 3) co-ordinating the work of the local governorates and with the central government in accordance with state policy; 4) providing administrative, financial and technical support to local administrative units; and 5) preparing and/or issuing required complementary laws, regulations and decisions to ensure effective implementation of the local administration law. The Ministry supervises 14 Syrian governorates, municipalities and city councils. Together with the local municipal administrations, it will play an essential role in enforcing the new EE Building Code, starting from the auditing process for the new building designs to ensure their compliance with the Code requirements and followed by the licensing process for new building projects and inspection of the construction to assure full implementation of the Code.
31. The **Ministry of Finance** is responsible for preparing a consolidated annual budget for the country. It is a key stakeholder for planning new incentives to encourage the private sector to adopt the new Building Code, including tax breaks for Syrian companies and customs duty

rebates or exemptions for importing EE materials and equipment. Support for enhancing the integration of solar water heating (SWH) systems in Syrian buildings was introduced in 2009 by financing of up to 50% of the total systems costs with a 0% interest loan. This loan is available for public sector employees only, however.

32. The **Ministry of Education** oversees all state and private schools, intermediate and vocational training institutes. The Ministry can play a key role in the project to support the mainstreaming of the EE concept within the educational curricula at all educational levels and for all educational entities it is supervising, including 1,737 kindergartens with 148,000 children; 16,579 primary schools with 4,514,800 pupils; 1,688 secondary schools with 194,000 students; 654 technical schools with 109,900 students; 129 religious schools with 20,500 students; and 188 intermediate institutes, with 81,900 students). The Ministry can also support and benefit from the project by applying the new EE building code in some of its new school buildings as demonstration projects.
33. The **Ministry of Higher Education (MHE)** oversees the work of state universities, private universities, higher institutes, vocational training institutes, university hospitals and a number of research councils, including the Supreme Council of Sciences, the Supreme Council for Arts, Humanities and Social Sciences, and the Arab Language Academy. An important role of MHE lies in setting future plans and policies for the higher education system in Syria, mainly through the regulatory work of the Council of Higher Education and a number of other specialized councils and committees, all for the purposes of assuring quality, regulating accreditation, and enhancing institutional and individual performance. The Ministry can play an essential role in promoting and facilitating the introduction of new EE-oriented curricula in Architecture, Mechanical Engineering and other relevant faculties.
34. **The Engineering Syndicate** is an organization that supervises the professional activities of architects and engineers in Syria. It is composed of 14 syndicates (branches) spread over the 14 Syrian governorates. Its members consist of around 110,000 engineers with different specialities, of which 40,000 are civil engineers, 22,000 architects and 20,000 mechanical engineers. Remaining categories include electrical, chemical, geological engineers and others. The Syndicate represents the first and main step in the licensing process of new buildings and is responsible for verifying and approving all new building designs. It is, therefore, a key stakeholder to ensure effective implementation of the new Building Code and other EE measures in buildings. The Syndicate has been considering the provision of training courses by and for its members on EE building measures. Furthermore, the Syndicate is giving attention to other important subjects related to energy efficiency and renewable energy, particularly motivating the Ministry of Electricity to consider renewable energy, encouraging and inviting Arab investors to develop renewable energy pilot projects, and to establish local industrial capacity for building insulation and EE equipment and materials. Raising awareness and knowledge among engineers and the general public to reduce energy losses and to increase energy efficiency also belong to the scope of work of the Syndicate.
35. **The Construction Contractors Association (or Contractors Union)** is the organization regulating the professional activities of building contractors in Syria, according to Law Nr. 2

governing the profession of contractors (22/12/2005) and placed under the Ministry of Housing and Construction. It is organized in 14 branches spread over the 14 Syrian governorates. Its objectives, as stated in Article 3 of Law Nr. 2, include the organization of contracting practices, the development of construction capabilities and expertise, participation in the modernization and development of legislation and regulations related to the profession, settling disputes, organizing conferences, seminars, exhibitions, and diffusing sector-related information through magazines and the internet, cooperating with Arab and other international related organizations, contributing to the training of contracting professionals. The Construction Contractors Association constitutes an important link to the building sector professionals that will be heavily involved in the project execution phase.

36. **Local materials and equipment manufacturers/distributors:** There are currently only 16 principal suppliers of imported and locally manufactured insulation materials, this low number being mainly due to limited demand in the construction market. Building materials suppliers are not organized in a syndicate or union, nor are there any implemented standards or specifications for imported or locally manufactured insulation materials. Consultations with individual stakeholders, as well as discussion at the stakeholder involvement workshop, showed that the development of the local production capacity of insulating materials would benefit the desired transition of the construction sector, as the currently imported and typically high-volume, low-density insulating materials see their retail price severely affected by high transport costs. The introduction of regulations facilitating the creation and development of local insulation material manufacturers will, therefore, be investigated during the project.
37. **Tenants or owners of housing units:** There are over 4 million dwellings in Syria; the owners are the final clients of those housing units and the final targeted drivers/promoters and beneficiaries of the EE Building Code. Through understanding of the benefits of buying and living in EE houses despite the initial additional investment, pressure from tenants/owners will encourage real estate developers to implement the provisions of the new EE Building Code.

Baseline Analysis

38. To achieve its energy conservation, energy efficiency and renewable energy objectives, the Syrian Government has implemented a number of national and donor supported initiatives, including:
- UNDP support for the development of the Renewable Energy Master Plan (REM, 2003).
 - UNDP/Government of Japan “Support for decentralized rural electrification through PV”.
 - UNDP/GEF “Supply Side Efficiency and Energy Conservation and Planning” Project (SSECP).
 - UNEP/MAP “Plan Bleu on Energy Efficiency and Renewable Energy in the Syrian Arab Republic”.

- EU Regional Project “MED-ENEC” supporting Energy Efficiency in the Construction Sector in the Mediterranean region, under which a demonstration project implementing EE practices was built.
- GTZ support to the “Master Plan for Energy Efficiency and Renewable Energies (MEERE)”.
- Government project to install 50 MW wind power plant near Homs in the Middle of the country (still in planning phase).
- Project to build a factory producing photovoltaic panels, in support to the national objective to increase the share of solar energy in energy generation in Syria (still in planning phase).

39. Current initiatives include:

- KfW-NERC Syrian-German cooperation project to support the practical application of the Syrian Thermal Insulation Code (started in 2009).
- EU Regional Project “MED-ENEC II” supporting Energy Efficiency in the Construction Sector in the Mediterranean region (started in 2010).
- In addition to the development and adoption of the Thermal Insulation Code, the Government has implemented a green building pilot project (a public kindergarten) as a local initiative, but the results are not yet reported.

40. While some policy and institutional capacity barriers have been removed by the listed projects, a number of regulatory, institutional, informational and capacity barriers still need to be addressed, such as the pervasive lack of EE-supportive incentives, the lack of a robust **Monitoring, Verification and Enforcement** regime and the need for capacity building of professionals. Without the proposed project and its technical assistance, the various stakeholders are unlikely to focus on EE in the building sector due to these remaining barriers, the overall non-conducive business environment and the usual difficulties in enforcing new regulations and contractual arrangements. At the same time, the initiatives listed above are clear signs of the Government’s understanding and proactive attitude towards the development of EE and RE, including the integration of EE in buildings. They constitute important first steps on the road towards shaping the energy efficiency market in Syria. The Ministry of Electricity is particularly involved and is placing great emphasis on the introduction of EE in new buildings, recognizing that it is easier to implement EE practices during the design and construction phases rather than retrofitting existing buildings after residents have moved in. A comprehensive survey of past EE initiatives in Syria, as well as interviews with private sector stakeholders (architects, builders and real estate developers), have made it clear that EE standards developed for the Syrian market must be adapted to the local economic and cultural environment. As a result, the technical capabilities of Government institutions such as the NERC and local municipal agencies must be reinforced in order to support the Government’s efforts to define and mandate EE buildings standards, while the necessary legal and regulatory framework is established in parallel.

41. During the project preparation phase, a stakeholder involvement workshop was held in the Ministry of Electricity and opened by the Minister himself. The event succeeded in gathering 90 attendees from across the public sector, private sector, academic and financial spectrum. There was a strong sense among Government officials, construction professionals and

investors/operators that minimum EE building performance standards must be developed and introduced. The private sector (notably the Engineering Syndicate and some contractors) clearly indicated that they were expecting the public sector to lead by example and apply the upcoming EE standards and measures to their own building projects, e.g. social housing, government buildings, schools, etc. The project addresses this concern by selecting public buildings as demonstration projects. It is also of note that real estate developers, landlords and even Government agencies were found to rely largely on technical experts such as architects, engineers and builders to advise them on improving the energy efficiency of buildings. This reliance on professionals is addressed in the project by dedicating a large part of the activities to capacity building of professionals. Moreover, the feedback that came through workshops and individual meetings indicated that, without the strong and informed endorsement of EE standards/codes by such professionals, the developers and landlords will most likely ignore the proposed regulations.

42. As a result of consultations, the following principles to promote energy efficiency in buildings were defined and accepted: (i) preparing a set of clear EE standards for building efficiency and EE materials that are universally applied in the building sector; (ii) integrating EE standards into the public and private sectors' construction and investment programmes; and (iii) communicating the national importance of EE initiatives for buildings.

STRATEGY

43. The project strategy is presented via a logical framework approach. The essence of this approach is that outputs are clustered by outcomes, which together will achieve the project objective. The main components are briefly discussed below, with further details in Chapter III – Strategic Results Framework.

Project Rationale and Policy Conformity

44. As the standard of living in Syria improves, energy expenditures are expected to grow rapidly as more people demand hot water, heating and air conditioning for their basic comfort and household energy needs. The timing of this project is important because of a conjunction of several factors: (i) Syria's trade balance in fuel is deteriorating to a point that, between 2010 and 2014, its energy demand will exceed domestic production capacity; (ii) Syria's demand for new urban housing is driven by a strong rural exodus, as two years of severe drought have caused the displacement of 300,000 families towards urban areas¹⁸, and the poorer eastern part of the country is suffering from severe food shortages; (iii) energy subsidies are gradually declining, thereby increasingly exposing consumers to the real costs of energy; and (iv) there has been a boost in national and foreign investment in the real estate market in the past 3 years, which is expected to continue in the future. By removing the barriers that currently inhibit the implementation of new EE building standards, the project will allow Syrian households and commercial buildings to reduce their energy expenditures while improving quality of life issues. Estimated annual energy savings range from 15% to 35%, depending on the type of building and the sector.

45. In 2009, Syria conducted a Vulnerability Assessment¹⁹ identifying the impacts of climate change on its territory. This study showed that average summer temperatures could increase by 4.4 - 7°C by the end of the century and precipitation could be reduced by 5-6% by 2040, compared to 1961-90 averages. Such conditions would significantly increase the demand for air conditioning and related energy consumption and have lasting socio-economic impacts in agricultural areas affected by drought, driving affected population towards major cities and thereby increasing the pressure for new residential buildings in cities. The project will support the construction of buildings with reduced cooling needs adapted to a hotter climate.

46. GEF funding is requested to cover the defined incremental costs of an effort to increase the energy efficiency of new buildings constructed by private and public sector investment funding. Together with the funding allocated by the Government of Syria for this purpose, the requested GEF funding will support the development of the necessary legal, regulatory and institutional frameworks, together with related capacity building. Demonstrating the success of this initiative in Syria will set an example for replicability in other neighbouring countries and will also support on-going efforts to create regional programmes for pooling

¹⁸ Source: IRIN Article "Syria: Over a million people affected by drought", 17 February 2010, <http://www.irinnews.org/Report.aspx?ReportId=88139>.

¹⁹ http://www.inc-sy.org/index.php?option=com_phocadownload&view=category&download=73:vulnerability-assessment-and-adaptation-measures-to-climate-change-in-syria&id=42:-

the national resources and capabilities of individual countries currently being envisaged by the MED-ENEC II, MED-EMIP and RCREEE programs for MENA countries. The project will also help Syria to meet its MDG goals by reducing the cost of energy services for Syrian households, especially poorer households that are observing an increasing share of their household income being devoted to energy expenditures. While focusing on new buildings, the project will synergistically also bring co-benefits to the improvement of the existing building stock through raised awareness and enhanced capacity of key stakeholders, stimulating demand for the EE market, increasing the local production capacity of EE materials at lower cost and making building renovation more affordable.

47. The requirements for a comprehensive capacity building and outreach programme, along with strengthening of the necessary legal, regulatory and institutional frameworks, are in line with GEF Operational Programme #5: “Removal of Barriers to Energy Efficiency and Energy Conservation” and with GEF-4 Strategic Objective 1 “Energy-Efficient Buildings”. While the Government has begun to address these topics with the introduction of the thermal insulation code, complementary efforts, supported with national and international expertise, are required to introduce a comprehensive policy initiative, including the introduction of more flexible, performance-based technical requirements, related capacity building and outreach, as well as the introduction of a **Monitoring, Verification and Enforcement mechanism, during the licensing and construction phases.**
48. Extensive consultations with public and private stakeholders confirm the timeliness of an EE programme for Syria’s building sector that can strengthen national capabilities in the area of energy efficiency at a time of rising energy costs. The Ministry of Finance has expressed serious concerns about the ability of Government ministries and agencies to absorb energy costs through existing budgetary mechanisms and believes that an EE programme will not only help to reduce energy bills but also create an EE culture at the level of decision-makers and functionaries. Private sector actors, especially professionals such as architects and engineers, have a key role to play in ensuring the development, dissemination and adoption of EE building standards. A compliance support programme, including technical training, outreach, economic support and regulatory incentives, will improve the building sector’s technical and economic capacity to implement new requirements, while reducing defensive / avoidance behaviours that might jeopardize the effectiveness of the new regulation. The project will interact closely with the private sector to ensure that regulatory proposals and technical standards are widely disseminated and adopted throughout the building sector.
49. The proposed market transformation activities are designed to result in sustainable changes in the attitudes and adopted practices of particularly two key stakeholder groups, namely: (i) decision-makers, such as real estate developers, commercial buildings operators and Government ministries, who establish the requirements for their building projects and have the power to steer the market towards EE; and (ii) building professionals such as architects and engineers who, as building designers, need to have the technical capacity to design EE buildings, and who are also in the position to advise decision-makers, substantiating the new EE market opportunity with technical arguments and thereby being key influencers in the decision to incorporate EE standards in a project design.

Country Ownership: Country Eligibility and Country Drivenness

50. Syria ratified the UNFCCC on 4 January 1996, and the Kyoto Protocol on 27 January 2006.
51. The project has been designed with extensive inputs from the major line ministries (Electricity, Local Administration, Housing and Construction, etc.) in the course of meetings that were held at frequent intervals to review the objectives of the project and discuss overall results. It fits within the Government's overall plan to reduce energy costs in the building sector by integrating EE standards and practices in building design and management. This plan started with the elaboration of a set of regulations consisting of the Thermal Insulation Code, the Energy Conservation Law No.3 (22/2/2009), Law No.18 (14/10/2008) on EE standards and labelling for home appliances, and the Law reorganizing NERC to include energy efficiency programmes among its responsibilities.
52. The project is relevant to the UNDP mandate through its strong emphasis on capacity development and technical training of various public and private sector stakeholders in order to provide professionals with the necessary know-how and technical skills to advise builders and other decision-makers about EE standards and to integrate them in the design specifications of construction projects. It also fits UNDP's mandate by promoting better governance through sustained technical and institutional support, notably in the context of municipal enforcement agencies dealing with construction projects.

Design Principles and Strategic Considerations

53. The proposed UNDP-GEF EE buildings project falls within the framework of UNDP's overall support to the implementation of the 10th Five-Year Plan, as described in the United Nations Development Assistance Framework (UNDAF²⁰) and the Country Programme Action Plan (CPAP²¹) for Syria, and in the context of UNDP's ongoing work to support the Government in achieving its national Development Goals targets and indicators²².
54. Promoting Energy Efficiency Building Codes will result in the reduction of greenhouse gas emissions related to energy use in buildings as well as the reduction of energy demand. This project will specifically support:
 - UNDAF Outcome 4: "The environment at the national and regional/local levels improved, through the integration of sustainable environmental management in development plans, programmes and budgets".
 - CPAP Outcome C.1 "National capacity strengthened for meeting obligations towards ratified environmental conventions (biodiversity, climate change, and desertification conventions) and national environmental legislation enforced with a particular focus on water policies".
 - CPAP Output C.1.2 "Energy efficiency applications in different sectors promoted".

²⁰ Syrian UNDAF : [http://www.undg.org/docs/7352/Syria UNDAF 2007-2011.pdf](http://www.undg.org/docs/7352/Syria%20UNDAF%202007-2011.pdf)

²¹ Syrian CPAP : [http://www.undp.org.sy/files/SIGNED CPAP FOR SYRIA.pdf](http://www.undp.org.sy/files/SIGNED_CPAP_FOR_SYRIA.pdf)

²² Syrian National MDGs : <http://www.undp.org.sy/index.php/mdgs/mdgs-in-syria#>

- National MDG Goal 7 “Ensure Environmental Sustainability”, Target 1: “Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources”

55. Capacity building is a strategic priority for UNDP globally and in Syria in particular. Through the current project, UNDP will place strong emphasis on capacity development and technical training of various public and private sector stakeholders in order to provide professionals with the necessary know-how and technical skills to advise builders and other decision makers about EE standards and to integrate such standards into the design specifications of construction projects.

56. In addition to technical support, UNDP will also provide coordination and management support, including financial management and close monitoring of the implementation process.

Project Objective, Outcomes, Outputs and Activities

57. The project objective is to reduce Syria’s energy-related CO₂ emissions by reducing energy demand in the building sector. This will be accomplished through the introduction of a new performance-based energy efficiency building code, including minimum energy performance standards (MEPS) and energy-labelling of new buildings, standards for EE materials, capacity building of principal stakeholders and an appropriate **Monitoring, Verification and Enforcement** regime to facilitate and ensure the effective implementation of these new requirements. The building code will also take into account geographical climatic variability within the country and will anticipate changes due to global warming, thereby adapting the construction of new buildings to reflect both the present and the expected future climate conditions. To guarantee continuous improvement of new buildings’ energy performances over the long run, the building code’s requirements in terms of minimum energy performance and labelling classes will be reviewed and updated for more stringent ones on a regular basis, e.g. every five years.

