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Capacity Building For the Adoption and Application of Energy Codes for Buildings (PAL/99/G35)

Final Evaluation Report - Draft

Contents

1. Executive summary

1.1 Brief description of project

The project was developed in 1999, to address the issue of high energy demand for heating in buildings in the Palestinian Territories (PT), and the lack of implementation of energy demand reduction measures which are expected to bring significant benefits to residents and businesses, the country and the environment. The project document was signed on 5 April 2001, and project implementation commenced in June 2001, with a planned duration of 2 years. The project end date was postponed to December 2004.

Despite the relatively mild winters and summers that characterize the PT, heating remains essential in the winter season (November – March) and cooling is required in the hot summer (June - September). Approximately 40% of the 872 KTOE of energy consumed in the PT is used for residential purposes. Primary energy consumed is imported and purchased from outside sources, making it an expensive commodity and an economic constraint, in addition to being an environmental burden. Thus, the reduction of energy consumption is a national priority

The project expected to deliver four main outputs to achieve these results:

1. A model energy code for buildings specifying minimum energy efficient standards for new building construction.
2. Developed human and resource capacity in the Palestinian society to promote and develop energy codes for buildings.
3. Increased awareness of the long-term economic and global benefits of energy-efficient building material, methods and designs.
4. Dissemination mechanisms that ensure open and wide access to cost-effective energy-saving building materials, methods and designs.
5. Action plan for the facilitation of future adoption of the “Energy Code for Buildings Act”.
6. Reduction in greenhouse gases emission and energy consumption.

Regional cooperation was the subject of a specific output, and was included in the project management activities.

1.2 Context and purpose of the evaluation

The final evaluation is intended to assess the relevance, performance and success of the project. It looks at early signs of potential impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals. It should also identify and document lessons learned, make recommendations that might improve the design and implementation of other UNDP/GEF projects, and forward vision recommendations related to the sustainability of project outputs.

Key issues in this evaluation include the relevance and quality of the technical outputs; stakeholder involvement in the development and introduction of the Thermal standard; process characteristics of the project; the sustainability of the project outcomes. For this evaluation, indicators have been developed for the issues relevant to UNDP/GEF Final project evaluation. An indicator targets an important, measurable aspect of an evaluation issue, to make a complex, qualitative issue measurable and (semi-) quantifiable. Ratings are based on these indicators, complemented with the contextual information and information of a strictly qualitative nature.

The evaluation included a desk review of project documentation; interviews with project officers and major stakeholders; additional desk review of technical outputs; and the analysis of the collected information, and assessment of the projects relevance, performance, success and potential impact. The evaluation took place in November and December 2005, including a mission to Jerusalem.

1.3 Main findings, conclusions, recommendations and lessons learned

1.3.1 Main findings & Conclusions

The project has achieved a lot of impact in Palestine, and has significantly raised the profile of energy efficient building practices. Before this project, building energy efficiency was almost a non-issue in the Palestinian territories. Now, after the project, the issue is on the agenda with building professionals, and elements have been put into place to give it wider attention with the general public and in the policy arena. Looking back on the project design, however, it is clear that the intended leap forward with this project was not realistic given the situation in Palestine and the resources of the project, and the results of the project, although good, fall short of achieving the ambitious targets set forward in the project document.

Overall, the *results* of the project are good, given the starting point, the context and the size of the project. This evaluation takes into account that the project was developed in 1999, under a different political and societal scenario, and was implemented during the 2nd *intifada*. That fact accounts for various differences between expected and realized outcomes, although for some objectives, the project document was overly optimistic about the impact that could be achieved with a relatively small project. Although the results are good, they are probably not sufficient for a full adoption of mandatory building energy codes for all buildings in Palestine.

In general, the *project formulation* was appropriate for the national context and development issues as identified at the time. The project targeted an urgent national need, recognized by important governmental and civil society stakeholders. The project design was balanced, assigning most attention to the most demanding issues. Some critical issues were not sufficiently assessed during project design, specifically the institutional aspects of regulation building energy performance. This is likely to result in long-term difficulties for the (planned) implementation of the building energy code as a mandatory standard. National ownership and stakeholder involvement during project design appear to have been (too) limited, although stakeholder involvement has much improved during project implementation.

Overall, *project implementation* was good. It has been challenging, due to a national political context that severely hindered project implementation. The political situation resulted in difficult working conditions, travel restrictions and at times a loss of political attention for the project. Project management adapted the project adequately in response to these challenges, and has kept the project continuously on track towards its objectives. These objectives were achieved, after some delays, and with some changed project activities.

Stakeholders expressed their appreciation of the role they could have in the implementation of the project, and thus in the development of a regulation. Such development was new to the Palestinian society, and it is considered to be a successful approach by both the government and the non-governmental stakeholders. Stakeholders have repeatedly expressed their appreciation of the project team that was created, and have recognized the role of the UNDP country office in providing guidance to the project manager.

An *Energy Efficient Building Code* has been prepared in the project, including (fairly modest) provisions for heat loss reductions through ceilings, roofs and walls of buildings. The Code was based on a pre-existing Jordanian energy code, which was adapted to the Palestinian climatic conditions. The approach did not account for the Jordanian code was already fairly old and that the Palestinian climate would have required some different analyses. The Code was recently adopted as a by-law, which regulates the adoption as a mandatory standard for new public buildings, and as voluntary for all other buildings. No incentive mechanism has been created to support voluntary adoption; a verification and enforcement mechanism is yet to be prepared for the adoption of the Code.

Extensive attention was given to the *development of capacities* for the adoption of the thermal standard, especially with private sector professionals and in close collaboration with professional bodies and universities. The project has delivered various outputs beyond what was planned

(including a software tool and guidelines), and which contribute considerably to the building of professional capacities.

There are various elements contributing to the *sustainability* of the project, but there are also some risks. The training of professionals and the inclusion of building energy efficiency in university training programs are likely to contribute to the further evolvement of building energy efficiency in Palestine in coming years. The developed energy code has been formally adopted, and a new building code unit within the Palestinian Authority will also continue to contribute to the future impact of the project. The scope of the institutional follow-up to the project, however, is very limited and organizational responsibilities and funding for the follow-up are not yet fully defined. Given this, the sustainability of this project, to create and implement energy codes for (all) buildings, would benefit from further attention.

1.3.2 Recommendations

The recommendations cover suggested actions to correct issues in the output or outcome of the project; suggested actions to reinforce the outcome of the project in Palestine; and suggestions for future work, furthering the cause of energy conservation in buildings.

The main issues for *corrective action* are to reconsider the implementation strategy for the Energy Efficient Building Code, and to finalize or correct some of the outputs of the project. The implementation strategy for this project has so far been targeted on the adoption of the Energy Code as a mandatory standard for all new buildings, with the current adoption as an interim stage. However, several required elements are missing, to make this a successful strategy.