58. The project consists of four outcomes that are designed to contribute towards achieving the project’s objective. Each of these outcomes includes a number of specific outputs and a series of activities planned to achieve them.

OUTCOME 1: The knowledge, experience and trust of the key stakeholders on new construction materials and techniques and their energy saving opportunities built

59. While the Government is aware of the need to introduce EE in buildings and has introduced a number of new regulations, EE has not been effectively implemented in Syria’s building sector so far. As a consequence, building contractors, architecture and engineering firms and other key stakeholders have generally not been confronted with the design and construction of EE buildings and lack therefore the necessary trust in the feasibility and benefits of EE buildings, as well as the experience and know-how regarding building design, techniques and materials that are adapted to the Syrian context. The activities under this outcome will

address this issue by: i) identifying country-relevant EE building materials and techniques; ii) investing US\$8.3 million in EE building design, materials and equipment through the realisation of demonstration projects; and iii) disseminating knowledge and information on the good practices gained from the demonstration projects to key stakeholders and decision-makers.

Output 1.1: Cost-effective energy saving construction techniques & materials applicable for Syrian conditions identified

60. Contractors and building designers, who will need to amend their usual practices and designs in order to construct EE buildings, lack options to find technical information and advice concerning EE materials and techniques that are best adapted to Syria-specific requirements, building sites' climate regimes and locally-available resources. To address these information needs, NERC plans to purchase testing equipment to determine the thermal properties of EE building materials and of complete building elements such as walls and windows. This testing will be used to contribute to Output 1.1 by determining the energy performance of the products available in the Syrian market. The possibility of meeting EE requirements by making use of traditional Syrian building designs and techniques, and to combine locally-available natural resources with new building techniques (as in the case of straw-bale buildings, for example) will also be investigated.
61. The creation of a centre of excellence for sustainable building, conducting research on building elements' thermal performance (such as thermal conductivity and heat transfer coefficients) and providing building professionals with technical information and guidance on EE materials and building techniques, has been identified during the project preparation phase as a means to bring together the necessary multi-disciplinary areas of expertise and capacities necessary for the development of sound advice on EE buildings. Its feasibility will need to be examined further in cooperation with the national counterpart during the project inception phase. Ideally, this centre will be financed by the Ministry of Electricity and other line ministries such as the Ministry of Housing and Construction and the Ministry of Environment, and will build upon NERC's planned testing capabilities and acquired technical expertise, complementing it where necessary with disciplines such as traditional and modern architecture, mechanical and construction engineering, building materials engineering, environmental management, and exchanges with regional expertise networks and programmes such as MED-ENEC II and RCREEE. It will contribute to the sustainability of the project by capitalizing on project experiences, performing long-term multidisciplinary research, and ensuring sound knowledge management and diffusion of technical information.

Activities:

- Performing a survey of the existing modern and traditional building techniques and materials in the Syrian market.
- Performing a feasibility study to assess which techniques and materials are technically suitable and cost-efficiently implementable in Syria, with a particular emphasis on the use of local raw materials.
- Supporting the creation of a centre of excellence for sustainable building that will conduct research on building elements' thermal performance (such as U-values and

lambda-values) and providing building professionals with technical information and guidance on EE materials and building techniques.

Output 1.2: Selected techniques and materials tested and demonstrated in actual building sites

62. To build the confidence of targeted stakeholders and decision-makers in new building techniques and materials, demonstration projects will be carried-out. Design and execution of these projects will allow the targeted stakeholders to benefit from concrete experience of EE building stages in a real-world environment. During the project preparation phase, a list of 25 demonstration projects was drawn up, of which 15 projects have been selected for support. These projects are distributed over Syria's 6 different climate zones and include various types of buildings, including social housing, schools and offices. They have been selected with attention to their high visibility and exemplary value to experts, decision makers and the general public. A complete list of demonstration projects is available in Annex 6.
63. Confirmed demonstration projects include NERC's new office building in Damascus, which will be subject to exceptional attention with respect to its energy efficiency 'pathfinder' role; a Green Conference Centre in the Damascus neighbourhood; a Scientific and Vocational Training Centre for the Disabled in Hama; Social Housing for Youth in Idleb; a school in Al Raqqa. Choosing schools as demonstration projects is particularly relevant in Syria, as the design of Syrian schools is standardized and was last updated in the 1970s, at a time when energy efficiency was not an area of concern. The school demonstration projects will provide new EE-design templates for the considered school types, allowing replication of EE benefits across hundreds of other schools that will be built later on according to the new EE design, and will usefully support awareness raising for the general public throughout the country. This is further referred to under Output 1.3 in the context of the dissemination of project results.
64. The demonstration projects have been selected from a list of public and private buildings planned and budgeted under the 11th Five Year Plan (2010-2014). Without the project's intervention, it is unlikely that these buildings would integrate any EE requirements that would be additional to the baseline defined by the current regulations, i.e. the Thermal Insulation Code (TIC) in force. This is due to the relatively recent beginning of the process of improving energy efficiency in buildings, to be compared with the time of enforcement of EE measures in industrialized countries. Therefore, while the baseline design and building costs of the selected buildings will be covered by the entity (Ministry or private sector) planning to build them, the project will finance investments that are additional to the baseline, such as EE design, materials and equipment. The project may also support the implementation of recently adopted regulations, such as Law #3 and the Thermal Insulation Code, by using exclusively non-GEF co-financing sources.
65. Each building will be designed by the same local architecture and engineering bureau that was initially planned, acting in close cooperation with an international architect who will follow each project during the critical stages of conception, design and execution through regular project design reviews (typically every 2 months). Project design reviews will allow

“on-the job” capacity building of the engineers and architects involved in each project. Visits by the international architect will also permit general capacity building sessions to be organized in major engineering syndicates. Local architects and heating, ventilation and air-conditioning (HVAC) engineers will be encouraged to co-operate in the building design from the very beginning by following an “integrated building design” approach. This will ensure that HVAC needs of the buildings are integrated into the first decisions about shape, lay-out, orientation, facades and materials of the building. A national architect will support communication within the national project design teams and between the national teams and the international architect, providing national expertise and assuring continuous follow-up of the projects in the time between project design reviews. Advanced contacts have already been made with international and national experts with the required experience and suitability to perform these tasks.

66. Capacity building of workers and foremen involved in EE materials and equipment installation will be assured before construction begins. Installation will be realised in cooperation with experienced international foremen. Site visits will be organized for building professionals to observe new installation / construction practices during the critical construction phases, such as the installation of EE materials (e.g. external insulation and windows) and equipment.

Activities:

- Co-financing the EE-related cost of 15 demonstration projects, making use of specifically-identified techniques and materials.
- Designing and executing demonstration projects by using national and international EE expertise and ensuring transfer and capitalization of best available techniques and know-how.
- Assessing energy performance of demonstration projects using purchased testing equipment, according to an internationally recognized monitoring and verification protocol such as the International Performance Measurement and Verification Protocol (IPMVP).

Output 1.3: Information on results of the first demonstration projects shared

67. An outreach programme to disseminate information on the results and benefits of the demonstration projects among key stakeholders and decision-makers will be undertaken. Environmental NGOs and CBOs will be strongly encouraged to contribute to this outreach programme with the objective of disseminating the concept of EE in buildings and its environmental and economic benefits to the general public, as well as to decision-makers from the key stakeholders (e.g. municipalities, governorates, contractors). The specificities of each of the demonstration projects, detailing the technical EE measures implemented and stressing their environmental, economic and social benefits, will be presented in an information brochure that will be edited and distributed to stakeholders and decision-makers. Visits will provide participants with a “touch and feel” experience of EE buildings and allow debates within the local engineering syndicate, municipality and contractors union to provide useful feedback for the practical implementation of the EE code. Information on the demonstration projects’ technical details and benefits will also be published on the websites

of NERC and MED-ENEC II²³, an EU-funded programme dedicated to promoting energy efficiency in the construction sector in the Mediterranean region. This outreach programme will also support capacity building and sustainability of the project under Output 3.3, as EE knowledge will be retained in the relevant organisations.

Activities:

- Organizing know-how transfer training sessions for architects and engineers based on lessons learned from demonstration projects' design and execution phases.
- Carrying-out a long-term outreach programme to inform key stakeholders about the importance of EE in buildings and the results of the 15 demonstration projects, including organizing site visits, conferences, public debates, distribution of dedicated project information through appropriate media (brochures, CDs, newsletters, websites) and ensuring media coverage.

OUTCOME 2: New EE building codes, as well as a comprehensive legal and regulatory framework (including financial and other incentives) to facilitate their effective implementation and enforcement, established

68. While the release of Syria's first Thermal Insulation Code in 2008, and of the Energy Conservation Law that provides it with a legal application framework in 2009, constitute a significant first step for the integration of EE into Syrian buildings, the need for a more flexible and, therefore, more cost-efficient instrument, providing control over the overall energy demand of the building and creating an incentive on the market demand-side towards more energy efficient buildings, has been identified. The current version of the Thermal Insulation Code is prescriptive: by imposing minimum thermal performance requirements for each building element (such as walls, windows and roof) it constitutes, at the level of the complete building, an obligation of means (building elements must be of a certain quality) but not an obligation of result (in terms of a guarantee that the overall energy need of the complete building is under control). This is due to the lack of consideration for the significant impact of the building's design (including orientation, shape, and solar gain through windows) on the thermal needs of the building. Besides, this obligation of means imposes material costs whose effect might be achieved at lower cost by a simple modification of the building design itself.
69. Under this Outcome, the current prescriptive Thermal Insulation Code will be upgraded into a performance-based Building Code, setting limits to the overall thermal needs of the building. It will include a minimum energy performance standard (MEPS) and an energy-labelling scheme. It will be an improvement on the existing prescriptive building code as it will allow the building designer to reach a required level of performance by different, more cost-effective means, and provide control over the energy performance of the building. The introduction of an energy-labelling scheme making the energy class of the building visible – for example, through a sign at the building entrance and a mandatory certificate to be produced during purchase and renting of the building or apartment – will allow the consumer to benchmark his/her expected energy bill, hence creating a demand-side incentive for more energy efficient buildings.

²³ <http://www.med-enec.com>

70. Focusing on the thermal needs of the building is especially appropriate to a developing country such as Syria. As the inhabitants of residential buildings become wealthier, they will likely act to improve their indoor comfort by introducing or up-scaling heating and cooling equipment, thereby increasing their energy consumption. Buildings whose thermal needs are limited by a MEPS will maintain this increase within controlled limits, which will be beneficial both to the inhabitants by limiting their energy consumption and to Syria by providing control over the public deficit caused by the building sector's rising energy demand.

Output 2.1: An updated market assessment and a continuing market monitoring mechanism in place

71. In order to develop and implement effective market intervention measures such as new regulations and enforcement mechanisms, training and awareness programmes and possible incentive schemes, there is a need for a comprehensive understanding of the dynamics of the building market in Syria, both for the materials and the actual construction activities. This need will be addressed by a market assessment identifying key factors, drivers and stakeholders influencing this process. The market assessment will finalise a list of EE materials available in the market by building on the assessment done under Output 1.1; describe the market chain from producer to end-user; analyse the supply-side capacity to deliver products; identify the financial returns for market players along this chain; and specify the measures in place to prevent fraud and other malpractices. Producing this information will require: (i) interviews with market experts such as producers of materials, importers, wholesalers and distributors, construction companies and installers; (ii) review, cross-analysis and synthesis of the available statistical data, such as local production data and trade statistics; (iii) introduction of possible new market surveillance and monitoring activities and data collection methods; and (iv) discussions with the public authorities responsible for guiding and controlling the market. A permanent market monitoring and data collection mechanism will allow monitoring and analysis of the impacts of the project by keeping track of the sale of different EE materials and the construction of EE buildings.

Activities:

- Carrying out a market assessment for EE building materials and EE buildings, including a list of EE materials available in the market, describing the market chain from producer to end-user, identifying the financial returns for market players along this chain, and specifying the measures in place to prevent fraud and other malpractices.
- Supporting the development of a comprehensive market monitoring mechanism. This mechanism will collect statistics about the annual sales of EE materials by their type and thermal characteristics as well as the number of erected EE buildings by their energy label and size (m²).

Output 2.2: Updated standards for EE building design, materials and installation developed and submitted to Government for issuance, including active and passive solar design and mitigation of the urban heat island phenomenon

72. The updated standards developed under this outcome will include a minimum energy performance standard (MEPS) to stipulate new buildings' maximum allowable thermal needs taking into account passive solar design, quantified requirements for active solar equipment such as solar water heaters, and a labelling scheme attributing an energy performance class to new buildings.
73. A voluntary certificate scheme for housing projects reaching the highest efficiency class will also be created. This will allow real estate developers to market the improved efficiency of their housing units to householders and help create a demand for EE housing as well as an incentive for building designers to acquire the best EE design capacity and use the best EE materials and equipment.
74. The performance-based approach will build upon the existing prescriptive approach currently being developed by NERC and the Government with the development of a Thermal Insulation Code and the passing of Law Nr. 3 on energy conservation.
75. The urban heat island phenomenon will also be specifically addressed under this outcome. This phenomenon is produced in summer in cities by the heat accumulated in paved areas and building roofs, and causes atmospheric temperatures to be several degrees warmer than nearby rural areas, increasing energy demand for air conditioning, peak power demand and likelihood of power failures, thereby requiring costly upgrades of the production capacity. The project will contribute to mitigation of the urban heat island phenomenon at the building level by promoting vegetated roofs and "cool roofs" that make use of reflective materials and coatings that reduce the share of incoming solar radiation converted into local heat. Besides contributing to lower urban atmospheric temperatures, reflective roofs also directly reduce the inflow of heat into a building, as roof insulation also does. As a consequence, a trade-off needs to be found, and the project will seek to minimize the building's life-cycle costs by determining optimal roof reflectivity and insulation levels and consideration will be given to the inclusion of roof reflectivity as part of the standards. Using a more integrated territorial approach, the urban heat island phenomenon can also be significantly mitigated through urban planning measures, such as repaving streets in lighter colors ("cool pavements"), urban planting of shade trees and vegetation, and limiting urban sprawl. The project will therefore seek to find synergies with the project stakeholders in charge of urban planning, such as the Ministry of Local Administration, as well as ongoing programmes such as the GTZ co-financed Urban Development Project (UDP)²⁴. The project will also make use of the latest information and research on urban heat island materials and policy instruments, as available from, for example, the Berkeley Laboratory Urban Heat Island Group²⁵ the Cool Roof Rating Council²⁶ and the EU Cool Roof Council²⁷.
76. The improvements in building design resulting from the implementation of the above measures will reduce the impact of hotter climates on new buildings' thermal needs, thereby

²⁴ <http://www.udp-syria.org>

²⁵ <http://heatisland.lbl.gov>

²⁶ <http://www.coolroofs.org/>

²⁷ <http://coolroofs.univ-lr.fr/index.php>

making new buildings more resilient to a changing climate. Mitigation of the urban heat island phenomenon will additionally contribute to reducing the city's summer temperatures, thereby also contributing to the adaptation of Syrian cities to a warmer climate.

77. The complete process of establishing the new EE Building Code will include the following major steps:

- Developing the capability of building designers to assess new buildings' thermal needs at the design stage. This capability will be achieved through: (i) the procurement of commercial simulation software for the research purposes of NERC, allowing advanced thermal simulation of building behaviour; and (ii) the adaptation to Syrian conditions and specific user needs of the thermal simulation software "CLIP". CLIP was initially developed under a UNDP-GEF co-financed EE building code project in Tunisia, and calculates buildings' thermal needs as a function of their active and passive design characteristics and local climatic conditions, in response to the need of the majority of building designers to have a free and simple-to-use and sufficiently accurate thermal simulation tool to assess conformity of the building design with building code requirements (see Annex 10). The aim under the proposed project is to provide the Syrian adaptation of the CLIP software free-of-charge to building designers via CD and a website.
- Designing and implementing a mandatory energy labelling programme for new buildings, providing the consumer with a label of the building's thermal needs, for each type of building.
- Defining a minimum energy performance standard (MEPS), setting limits to new buildings' thermal needs, for each building type.
- Writing architectural guides providing specific EE recommendations relating to building design for each building type and local climate conditions (addressed under Output 3.2).
- Designing and implementing a communication campaign advertising the benefits and mandatory legal nature of the standard and labelling scheme. This campaign will target: (i) building contractors, architects and engineers, with support from the NERC, the Engineering Syndicate, the Ministry of Local Administration and the Contractor's Union; and (ii) the general public, in cooperation with a communication agency, through the press, radio, television and internet. This point is addressed under Output 3.3.
- Ensuring programme integrity: after the label design process is mandated and the standard is set, compliance will be assured by verifying the conformity of the erected building with the design based on which the licensing has been granted and the labelling has been issued. This point is addressed under Output 2.3.

Activities:

- Defining the typology of buildings to be addressed by the Building Code.
- Defining climate zones that group the local administrative authorities by similar climate conditions.
- Assessing the thermal needs of currently designed buildings through use of a dynamic simulation software package, providing NERC with a commercial version of this software and training NERC staff to use it.

- Adapting the simulation software “CLIP” to the Syrian context and requirements, calculating the thermal needs of newly designed buildings, allowing assessment of conformity with the new regulation and distributing this software freely and widely to building designers.
- Defining, for each building type, an energy-labelling scheme that categorises buildings according to their thermal needs.
- Setting, for each building type and climate zone, a minimum energy performance standard (MEPS) by defining the building's acceptable energy classes.