The question to answer is whether the institutional capacities of the Palestinian Authority, for the introduction, promotion, compliance checking, enforcement and updating of the energy code, can be developed quickly enough to engage in a trajectory that will lead to the adoption of a (possibly improved) mandatory energy code for all new buildings, with the necessary policies and procedures in place. This seems to be unlikely, given the current unstable situation in Palestine. An alternative strategy would be to focus on voluntary adoption of the energy code as the final objective of the current project, and targeting actions on making this as successful as possible. This strategy could build on the successful engagement of many professionals in this project, and their commitment to building energy efficiency, while reducing the need for a leading government role. In both cases, it is recommended that the institutional roles and commitments in the implementation of the energy code are revisited and tailored to the needs of the implementation strategy.

Some outputs of the current project require correction or upgrading. These include an updating of the project website; the preparation of correct cost-effectiveness calculations for the energy code requirements; and the preparation of a national energy and carbon-emission impact analysis.

Several options have been identified to *strengthen the impact* of the Energy Code development. An item about (voluntary) application of the Code could be added to building permit application forms and building usage application forms. Demonstration projects, of buildings that have applied the Energy Code requirements, could be useful disseminate the benefits of the Code to the construction sector. Dissemination of the benefits of the Code could further be improved by awareness raising campaigns, separately for the professional audience and the general public.

It could be considered to develop more and/or longer training programs for professionals. Palestinian universities may be able to have a bigger role in follow-up of the project. It would be advisable, however, to seek the advice of high-level international experts to bring Palestinian experts up-to-date on best practices.

Before considering *future steps* for regulating building energy performance, it is important that the current step, of the development and complete implementation of a first building energy code, is successfully concluded. This may take quite some time, and a clear focus on this is probably more helpful than considerations about potential future steps in building energy code development. In the long term, a building energy performance standard could be considered.

Besides this, a logical follow-on to further the energy performance of buildings would be to work on HVAC equipment, appliances and lighting. Further potential follow-on to the work on the energy code development would be a program to bring local building material manufacturing up to international quality levels, and to certify these products according to internationally recognized standards.

1.3.3 Lessons Learned

The project, including its design, implementation and results, shows many insightful lessons.

A first lesson is in the good, intensive involvement of stakeholders throughout the project. Elements of this involvement are a national code committee included all stakeholder groups, that was involved in all decisions during the project; the involvement of key national stakeholders in the development of project outputs; and supporting that stakeholders develop their own links and usages of the project outputs. These elements, and the open and informative management and communication style of the project management, explain the success of the stakeholder involvement.

Secondly, a project approach should be in line with the capacities of the country. Building energy code development can be very complex work, requiring experience with regulatory policy and with building energy efficiency. Experts in these fields were scarce in Palestine, making a complex building energy code development difficult. The project management chose to scale down the complexity of the work, to make the project manageable. An alternative might have been to first improve the national capacities, and use these for a development process with a better reflection of the national conditions and a better analysis.

A last lesson is that an better, in-depth assessment of the national regulatory infrastructure is needed, for the development of new regulatory policies. These policies rely on other regulatory and institutional aspects, and essential issues are easily overlooked during project design. A detailed analysis could reduce this risk, and allow a better inclusion of wider ranging regulatory and institutional aspects.

1.3.4 Ratings of project components

Rated elements in the project formulation, implementation and results are listed here.

The overall appreciation of the project formulation is acceptable. Rated elements are:
- Conceptualization / Design: *satisfactory*
- Stakeholder participation: *marginally satisfactory*

The overall appreciation of the project implementation is good. Rated elements are:
- Implementation Approach: *highly satisfactory*
- Monitoring and Evaluation: *satisfactory*
- Stakeholder participation: *satisfactory*

The overall appreciation of the project results is good (satisfactory). Rated elements are:
- Reduce greenhouse gas emissions (Development objective 1): *no rating*
- Establish thermal energy standards for buildings and prepare grounds for future adoption of the standard as an energy code for buildings (Development objective 2): *marginally satisfactory*
- Initiation of a transformation in the construction industry in Palestine (Development objective 3): *satisfactory*
- Establishing a cost-effective energy code for buildings (Immediate objective 1): marginally *satisfactory*
- Building local human and resource capacity in energy-saving modalities in the PA (Immediate objective 2): *highly satisfactory*
- Wide public adoption of cost-effective energy-saving modalities in buildings by the Palestinian public (Immediate objective 3): *satisfactory*
- Increase regional cooperation (Immediate objective 4): *satisfactory*

2. Introduction

2.1 Purpose of the evaluation

The final evaluation is intended to assess the relevance, performance and success of the project. It will look at early signs of potential impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals. The final evaluation is also supposed to identify and document lessons learned and to make recommendations that might improve the design and implementation of other UNDP/GEF projects. Furthermore, the final evaluation is to make forward vision recommendations related to the sustainability of project outputs.

The deliverables of the evaluation process are:

- List of evaluation indicators
- Questionnaires to be used during interviews
- Interviews reports (summary versions)
- Draft final report
- Final report

2.2 Key issues addressed

Key issues in this evaluation include:

- The relevance and quality of the technical outputs (Climate zoning, surveys, energy code, energy code guideline, software tool for the energy code);
- The stakeholder involvement in the development and introduction of the Energy code, and the national implementation process;
- Process characteristics of the project, steps taken during the project and distinctive characteristics of the project implementation;
- The sustainability of the project outcomes, and further action recommended to improve the impact and sustainability of these outcomes.

2.3 Methodology of the evaluation

This evaluation aims at assessing the projects relevance, performance and success, early signs of impact and sustainability of results, identifying lessons learned, and making recommendations for the sustainability of project outputs and for future projects. For this, evaluation indicators have been developed, based on the evaluation issues relevant for UNDP/GEF Final project evaluation (annex 3, evaluation indicators).

An indicator targets an important, measurable aspect of an evaluation issue, with the aim to make a complex, principally qualitative issue measurable and (semi-) quantifiable. During the evaluation, fact-finding focuses on collecting data regarding these indicators (next to general qualitative and contextual information about the project), and during the analysis the projects results are valued against indicators (ranging from below to above what has been / might have been expected or was implied in the project design). Given the extent of the project and the complexity of the subject, not all aspects (of all issues) can be targeted during this evaluation.

Evaluation issues have been rated according to the assessment of the project on the indicators, complemented with the contextual information and information of a strictly qualitative nature. The rating is reported and justified in the *Findings and Conclusions* section. The Evaluation outline (annex 2, Evaluation itinerary) provides a full overview of the project methodology.