Output 2.3: Application decrees and eventually mandatory complementary technical standards to support the implementation and enforcement of the new EE building code drafted and submitted to Government for issuance

78. As the EE Building Code is drafted, the appropriate regulatory framework needs to be developed to mandate adoption of the Code for new construction in targeted sectors. This will require NERC to draft the necessary application decrees and local ordinances that specify the purpose and scope of the Code and the penalties for violation of Code provisions under the umbrella of the Energy Conservation Law that has already been passed by the Government. Separate ordinances may be required to ensure that the Code is applied. Additionally, supporting measures such as financial and other incentives will be necessary to ease the transition for the Syrian building sector. For example, the licensing process for new buildings has recently been modified in order to prevent new buildings from being licensed if they do not comply with the requirements of the Thermal Insulation Code. In the absence of adequate supporting measures, the higher additional investment imposed by these requirements, compounded by lack of capacity and insufficient information and trust in the benefits of EE, may create an incentive for unlawful behaviour and deter foreign direct investment in the Syrian building sector. An appropriate set of supporting measures will be designed in order to “ease the step” of the building sector during the market's transition period – for instance, by reducing the apparent additional costs of EE, providing additional incentives to building contractors, or considering voluntary implementation during a transition period, leaving institutions with the time to scale-up their implementation capacity. At the same time, EE design verification procedures in the licensing process, random checking programmes on construction sites, and penalties for violation of the Code's provisions will be defined, implemented and regularly evaluated and, if necessary, revised in order to form a strong and balanced **Monitoring, Verification and Enforcement** mechanism. Such measures are likely to accelerate implementation of the new regulation, thereby increasing GHG savings.
79. It should be noted that the project management process will ensure a continuous policy dialogue with the Government through regular policy reviews with the Technical Committee and Project Board, thereby ensuring that at the end of the drafting process all regulatory texts submitted to the Government are already fully endorsed.
80. To specifically address the enforcement risk, a senior international monitoring, verification and enforcement (MV&E) advisor will be appointed, and a national MV&E unit composed of one senior and one junior expert will be created. They will collaborate to: (1) define a legal framework related to the implementation of the building code that will (i) create an

official and independent body in charge of carrying out MV&E of the building sector and (ii) include regulatory texts making the MV&E regime lawful and applicable; (2) elaborate an MV&E regime including (i) supporting measures such as, for example, issuing an operational compliance manual for building developers with project-oriented checklists; (ii) MV&E procedures with assigned responsibilities, e.g. random inspections of a proportion of buildings to be defined (e.g.10%) during design and construction phases, probing for quality and thickness of insulation, monitoring energy bills, and a gradual and coercive enforcement regime to provide appropriate response to non-compliance: warnings, reports appropriately filed in a database, public information (e.g. on internet), financial and other legal sanctions (e.g. fines, imprisonment); and (3) define a training programme for inspectors to be carried-out by the MV&E organism.

81. Finally, an Inter-Ministerial Working Group has already been created by the Government to address the issue of introducing fiscal incentives to EE, and its work will be supported by a consultancy report exploring EE financing options (taxes, tariffs and other economic incentives), including the financing of an MV&E body (e.g. through fees collected at the project licensing stage).

Activities

- Drafting, in cooperation with the Government, regulatory texts that specify the technical requirements of the EE Building Code and detail the responsibilities of each stakeholder involved in the process of licensing new buildings, and submitting them to the Government for issuance.
- Drafting, in cooperation with the Government, a legal framework for MV&E, creating a body in charge of MV&E and defining MV&E procedures to be followed, and submitting them to the Government for issuance.
- Drafting, in cooperation with the Government's Inter-Ministerial Working Group, a set of economic incentives such as temporary import tax removal, VAT exemptions and subsidies for purchasing EE buildings, aiming at scaling up production capacity and supporting implementation of the new EE Building Code, and submitting them to the Government for issuance.
- Reviewing the need for complementary technical standards to support the implementation of the new EE Building Code, drafting the required additional standards and submitting them to the Government for issuance.

OUTCOME 3: Strengthened institutional capacity to facilitate effective implementation of new EE Building Code and the sustainability of project results

Output 3.1: An inter-agency coordination and consultation mechanism to support the development and effective implementation of the new EE Building Code with related policy and other measures

82. This Output involves the creation of a “community” of EE stakeholders by ensuring good communication, aimed at reaching a shared vision and a common understanding of the needs

for effective implementation of EE in buildings and allowing implementation problems and unforeseen difficulties to be debated and resolved. Particular attention will be given to the division of responsibilities at the interfaces between each key stakeholder, in order to avoid the appearance of any responsibility gap. The coordination platform will also allow best practices and experiences to be shared among participating entities. This will be achieved through relevant NTIC tools, such as a website dedicated to EE in buildings disseminating news from the EE community and an e-mail discussion list where experts and stakeholders will be able to exchange views and share knowledge on EE in buildings.

Activities:

- Establishing suitable managerial structures to assess the effective implementation of the new EE Building Code by monitoring implementation indicators, identifying gaps and proposing solutions. This taskforce will be chaired by NERC and will include representatives of the Ministries of Electricity, Housing and Construction, Local Administration, Environment, the Engineering Syndicate and the Contractors Union.
- Creating an information and service tool for stakeholders and the general public, dedicated to energy efficiency in buildings, including a website linked to NERC and an information hotline service.
- Establishing an EE experts' discussion platform (virtual and physical) and linking it with international experts, supported by the above information tool, allowing transfer of knowledge and know-how on state of the art EE techniques and practices.

Output 3.2: Guidelines, tools and materials for supporting the implementation of the adopted EE Building Code and its complementary standards and recommendations

83. Technical guides will be developed for professionals to ensure that the technical recommendations necessary to respect the Building Code are communicated to building professionals in a way that is suited to their requirements. These practical guides will be designed for specific professions (e.g. masons, electricians, architects) and for specific components of the building (e.g. lighting, air conditioning). Practical guides will also be distributed to stakeholders involved in the enforcement of the Building Code, such as inspectors and customs officials.

Activities:

- Drafting practical guides for professionals based on EE standards and best practices
- Validating these guides with building sector professionals
- Publishing these guides on a website dedicated to EE in buildings

Output 3.3: A set of awareness-raising and training programmes tailored to the specific needs of the key stakeholders, including Government agencies, building developers, other building professionals, code enforcement officials, building managers, architecture/engineering school officials and the general public, implemented

84. Each key stakeholder must be aware of the benefits of EE and of the role he/she has to play to contribute to the successful development of EE in the building sector. A multidisciplinary team including NERC engineers and participants from other relevant entities will be in

charge of defining the awareness-raising and training programme. Several master's degree programmes in Syria are targeting the issue of EE in buildings, such as the master's degree in EE in buildings at the University of Aleppo. By building on these successful academic initiatives, architecture and mechanical engineering university teachers and students will be provided with the necessary training to use the simulation tools needed for EE building design. While the focus of the training and awareness raising activities under Output 3.3 will be on the direct stakeholders (construction sector, architects, local authorities, etc.), environmental NGOs, such as the Syrian Environment Association, are ready to participate in a complementary outreach programme targeting the general public. To the extent possible, the training sessions will be recorded on audio and video and will be published on the NERC website and distributed through CDs to facilitate information dissemination in areas where internet capacities are not sufficiently developed.

Activities:

- Preparing an awareness-raising campaign for public and private stakeholders and financial institutions, including a conference under the patronage of the Ministry of Electricity, presenting EE in buildings as a new business opportunity that is also a long-term priority for the Government.
- Organizing awareness-raising and training programmes for other key stakeholders, including training of trainers (TOT).
- Preparing and implementing mandatory EE courses to be included in the architecture and mechanical engineering curricula of public and private universities.
- Designing a presentation and an audio-video material awareness toolkit for practitioners, making it available on a dedicated website and distributing it freely on CDs.
- Designing an outreach programme for the general public, making use of mainstream media.
- Introducing the concept of energy efficient buildings in schools' curricula at all levels.

Output 3.4: Public & private building stakeholders and financial institutions mobilized to support the projects and programmes of EE in buildings

85. The market transformation measures proposed in this project will be best implemented if public and private building stakeholders and financial institutions adopt a proactive attitude towards them. Such an attitude is facilitated when these stakeholders identify the introduction of EE in buildings as a personal benefit (e.g. a new business opportunity), and can find synergies with relevant business partners. For instance, building developers who are convinced that it is in their customers' (house buyers', companies') interest to buy EE buildings will turn EE into a premium selling argument and will be interested in promoting EE themselves. Similarly, banks that are convinced of the benefits of EE in buildings will consider lending money for EE building investments as a new business opportunity. Discussions with key stakeholders during project preparation indicate widespread support for facilitated access to credit and soft loans as a measure to catalyse investments in EE. This will be further validated and specified in greater detail during project implementation.

Activities:

- Following the conference presented under Output 3.3, initiate a dialogue with public and private stakeholders and financial institutions through a series of workshops aimed at: (i) presenting and validating identified barriers to the development of the EE market in Syria and proposing solutions to remove them; and (ii) presenting and validating identified synergies between public and private actors and financial institutions and proposing ways to put them into practice.
- Based on the workshops' findings, drafting a mechanism aiming at supporting the implementation of identified synergies between building stakeholders and financial institutions.

Key Indicators, Risks and Assumptions

86. The main global environmental impact of the project is the reduction of CO₂ emissions. The underlying local impacts from increased EE activities in the building sector contribute to the overall sustainability of the project and thus are critical to the continued reduction in CO₂ emissions. A strong baseline, along with measurable indicators, will need to be established in order to properly monitor the impact of the project. This will need to be done before EE standards are established and implemented. The impact monitoring will be done on an annual basis by the project implementation team, and the results will be used by the project team for improving and/or revising the proposed EE standards for buildings. Table 1 identifies the indicators that will be used to measure the impact of the proposed initiatives.

Table 1: Key Indicators for Impact Monitoring

Impact to Be Monitored	Indicators	Verification Means
CO ₂ emissions reduction	- Reduction in energy consumption in building sector	- Survey of architects, builders and Government agencies - Analysis of energy bills - Dedicated on-site metering (demonstration projects) - Government national energy subsidy bill
Share of building projects that integrate EE standards	- Number of buildings that integrate EE standards and design parameters	- Survey of licensing process for new buildings at Engineering Syndicate - Survey of architects, developers and Government agencies - Survey of municipal enforcement agencies
Increased use of EE standards by building professionals	- Number of professionals trained in EE Building Code and standards and applying such skills/knowledge	- Survey of architects, developers, and Government agencies - Project files - University records - Number of downloads/ distributed CDs of the software package and training material - Number of visits to the dedicated website providing online EE building design courses

Risks

87. The project will be exposed to a series of legislative, institutional, technical and market risks which are detailed below.

88. **Legislative Risks.** This project is aligned with Government policy and strong Government financial imperatives linked to the need to reduce the cost burden of energy subsidies and to reduce future energy imports. Therefore, high-level ministerial support for the successful implementation of this project has been sought and granted. However, limited motivation of intermediate-level institutions may temper the efficacy of this support. For instance, while Law No.3 on Energy Conservation was issued by the President of Syria in February 2009, it has not been effectively implemented so far. This delay can be attributed to the lack of coordination between institutions and ministries, resulting in delays in issuing the necessary by-laws (decrees) detailing the responsibilities of each involved stakeholder, as well as the need for adaptation to these by-laws by concerned stakeholders. The project will seek to minimize the risk of such lack of coordination by adopting an integrated approach with all stakeholders involved in the new administrative processes required for the successful implementation of the project. Regarding the Law to expand NERC's responsibilities to include energy efficiency, regulatory barriers remain, as the Ministry of Electricity is now required to develop, through NERC, the necessary laws and decrees to mandate EE standards for new construction, and NERC does not have sufficient regulatory experience and technical expertise to draft these decrees. While NERC has indicated its intention of recruiting new legal experts, the project will seek to further minimize this risk by involving high-level national legal expertise that has already been identified during the project preparation phase.

89. **Institutional Risks.** In order to have a measurable impact, this project requires a multi-sectoral, integrated approach to ensure that the EE Building Code and standards are incorporated into the sectoral programmes of each participating ministry. There is always the risk in any administration that a lack of inter-ministerial communication will slow down cooperation among ministries. This risk is mitigated with the creation of a Technical Committee that will institutionalize ongoing policy dialogue between public and private sector stakeholders and provide a forum to harmonize the programmes of participating ministries. At the municipal level, the enforcement capabilities of local institutions that are responsible for regulating construction projects will be a determining factor in the long-term implementation of the Code. As a consequence, significant delay in enforcement is a risk, as is currently evidenced by the delay in implementation of the Thermal Insulation Code and Energy Conservation Law. The project will build on the success of the enforcement of seismic building standards in Syria, where local agencies have been very proactive, and will address the risk of insufficient enforcement capability by providing capacity building assistance to municipal enforcement agencies to help them to understand the EE Code and ensure that its provisions are properly integrated into on-going construction projects. Additionally, concrete incentives to motivate municipal administrations to strengthen their enforcement will be further explored during the project implementation. Turn-over of personnel in the participating institutions is a risk that can undermine the efforts of institutional capacity building. This risk will be addressed through sound knowledge management, including detailed documentation of the results and findings of the project and

by preparing the training and information dissemination materials in a form that can be used for self-learning after the finalization of the project.

90. **Technical Risks.** Successful implementation of this project requires an increase in the technical capacity of the project team, including NERC and other participating entities' staff, and adequate capacity in the private sector. Potentially insufficient technical capacity of the NERC project team, building designers and other stakeholders creates the risk of increased delays and weak implementation in the execution phase of the project. This risk is addressed by project outcomes that will assist NERC and other participating entities in developing the necessary in-house technical skills and by providing training courses to professionals (architects, engineers, contractors, etc.) in partnership with their respective syndicates and unions. Another technical risk is linked to the preparation of the EE standards and the drafting of the EE Code. In the past, some international standards were adopted by the Government without sufficient analysis of their relevance or applicability to the Syrian context. The professionals surveyed for this project were adamant about the importance of developing an EE Code that takes into account the regulatory, economic and cultural particularities of the building sector in Syria. The project will seek to mitigate this risk by providing sufficient capacity building support to NERC and SASMO to ensure that the necessary technical and field studies are conducted before defining the proposed EE standards. Successful completion of the demonstration projects and adequate monitoring and reporting of their results in accordance with their original purpose is obviously critical for the project's technical assistance activities. This risk will be minimized with adequate supervision, training and other technical assistance provided during the site selection, finalisation of the project design and construction (including a need to ensure proper installation of the selected equipment and materials). This work is to be conducted by a team consisting of both local and international experts, thereby facilitating the exchange of information and exposure of the local team to international state of the art approaches and best practices.
91. **Market Risks.** The transaction costs associated with the implementation of a new EE Building Code are likely to deter private sector contractors from implementing the new Code provisions. This risk is addressed by awareness raising, capacity building and the introduction of financial and other market incentives. Consumers might also not see the benefit in, or lack the financial capacity for, purchasing EE buildings at a higher initial cost. This risk will be addressed by awareness raising campaigns detailing the sustained benefits of EE in terms of running costs, as well as by an effort to introduce additional financial incentives and/or mechanisms aimed at facilitating access of consumers to more expensive buildings. A typical risk for different training and capacity building activities is that after the completion of the training there will be no real demand for the services of the trained experts. The integrated approach adopted by the project is expected to mitigate this risk by combining the training with concrete possibilities to apply the new skills in practice through the new responsibilities and work associated with the implementation of the EE Building Code and the adopted verification and enforcement scheme.
92. **Project Management Risks.** In a project of this nature, a committed project manager with adequate outreaching and networking skills is absolutely essential for the success of the

activities. He/she should have an ability: i) to engage the key stakeholders in constructive discussion about the future development needs of the energy efficient building sector in Syria; ii) to guide and supervise the studies done; iii) to present their findings and recommendations in a convincing way to the key policy makers and opinion leaders by taking into account the main macroeconomic and policy drivers for local energy sector development; and iv) to identify areas of future work. The risks relating to selection of project personnel will be mitigated by open tendering and thorough screening of the candidates applying for the posts, as well as by establishing partnerships with recognized international entities or individual experts with proven track records of successfully supporting similar actions in Syria or in other countries.

93. Critical risks and possible mitigation measures are summarized in the following table:

Risk	Risk Rating	Risk Mitigation Measure
Lack of coordination between ministries	S (P = 2 I = 4)	Adoption of an integrated approach (including the establishment of a Technical Committee) involving all stakeholders in the administrative process of developing and elaborating the implementation and enforcement of the new building code.
NERC's lack of legal expertise in the drafting of new laws	M (P = 1 I = 3)	Recruitment of legal experts in the project team, involving identified high-level legal experts in the drafting of regulations.
Adopted EE building code regulations may not be effectively enforced.	H (P = 4 I = 4)	The project will create and staff a national MV&E unit collaborating with an international expert and an Inter-Ministerial Working Group that will (1) define a legal framework for MV&E that will include the creation of an independent body in charge of MV&E and associated regulatory texts for government issuance; (2) define a set of MV&E procedures and support activities and (3) define training programs for inspectors. The project will also define a financing mechanism for the MV&E body.
Private sector not willing to implement EE building codes	S (P = 2 I = 4)	The project will explore a comprehensive set of financial and other market incentives (such as temporary import tax removal, VAT exemptions) and an awareness-raising programme to allow the full participation of the private sector in project implementation.
Consumers not interested in purchasing	S	Awareness-raising campaigns during project implementation by public and private sector partners;

Risk	Risk Rating	Risk Mitigation Measure
EE buildings at a higher initial cost	(P = 2 I = 4)	financial and other incentives facilitating purchase of EE buildings, such as fiscal benefits and soft loans.
Lack of adequate and reliable market data.	S (P = 4 I = 3)	Close cooperation with construction firms, industry associations (e.g. the Engineering Syndicate, the Construction Contractors Association) and the Central Bureau of Statistics. For required additional data, specific surveys and/or other expanded data collection activities to be initiated. Cross-checking the reliability of the data by comparing the results from different sources and approaches (e.g. top-down / bottom-up).
Inadequate and/or non-capacitated human resources to successfully implement the project.	S (P = 3 I = 4)	Open tendering and thorough screening of the candidates applying for the posts as well as establishing partnerships with recognized international entities and/or individual experts with proven track record of successfully supporting similar actions in Syria and in other countries. UNDP procurement procedures applied in a pragmatic and efficient way (within the allowed limits) to meet the project support requirements in a timely fashion and to ensure the highest professional level of the support provided.
Overall Risk Rating	S	

Note: M: moderate; S: substantial; H: high;

P: Probability; I: Impact (on a scale from 1=very low to 5= very high)

Financial Modality

94. The project will follow the modality of national execution and the Executing Agency will be the National Energy Research Centre (NERC).
95. UNDP has been requested by the Government to provide technical and substantive assistance in setting-up the project. UNDP is in a prime position to assist the Government through its ability to build partnerships, coordinate between the various parties involved, obtain knowledge from global sources and experiences, build capacities, and assist with fund raising efforts. Cost sharing funds will be channelled through the UNDP bank account, and funds will be disbursed through the direct payments modality, with the implementing partner (NERC) responsible for keeping records of payments. The project must open a separate bank account in order to receive and disburse any funds transferred from UNDP.

96. Upon the request of the implementing partner through the project manager, UNDP will be responsible for the recruitment and contracting of project staff in coordination with the Project Board and will be responsible for the purchase of non-expendable equipment in accordance with UNDP rules and procedures. In accordance with the decisions and directives of UNDP's Executive Board, the following contribution shall be shared for non-GEF funds:

- 10% cost recovery for the provision of general management support (GMS) by UNDP headquarters and country office.
- Direct cost for Implementation Support Service (ISS) provided by UNDP to the project for these services in accordance with the UNDP cost recovery policy and the latest update of the UNDP Universal Price List.

Cost-Effectiveness: Expected Global, National and Local Benefits

97. While the majority of the targeted GHG benefits of the project will be indirect by their nature, the direct GHG reduction benefits resulting from the implementation and financing of the planned demonstration projects are estimated to be 56.4 kilotonnes of CO_{2eq}. Indirect benefits are estimated to reach 80 Mt CO_{2eq} and associated marginal GHG emissions abatement costs are estimated at approximately US\$ct 4/tCO_{2eq}. For further details see Annex 9.

98. The associated national and local benefits from improved energy efficiency include reduced local pollution from the burning of fossil fuels, strengthened national energy security through reduced dependency on imported fuels as well as direct socioeconomic benefits in terms of reduced energy bill of final end-users, thereby reducing fuel poverty, and direct financial savings in Government subsidies. The complementary national economic benefits include new employment and business opportunities from the increased use of different energy efficient and renewable energy technologies and/or materials, their installation and related after-sale services.

Sustainability

99. The sustainability of the project is based on an effort to ensure that energy efficiency is better understood by investors, professionals and the general public, and efficient designs become standard practice in the service industry. The key is to change building codes to make energy conservation a standard requirement during the design and construction phase of new buildings, to provide strong case studies of the savings for new buildings, and to ensure that stakeholders' self-interests are aligned as fully as possible with energy efficiency. The proposed demonstration projects will provide a solid foundation for transforming the construction sector's perception of energy efficiency. The demonstration projects in the targeted sectors will be documented to highlight the benefits of energy efficient building designs. These case studies will be shared with industry professionals through their trade associations, trade conferences and the media. Once the Government – as the country's principal real estate developer (as a direct or indirect investor) – starts incorporating EE standards in its design requirements, the developers and architects interviewed for this

project have indicated that they expect the private sector to follow the Government's lead as market expectations regarding efficient building designs will evolve.

100. A number of specific activities are proposed under this project that can ensure its sustainability:

- Mechanism supporting the implementation of synergies between the public and private sectors and financial institutions.
- Strong partnership with professional associations such as the Engineering Syndicate and the Contractors Union, ensuring that project information is disseminated via their newsletters and workshops to the professional memberships of these associations.
- National EE events, such as EE conferences, EE architecture contests and trade fairs (sponsored by the Ministry of Electricity, NERC, the Ministry of Housing and Construction, the Ministry of Higher Education, the Ministry of Environment), will send a strong message to the private sector and, through the media, to the general public about the benefits of EE buildings.
- Regular training programmes to industry professionals.
- Voluntary certification for housing projects reaching the highest class of the EE labelling scheme. This will allow real estate developers to market the improved efficiency of their housing units to householders and help to create a demand for EE housing as well as an incentive for building designers to acquire the best EE design capacity and use the best EE materials and equipments.

101. Other factors influencing project sustainability include the quality of the buildings/sites and the technical assistance and capacity building programme to ensure that all engaged stakeholders gain full ownership of the tools and methods to be used. There is a core group of companies in Syria that have some familiarity with the technical, financial and commercial aspects of energy efficiency projects. One of the purposes of this project is to stimulate sufficient demand for EE measures so that: (i) the use of energy efficient processes and technologies in the public sector together with the service industry will become an accepted practice; and (ii) local industry will continue to invest time, material and people into building a strong, local knowledge base.

102. By the end of this GEF project, sustainability of project results will be ensured by:

- Establishing a financially sustainable multidisciplinary Centre of Excellence for sustainable building, carrying out research on materials and construction techniques, and developing and updating the EE Building Code (major revisions to the Code can be expected every five years on average).
- Updating the legal and institutional framework governing energy efficiency.
- Providing training to architects, engineers, developers and municipal enforcement agencies;
- Cooperating with the National Energy Committee that will ensure harmonization of EE policies and activities among key line ministries and that will promote ongoing policy dialogue between public and private stakeholders.
- Incentivising and informing consumers through the EE labelling scheme.

103. It is also important to note that there will not be a need for a similar project in Syria in the future once the identified barriers are removed. A change in regulation and adoption of a new set of rules for the building code of Syria – if done right – should be an irreversible process, unless there is a major policy reversal that could not have been anticipated. The issue of minimizing additional investment costs for thermal efficiency in buildings will be the object of attention throughout the project.

Replicability

104. Given the expressed interest of a number of countries in the region to develop and implement energy efficiency building projects, the outputs, results and lessons learnt in this project are expected to be of direct interest to other countries. Close monitoring and evaluation of the project implementation and results take on added importance in this context. An interesting opportunity of replicating the strategy proposed in this project – that of introducing MEPS and energy labelling associated with thermal needs – has been identified during discussions with the team leader of the EU-funded and Cairo-based regional project for the promotion of energy efficiency in the construction sector in Mediterranean countries (MED-ENEC II²⁸), that started in early 2010. The co-operation opportunities with this project will be further explored during the execution phase of this project. The Arab League will also be invited to participate in project events. Further synergies with RCREEE, a Cairo-based independent regional think tank on energy efficiency and renewable energy, will also be explored during the execution phase of the project.

²⁸ <http://www.med-enec.com>

PROJECT RESULTS FRAMEWORK

This project will contribute to achieving the following Country Programme Outcome as defined in CPAP or CPD: C.1: National capacity strengthened for meeting obligations towards ratified environmental conventions (biodiversity, climate change, and desertification conventions) and national environmental legislation enforced with a particular focus on water policies
Country Programme Outcome Indicators: National progress reports prepared and submitted to the Secretariat of the environmental Conventions
Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one): 1. Mainstreaming environment and energy
Applicable GEF Strategic Objective and Program: CC 1- SP#1: Promoting Energy Efficiency in Residential and Commercial Buildings
Applicable GEF Expected Outcomes: Outcome # 1: Energy-Efficient Buildings
Applicable GEF Outcome Indicators: Quantity of Energy to be saved; quantity of GHG emissions avoided

	Indicator	Baseline	Targets End of Project	Source of verification	Risks and Assumptions
<p>Project Objective²⁹</p> <p>To reduce Syria's energy-related GHG emissions through the development and effective implementation of a performance-based energy efficient building code for new construction in Syria.</p>	Reduction of energy consumption and related GHG emissions in new buildings.	The buildings' energy needs to ensure thermal comfort (20°C during the heating season and 26°C during the cooling season) correspond to a specific final annual energy demand estimated at 144 kWh per m ² for heating, ventilation, air conditioning (HVAC), while after including also the energy consumption for hot water, lighting and other electrical appliances an average annual baseline energy demand can be estimated at 198 kWh per m ² .	<p>For buildings subject to the planned new building code, the annual final energy demand to be under 62 kWh per m² for heating, ventilation and air-conditioning (HVAC).</p> <p>For demo projects, the targeted final annual energy demand for HVAC is expected to correspond with the target set for the buildings subject to the new building code (i.e. 62 kWh per m²), while complementary energy efficiency gains will be sought from hot water preparation, lighting and other electric appliances with a target to stay under 93 kWh/m² for the total final energy consumption of the demo buildings.</p>	<p>Computer simulation using CLIP and dynamic simulation software.</p> <p>NERC's evaluation reports of demonstration projects.</p> <p>Review of the design and / or construction of other buildings started during the project duration (see Outcome 3).</p>	<p>The Government adopts and ensures effective enforcement of a supportive regulatory framework.</p> <p>Compliance of new construction with the adopted new Building Code and standards.</p>

²⁹ Objective (Atlas output) monitored quarterly ERBM and annually in APR/PIR

	Indicator	Baseline	Targets End of Project	Source of verification	Risks and Assumptions
<p>Outcome 1³⁰</p> <p>The knowledge, experience and trust of the key stakeholders on new energy efficient (EE) construction materials and techniques and their energy saving opportunities built.</p>	<p>Availability of objective and trusted information and demonstrated experiences and results on the key characteristics and use of new EE construction materials and techniques.</p>	<p>Lack of verified information, demonstrated results and corresponding experience and trust on the use of new energy efficient materials and construction techniques.</p>	<p>Verified information and demonstrated experiences and results on the key characteristics and use of new EE construction materials and techniques made available and accepted as credible by the key stakeholders.</p>	<p>Project progress reports.</p> <p>Documented feedback received on the findings and results shared (see Output 1.3).</p>	<p>Access to local and international state-of-the-art information on different energy efficient materials and construction techniques (including, as applicable, traditional construction techniques used in Syria).</p> <p>Successfully finalized demonstration projects.</p>
<p>Output 1-1</p> <p>Cost-effective energy saving construction techniques & materials applicable for Syrian conditions identified</p>	<p>A guidebook/ index on energy saving construction techniques and materials.</p> <p>An established centre of excellence undertaking research, testing and information dissemination.</p>	<p>No consolidated and verified information on various energy saving construction techniques and materials available.</p>	<p>A guidebook and index on energy saving construction techniques and materials that are most suitable for Syrian conditions published.</p> <p>A financially sustainable centre of excellence maintaining the research, testing and information dissemination first initiated by the project (including regular updating of the guidebook and index) established.</p>	<p>Project progress reports.</p>	<p>Access to the needed data.</p> <p>The financing arrangements to ensure the sustainability of the operations of the centre of excellence and related testing facilities and activities in place.</p>
<p>Output 1-2</p> <p>Selected techniques and materials tested and demonstrated in actual building sites.</p>	<p>Demonstration projects implemented</p>	<p>Selected techniques and materials not tested and demonstrated.</p>	<p>At least 15 demonstration projects across different governorates to cover all of Syria's climatic zones and a broad spectrum of building-types successfully completed.</p>	<p>Evaluation reports of each demonstration project.</p>	<p>All stakeholder commitments for co-financing and other co-operation to facilitate the construction of the planned demonstration projects stand.</p>
<p>Output 1-3</p> <p>Information on the results of the first demonstration projects shared.</p>	<p>Publications, workshops and seminars to discuss and disseminate the results of the demonstration projects.</p>	<p>Information on the results, experiences and lessons learnt with the first demonstration projects not consolidated and shared.</p>	<p>The results, experiences and lessons learnt with the first demonstration projects documented in evaluation reports of each demo project and in one</p>	<p>Project progress reports.</p>	<p>Finalized procedures for, and systematic monitoring and reporting of, the results, observations and experiences with all demonstration projects</p>

³⁰ All outcomes monitored annually in the APR/PIR. It is highly recommended not to have more than 4 outcomes.

	Indicator	Baseline	Targets End of Project	Source of verification	Risks and Assumptions
			<p>consolidated summary report.</p> <p>At least 4 workshops and 2 seminars to present and discuss the results with related recommendations for the next steps organized.</p> <p>Finalized workshop reports documenting the discussions and recommendations made.</p>		<p>from early design to actual use and covering not only the physical measurements but also experiences, eventual difficulties and solutions encountered during the design and construction (including installation of EE materials and equipment).</p> <p>All contractors are motivated to compile and share the required information.</p> <p>No delay with the implementation of demonstration projects due to financial or regulatory reasons.</p>
<p>Outcome 2</p> <p>New EE building code and a comprehensive legal and regulatory framework (including financial and other incentives) to facilitate its effective implementation and enforcement established</p>	<p>Status of the new energy efficient building code and related complementary regulations to supersede the current thermal code.</p>	<p>Some laws and decrees have been issued, but they are not fully implemented and gaps in coverage remain.</p>	<p>A new performance-based energy efficient building code, minimum energy performance standards (MEPS) and labeling scheme formally adopted by the Government together with related complementary regulations, technical standards and other orders (including possible financial and fiscal incentives) to facilitate effective implementation of the adopted building code, MEPS and labeling scheme.</p>	<p>Official Government announcements and proclamations.</p>	<p>Continuing commitment and co-operation of the key public authorities to support the introduction of the new energy efficient building code, MEPS and labeling scheme and their effective implementation.</p> <p>The eventual discovery of new fossil fuel reserves from Syria and/or decline of international oil and gas prices do not negatively affect the Government's enthusiasm towards energy efficiency.</p>
<p>Output 2.1: An updated market assessment and a continuing market</p>	<p>Adequate data available to effectively monitor market development.</p>	<p>Shortage of information to effectively monitor market development.</p>	<p>A comprehensive market assessment finalized (for further details, see Chapter</p>	<p>Market monitoring mechanism. Project progress</p>	<p>Access to extensive primary and required secondary data.</p>

	Indicator	Baseline	Targets End of Project	Source of verification	Risks and Assumptions
monitoring mechanism in place			<p>III of the project document).</p> <p>An established and financially sustainable market monitoring mechanism to keep track on the sale of different EE materials and the amount, key characteristics and energy performance / EE level of buildings constructed.</p>	monitoring reports.	Support of the required key stakeholders to continue the compilation and sharing of the required market information.
Output 2.2: Updated standards and a labeling scheme for EE building design, materials and installation developed and submitted to Government for issuance, including active and passive solar design and mitigation of the urban heat island phenomenon.	Status of the proposed new standards and labeling scheme.	Only prescriptive Thermal Insulation Code is available.	A new performance-based EE building code with related minimum energy performance standards and labeling scheme drafted and submitted to Government for issuance together with required background documentation.	<p>Updated standards and labeling scheme.</p> <p>Project progress reports.</p>	Continuing commitment and co-operation of the key public authorities to support the development of the new EE building code, MEPS and labeling scheme.
Output 2.3: Application decrees and eventually required complementary technical standards to support the implementation and enforcement of the new EE building code drafted and submitted to Government for issuance	Status of the required application decrees and eventual complementary technical standards.	The required application decrees and eventual complementary technical standards missing, preventing effective implementation of the new EE building code.	A complete set of required application decrees (including possible new financial and/or fiscal incentives) and eventual complementary technical standards drafted and submitted to Government for issuance together with required background documentation.	<p>Application decrees.</p> <p>Project progress reports.</p>	Continuing commitment and co-operation of the key public authorities to support the development of application decrees and eventually technical standards.
Outcome 3 Strengthened institutional capacity to facilitate effective implementation of new EE building code and	<p>Government building (social and public service) programmes adopt EE building code.</p> <p>Private contractors become aware of and adopt EE</p>	<p>Very few buildings have incorporated EE design standards.</p> <p>Government new building programmes do not specify minimum EE performance</p>	The different Government entities and private contractors are following the provisions of the adopted new regulations (and, as applicable,	Survey with relevant public authorities of the design documents of all new building projects proposed or started during the last year(s) of the project.	<p>Government is willing to “lead by example” in adopting EE standards in its own programmes.</p> <p>Strong support from professionals and operators</p>

	Indicator	Baseline	Targets End of Project	Source of verification	Risks and Assumptions
the sustainability of project results.	building code.	standards. Professionals and developers do not understand basic EE principles.	eventual complementary voluntary recommendations) in at least 75% of the new building projects underway at the end of the project.	Survey of municipal enforcement agencies to assess the level of compliance. Random compliance checking of projects underway. Final evaluation.	for EE standards. The availability of the required EE materials can be secured.
Output 3.1: An inter-agency coordination and consultation mechanism to support the development and effective implementation of the new EE building code with related policy and other measures	Progress with the inter-agency coordination and consultation mechanism chaired by NERC, and with the experts' discussion forum.	No inter-agency coordination and consultation mechanism to support the development and effective implementation of the new EE building code with related policy and other measures.	An inter-agency coordination and consultation mechanism to support the development and implementation of the new EE building code with related policy and other measures established and in active use by the end of the first year of the project.	Project progress and monitoring reports. Minutes of the organized meetings of the coordination and consulting group. Information website and telephone hotline operational.	Willingness and continuing commitment of the key authorities from different ministries and other public entities to co-operate in the development and implementation of new EE building sector policies and measures.
Output 3.2: Guidelines, tools and materials for supporting the implementation of the adopted EE building code and its complementary standards and recommendations	Availability of the guidelines and related supporting materials and tools.	No consolidated guidelines and related tools and materials to support the implementation of the adopted EE building code and its complementary standards and recommendations.	Guidelines with other supporting materials such as software, video, website, leaflets etc. to support the implementation of the adopted EE building code and its complementary standards and recommendations made available to all key stakeholders.	Project progress reports.	
Output 3.3: A set of awareness raising and training programmes tailored to the specific needs of the key	EE courses for university and school curricula introduced; audio-visual toolkit for EE practitioners developed.	The only activity started by the Engineers Syndicate is a training series, yet to be rolled out, for engineers on the Thermal Insulation Code.	Mandatory EE courses included in the architecture and mechanical engineering curricula of public and private universities and, at	Project progress reports. Review of the curricula of different educational entities and related ad-hoc visits.	Recognized benefits of, and interest in, integrating building EE courses in their curricula by different educational entities. Availability of trained

	Indicator	Baseline	Targets End of Project	Source of verification	Risks and Assumptions
stakeholders, including Government agencies, building developers other building professionals, code enforcement officials, building managers, architecture / engineering school officials and the general public, implemented.			<p>applicable levels, in schools' curricula.</p> <p>An awareness raising and capacity building programme for public and private sector professionals developed and implemented.</p> <p>A general public awareness raising campaign on EE in buildings developed and channelled through mainstream public media.</p>	Post-training surveys.	trainers and teachers motivated to promote building EE.
<p>Output 3.4:</p> <p>Public & private building stakeholders and financial institutions mobilized.</p>	Availability of attractive financing mechanisms and financial and/or fiscal incentives to promote building EE.	The first initiative in the renewable energy sector was initiated in 2009 to support the installation of SWH systems by facilitating bank loans but it was not very attractive for clients due to technical and social reasons.	Agreed financial and/or fiscal incentives or other supporting financing mechanisms to promote building EE made available.	Project progress and monitoring reports.	Agreement of the key stakeholders to introduce such financial support schemes.