2.4 Structure of the evaluation

The evaluation included the following steps:

- The desk review of (all kinds of) project documentation, including the project document, progress reports, and outputs. This review has served to (a) generate an overview of the project, its context, proceedings, outputs and outcome; (b) develop a list of evaluation indicators for the assessment of the project; and (c) to collect data regarding the evaluation issues and indicators. Further documentation (interim technical reports, workshop reports, financial statements) have been reviewed to answer specific issues. The desk review has taken place in the initial stage of the evaluation. A list of reviewed documents is included in annex 4 (List of documents reviewed).
- Interviews with project officers and (representatives of) major stakeholders involved in the project. The interview schedule is included in annex 5 (List of persons interviewed). These interviews have served to (a) complete the overview of the project, in its context, and the relevance and (future) impact of the projects outcomes according to the involved organizations and stakeholders; (b) complete the fact finding regarding the evaluation issues and indicators; and (c) assist in the assessment of the project by asking the involved organizations about their impression of the projects results on specific issues (indicators), where relevant. A questionnaire, developed during the desk review phase, was used for these interviews (semi-structured interviews). Questions are included in the summary interview reports (annex 6).
- Additional desk review of (interim and final) project outputs and documents has taken place at a later stage to create a better overview of the issues that have led the project team to change their international consultant and of the technical issues that emerged during the review of the project.
- The analysis of the collected information, and assessment of the projects relevance, performance, success and potential impact. Collected data have been analyzed and structured according to the evaluation indicators. Where target values for evaluation indicators exist (in the project proposal), the observed results of the project have been compared to these target values. Where these target values did not exist, a status quo description has been given and an assessment of the projects results based on a review of the project documentation (and the implied assumptions in it), reference information from similar developments (of thermal standards or energy codes) in other environments, stakeholders opinions and the evaluators judgment. Ratings have been assigned based on this information. Together with the overview and contextual information, this formed the basis for this final evaluation report.

The evaluation took place from November 2005 to February 2006, including a mission to Jerusalem from 8th to 11th November 2005. The Energy Code project was completed in December 2004, and some institutional representatives had changed position since then. All current stakeholder representatives could provide a good overview of the later years of the project, but the information available about the start-up phase was limited. Since the most important impacts have been achieved in later years, this presented only limited difficulties for the evaluation process. The evaluation of the project design, however, was hindered by this situation.

A draft final evaluation report has, via the UNDP PAPP office, been circulated with the project team and the main stakeholders of the project. Comments and additions have been included in this final version of the report.

3. The project and its development context

3.1 Project start and duration

The project was developed in 1999, to address the issue of high energy demand for heating in buildings in the Palestinian territories, and the lack of implementation of energy demand reduction measures which are expected to bring significant benefits to residents and businesses, the country and the environment. The project is a part of a regional project (together with a similar project in Lebanon).

The project document was signed on 5 April 2001, and project implementation commenced in June 2001, with a planned duration of 2 years. The project end date of June 2003 (planned at project inception), was postponed to December 2004, as part of the second Tri-partite review of the project in October 2004. This implies that the project was significantly behind schedule at this review, and already close to its end date and the postponement served to formalize a delay that was already occurring.

During project implementation, which lasted 3.5 years, only two tri-partite reviews have been conducted. This is mainly due to the political situation in the Palestinian Territories during the implementation of the project, which made it very difficult to bring together the required people for a meeting. It should be noted, however, that actual implementation of the project to a very large extend took place between the two meetings, in October 2002 and October 2004, indicating that the actual impact of these reviews on project implementation must have been limited.

The Project Implementation Reports, prepared yearly throughout the project, have been circulated to all parties involved in the tri-partite reviews, and seem to have taken over their role as the main source of progress tracking instrument and forum for adjustment of implementation plans.

3.2 Problems that the project seeks to address

Despite the relatively mild winters and summers that characterize the PT, heating remains essential in the winter season (November – March) and cooling is required in the hot summer (June - September). Electricity, butane (natural gas), kerosene, timber and coal are the common energy sources for heating in winter. Approximately 40% of the 872 KTOE of energy consumed in the PT is used for residential purposes. The application of innovative building codes to save energy consumption in buildings is therefore essential to reduce emissions of greenhouse gases and energy bills. The existing compulsory building codes in the PA areas are outdated and lack reference to energy-saving modalities.

Primary energy consumed in the PT is imported and purchased from outside sources making it an expensive commodity and an economic constraint, in addition to being an environmental burden. Thus, the reduction of energy consumption is a national priority. Baseline activities on thermal performance of buildings were ongoing in Palestine before the development of this project, but many barriers existed for this to become an effective national strategy:

<u>Institutional barriers</u>

B.1. Absence of energy codes for buildings. The currently applied building codes in the West Bank and Gaza Strip are outdated and do not address the issues of energy savings and efficiency.

B.2. Absence of quality assurance of building materials. Quality control division at PSI is still in the preliminary stages, and lacks equipment and experience.

B.3. Lack of a coordination body in the PA to establish and promote energy codes for buildings.

<u>Human and resource capacity barriers</u>

B.4. Lack of formal and informal training in local educational institutions in energy efficiency in buildings and building designs.

B.5. Lack of expertise and knowledge of local civil engineers and contractors in designing and constructing energy efficient buildings.

Information Barriers

B.6. Limited access of professionals and consumers to appropriate technologies in the field of energy efficiency in buildings

B.7. Unavailability of studies, guidelines, and software to local professionals and consumers for the designing and construction of energy efficient buildings.

B.8. Lack of awareness of the short- and long-term economic and environmental benefits of energy-saving designs and construction.

B.9. Unfamiliarity with methods and tools for measuring energy efficiency in buildings.

The project design included technical, institutional and capacity building components, as well as regional exchange of experiences, to overcome these barriers.

3.3 Immediate and development objectives of the project

The development objective of the project was the *Reduction of CO_2-emissions into the environment*, by means of the *Establishment and Adoption of energy codes for buildings*.

Goals of the project were to achieve:

- Building local capacity in the field of energy-saving modalities in buildings;
- Wide public adoption of cost-effective energy-saving modalities in buildings;
- Transformation of construction industry;

These goals should have objectively verifiable outcomes in the country:

(development objectives)

- A set of energy codes and guidelines for buildings will be established in the PA and endorsed by the PA/MLG by the year 2001
- Annual energy saving of 0.025 MTOE for the Palestinian Territories.

(immediate objectives)

- Increased number of energy-efficient buildings
- Increased demand on energy-efficient building material and designs
- Improved energy performance in residential buildings
- Increased public awareness of energy-saving modalities
- Increased knowledge and expertise in energy-efficient modalities by civil engineers and contractors

3.4 Main stakeholders

The stakeholders of the project are primarily the nationally involved parties in construction sector regulations and in building design.

The ultimate PA institution responsible for the approval of building codes, planning schemes and licenses is the Palestinian Higher Planning Council / Higher Council of Construction. The Authority of this Council supersedes the authorities of the Ministry of Local Government, municipalities and village councils. The Higher Planning Council or 'HCC' consists of a total of 16 members of which 5 were part of the energy code for buildings project:

- The Palestinian Ministry of Local Government, Chair, Secretariat and Treasurer
- The Palestinian Engineer Association

- The Ministry of Environmental Affairs
- The Palestinian Ministry of Housing
- The Ministry of Economy and Trade through the Palestinian Standards Institute

Furthermore, the following parties have a key role to play in the advancement of building energy codes:

- Ministry of Local Government (MLG), responsible for providing all services to local authorities and councils, including licensing, zoning, infrastructure planning, local elections.
- Palestinian Engineers' Association, which is concerned with the improvement of the engineering profession and standards of Palestinian engineers, and is an active body in the design and implementation of building codes and accreditation of engineering offices, consultants and contractors.
- Palestinian Standard Institute (PSI), a non-profit independent organization controlled by a council of 19 members representing the PA institutions, industry and trade associations, and academic institutions.
- Palestinian Universities & Research Centers, and particularly the Departments of Architecture, Civil and electrical engineering of An-Najah National University in Nablus; Bir-Zeit University in Ramallah; and the Islamic University in Gaza.
- The Renewable Energy and Global Environment Research Center (REGERC) at An-Najah National University, a unique academic research center in the PA.
- Palestinian Energy Authority (PEA), the agency responsible for the overall coordination of the energy sector, as well as for policy formulation and system development. The PEA also coordinates efficiency and conservation responsibilities with other organizations working in the field, including the Palestine Energy Center (PEC), an existing independent agency focusing on research and public education.

3.5 Results expected

Upon completion of the project, the Palestinian Authority will have increased public awareness of cost-effective energy-efficient building materials, methods and designs, as well as benefits of energy efficient measures in buildings. Overall, it should possess improved institutional, human and resource capacities in the field of energy efficiency and standards in buildings and transformation of the construction industry. The main outputs anticipated of this project are:

1. A model energy code for buildings specifying minimum energy efficient standards for new building construction.
2. Developed human and resource capacity in the Palestinian society to promote and develop energy codes for buildings.
3. Increased awareness of the long-term economic and global benefits of energy-efficient building material, methods and designs.
4. Dissemination mechanisms that ensure open and wide access to cost-effective energy-saving building materials, methods and designs.
5. Action plan for the facilitation of future adoption of the “Energy Code for Buildings Act”, ensuring the continued momentum of the project activities after the completion of the project.
6. Reduction in greenhouse gases emission and energy consumption.

4. Findings and Conclusions

4.1 Project Formulation

The project was designed in 1999, following the Oslo peace process and before the start of the 2nd *intifada*. Implementation, however, had to start during the *intifada*, which has had a severe impact on the project. The capacities on the Palestinian Authority to govern its territory, expected to develop quickly after the Oslo process, are still limited, and mobility restrictions have made it difficult to organize cooperation between parties. This couldn't be expected during project design, but the resulting situation should be taken into account when considering the next steps. This issue will be revisited in the *recommendations* sections.

In general, the project formulation was appropriate for the national context and development issues as identified at the time. The project targeted an urgent national need, recognized by important governmental and civil society stakeholders. The project design was balanced, assigning most attention to the most demanding issues. Some critical issues were not sufficiently assessed during project design, specifically the institutional aspects of regulation building energy performance. This is likely to result in long-term difficulties for the (planned) implementation of the building energy code as a mandatory standard.

Given that the project was designed 6 to 7 years ago, and that there have been many personnel changes with all involved parties, it is difficult to assess the project design phase in detail. National ownership and stakeholder involvement during project design appear to have been (too) limited, although stakeholder involvement has much improved during project implementation.

The overall appreciation of the project formulation is acceptable. Rated elements are:

- Conceptualization / Design: satisfactory
- Stakeholder participation: marginally satisfactory

4.1.1 Conceptualization/Design (R)

Rating: satisfactory

After the signing of the Palestinian - Israeli Interim Agreement, the PA-controlled areas witnessed a construction boom of buildings and housing units. This wave of construction followed years of strict limitations by Israel on Palestinian construction in the PT. The number of new buildings was expected to increase in the following years. The projected increase of building growth rates was likely to be exceeded, considering the natural population growth rate in the PT, a possible influx of refugees from neighboring countries and new investments in the construction sector if the political situation had been solved and clarified.

The project design targets heat gains and losses via the building envelope, one of the major components in building energy performance. Targeting building envelope thermal performance, via a Thermal standard, is a logical and necessary step, and can bring significant benefits to a country. It has also been a common first step in the development of national building energy policies, in many countries. Prior to this project, awareness of building energy performance was minimal with the public and politicians, and low even among professionals.

The need to target building energy consumption was recognized, and supported, in the Palestinian Authority. All stakeholders identified the need to reduce (building related) energy cost, and minimize national energy consumption and CO_2-emissions. Energy imports are a major cost to the national budget, and reducing (or dampening an increase of) these imports, has many benefits. Energy cost has been a daily concern for many Palestinians for years, but the relationship of a higher first cost (due to investments in energy conservation) versus lower running cost was not recognized, nor acted on. This project was to provide the tools to regulate the thermal performance of the building envelope, and to facilitate professionals in doing this properly.

The project concept originated from the updating of Palestinian building codes by the Ministry of Local Government, and the energy policy, adopted by the Palestinian Energy Authority. The design justly emphasized that the implementation of a regulations for the thermal performance of buildings is a more demanding step than the development of a standard, and, consequently, more attention was given to the implementation than to the development steps. The project design stressed the roles of stakeholders, and the need to include stakeholder representatives in all stages of the project. This has greatly benefited the project.

The project design included regional coordination with other countries in the region, involved in similar projects. The coordination structure was appropriate for this project. Specific action was planned to analyze experiences in countries with longer histories in regulating energy performance of buildings, which could have been a useful element of the project. There is no indication, however, that this analysis has been performed.

A logical framework and performance indicators were developed during project design. The project consisted of four well-balanced components, and indicators to track the impact of the project on the building sector in Palestine. The detailing of outputs in the project document later proved to be insufficient, in specificity and requirements, and the project management had to base their decisions mainly on their own judgment of the most appropriate course of action.

In the project design, it is assumed that the PA was ready to implement building energy codes, provided that sufficient training and technical resources were made available to government staff. This appears to be an underestimation of the institution building aspects of regulating a previously unregulated aspect. This underestimate is common to more countries and projects, but is especially relevant for this project, which was implemented in a territory where government institutions were underdeveloped. More attention for the institutional aspects of regulating building energy performance would have been justified.