TOTAL BUDGET AND WORKPLAN

Award ID:	00060298	Project ID(s):	00075861
Award Title:	Syria - Energy Efficient Buildings Codes		
Business Unit:	SYR10		
Project Title:	Syria - Energy Efficiency Building Codes		
PIMS no.	4037		
Implementing Partner (Executing Agency)	Ministry of Electricity / National Energy Research Centre		

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)	Total (USD)	Note
OUTCOME 1: The knowledge, experience and trust of the key stakeholders on new construction materials and techniques and their energy saving opportunities built.	MOE 002084	62000	GEF	71200	International Consultants	80 000	100 000	80 000	70 000	330 000	1
				71300	Local Consultants	80 000	80 000	80 000	70 000	310 000	
				72100	Contractual services – companies	120 000	120 000	50 000	0	290 000	2a
				71600	Travel	20 000	20 000	20 000	20 000	80 000	
				72200	Equipment and Furniture	200 000	200 000	0	0	400 000	5
				72300	Materials & Goods	20 000	20 000	20 000	10 000	70 000	
				75700	Training Workshops & Conference	40 000	40 000	40 000	40 000	160 000	4
				72400	Communication & Audio-visual Equip.	10 000	10 000	10 000	10 000	40 000	
				74200	Audio-visual & Print Prod. Costs	20 000	20 000	20 000	20 000	80 000	3
				74500	Miscellaneous	10 000	10 000	10 000	10 000	40 000	
		Sub-Total GEF			600 000	620 000	330 000	250 000	1 800 000		
	30071	MOE/NERC	71200	International Consultants	20 000	20 000	10 000	15 000	65 000	1	
			71300	Local Consultants	20 000	20 000	20 000	20 000	80 000		
			72100	Contractual services – companies	1 620 000	1 636 000	1 520 000	1 380 000	6 156 000	2a	
			71600	Travel	10 000	9 000	9 000	10 000	38 000		
			72200	Equipment and Furniture	190 000	10 000	9 000	0	209 000	5	
			72300	Materials & Goods	28 000	16 000	9 000	0	53 000		
			75700	Training Workshops & Conference	23 000	18 000	17 000	20 000	78 000	4	
			74200	Audio-visual & Print Prod. Costs	9 000	11 619	11 810	9 000	41 429	3	
74500			Miscellaneous	8 571	7 000	8 000	7 905	31 476			
			Sub	1 928 571	1 747 619	1 613 810	1 461 905	6 751 905			
	Facilities & Administration	96 429	87 381	91 190	73 095	348 095					
	Sub-Total NERC			2 025 000	1 835 000	1 705 000	1 535 000	7 100 000			
	TOTAL OUTCOME 1			2 625 000	2 455 000	2 035 000	1 785 000	8 900 000			
OUTCOME 2: New EE building codes as well as a comprehensive legal and regulatory framework (incl.	MOE 002084	62000	GEF	71200	International Consultants	50 000	50 000	50 000	37 250	187 250	1
				71300	Local Consultants	46 250	60 000	57 000	52 000	215 250	
				72100	Contractual services – companies	25 000	25 000			50 000	6
				72800	Information Technology Equip.	20 000	25 000	0	0	45 000	
				75700	Training Workshops & Conference	30 000	20 000	30 000	16 500	96 500	4
				74200	Audio-visual & Print Prod. Costs	5 000	5 000	5 000	5 000	20 000	3
				71600	Travel	5 000	10 000	4 000		19 000	

financial and other incentives) to facilitate their effective implementation and enforcement established

				72500	Office Supplies	17 000	10 000	5 000	5 000	37 000	
				74500	Miscellaneous	5 000	5 000	5 000	5 000	20 000	
					Sub-Total GEF	203 250	210 000	156 000	120 750	690 000	
		30071	MOE/NERC	71200	International Consultants	10 000	15 000	15 000	10 000	50 000	
				71300	Local Consultants	10 000	20 000	20 000	10 000	60 000	
				72100	Contractual services – companies	0	20 000	0	0	20 000	
				71400	Contractual services – individual	13 000	13 000	0	0	26 000	
				72800	Information Technology Equip.	20 000	36 000	0	0	56 000	
				75700	Training Workshops & Conference	9 000	27 000	18 000	14 000	68 000	4
				74200	Audio-visual & Print Prod. Costs	9 000	7 000	9 000	0	25 000	3
				74100	Professional Services	3 000	3 000	3 000	3 000	12 000	
				71600	Travel	4 000	5 000	9 000	9 000	27 000	
				72500	Office Supplies	4 000	5 000	5 000	5 000	19 000	
				74500	Miscellaneous	4 667	4 238	4 810	4 238	17 953	
					Sub	86 667	155 238	83 810	55 238	380 953	
					Facilities & Administration	4 333	7 762	4 190	2 762	19 047	
					Sub-Total NERC	91 000	163 000	88 000	58 000	400 000	
		04000	UNDP	71300	Local Consultants	31 000	31 000	31 000	30 750	123 750	
					TOTAL OUTCOME 2	325 250	404 000	275 000	209 500	1 213 750	
OUTCOME 3: Capacities of key public and private agents enhanced	MOE 002084	62000	GEF	71200	International Consultants	30 000	58 000	58 000	58 000	204 000	1
				71300	Local Consultants	20 000	34 000	25 000	35 000	114 000	
				71400	Contractual services – individual	15 000	15 000	15 000	15 000	60 000	
				75700	Training Workshops & Conference	30 000	30 000	30 000	30 000	120 000	4
				72800	Information Technology Equip.	10 000	30 000	20 000	0	60 000	
				74200	Audio-visual & Print Prod. Costs	10 000	15 000	15 000	10 000	50 000	3
				71600	Travel	20 000	20 000	15 000	15 000	70 000	
				72400	Comm. & Audio-visual Equip.	10 000	10 000	10 000	10 000	40 000	
				72500	Office Supplies	10 000	8 000	5 000	5 000	28 000	
				74500	Miscellaneous	8 000	6 000	5 000	5 000	24 000	
					Sub-Total GEF	163 000	226 000	198 000	183 000	770 000	
		30071	MOE/NERC	71200	International Consultants	20 000	30 000	30 000	30 000	110 000	1
				71300	Local Consultants	5 000	20 000	30 000	0	55 000	
				71400	Contractual services – individual	13 000	13 000	13 000	13 000	52 000	
				75700	Training Workshops & Conference	8 000	18 000	28 000	18 000	72 000	4
				71600	Travel	5 000	9 000	9 000	8 000	31 000	
				72400	Comm. & Audio-visual Equip.	5 000	9 000	8 000	5 000	27 000	3
				72500	Office Supplies	4 000	4 000	4 000	3 000	15 000	
				74500	Miscellaneous	4 762	4 619	4 667	4 905	18 953	
					Sub	64 762	107 619	126 667	81 905	380 953	
					Facilities & Administration	3 238	5 381	6 333	4 095	19 047	
					Sub-Total NERC	68 000	113 000	133 000	86 000	400 000	
					TOTAL OUTCOME 3	231 000	339 000	331 000	269 000	1 170 000	
PROJECT MANAGEMENT	MOE 002084	62000	GEF	71400	Contractual services – individual	36 400	36 400	36 400	36 400	145 600	2b
				71600	Travel	3 100	6 100	5 100	5 100	19 400	
				72500	Office Supplies	3 000	3 000	4 000	5 000	15 000	

			74500	Miscellaneous	5 000	5 000	5 000	5 000	20 000	
				Sub-Total GEF	47 500	50 500	50 500	51 500	200 000	
	30071	MOE/ NERC	71400	Contractual services – individual	13 000	13 000	13 000	13 000	52 000	2b
			71600	Travel	4 000	5 000	5 000	4 000	18 000	
			72500	Office Supplies	4 000	4 500	4 500	0	13 000	
			74500	Miscellaneous	2 810	3 214	3 214	3 000	12 238	
				Sub	23 810	25 714	25 714	20 000	95 238	
				Facilities & Administration	1 190	1 286	1 286	1 000	4 762	
				Sub-Total NERC	25 000	27 000	27 000	21 000	100 000	
				TOTAL OUTCOME 4	72 500	77 500	77 500	72 500	300 000	
				Total GEF	1 013 750	1 106 500	734 500	605 250	3 460 000	
				Total MOE/NERC	2 209 000	2 138 000	1 953 000	1 700 000	8 000 000	
				Total UNDP	31 000	31 000	31 000	30 750	123 750	
				Total Project	3 253 750	3 275 500	2 718 500	2 336 000	11 583 750	

Budget notes:

Number	Note
1	Including the mission (travel) costs
2a	Consisting of additional EE materials, equipment and services to be procured for demonstration projects from both international and national companies and/or institutions
2b	Consisting of national and international expert services to facilitate project management duties and project execution
3	Including awareness raising and training materials
4	Including also the costs of training workshops and stakeholder consultations meetings
5	Monitoring and testing equipment
6	Consultancy report on financing options for EE (tax, tariffs) and financing scheme of the MV&E body

Summary of Funds: ³¹

Summary of all Funds, by source:

Source	Cash (US\$)	In kind (US\$)	Total (US\$)
GEF	3 460 000		3 460 000
Min. of Electricity / NERC	8 000 000		8 000 000
UNDP	123 750		123 750
Subtotal managed by UNDP	11 583 750		11 583 750
Min. of Electricity / NERC		3 500 000	3 500 000
Min. of Electricity (*)	3 260 870		3 260 870
Min. of Local Administration (*)	1 631 076		1 631 076
Min. of Health (*)	21 260 869		21 260 869
Min. of Housing & Construction (*)	597 825		597 825
Min. of Social Affairs & Labour (*)	5 475 181		5 475 181
Min. of Culture (*)	652 173		652 173
Min. of Education (*)	1 043 478		1 043 478
Subtotal managed by Government	33 921 472	3 500 000	37 421 472
Total	45 505 222	3 500 000	49 005 222

(*) entity financing the baseline costs of one or more demonstration projects.

³¹ Summary table should include all financing of all kinds: GEF financing, cofinancing, cash, in-kind, etc...

Outcome	Output	GEF (US\$)	Co-financing				Total co-fin. (US\$)	Total (US\$)
			Managed by UNDP		Managed by Government			
			NERC (cash) (US\$)	UNDP (cash) (US\$)	NERC (in kind) (US\$)	Government (cash) (US\$)		
1. The knowledge, experience and trust of the key stakeholders on new energy efficient (EE) construction materials and techniques and their energy saving opportunities built.	1.1. Cost-effective energy saving construction techniques & materials applicable for Syrian conditions identified.	100 000	100 000		200 000		300 000	400 000
	1.2. Selected techniques and materials tested and demonstrated in actual building sites.	1 500 000	6 800 000		2 100 000	33 921 472 ³²	42 821 472	44 321 472
	1.3. The information on results of the first demo projects shared.	200 000	200 000		200 000		400 000	600 000
	TOTAL OUTCOME 1	1 800 000	7 100 000		2 500 000	33 921 472	43 521 472	45 321 472
2. New EE building code and a comprehensive legal and regulatory framework (including financial and other incentives) to facilitate their effective implementation and enforcement established.	2.1 An updated market assessment and a continuing market monitoring mechanisms in place.	100 000	100 000		50 000		150 000	250 000
	2.2 Updated standards for EE building design, materials and installation developed and submitted to Government for issuance including active and passive solar design and mitigation of the urban heat island phenomenon.	400 000	200 000		300 000		300 000	700 000
	2.3 Application decrees and eventually required complementary technical standards to support the implementation and enforcement of the new EE building code drafted and submitted to Government for issuance	190 000	100 000	123 750	50 000		273 750	463 750
	TOTAL OUTCOME 2	690 000	400 000	123 750	200 000		723 750	1 413 750
3. Strengthened institutional capacity to facilitate effective implementation of new EE building code and the sustainability of project results.	3.1 An inter-ministerial coordination and consultation mechanism to support the development and effective implementation of the new EE building code with related policy and other measures.	100 000	50 000		50 000		100 000	200 000
	3.2 Guidelines, tools and materials for supporting the implementation of the adopted EE building code and its complementary standards and recommendations.	160 000	50 000		50 000		100 000	260 000
	3.3 A set of awareness raising and training programs tailored to the specific needs of the key stakeholders, incl. governmental agencies, building developers other building professionals, code enforcement officials, building managers, architecture/engineering school officials, and the general public implemented.	350 000	200 000		200 000		400 000	750 000
	3.4 Public & private building stakeholders and financial institutions mobilized to support the projects and programs of EE in buildings.	160 000	100 000		200 000		300 000	460 000
	TOTAL OUTCOME 3	770 000	400 000		500 000		900 000	1 670 000
4. Project management.	4.1 Overall project management and coordination.	200 000	100 000		300 000		400 000	600 000
	TOTAL OUTCOME 4	200 000	100 000		300 000		400 000	600 000
Total project costs		3 460 000	8 000 000	123 750	3 500 000	33 921 472	45 545 222	49 005 222

³² Confirmed co-financing for 10 demonstration projects, out of 15 selected projects. Co-financing for the remaining 5 projects is highly likely to materialise; however, for the purposes of conservativeness, only the funding for the 10 demonstration projects is presented here and in the GEF CEO Endorsement Request (cf. Annex 6).

MANAGEMENT ARRANGEMENTS

The project will be nationally executed (NEX) by the National Energy Research Centre (NERC), later referred to as the implementing partner, under the guidance of the Ministry of Electricity. The NERC will be responsible for the overall implementation of the project and for ensuring that the day-to-day activities are implemented in accordance with the work plan. It will also be responsible for supervising project staff and consultants, in coordination with UNDP.

The responsible Government entity will assign a senior officer as the Project Coordinator. The National Project Coordinator is the focal point of the Government vis-à-vis the project, and will have the following responsibilities: (i) ensuring coordination of all project activities between all parties (related ministries and other Government entities, UNDP and others); (ii) following up on all activities and transferring the opinion of the Government to the project during implementation; (iii) participating in periodic project meetings as well as TPR and Board meetings; (iv) assuring homogeneity at all levels (technical/ functional) and ensuring the quality assurance of process; (v) participating in preparing project progress and quarterly reports, biannual and final reports; (vi) participating in the selection panels for national and international consultants, and in the procurement and evaluation panels for tender; (vii) providing information at the technical level and on administrative issues (rules and regulations of the Government) to enhance the link between the project and the Government; (viii) facilitating the job of the National Project Manager (NPM) and staff in implementing project activities; (ix) ensuring smooth continued support from Government staff and NERC; and (x) reporting of any problems or obstacles to the head of the executing agency and developing relevant solutions.

A Project Board (PB) will be established to monitor the project's progress towards results. The PB will function as an oversight body to ensure that activities are on track and results are achieved in accordance with the project work plan. The PB must: i) approve annual work plans and quarterly plans and any variations that alter the project outputs or overall budget figure including approval of resources (financial and human) needed for quarter period; ii) facilitate the work of the NPM vis-a-vis other agencies; iii) agree on any necessary steps needed for better project implementation; iv) review financial audit reports; v) review quarterly progress reports; vi) ensure that Government funds are made available when needed by taking proactive steps and prerequisites for release of funds; vii) ensure that there is a clear and unambiguous decision-making process with the relevant governmental bodies for project implementation so that project activities are implemented well; viii) review APR reports; ix) attend Annual Review meetings; and x) make policy recommendations to improve project implementation and provide advice to project staff.

The PB will consist of representatives from the MOE, NERC, SPC and UNDP. Other stakeholders, such as representatives of other line ministries, governorates or active donors, may participate in the work of the PB upon request and invitation. The PB members will meet at least once per year. As a need may emerge, UNDP or the implementing agency can call for an ad hoc meeting. The NPM will act as a secretariat for the PB, being responsible for convening the meetings, preparing the agenda, overseeing preparation of materials for presentation to the meeting and for preparing and distributing minutes of the meetings.

The day-to-day management of the project will be carried out by a Project Management Unit (PMU) under the overall guidance of the PB. The PMU will be based in the NERC and will report to the implementing partner and the PB. The PMU will be composed of the national Project Manager (NPM) and a project assistant/financial officer (TORs presented in Annex 3). The NPM will be selected jointly by the implementing agency and UNDP, in consultation with the UNDP-GEF Regional Co-ordination Unit in Bratislava.

The NPM will be supported by international and national experts who will take the lead in the implementation of specific technical assistance components of the project. Contacts with experts and institutions in other countries that have already gained more experience in implementing EE programmes are also to be established.