It should be noted that the political situation in the Palestinian Territories changed significantly between the time of project design (1998 - 1999) and implementation (2001 onwards). The start of the second *intifada*, in 2000, significantly changed the societal and political context for this project, and the imposed restrictions on public life following the *intifada* has had a severe impact on the ability of the Palestinian Authority to govern the territory, and thus on the ability to develop and implement building energy codes. Some of these difficulties persist today, and continue to have a limiting effect on the ability of the PA to implement building energy codes.

Evaluation indicators for this item:

1. Project design targets root causes of building energy consumption: yes
2. Project design (summarized in LogFrame) is appropriate and suitable for the national context: yes, at the time of project design, noting that institutional aspects were underrepresented in the design
3. Project design includes sufficient indicators to track progress and measure outputs: appropriate indicators were included, but the level of detail was limited

4.1.2 Country-ownership/Drivenness

The project has good links with other national policies (to revise building codes) and energy sector plans. It was instrumental for the Palestinian Authority for developing a national identity, and governance over their territory. Since all energy is imported, saving energy is of direct importance to the Palestinian economy. The implementation of the code will create economic opportunities (new business, jobs), and thermal insulation will lead to a better comfort in houses.

The need to conserve energy is widely recognized, and was a strong driver for the project. Heating is the main source of household energy consumption, used five months per year, or around 100 days per year continuously. It is widely recognized that energy costs are significant, and that energy conservation is needed.

The project to develop and implement building energy codes, however, appears to have started as an outside initiative, with little institutional commitment in the Palestinian society. This has improved somewhat during implementation, but more and longer efforts would have been needed to secure a full institutional backing of the Energy Code implementation.

Many stakeholders indicate that their involvement in the project is fairly recent, and have criticized aspects of the approach of the project. This indicates a limited involvement during project design. Various parties further indicated that, although the government in general was very supportive of the project, actual involvement was limited due to the many other issues that had a higher priority (like political and security concerns). Together, this indicated that national ownership of the project was weak at the project's start, although this has improved significantly during the implementation of the project.

Evaluation indicators for this item:

4. Project concept originates from within and is supported by national institutions: no, the project concept appears to have originated without much national involvement, and the institutional support appears to be limited.

5. Project concept targets pressing national environmental and development needs: yes, reducing energy demand is an important environmental and development goal.

4.1.3 Stakeholder participation (R)

Rating: marginally satisfactory

Stakeholder participation in the design phase of the project is difficult to assess, given the fairly long time between project design and this evaluation, the drastic changes that the Palestinian society went through since, and the fact that all key personnel of all involved parties has changed since the project design phase[1]. Roles and capacities of major stakeholders are reported in the project document, although the level of detail of that information is limited. Comments by current stakeholders representatives (reported in section 4.1.2) indicate that stakeholder involvement in the project design phase has been limited.

Stakeholder involvement in the project has been much better, and this was successful. Government and civil society stakeholders have been involved in project management (via a National Code Committee, as well as via bilateral contacts), have significantly contributed to the development of the project outputs and have provided the project with many resources (personnel, expertise as well as 'network').

Stakeholders have been frequently consulted during the project, to build and maintain contacts with the relevant target groups. They engaged in the design and fine-tuning of project activities, and have participated in the preparation of project outputs. The project management has maintained an open dialogue with stakeholders in the later stages of the project, and this has significantly contributed to the success of the project.

Evaluation indicators for this item:

6. Stakeholders have been actively and passively informed about the project and its results: yes

7. Key stakeholders have been consulted about core project decisions and have provided significant input into the project: probably limited in early stages, but quite good in later stages

[1] It is noteworthy that none of the parties involved in the final stages of the project, including stakeholders, reported to having been involved in project design.

4.1.4 Replication approach

During project implementation, experiences and lessons learned have been exchanged with similar ongoing projects in the region (Lebanon, Tunisia, Egypt), and with an already completed thermal insulation code (Jordan). This has been beneficial to this project, and probably to the other projects as well.

No formal exchange of experiences is foreseen after this project, although that would certainly be recommended. This project includes some important lessons and can share good and bad experiences, which are likely to be of interest to other countries, many of which are developing building energy efficiency regulation, or would benefit from such activity.

Some of the experiences of this project are indicated in the Lessons Learned section of this report.

Evaluation indicators for this item:

8. Project has communicated lessons learned and sought cooperation with new or ongoing projects of similar concept: yes, during project implementation (not before or after)

4.1.5 UNDP comparative advantage

UNDP-PAPP is an important partner to the Palestinian Authority, supporting its development of governance in many aspects. This puts UNDP in a unique position to assist the PA in the development and implementation of building energy codes, which is a complicated procedure, requiring much institutional capacity building and the development of links between government and public and civil sector parties.

Non-government stakeholders have expressed their appreciation for the opportunities created for their involvement in this project, including possibilities to co-decide about the implementation of the project. Government representatives have recognized this aspect as well, and also appreciate the role UNDP has had in setting-up the project.

Links with other energy projects in the Palestinian Territories have not been developed, since such projects were not present at the time. UNDP has linked this project to similar, ongoing projects in Egypt, Tunisia and Lebanon[2], which allowed for exchange of best practices and experiences.

Evaluation indicators for this item:

9. Project is linked with other projects or programs in the sector via well-developed management arrangements: yes, cooperation with projects in other countries in the Arab region.

[2] Formally, the Lebanese and Palestinian projects are part of one UNDP/GEF-project, although these are implemented separately. This evaluation focuses on the Palestinian project only.

4.2 Project Implementation

Overall, project implementation was good. Project implementation has been challenging, due to a national political context that severely hindered project implementation. The political situation resulted in difficult working conditions for the project team and the implementing agency (the PA Ministry of Local Governments), travel restrictions for project staff, stakeholders and consultants, and at times a loss of political attention for the project.

Project management adapted the project adequately in response to these challenges, and has kept the project continuously on track towards its objectives. These objectives were achieved, after some delays, and with some changed project activities. The project has kept good track of changes in the project environment, outputs and other relevant issues, and activities, budgets and timing have been adapted accordingly.

Overall project outputs exceed the originally expected ones in quantity. Stakeholder involvement in the project was good, although the institutional involvement of governments and professional bodies was (too) limited. The project manager has spent a lot of time and effort on managing the stakeholder relations, and with success. Especially the role of the National Code Committee, including many committed professionals, should be noted. This group has provided extensive support to the project, volunteering time and resources to the project.

Stakeholders expressed their appreciation of the role they could have in the implementation of the project, and thus in the development of a regulation. Such development was new to the Palestinian society, and it is considered to be a successful approach by both the government and the non-governmental stakeholders. Stakeholders have repeatedly expressed their appreciation of the project team that was created, and have recognized the role of the UNDP country office in providing guidance to the project manager.

The overall appreciation of the project implementation is good. Rated elements are:

- Implementation Approach: highly satisfactory
- Monitoring and Evaluation: satisfactory
- Stakeholder participation: satisfactory

4.2.1 Implementation Approach (R)

Rating: highly satisfactory

Project implementation has been challenging, due to a national political context that severely hindered project implementation. The political situation resulted in difficult working conditions for the project team and the implementing agency (the PA Ministry of Local Governments), travel restrictions for project staff, stakeholders and consultants, and at times a loss of political attention for the project.

The project team has managed these difficulties as far as possible. The project was implemented according to plan, although at a slower pace, and solutions were found to counteract the impact of the travel restrictions on the availability of stakeholders and consultants. Regarding stakeholder involvement, this implied that much more effort was needed to organize stakeholder meetings and outreach events, that different teams were needed for the delivery of workshops in the various parts of the territory, and that some training took place outside of the Palestinian Territories (in Jordan or Egypt). This has taken a lot of effort, from the project team as well as from stakeholders, but the quality of these aspects has remained intact.

Due to travel restrictions and the security situation, it was impossible to involve an international consultancy in the technical development of the building energy code, as was planned. Instead, the project team, in consultation with UNDP, decided to hire the Jordanian Royal Scientific Society to provide technical assistance for the development of the code. The selected approach for the development of the code, not defined in the project document, was to duplicate, with adaptations, the Jordanian building energy code. A further analysis of regional and international

building energy codes or thermal standards, as was listed in the project document, seems not have been conducted. Later information[3] learned that the Jordanian building energy code is approx. 15 years old and – according to this information – should be updated. This output will be further evaluated in section 4.3.1.

The project was part of a regional project involving both the Republic of Lebanon and the Palestinian Authority with an initial duration of two years. The main objective was to contribute to a measurable reduction in energy consumption in the building sector and to produce global benefits by reducing emissions of CO2 and other greenhouse gases into the atmosphere. The project also contributed to the integration of global environmental concern within national development activities.

Regional cooperation has been mutually beneficial to this project, and similar projects in other countries. There have been frequent exchanges with Energy Code / Thermal standard development projects in Egypt, Lebanon and Tunisia, and project management units have assisted each other.

A logical framework was developed during project design, and progress was reported according to this, in yearly Project Implementation Reports (PIRs). Since the project has maintained its original objectives and activities, no updating of the logical framework was needed. When difficulties were encountered, the project team indicated (in the yearly PIRs) the status quo for each objective and activity, and the actions needed to reach the objective. In that way, the logical framework was used in a very effective way in the implementation of the project.

The activities of the project were implemented by the Ministry of Local Government under the framework of a Memorandum of Understanding signed on the 6th of June 2001 with the UNDP/PAPP. The project commenced in April 2001 for an estimated duration of twenty four months, but was subsequently extended until December 2004. A formal Steering Committee was established for the project, including government and UNDP representatives, as well as a National Code Committee, which included many representatives from academia, civil society and the private sector. In practice, the National Code Committee seems to have been the main counterpart for the project manager in discussions about the direction of the project and the content of outputs. Via this forum, stakeholders have been closely involved in the project, although they were not represented in the Steering Committee. This arrangement seems to have worked well, although it would have been advisable to include the main stakeholders directly in the Steering Committee and not have a separate committee in parallel to this.

A project website was developed, to communicate the set-up and progress of the project to the wider community of public and private sector professionals. This website is hosted at the website of the Ministry of Local Government, during and after the conclusion of the project. The website provides an overview of the project, and includes the first outputs of the project. Unfortunately, the final outputs, including the Energy Efficient Building Code and the Guidelines for energy efficient building design, are not available online. The project has further developed a software tool (not foreseen in the original project design), to support the application of the energy code by professionals. All outputs, including this software tool, have been made available to professionals via a CD-ROM.

Evaluation indicators for this item:

10. Logical Framework is used as a management tool during implementation: yes, quite well
11. Implementation management is adaptive to changes in the project environment: yes, the project management responded admirably to the many difficulties

[3] Presentation by Mr. Walid Shahin, National Energy Research Centre, Jordan, at the Regional Workshop on Energy Efficiency Building Codes and Appliance Standards & Labels in the Mediterranean Countries, organised by UNDP, Tunisia 23 – 25 November 2005.

12. ICT have been used to support project implementation and dissemination: yes, although more updating of the project website would be advisable

13. The project established suitable operational relations between involved institutions and key stakeholders: yes, good relationships were established with stakeholder representatives. Institutional relationships, however, were limited.

14. The project employed the required technical capacities and made appropriate use of these: yes, as far as possible. The societal and political context didn't allow for a larger involvement of international experts, although that was planned.

4.2.2 Monitoring and evaluation (R)

Rating: satisfactory

Project progress has been closely monitored, by the project management, and by the UNDP office. There has been a frequent interaction between project management, the executing agency (Ministry of Local Government) and the country office regarding implementation issues, changes in the project environment and the outputs, and required adaptations. The objectives of the project have been the focal point during these interactions, and adaptations to the project activities and budgets have been implemented whenever this was required to meet these objectives.

Several tools were applied to support the progress monitoring, including yearly Project Implementation Reports (PIRs), summary presentations to the tripartite meetings and presentations to and discussions with the Steering Committee and National Code Committee. The required adaptations to the project design, following this monitoring, have been taken swiftly and correctly.

Progress was tracked, via the PIRs, against the Logical Framework, indicating the level of performance achieved so far and – if appropriate – the actions to be taken to stay on route towards the projects objectives. Difficulties encountered, these were recorded in these yearly reports as well.

During project implementation, two tri-partite review meetings have taken place, in 2002 and 2004. Yearly meetings were planned, but couldn't be conducted due to the unstable political situation in the Palestinian Territories. The meetings served to present and discuss the results achieved so far, to agree on actions to be taken to help the project move forward and to agree on extensions of the project.

Both a mid-term and a final (external) evaluation were included in the project design. Given the relatively small scope and duration of the project, one external evaluation might have sufficed as well. Due to the security situation, no mid-term evaluation could be performed at the appropriate time, for this project or any other UNDP/GEF project in the Palestinian Territories. Instead, a review of the whole portfolio was made by the GEF Secretariat.

Evaluation indicators for this item:

15. The project has established progress monitoring and has undergone regular evaluations, which have led to required adaptations of the implementation: yes, with varying intervals but adequate for the project.

4.2.3 Stakeholder participation (R)

Rating: satisfactory

Various stakeholders were actively involved in the project, and have contributed to its results. The National Code Committee, which included the main government, private and civil sector stakeholders and academia, has been a very active party in the project. Securing the involvement of the right local stakeholders in the project has taken much effort. This paid off well, and top-level professionals have volunteered much time and expertise to the project. Many have participated in training sessions and workshops, and have also assisted in the delivery of these.