The UNDP National Execution modality will be employed, with the support of the UNDP Country Office. In addition to technical backstopping and monitoring activities provided regularly, the UNDP Country Office shall provide the Implementing Partner with support services for the implementation of the Project. This will ensure that technical and substantive expertise is available to the Project for coordination, recruitment, procurement and contracting. All implementation arrangements will be undertaken according to UNDP rules and regulations.

Services shall be provided in accordance with UNDP procedures, rules and regulations. The implementing agency shall retain overall responsibility for the execution of the project and shall be responsible for, and bound by, any contracts signed by the UNDP Resident Representative, on behalf of the implementing partner and upon its request, for the procurement of goods and services and/or recruitment of personnel for the programme.

UNDP Syria will maintain oversight of, and will manage, the overall project budget. It will be responsible for monitoring project implementation, timely reporting of the progress to the UNDP Regional Co-ordination Unit and GEF as well as organizing mandatory and non-mandatory evaluations. It will also support the implementing agency in the procurement of the required expert services and other project inputs and administer the required contracts. Furthermore, it will support the co-ordination and networking with other related initiatives and institutions in the country. UNDP will assign a senior programme officer as the main UNDP focal point in charge of the project, who will undertake regular monitoring of the project implementation towards achievement of results, including escalating any issues to be discussed by the PB. The Programme Officer in charge will be in close coordination with the NPM reporting the progress and outcomes to the CO management, UNDP-GEF regional office, headquarters and other development partners.

Planning and management of implementation will be governed through approved annual work plans, with schedules defined either monthly or quarterly. The approved annual work plan, once endorsed by the PB or NERC and UNDP, will be the instrument of authorization to the Project Team to implement the planned activities. The realisation of the stated co-financing commitments will be observed in this respect as well.

The Project Team will be subjected to monthly, quarterly and annual reporting and review requirements. These reviews will reassess, if appropriate, the work plans. These reviews are

intended to create the necessary conditions for effective and efficient execution as well as implementation.

Payments will be done directly through UNDP based on a request by the project management; however, financial advances to cover petty cash will be transferred to the project on a quarterly basis upon request, in accordance with UNDP NEX procedures. The purchase of non-expendable equipment and services will be done according to UNDP rules and regulations. An Implementation Support Service (ISS) fee will be charged to the project according to the nature of services offered as requested by NPM. The request should be based on a procurement plan submitted along with the work plan. These fees will be charged based on the latest update of the UNDP Universal Price List.

The NERC will coordinate with relevant ministries, provincial departments, other governmental sectors and line agencies. However, other key Ministries and departments may play significant roles upon request by NERC.

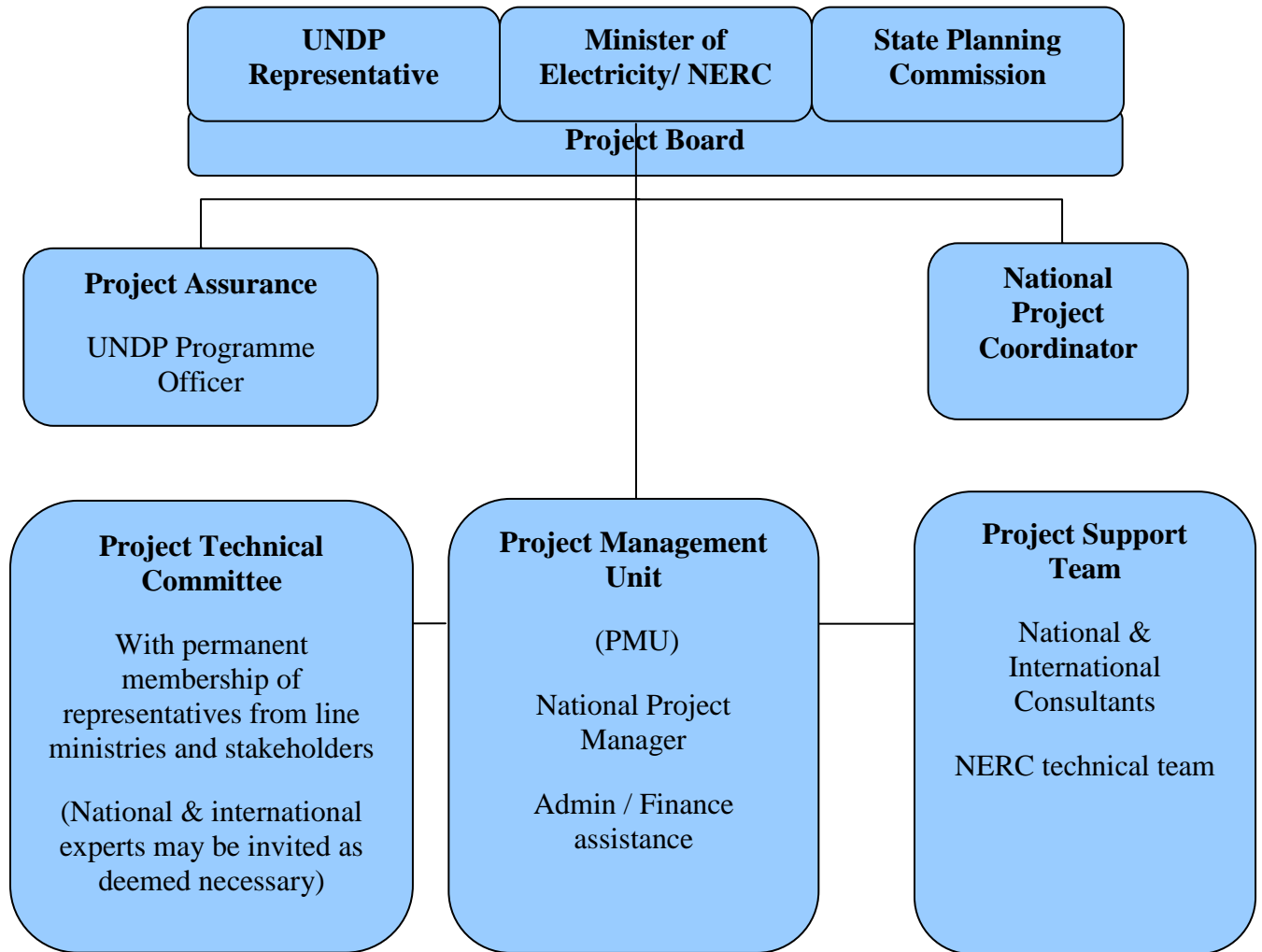
To facilitate co-ordination, participation, involvement of all stakeholders and sustainability of the results of the project, the MOE/NERC will establish a Project Technical Committee (PTC) composed of senior members from the line ministries, governorates, Engineering Syndicate, SASMO, academic and research centres, PMU and UNDP. The PTC will provide general technical guidance and support to the project, as well as promoting public participation and awareness raising through workshops, TV, web sites, electronic networks and otherwise. Furthermore, the members of the PTC will act as a focal point for their respective entities and are responsible for facilitating and ensuring effective involvement of their respective entities in the project activities. As deemed necessary, the head of the Committee can invite any other relevant members or request a support of national and/or international expertise.

The Government of Syria will provide cash and in-kind support to ensure its commitment for the success of the project. The cash and in-kind support will be provided as per the allocations outlined in the project budget. The Government in-kind contribution will also cover the costs of PMU office space, office equipment and supplies, time of the staff of different Government entities and other members of the PB, facilities for meetings and consultations, political support.

In order to accord proper acknowledgement to GEF for providing funding, a GEF logo will appear on all relevant GEF project publications, including among others, project hardware and vehicles purchased with GEF funds.

Audit Clause: The Audit will be conducted in accordance with UNDP Financial Regulations and Rules and applicable audit policies on UNDP projects.

Project Organization Chart



MONITORING FRAMEWORK AND EVALUATION

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

Project start:

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

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

- Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RCU staff vis à vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.
- Based on the project results framework and the relevant GEF Tracking Tool if appropriate, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and re-check assumptions and risks.
- Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
- Discuss financial reporting procedures and obligations, and arrangements for annual audit.
- Plan and schedule Project Board meetings. Roles and responsibilities of all project organisation structures should be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.

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

Quarterly:

- Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Note that for UNDP GEF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes, or capitalization of ESCOs are automatically

classified as critical on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical).

- Based on the information recorded in ATLAS, a Project Progress Reports (PPR) can be generated in the Executive Snapshot.
- Other ATLAS logs can be used to monitor issues, lessons learned etc... The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

Annually:

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

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

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

Periodic Monitoring through site visits:

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

Mid-term of project cycle:

The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation (2012). The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after

consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Center (ERC). The relevant GEF Focal Area Tracking Tools will also be completed during the mid-term evaluation cycle.

End of Project:

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

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

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

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

Learning and knowledge sharing:

Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums.

The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects.

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

M& E workplan and budget

Type of M&E activity	Responsible Parties	Budget US\$ <i>Excluding project team staff time</i>	Time frame
Inception Workshop and Report	<ul style="list-style-type: none"> ▪ Project Manager ▪ UNDP CO, UNDP GEF 	Indicative cost: 10,000	Within first two months of project start up
Measurement of Means of Verification of project results (including monitoring and evaluation of the energy performance of the pilot projects)	<ul style="list-style-type: none"> ▪ UNDP GEF RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members. 	Indicative cost: 30,000. To be finalized in Inception Phase and Workshop.	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on <i>output and implementation</i>	<ul style="list-style-type: none"> ▪ Oversight by Project Manager ▪ Project team 	Indicative cost: 15,000 per year for four years. To be determined as part of the Annual Work Plan's preparation.	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	<ul style="list-style-type: none"> ▪ Project manager and team ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG 	None	Annually
Periodic status/ progress reports	<ul style="list-style-type: none"> ▪ Project manager and team 	None	Quarterly
Mid-term Evaluation	<ul style="list-style-type: none"> ▪ Project manager and team ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team) 	Indicative cost: 35,000	At the mid-point of project implementation.
Final Evaluation	<ul style="list-style-type: none"> ▪ Project manager and team, ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team) 	Indicative cost: 35,000	At least three months before the end of project implementation
Project Terminal Report	<ul style="list-style-type: none"> ▪ Project manager and team ▪ UNDP CO ▪ local consultant 	0	At least three months before the end of the project
Audit	<ul style="list-style-type: none"> ▪ UNDP CO ▪ Project manager and team 	Indicative cost: 4,000	Yearly
Visits to field sites	<ul style="list-style-type: none"> ▪ UNDP CO ▪ UNDP RCU (as appropriate) ▪ Government representatives 	For GEF supported projects, paid from IA fees and operational budget	Yearly
TOTAL indicative COST		US\$ 174,000	
Excluding project team staff time and UNDP staff and travel expenses		(+/- 5% of total budget)	

LEGAL CONTEXT

This document, together with the CPAP signed by the Government and UNDP which is incorporated by reference, constitute together a Project Document as referred to in the Article I of the Standard Basic Assistance Agreement (SBAA) between the Government of Syrian Arab Republic and the United Nations Development Programme, signed by the parties on 12 March 1981 and all CPAP provisions apply to this document.

The following types of revision may be made to this Project Document with the signature of the UNDP Resident Representative only, provided that he 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; and 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.

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

The implementing partner shall:

- put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
- assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

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

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

ANNEXES

1. Risk Analysis
2. Agreements
3. TORs
4. Capacity Assessment
5. Signed CPAP
6. List of 15 pre-selected demonstration projects
7. Stakeholder Involvement Plan
8. List of stakeholders consulted during the preparatory phase
9. Greenhouse Gas Emissions Reduction Analysis
10. Presentation of the CLIP software package

Annex 1 - Risk Analysis.

OFFLINE RISK LOG

#	Description	Date identified	Type	Impact & Probability	Countermeasures / Management Response	Owner	Last Update	Status
1	Lack of coordination between ministries in implementing the project activities.		Political & Organizational	Targets for project activities requiring institutional co-operational and cross-sectoral ownership not met. P = 2 I = 4	Fostering co-operation by early engagement of the key stakeholders and adoption of an integrated approach (including the establishment of a Technical Committee) involving all stakeholders in the administrative process of developing and elaborating the implementation and enforcement of the new building code.	Project Board; Project Technical Committee	N/A	N/A
2	NERC's lack of legal expertise in the drafting of new laws.		Organizational	Building Code is flawed in design, difficult to interpret and operationalise and fails to attract stakeholder understanding or support. P = 1 I = 3	Recruitment of legal experts in the project team, involving identified high-level legal experts in the drafting of regulations.	National Project Manager in cooperation with the Project Technical Committee	N/A	N/A
3	Adopted EE building code regulations may not be effectively enforced.		Political & Organizational	Lower compliance and therefore lower impact of the adopted EE building code. P = 4 I = 4	The project will create and staff a national MV&E unit collaborating with an international expert and an Inter-Ministerial Working Group that will (1) define a legal framework for MV&E that will include the creation of an independent body in charge of MV&E and associated regulatory texts for Government issuance; (2) define a set of MV&E procedures and support activities and (3) define training programs for inspectors. The project will also define a financing mechanism for the MV&E body.	Project Board National Project Manager in cooperation with the Engineering Syndicate and the Construction Contractors Association	N/A	N/A
4	Private sector not willing to implement EE		Strategic	Low level of compliance and	The project will explore a comprehensive set of financial and other market incentives (such as temporary import tax removal, VAT exemptions)	National Project Manager in	N/A	N/A

	building codes.			implementation P = 2 I = 4	and an awareness-raising programme to allow the full participation of the private sector in project implementation.	cooperation with the Construction Contractors Association		
5	Consumers not interested in purchasing EE buildings at a higher initial cost.		Strategic	Low level of demand for EE buildings, leading to reduced supply-side incentives P = 2 I = 4	Awareness-raising campaigns during project implementation by public and private sector partners; financial and other incentives facilitating purchase of EE buildings, such as fiscal benefits and soft loans.	National Project Manager	N/A	N/A
6	Lack of adequate and reliable market data.		Organizational	Inadequate information for monitoring project impact and for planning new policy measures P = 4 I = 3	Close cooperation with the construction firms, industry associations (e.g. the Engineering Syndicate, the Construction Contractors Association) and the Central Bureau of Statistics. For required additional data, specific surveys and/or other expanded data collection activities to be initiated. Cross-checking the reliability of the data by comparing the results from different sources and approaches (e.g. top-down / bottom-up).	National Project Manager in cooperation with the Project Technical Committee	N/A	N/A
7	Inadequate and/or non-capacitated human resources to successfully implement the project.		Operational	Project not meeting the stated targets. P = 3 I = 4	Open tendering and thorough screening of the candidates applying for the posts as well as establishing partnerships with recognized international entities and/or individual experts with proven track record of successfully supporting similar actions in Syria and in other countries. UNDP procurement procedures applied in a pragmatic and efficient way (within the allowed limits) to meet the project support requirements in a timely fashion and to ensure the highest professional level of the support provided.	UNDP	N/A	N/A

Annex 2 - Agreements.

The co-financing letters are included as separate annexes.

Annex 3 - Terms of Reference for Key Project Personnel

Terms of Reference - National Project Manager

Duration: 1 year, subject to extension.

Objective: The National Project Manager (NPM) will work in close cooperation with UNDP (the executing agency) and the Ministry of Electricity / National Energy Efficiency Centre (the implementing agency), and will be responsible for delivery of the project outputs as per the Project Document and in accordance with UNDP rules and regulations.

Responsibilities:

- Assume overall responsibility for the successful execution and implementation of the project towards achieving the outputs as per the Project Document.
- Represent the project at Project Board Meetings and Tripartite Reviews.
- Ensure the adherence of project activities to the approved project work plan.
- Ensure the proper use of project resources.
- Ensure that UNDP rules and regulations for nationally executed projects are implemented in all project activities, including procurement and recruitment.
- Represent the national executing agency at project and annual reviews.
- Support resource mobilization efforts to increase resources in cases where additional outputs are required;

The NPM will be assisted by administrative staff and technical staff at the NERC in fulfilling the following responsibilities:

Management:

- Supervise the work of the Technical Manager and administrative staff, project work teams, consultants and sub-contractors.
- Manage the project's financial resources to achieve the completion of project outputs.
- Manage the project's material resources, ensuring that vehicles, office equipment, furniture, etc. are properly maintained and used correctly for implementation of project activities. Ensure that the required work plan is prepared and updated in consultation and agreement with UNDP and distributed to the Government.
- Initiate and administer the mobilization of project inputs under the responsibility of the executing Agency.
- Support to media/communications work of the project.
- Ensure that UNDP is invited to all stakeholder meetings.

Technical:

- Identify and locate, in consultation with UNDP, the services needed to move the project along, and
- Prepare terms of reference and contracts according to UNDP authorized procedures.

- Arrange, in consultation with UNDP, the recruitment of project professional and support staff in line with approved recruitment processes.
- Prepare annual and detailed quarterly work plans.
- Obtain approval from UNDP on annual and quarterly work plans during their preparation and present the final work plans to the Project Board for approval.
- Prepare papers for the Project Board.
- Prepare funding proposals if required.
- Draft technical and other documents as required.
- Share with UNDP draft documents and outputs for comments, as well as final products.
- Develop mechanisms for updating stakeholders on progress of the project.
- Participate in all project meetings and annual reviews.

Facilitation:

- Ensure that GEF-UNDP's name is mentioned in all publications, workshops and project activities.
- Serve as the focal point of the project for coordination of the project activities with UNDP, NERC and other ministries and local authorities and other partners on behalf of the project.
- Liaise with the UNDP Programme Officer on a daily/weekly basis to ensure proper monitoring and realization of results.
- Liaise with UNDP staff to organize the annual review, evaluation missions and project visits.
- Liaise with various stakeholders (academic, media, Government, donors, etc).
- Lead efforts to build partnerships for the support of outcomes indicated in the project document.
- Support resource mobilization efforts to increase resources in cases where additional outputs and outcomes are required.

Financial:

- Act on behalf of the Implementing Agency in preparing and adjusting commitments and expenditures.
- Act as the sole authorizing officer for all project financial transactions (i.e. approve all financial expenditures and sign all direct payments.)
- Authorize commitments of resources and expenditures for inputs including staff, consultants, goods and services and training.
- Bear responsibility for delivery of the project's services and achieving annual financial delivery targets.
- Manage the project resources, e.g. vehicles, office equipment, furniture and stationery, procured under the project and maintain an asset register.
- Ensure that appropriate accounting records are kept and organized; facilitate and cooperate with audit requirements at all times, as required.

Reporting:

- Progress towards achieving outputs:

- Quarterly reports of progress on project activities for each of the activities listed for that quarter in the annual and quarterly workplans. Annual project reports (APRs/PIR).
- A Terminal Report at the end of the project, in the approved UNDP format.
- Technical, policy and briefing papers as requested by UNDP and the implementing agency.
- Any reports requested by UNDP for the TPR meeting (Tripartite Review). financial reporting:
 - Quarterly financial reports, in the approved UNDP format.
 - Annual financial reports, in the approved UNDP format.
 - Final financial report at the end of the project, in the approved UNDP format.

Reporting Line:

Contractually to the UNDP Resident Representative, and technically to both UNDP and the Implementing Partner.

Evaluation:

The renewal of contract will be based on satisfactory mid-term and final performance evaluation by UNDP and the implementing agency.

Duration of Contract: Annual contract, subject to confirmation after three months.

Qualifications:

- Advanced university degree and at least 10 years of professional experience in energy and/or energy efficiency, including extensive knowledge of the international context, state of the art approaches and best practices in energy efficiency in buildings and their sustainable promotion (by applying different policy measures, new financing mechanisms, etc.).
- Experience in managing projects of similar complexity and nature, including demonstrated capacity to actively explore new, innovative implementation and financing mechanisms to achieve the project objective.
- Demonstrated experience and success in the engagement of, and working with, the private sector and NGOs, creating partnerships and leveraging financing for activities of common interest.
- Strong analytical and problem-solving skills and experience with 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 how 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 competences in handling the project's external relations at all levels.
- Good knowledge and fluency of English and Arabic languages.

- Strong Information Technology skills and experience with using Microsoft Office is essential; experience with CLIP and other specialized energy efficiency / construction / architectural software is considered to be an asset.
- Familiarity and prior experience with UNDP and GEF requirements and procedures are considered to be an asset.

Salary:

The salary will be based on UNDP salary scales.

Terms of Reference - National Project Coordinator

Objective:

The Government national project coordinator is the focal point of the implementing partner vis-a-vis the project. He/ She will facilitate the implementation aspects of project activities.

Duties:

The coordinator will act on behalf of NERC and will have the following responsibilities:

- Ensures coordination of project activities between all parties (related ministry, UNDP and others).
- Follows up on all activities and transfers the opinion of the implementing agency to the project during implementation.
- Participates in the periodic project meetings as well as TPR and Project Board Meetings.
- Assures homogeneity at all levels (technical/ functional) and related matters and ensures quality assurance.
- Participates in preparing project progress and quarterly reports, biannual, and final reports.
- Provides information on technical issues and administrative issues (e.g. rules and regulations of NERC) to enhance the link between the project and the implementing agency.
- Facilitates the job of the National Project Manager (NPM) and staff in implementing project activities.
- Ensures smooth continued support from the staff of the ministry.
- Reports any problems obstacles to the head of the implementing agency and obtains relevant solutions.

Terms of Reference - Project Board

The Project Board is the group responsible for making – by consensus – management decisions for the project when guidance is required by the NPM, including recommendation for UNDP/Implementing Partner approval of project plans and revisions. In order to ensure UNDP's ultimate accountability, Project Board decisions should be made in accordance with standards that ensure management for development results, best value for money, fairness, integrity, transparency and effective international competition. In case a consensus cannot be reached within the Board, final decision shall rest with the UNDP Programme Manager. In addition, the Project Board plays a critical role in UNDP-commissioned project evaluations by quality assuring the evaluation process and products, and using evaluations for performance improvement, accountability and learning.

Project reviews by this group are made at designated decision points during the running of the project, or as necessary when raised by the NPM. This group is consulted by the NPM for decisions when NPM's tolerances (normally in terms of time and budget) have been exceeded (flexibility). Based on the approved annual work plan (AWP), the Project Board may review and approve project quarterly plans when required and authorizes any major deviation from these agreed quarterly plans. It is the authority that signs off the completion of each quarterly plan as well as authorizes the start of the next quarterly plan. It ensures that required resources are committed and arbitrates on any conflicts within the project or negotiates a solution to any problems between the projects and external bodies. In addition, it approves the appointment and responsibilities of the NPM and any delegation of its Project Assurance responsibilities.

Project Board Members:

- Implementing Partner: Ministry of Electricity
- UNDP RR or Deputy Resident Representative
- Head or Deputy Head of State Planning Commission
- Head of NERC

Ex-Officio:

- The Project Team
- The National Project Coordinator
- UNDP Programme Officer

Terms of Reference:

- Agrees on annual work plan and approve quarterly work plan, including approval of resources (financial and human) needed for quarter period.
- Facilitates the work of National Project Manager vis-à-vis other agencies
- Agrees on any necessary steps needed for better project implementation
- Reviews financial audit report
- Reviews quarterly progress report
- Ensure that Government funds are made available when needed by taking proactive steps and prerequisites for release of funds

Annex 4 - Capacity Assessment:

Capacity Assessment, including the Harmonised Approach to Cash Transfer (HACT) Micro Assessment, will be conducted in 2010-2011.

Annex 5 – Signed CPAP

The signed CPAP is downloadable from:

<http://www.undp.org.sy/files/SIGNED%20CPAP%20FOR%20SYRIA.pdf>

Annex 6 - List of 15 pre-selected demonstration projects

Governorate	Responsible entity	Building Project	City	Project Cost		Total Area (m ²)	
				(1000 SYP)	(USD)		
Damascus	Min. of Electricity	NERC - The New Building	Damascus	150 000	3 260 870	6 000	
Damascus	Min. of Local administration	Green Conference Hall	Damascus	75 029	1 631 076	1 400	
Sweida	Min. of Health	Maternity & Children Hospital	Sweida	178 000	3 869 565	6 724	
Lattakia	Min. of Housing & Construction	Social Housing buildings	Lattakia	10 500	228 260	1 710	
Hama	Min. of Social Affairs & Labour	Scientific & Vocational Training Centre for Disabled	Hama	76 220	1 656 957	1 800	
Al Quneiterah	Min. of Culture	Culture Centre	Rafeed	30 000	652 173	900	
Al Hasakah	Min. of Social Affairs & Labour	Juvenile Rehabilitation Centre	Hasakah	175 640	3 818 224	7 492	
Idleb	Min. of Housing & Construction	Social Housing for Youth	Idleb	17 000	369 565	1 800	
Dara'a	Min. of Health	AL Dahia Hospital	Dara'a	800 000	17 391 304	3 500	
Al Raqqah	Min. of Education	School (24 classrooms)	Al Raqqah	48 000	1 043 478	1 590	
				Sub-Total (confirmed costs)	1 560 389	33 921 472	32 916
Rural Damascus	Min. of Housing & Construction	Social Housing for Workers	Adrah	(*)	(*)	4 548	
Aleppo	Min. of Endowment	Fatema Zahra'a Mosque	Aleppo	(*)	(*)	700	
Homs	Min. of Education	School	Homs	(*)	(*)	2 800	
Tartous	Min. of Higher Education	Technical Engineering Faculty Building	Tartous	(*)	(*)	1 800	
Deir Al Zour	Min. of Higher Education	University Hospital	Dair Al Zour	(*)	(*)	7 000	
				Sub-Total			16 848
				Total			49 764

(*) Projects whose costs are currently being estimated. These projects do not contribute to the co-financing totals provided in the Project Document or the GEF CEO Endorsement Request.

Note: The Ministry of Endowment is the Ministry in charge of religious affairs.

Annex 7 - Stakeholder Involvement Plan

During the preparatory assistance phase, a number of activities were undertaken to ensure broad consultation among stakeholders and to maximize the opportunities to disseminate project information. The principal activities included:

- Regular meetings of the project team (international and national experts) with NERC, the Ministry of Electricity and the Ministry of Environment.
- Additional meetings with key stakeholders, including key ministries (e.g. the Minister and two Deputy Ministers of Local Administration, the Deputy Ministers of Environment, Education, Housing and Construction, Endowment and Health), Government agencies (e.g. the head of the construction materials department in SASMO), private sector trade associations (e.g. the Board members of the Engineering Syndicate), and power sector representatives (e.g. the director of the Public Establishment for Electricity Generation and Transmission, PEEGT).
- All-day workshop on 25 January 2010 at the Ministry of Electricity under the patronage of the Minister of Electricity, attended by 90 representatives of the public (related ministries and construction companies) and private sector (e.g. insulation materials suppliers and some building contractors), hosted by NERC and UNDP.
- In-depth survey of the Syrian buildings sector (almost 35 persons interviewed) on both the supply and demand sides, including real estate developers, architects, engineers and suppliers, to gauge their awareness, understanding and guidance on EE issues.
- A baseline and scenario analysis of housing energy demand and greenhouse gas emissions. This analysis was performed through a study estimating the evolution of the building energy demand according to different development conditions, using the end-use energy model MAED to simulate Syria's energy demand.

The project will schedule a number of workshops at the start of the project, as well as at critical points during its implementation to ensure: (i) close coordination with private sector companies representing developers, architects, suppliers and energy audit bureaus; and (ii) continued collaboration between the NERC and participating ministries to ensure the broadest possible level of political and administrative support.

Participation and involvement of these stakeholders will continue during the project through: (i) national EE forums which will be held annually; (ii) Project Technical Committee meetings that will be held during the implementation phase; (iii) electronic newsletters that will be distributed through professional trade associations to their members; and (iv) training sessions and other outreach/capacity building activities designed to provide the necessary technical tools to industry professionals. See Chapter II - Strategy, Outcome 3 for further details.

The Project Technical Committee will, in particular, ensure that there is a forum for a policy dialogue regarding EE with both public and private sector representatives. This forum will act in an advisory capacity to the NERC, which will be responsible for drafting the EE Building Code, and SASMO, which will be responsible for developing the EE standards. This forum will also serve as a platform to ensure that each participating line ministry is actively pursuing sectoral

policies that are aligned with the objectives of this project, thus ensuring that EE concerns become embedded within the sectoral programmes of each ministry.

Annex 8 - List of Stakeholders Consulted During the Preparatory Phase

The Deputy Minister of Electricity	Damascus
The Director of NERC	Damascus
NERC team of the EE buildings department, in charge of development of EE legislation and outreach	Damascus
Secretary of the National Energy Committee	Damascus
Team Leader of MED-ENEC II programme	Damascus & Cairo, Egypt
Head of Mechanical Engineering Department of the engineering company GCEC, supervising the design of the MED-ENEC I demonstration building	Damascus
Designer of the building simulation software CLIP (used in a former UNDP/GEF EE building code project in Tunisia)	Toulouse, France
International Architect supervising the design of 10 demonstration projects during a former UNDP/GEF EE building code project in Tunisia	Montreal, Canada
Manager of the company PLANET (ESCO)	Damascus
Technical Director of CLASP (NGO specialized on EE, labelling and standards, funded by the Climate Works Foundation)	Washington, USA
Members of the Board of the Syrian Environment Association (NGO)	Damascus
Members of the RCREEE think tank	Cairo, Egypt
University Professor in charge of a Master Course on Energy Efficiency	Aleppo
The Minister of Local Administration	Damascus
The Deputy Minister of Housing and Construction	Damascus
The Deputy Minister of Local Administration	Damascus
The Deputy Minister of Endowment	Damascus
The Deputy Minister of Environment	Damascus
The Deputy Minister of Education	Damascus
Head of planning directorate in the Ministry of Housing and Construction	Damascus
Head of Construction Materials department in SASMO / Ministry of Industry	Damascus
Director of Planning department of the General Establishment of Housing / Ministry of Housing and Construction	Damascus
Members of the Board of Engineering Syndicate, central headquarters	Damascus
Members of the Board of Engineering Syndicate, Rural Damascus branch	Rural Damascus

Member of Contractors Union	Damascus
Private suppliers of insulation materials	Damascus And Aleppo
Director of PEEGT/ Ministry of Electricity	Damascus
Selected architects from Damascus and Aleppo	Damascus and Aleppo
Selected engineers from Aleppo and Damascus	Damascus and Aleppo
Member of Board of Engineering Syndicate, Aleppo branch	Aleppo
Selected university professors	Damascus and Aleppo
Private building contractors	Damascus and Aleppo
Engineers from Technical Affairs Directorate of Rural Damascus	Rural Damascus
The National Coordinator of the EU funded project “Improving standardization and quality system in Syria”, Ministry of Industry	Damascus
Directors and consultants from SPC	Damascus
Secretary of the National Committee for Energy and Resources, the Cabinet	Damascus
GTZ consultant on the RE Master Plan Project, NERC	Damascus
Selected house owners	Damascus and Aleppo

Annex 9 - Greenhouse Gas Emissions Reduction Analysis

The GHG emissions reduction calculation reflects the standard GEF methodology, differentiating between direct and indirect emission reductions and using a causality factor for the latter. The direct GHG reduction impact results from the implementation of the planned 15 demonstration projects and has been estimated at 56.4 kt CO₂eq. The indirect impact results from: (i) the adoption of the requirements of the new Building Code for the construction activities started during project implementation; and (ii) from the adoption of the new Building Code, from its effective enforcement and from the associated capacity building and awareness raising activities, for new construction started after the end of the project until 2025. The projection of the combined cumulative direct and indirect benefits linked to the implementation of the project and the buildings constructed during the period 2010-2025 is showing a reduction of 80 Mtonnes CO₂ at a level of energy efficiency improvements and adaptation measures that are considered both technically feasible and economically justified.

For the indirect impact, a **causality factor** that is gradually declining from 4 (80%) in 2015 to 2 (40%) in 2025 has been assumed. The **calculation period** for the impact of the different energy saving measures and appliances adopted into new buildings constructed during 2010-2025, 30 years has been applied for space heating needs, 15 years for HVAC appliances and 5 years for other appliances such as lighting.

As in other similar projects, the achieved greenhouse gas reductions are highly cost-effective. For the GEF allocation and considering both the direct and indirect emission reductions, the abatement costs for GEF funding would be about US 4.2 cents per tonne of CO₂ abated, thereby making this project economically and environmentally very attractive.

For the **grid emission factor**, a gradual reduction from 0.824 kgCO₂eq/kWh in 2007 (calculated on the basis of the reported fuel consumption of the Syrian power plants and the net electricity consumption in 2007 as per the latest IEA annual statistics and the 2006 IPCC emission factors for different fuels) to around 0.60 kgCO₂eq/kWh in 2030 is expected from a gradual improvement of the power generation and distribution efficiency and the share of different fuels in power generation.

For the **emission factor of space and water heating with oil**, the value of 0.38 kgCO₂eq per kWh has been employed by using the IPCC emission factors for heating oil and an estimated average conversion efficiency of 70% for space heating appliances installed into new buildings. With the estimated average share of 10% of electricity used for space heating, this corresponds to an emission factor of about 0.41 kgCO₂eq per kWh for meeting the buildings' space heating demand.

Baseline Energy Consumption and GHG Emissions

The baseline scenario of the project was constructed with the help of an end-use modeling software and methodology, MAED (Model for Analysis of Energy and Electricity Demand), estimating medium and long-term energy and electricity demand at the national or regional level (Hainoun *et al.*, 2006). This model connects the development of energy demand with

demographic and economic projections, national policies, social aspects, technical change and other driving factors. National and international trends for each final energy form, such as electricity, gas, oil and solar energy, are also considered.

The modeling procedure comprises the following sequential calculation steps:

- Breakdown the structure of final energy consumption in each end-use category of the building sector in a consistent manner by fuel-type and energy form;
- Identification of social, economic and technological driving factors influencing each category of final consumption and their relationship to final energy consumption;
- Reconstruction of final energy consumption based on the statistical data available for the base year of the study (the financial year 2005 is used);
- Construction of the development scenario with respect to the evolution of demographic, macroeconomic, socio-economic and technological factors influencing the energy demand.
- Calculation of the final energy demand – including electricity – for the period up to 2025.

The **baseline scenario** (BLS) for the end-use energy demand for different consumption categories in the Syrian building sector is presented in Figure 1. The main energy sources are heating oil and LPG for thermal uses (space and water heating) and electricity for different specific uses such as air-conditioning, ventilation, lighting and other electric appliances.

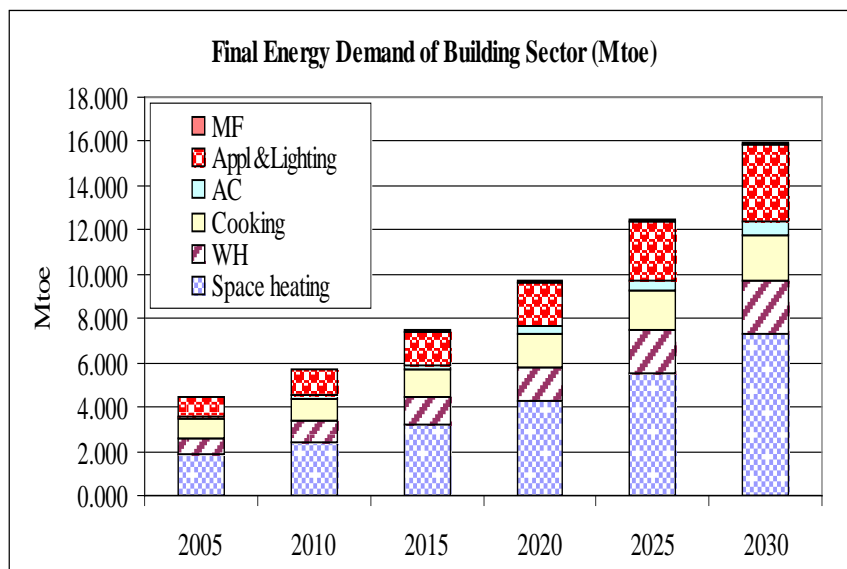


Figure 1: Development of Final Energy Demand of Building sector by Type of Consumption for BLS (NECS, 2009)

Some shifting between the different types of energy has been projected for the study period. The share of solar and biomass is expected to increase to about 6.2% in 2030. Both will substitute the use of fossil fuels for thermal applications, where the share of fossil fuels will decrease from

63% to about 58%. The share of electricity will increase from 30% to about 32% following the increased penetration of electric equipment and other specific electric use.