The implementing agency, the key government stakeholder itself, has been a supporter of the project and has created favorable conditions for its development.

The systematic way of Code development and the involvement of stakeholders have contributed to the acceptance of the result by the Palestinian society. Being involved in the development process has made the stakeholders 'hungry' for more involvement with building energy efficiency developments.

Although stakeholders, all professionals themselves, have very actively participated in the project, the institutional involvement, of government departments, professional bodies and universities, has been very limited. Stakeholder representatives usually operated out of a personal commitment – which is commendable – but without much institutional backing. This lack of institutional arrangements, and institutional support, is most visible with the government departments involved. Although supportive of the project, little had been done for the institutional adoption of the projects results, the energy code. After a change in government, stakeholders felt that the government was no longer driving the project forward. This appears to have changed somewhat in recent months, as the government has proceeded with the formal adoption of the building code. However, the involvement of government institutions in the project needs further development, in the future.

The Engineering Association, the main professional body for building designers, appreciates the project. The engineers have benefited from a scientific perspective, but the practical implementation is difficult. Public understanding of the need to apply measures for energy conservation in buildings is still very low, according to the Association. This limits the possibilities for building engineers to adopt the requirements of the code in their designs.

The Palestinian Standards Institute (PSI) was involved in the project, and participated in various workshops. The development process of the Energy Code has initiated discussions about other needed standards and codes.

All stakeholders appreciated the training sessions that were organised by the project. For many, it was the first in-depth experience with energy efficient building design. The courses were fairly short (few days), but contained a lot of information. For many, it was difficult to fully absorb all the information during the courses, and additional training, especially on the practical application of energy code requirements, would have been appreciated. In Gaza-strip alone, more than 240 engineers have received trained about the Energy Code, and have received a copy of it. More have participated in the West Bank. The training included an explanation of the principles of the energy code, and a training in the use of the Visual DOE3.1 software tool for calculating building energy consumption. Engineers for local firms and from municipalities have participated in the training.

A strong element in the project was the inclusion of many different stakeholders in the project. The involvement of university researchers in the preparation of technical outputs, however, could have been better. For future work, universities could provide training on energy code issues, after having been brought up-to-date themselves.

Evaluation indicators for this item:

16. The project properly involved national and local stakeholders in implementation and decision making: involvement of individual professional was very good, institutional involvement was (too) limited

17. The project properly involved government and other relevant institutions in implementation and decision making: yes, government and institutional representatives were adequately involved in the implementation of the project

18. The project disseminated the required information to all relevant stakeholders: yes

4.2.4 Financial Planning

Rating: satisfactory

The actual project cost by objectives, outputs and activities is as follows:

Item	Component	Total Planned (USD)	Actual Expenditure (USD)
1	Experts	55.800	70.156
2	Official Travel	25.000	42.528
3	Evaluation and Monitoring	15.000	17.062
4	Personnel	159.200	123.456
5	Subcontracts:	97.000	107.901
6	Training	53.000	40.103
7	Equipment	49.000	42.065
8	Miscellaneous	8.963	11.457
9	UNDP/PAPP Administrative Cost (8%)	37.037	36.378
	Project total*	500.000	491.107

*Please note that there is one more payment for the evaluation report for a total amount

In-kind contributions have been received from the Palestinian Authority. No monetary representation of these contributions could be established. However, given the amount of inputs and outputs provided, it is reasonable to assume that the total in-kind contribution amounts to at least the agreed sum of $ 64,000 (Palestinian Authority).

In general, it can be observed that:

- The cost for experts was slightly higher than planned, offsetting a saving on personnel cost;
- The cost for official travel is significantly higher than planned. This reflects that, due to travel restrictions, much travel to neighboring countries was needed for regional meetings and training by international experts;
- The cost for subcontracting is slightly higher than planned, offsetting a saving on training cost;
- The miscellaneous cost is minimally higher than planned.

Reflecting on the budget, it is noted that:

- There has been a limited redistribution of budget, and mainly between cost components with similar objectives;
- Spending appears to have been cost-effective. Budgets are fair to low in relation to the delivered outputs, and consultants and main contractors have been selected via standard procurement procedures, with cost-competition. Overall, more outputs have been delivered than was originally agreed, within the original budget. A benchmark or a comparison with other, similar projects, however, could not be established, as this project is fairly new to the region and has been subject to several unique circumstances;
- All cash spending (coming from the GEF-contribution), and most of the in-kind contribution, is in line with the GEF incremental cost criteria. The Palestinian Authority in-kind contribution could not be separately identified. The Ministry has engaged in the preparation of the building energy code and various sensitization activities, but is unclear how much of that work was spent specifically on thermal standard issues. Given the

amount of work put into this project by the Palestinian Authority, however, it is reasonable to assume that this has been equal to or in excess of the promised co-financing.

- Disbursement on the project was delayed, reflecting delays in the project implementation. At the time of writing this report, one budget item, for the evaluation report, is not yet disbursed. This, however, cannot be avoided.

The project was executed directly by UNDP, and the budget was subject to the UNDP internal budget control and auditing. Therefore, no external audit reports were needed.

Evaluation indicators for this item:

19. The actual spending on project activities was cost-effective and proportional to the projects objectives: cost-effective, and in general proportional

20. Financial management was timely and adequate: yes, and disbursement delays are justified

4.2.5 Sustainability

The sustainability of the project outcomes was discussed with the implementing agency and stakeholders during the project, which resulted in a sustainability plan.

This issue is further discussed in section 4.3.2 Sustainability, dealing with the extent to which the benefits of the project continue after finalization of this project (and the external assistance provided with it).

4.2.6 Execution and implementation modalities

The UNDP country office has had an active role in the execution and implementation of this project. Stakeholders have repeatedly expressed their appreciation of the project team that was created, and have recognized the role of the UNDP country office in providing guidance to the project manager.

The project has gone through various difficulties, and many of these required an adjustment in activities, budgets and/or timing of the project. These adjustments have been reviewed and agreed on in a smooth process, initially between the project manager and the UNDP office, and later confirmed by the tri-partite meetings. The smooth interaction between the project team and UNDP has probably been instrumental to the relatively smooth continuation of the project, despite the various incidents.

As a result of the security situation in the Palestinian territories during the project, it was impossible to procure international technical backstopping for the development of the energy code. Failing this option, the project management, in good coordination with UNDP, decided to waive the requirement to tender for this work and ask the Jordanian Royal Scientific Society to provide this technical support. Given the situation, this is an acceptable solution.