The development of GHG emissions in the building sector is presented in Figure 2. The total annual emissions in the baseline scenario will grow from about 22 to 69 Mtonnes of CO₂ during the study period, showing an average annual growth rate of 4.6%. This is primarily due to the increasing electricity consumption, followed by the consumption of fossil fuels for various heat applications. The expected share of CO₂ emissions by different energy sources in 2030 will be 57% for electricity, 38% for fossil fuels and 5% for other fuels, taking into account conversion efficiencies and, in addition for electricity, transmission and distribution losses.

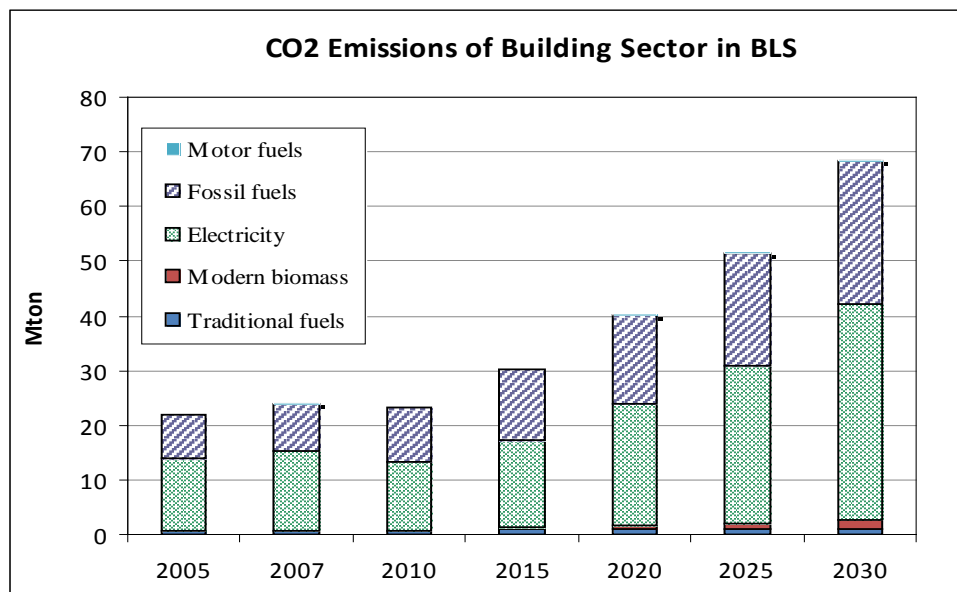


Figure 2: Development of the CO₂ emissions from energy use in the building sector by energy carrier (Calculated using data in (NCES, 2010))

Projected Energy Saving and GHG Reduction Impact of the Project

The energy saving and GHG reduction impact of the project has been assessed at three levels:

1. The direct GHG reduction impact resulting from the implementation of the planned 15 demonstration projects;
2. The indirect impact resulting from the adoption of the requirements of the new Building Code for the construction activities started during project implementation; and
3. The indirect impact resulting from the adoption of the new Building Code, from its effective enforcement and from the associated capacity building and awareness raising activities for new construction started after the end of the project until 2025 (with a gradually decreasing causality factor as it relates to the GEF project impact).

A summary of the analysis at these three levels is presented below.

1) Direct GHG reduction impact resulting from the implementation of the planned 15 demonstrations projects.

While the specific energy demand of each demonstrated building will be unique depending on its purpose of use, required appliances, daily occupation and other related parameters, it has been estimated that, on average, the achievable annual savings can reach over 90 kWh/m² reduction in the use of fossil fuels and electricity for covering buildings' heat demand and over 15 kWh/m² reduction of electricity consumption for other appliances, which together correspond to the reduction of annual primary energy consumption by over 180 kWh/m². The specific measures to achieve these savings, while also considered to be cost-effective for larger-scale replication, include:

- Improved design of the building envelope, including optimal orientation of the building and the placement and sizing of windows, summer time shading and improved insulation;
- More efficient appliances and design of the buildings' heating, ventilation and air-conditioning (HVAC) systems, including measures such as the use of thermal masses, natural ventilation, night-time cooling, more energy efficient HVAC appliances and the use of cost-effective renewable energy technologies such as solar water heating; and
- More energy efficient lighting and other appliances;

Table 1 presents an extended calculation of the achievable direct GHG reduction impact of the project with the minimum target of 180 kWh/m² savings in primary energy use compared to recently constructed similar buildings. The final, combined heat and electricity end-user demand will depend on the building type, but an achievable target for typical residential and office buildings in Syria has been estimated to be under 100 kWh/m², while in more energy consuming building types such as hospitals, an achievable target could be between 300 and 400 kWh/m² - subject to final technical, economic and financial feasibility analysis. This analysis, with related design of the targeted buildings, will be finalized during the first year of project implementation by a mixed team of local and international architects and HVAC engineers.

Table 1 Summary of the assumptions for and results from calculating the direct GHG reduction impact of the project.

Estimated total demonstration project floor area	49 764	m ²
Average annual savings in space heating demand	76	kWh/m ² a
60% substitution of the fossil fuels and electricity used for sanitary water heating by solar water heating systems	14	kWh/m ² a
Average savings in electricity consumption for AC and ventilation	6	kWh/m ² a
Average savings in electricity consumption of lighting and other appliances	9	kWh/m ² a
Share of electricity in space heating	10	%
Share of electricity in hot water preparation	35	%
Calculation period for energy savings of space heating	30	years

Calculation period for water heating, AC and ventilation	15	years
Calculation period for other appliances	5	years
Total energy savings in direct use of fossil fuels over the calculation period	2 206	kWh/m ²
Total energy savings in electricity consumption over the calculation period	440	kWh/m ²
Average EF for the direct use of fossil fuels	0.38	kgCO ₂ /kWh
Average EF for net electricity consumption (taking into account grid losses)	0.66	kgCO ₂ /kWh
Demo project CO₂ reduction over the calculation period	56.4	kt CO_{2eq}

2) Indirect impact resulting from the adoption of the requirements of the new Building Code for the construction activities started during the project implementation

For estimating the indirect impact resulting from the adoption of the requirements of the new Building Code (BC) for the construction activities started during project implementation (beyond the planned demonstration projects), it has been assumed (conservatively) that at least 5% of the planned total construction during 2010-15 can be influenced by the project activities. As part of this, all new public sector building construction projects are expected to show an example by adopting the new Building Code requirements or corresponding energy saving measures (should a new Building Code not have entered into force by then) into their design and to ensure the effective implementation of these requirements from early 2015 onwards.

By demonstrating the benefits of EE design on new constructions, the new Building Code will prepare the way for the more intricate retrofitting of the existing building stock through strengthened EE design capacities, building experience, consumer awareness and an already developed EE market. The additional impact of this co-benefit on the existing building stock is not accounted for in this calculation.

Table 2 Estimated new construction between 2010 and 2025

Projected new construction until 2030	2010-15	2015-20	2020-25
Residential buildings (million m ²)	76.571	95.151	105.441
Service sector buildings (million m ²)	30.532	40.960	50.057
Total (million m ²)	107.103	136.111	155.499

At the initial stage, the new Building Code is expected to set minimum standards for buildings' heating and cooling demand only, thereby primarily affecting the energy consumption of space heating, air-conditioning and ventilation. Complementary provisions to promote appliance energy efficiency and energy efficient water heating (for the latter, increasing the use of solar water heating in particular) can be integrated later into the Building Code, along with the

development of supply side capacity and adequate enforcement, compliance checking and quality control procedures and facilities for these appliances.

The average savings from the introduction and effective enforcement of the new Building Code or corresponding requirements have been estimated to reach at least 70 kWh/m² for buildings' heat demand and 6 kWh/m² for electricity consumption to meet buildings' air conditioning and ventilation needs. These and other related assumptions and results are presented in Table 3 below.

Table 3 Results and assumptions from calculating the indirect GHG reduction impact of the project for buildings affected by the project activities during the implementation of the project

Estimated total constructed floor area subject to project influence	5 355 000	m ²
Average annual savings in space heating demand	76	kWh/m ² a
Average savings in electricity consumption for AC and ventilation	6	kWh/m ² a
Calculation period for space heating	30	years
Calculation period for AC and ventilation	15	years
Total energy savings in heat demand over the calculation period	12.28	TWh
Total energy savings in electricity consumption over the calculation period	0.48	TWh
Average EF for covering heat demand (with 10% share of electricity)	0.41	MtCO ₂ /TWh
EF for net electricity consumption (taking into account grid losses)	0.66	MtCO ₂ /TWh
Causality factor	80	%
Indirect CO₂ reduction impact of the project for buildings, whose construction is started during project implementation.	4.3	Mt CO₂eq

3) The indirect impact resulting from the project activities and the associated capacity building and awareness raising activities for all new building construction until 2025.

For estimating the indirect impact resulting from the adoption of the requirements of the new Building Code for the construction activities started after the project duration, it has been estimated that the level of compliance will gradually increase from 5% in 2015 up to 80% in 2020-2025. These and other related assumptions and results are presented in the Table 4 below.

Table 4 Results and assumptions from calculating the indirect GHG reduction impact of the project

NEW CONSTRUCTION IN 2010 - 2025		2010-15	2015-20	2020-25	TOTAL
Residential buildings	mill. m ²	76.571	95.151	105.441	277,164
Service sector buildings	mill. m ²	30.532	40.960	50.057	121,549
Total	mill. m ²	107.103	136.111	155.499	398,713
Share of new building area in compliance with BC		5 %	50 %	80 %	
New area in compliance with BC	mill. m ²	5.355	68.056	124.399	197,810
Average baseline heat demand for space heating (covering 80% of the total area)	kWh/m ² .a	127	122	111	
Assumed new building code (BC) requirement for space heating	kWh/m ² .a	51	51	51	
Annual savings for SH per m2	kWh/m².a	76	71	60	
Average baseline electricity consumption for AC&V (covering 60% of total area)	kWh/m ² .a	17	17	16	
Assumed new BC requirement for cooling	kWh/m ² .a	11	11	11	
Annual savings in electricity use for AC&V per m2	kWh/m².a	6	6	5	
Total annual savings in space heating demand of buildings respecting new BC	TWh/year	0.41	4.82	7.46	
Total annual savings in el. cons. for AC&V in buildings respecting new BC	TWh/year	0.03	0.38	0.63	
Savings in SH demand over 30 years	TWh	12.28	144.63	223.77	
Savings in electricity consumption for AC and ventilation over 15 years	TWh	0.48	5.77	9.43	
Emission factor for covering SH demand	Mtonnes/TWh	0.41	0.41	0.41	
Emission factor for net electricity consumption	Mtonnes/TWh	0.66	0.64	0.62	
Total GHG reduction (Mtonnes of CO ₂ eq)	Mtonnes	5.3	62.6	96,5	164.5
Causality factor		80 %	60 %	40 %	
Indirect project impact	Mtonnes of CO ₂ eq	4.3	37,6	38.6	80.5

Note: The additional – beneficial – impact of the Building Code on the existing building stock is not accounted for in this calculation.

Annex 10 – Presentation of the CLIP simulation software

CLIP

A simplified tool for building design

1

The software tools

Why is it necessary to use a tool?

- 1) **For designers:** It is impossible to guess thoroughly the result of a choice. Targets are too many: summer comfort, winter comfort, energy saving, CO₂ production, etc.
- 2) **For administration:** It is compulsory to use an authorized tool to compare a project to the regulation requirements.

Two kinds of softwares: detailed and simplified.

2

The detailed simulation tools

DOE2; TRNSYS; Energy+, etc..

GOOD

- 1) Dynamic simulation (inertia taken into account)
- 2) Based on an hourly weather data
- 3) Everything can be changed (schedules, equipment, etc..)

BAD

- 1) Several days of work per simulation. Number of data to provide very high.
- 2) Learning is long (at least one week)
- 3) The purchase is only profitable for large agencies

3

The simplified calculation tools

BAD

- 1) Steady state computation only (no inertia, except corrections)
- 2) use of condensed variables (degree-hour for example)
- 3) Fit to specific needs
- 4) Many default values

GOOD

- 1) A few hours per study.
- 2) Number of entries limited
- 3) Only a few hours for learning
- 4) Often free, if not inexpensive

4

Comments on calculation tools

The detailed tools: DOE2; TRNSYS; Energy +, etc..

Results can differ by 10 %

The simplified tools

Differences are more significant (sometimes up to 20 %)

Usefull to see the influence of modifications

Precise enough to award a label

5

CLIP

A simple tool, adapted to the regulation, to help architects and engineers

CLIP enables the administration to control a project

CLIP allows the designer to improve the project all along the study, indicating rapidly the effect of changes.

CLIP is very simple to use

6

Users of CLIP:

- Administration
- project developers

Characteristics of CLIP:

- Adapted to the country meteorological data
- Adapted for different types of buildings
- Simple and easy to use
- Online documentation
- Works on any PC with Windows

Output of CLIP:

- Provides a label (related to the regulation)
- Annual and seasonal Results (for seasonal comfort)
- Indicates thermal needs (Quality of Construction)
- Indicates energy consumption (cost savings)
- Indicates CO₂ production (environmental protection)

7

CLIP Outputs CLIP Outputs

Thermal needs		to maintain
Winter	33 [kWh/m ²]	20 °C
Summer	104 [kWh/m ²]	26 °C
Year	137 [kWh/m ²]	
2 seasons		

Thermal needs represent the amount of energy per square meter which should be necessary to maintain the building comfortable.

No matter the building is actually heated and cooled or not

Thermal needs indicates the architectural quality

8

CLIP Outputs

Primary energy consumption

Winter 106 [kWh/m²] for heating,
Summer 52 [kWh/m²] cooling,
Year 200 [kWh/m²] hot water,
 4 seasons lighting and
 small equipment

Primary energy consumption represents the amount of energy per square meter which is actually used.

Depends on the heating and cooling equipment of the building

Energy consumption indicates the functioning cost of the building

9

CLIP Outputs

Greenhouse gas

CO₂ produced 7,84 [kg/m²]

Greenhouse effect gas produced by the functioning is reported in equivalent CO₂ production

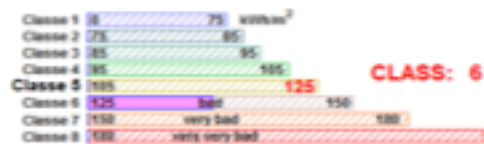
Modification overcost

Overcost 0 [Dt]

Overcosts induced by modifications can be computed by CLIP

10

CLIP Outputs



CLIP awards the project a label from class 1 (very good) to 8 (extremely bad). Class limits are provided by the regulation.

For Tunisia, this label is based upon the yearly thermal need (in this case: 137 kWh/m²)

11

CLIP Outputs

Compliance with the regulation

Decree date: août 2008	zone ZT1	Prescription	NON
Building: bureaux	type: privé	roofs U= 2,2 [W/(m ² °C)]	
Performance	NON	walls U= 1,108 [W/(m ² °C)]	
BECTH= 137 [kWh/m²]		glazing U= 6,2 [W/(m ² °C)]	
		SC= 1,0	

CLIP compare the project data to the 2 ways used by the Tunisian regulation:

Performance, must be < 125 kWh/m²

Prescription, some characteristics must be lower than given limits.

The project must meet at least one of the two approaches. This is not the case here.

12

CLIP Outputs

Windows	
Global percentage	28 [%] moyen
Relative percentage	
north	4 [%]
north-east	8 [%]
east	11 [%]
south-east	8 [%]
south	1 [%]
south-west	8 [%]
west	8 [%]

Energy use	
100 [%]	is heated
91 [%]	is cooled
14.2 [%]	Gas
14.2 [%]	Fuel oil
14.2 [%]	Wood
14.2 [%]	Electricity
with 0 [%]	water elec.
47 [%]	for heating
22.2 [%]	for conditioning
22.2 [%]	for DHW
22.2 [%]	for lighting
22.2 [%]	for equipment
with 0 [%]	solar

CLIP gives some informations about the project. It can be used to have a fast view of its main characteristics.

gains and losses (kWh/m ²)		
U _{trans} = 1.7 (W/m ² °C)	WINTER	SUMMER
LOW	38.77	66.76
including: solar gains on walls	3,066	5,086
solar gains on roofs	8,885	28,01
solar gains through windows	25.9	43.52
GAINS DEGREE HOURS	89.89	34.3
including: conduction	89	26
air change	29.26	7.84
INTERNAL GAINS	17.87	6.894

13

CLIP Outputs

Name and version	Comments	Needs	Consumptions	Label
Original version BtuFac20-0000 N°1	BtuFac20-00-00 none none	Winter 11 (kWh/m ²) Summer 104 (kWh/m ²) Annual 117 (kWh/m ²)	Winter 109 (kWh/m ²) Summer 112 (kWh/m ²) Annual 121 (kWh/m ²)	6
Previous version BtuFac20-0000 N°2	BtuFac20-00-00 Double glazing none	Winter 11 (kWh/m ²) Summer 111 (kWh/m ²) Annual 122 (kWh/m ²)	Winter 99 (kWh/m ²) Summer 112 (kWh/m ²) Annual 111 (kWh/m ²)	5
Current version BtuFac20-0000 N°3	BtuFac20-00-00 Double glazing Roof insulated	Winter 19 (kWh/m ²) Summer 73 (kWh/m ²) Annual 92 (kWh/m ²)	Winter 43 (kWh/m ²) Summer 52 (kWh/m ²) Annual 179 (kWh/m ²)	3

CLIP let you compare different versions of the project

14