Stakeholders recognize and appreciate the supportive role of the Ministry of Local Government (MLG) in the implementation of the project. MLG has provided facilities for the project team, and has facilitated he project with its network. It should be noted, however, that many feel that the wider involvement of the Palestinian Authority, for the adoption and promotion of the Energy Code, was limited. Many stakeholders expect that the institutional support for the energy code is limited, and that this may limit the impact that the project will have in the Palestinian society.

When discussing the support of MLG for the project, it should be noted that a regulatory policy like a mandatory building energy code can only be successful if a government is well-organized and has the institutional capacities to properly absorb such regulation. In this project, the initial assessment, for the project document, failed to identify this aspect and the project has given little attention to the strengthening of the government's capacities for the implementation of a mandatory building code. Further, the project was designed during a time when the PA's capacities were expected to evolve quickly, following the Oslo peace accords. The 2nd *intifada*

interfered with this, limiting the capacities of the PA to govern its territories. Keeping this in mind, the level of institutional support for the building code by MLG is what could be expected.

Evaluation indicators for this item:

23. UNDP provided adequate oversight of the project and assignment of the required experts: yes.

4.3 Results

Overall, the results of the project are good, given the starting point, the context and the size of the project. This evaluation takes into account that the project war developed under a different political and societal scenario, and was implemented during the 2nd *intifada*. That fact accounts for various differences between expected and realized outcomes, although for some objectives, the project document was overly optimistic about the impact that could be achieved with a relatively small project. Although the results are good, they are probably not sufficient for a full adoption of mandatory building energy codes for all buildings in Palestine.

An Energy Efficient Building Code has been prepared in the project, and has recently been adopted by the Palestinian Higher Planning Council (the primary regulatory body for building related matters) as a by-law. This includes the adoption as a mandatory standard for new public buildings, and as a voluntary standard for all other buildings. Mandatory adoption of the Code for non-public buildings will be discussed at a later date (not planned yet). No incentive mechanism has been created to support this voluntary adoption; a verification and enforcement mechanism has yet to be prepared for the mandatory or voluntary adoption of the Code.

The Energy Code was developed on the basis of a pre-existing Jordanian energy code, which was adapted to the Palestinian climatic conditions. This approach did not account for the fact that the Jordanian code was already fairly old and that a large share of the Palestinian buildings are located in Gaza strip, which has a warm, littoral climate, requiring a different consideration than for cooler, more inland areas. The resulting energy code includes (fairly modest) provisions for heat loss reductions through ceilings, roofs and walls of buildings.

It can reasonably be assumed that the Energy Code will lead to a reduced building energy demand, and lower national greenhouse gas emissions. However, no quantification was made in the project. A transformation in the construction sector can only be expected in coming years.

Extensive attention was given to the development of capacities for the adoption of the thermal standard, especially with private sector professionals and in close collaboration with professional bodies and universities. The project has delivered various outputs beyond what was planned (including a software tool and guidelines), and which contribute considerably to the building of professional capacities. This should be considered to be a valuable extension of the expected results of the project.

The training sessions organized by the project, covering several aspects of energy efficient building design, were very well received. All stakeholders felt that these were useful sessions, with lots of new information, and training in the use of energy efficient design tools. Some international experts were involved in these training sessions.

The project team has established contacts with a sister-project in Lebanon, and has exchanged materials and information. Members of the Lebanese team participated in the several Palestinian meetings, and the Palestinian project team participated in a Lebanese workshop. Further, there have been contacts with related projects in Egypt, Tunisia and Jordan.

There are various elements contributing to the sustainability of the project, but there are also some risks. The training of professionals and the inclusion of building energy efficiency in university training programs seem to have a lasting impact, and are likely to contribute to the further evolvement of building energy efficiency in Palestine in coming years. The developed energy code has been formally adopted, and as such will have a lasting impact as well. The new building code unit will also continue to contribute to the further impact of the project, after its conclusion. The scope of the institutional follow-up to the project, however, is very limited. A sustainability plan lists many useful activities, but of a limited scope and a low level of detail, and the organizational responsibilities and funding for the planned activities are not yet fully defined. Given this, the sustainability of this project, to create and implement energy codes for (all) buildings, would benefit from further attention

The overall appreciation of the project results is good (satisfactory). Rated elements are:

- Reduce greenhouse gas emissions (Development objective 1): no rating
- Establish thermal energy standards for buildings and prepare grounds for future adoption of the standard as an energy code for buildings (Development objective 2): marginally satisfactory
- Initiation of a transformation in the construction industry in Palestine (Development objective 3): satisfactory
- Establishing a cost-effective energy code for buildings (Immediate objective 1): marginally satisfactory
- Building local human and resource capacity in energy-saving modalities in the PA (Immediate objective 2): highly satisfactory
- Wide public adoption of cost-effective energy-saving modalities in buildings by the Palestinian public (Immediate objective 3): satisfactory
- Increase regional cooperation (Immediate objective 4): satisfactory

4.3.1 Attainment of Outcomes/ Achievement of objectives (R)

The outcomes of the project are evaluated and rated separately for each of the (three) development objectives and (four) immediate objectives.

Reduce greenhouse gas emissions (Development objective 1)

Rating: no rating

The ultimate environmental goal of the project is the reduction of greenhouse gas emission, via the reduction of energy demand in buildings. The actual impact of the project on national energy demand cannot be identified now, since it will take some years for the Thermal standard to gain full impact on the market, and some more years for sufficient data to become available. Instead, the expected impact of the Thermal standard after completion of the project, and including the impact of national implementation arrangements, should be compared to the project baseline.

No calculations have been made to assess the impact of the project's results on future building energy demand. Some initial calculations have been made to show the effects of the building energy code on some cases, but there is no indication of the share of the market that these buildings represent, and the calculations are seriously flawed. For a project aiming to reduce national energy demand, this is a serious, and unnecessary, omission.

24. Projected emission reductions based on realized project results (baseline: annual energy saving of 0.011 / 0.025 MTOE pa, and 0.1 Mton CO2 emission reduction – ProDoc annex 8 / LogFrame Objectively Verifiable Indicators): no impact assessment made.

Establish thermal energy standards for buildings and prepare grounds for future adoption of the standard as an energy code for buildings (Development objective 2)

Rating: marginally satisfactory

An Energy Efficient Building Code has been prepared in the project, and has been proposed for adoption by the Palestinian Authority. Recently, the Code has been adopted by the Palestinian Higher Planning Council (the primary regulatory body for building related matters) as a by-law. Following this decision, the Code will enter into force as soon as it is officially published (which is planned to happen automatically, with the next issue of the official government journal, the Palestinian Gazette).

The adoption of the Code includes the adoption as a mandatory standard for new public buildings, and as a voluntary standard for all other buildings. Mandatory adoption of the Code for non-public buildings will be discussed at a later date (not planned yet). No incentive mechanism has been created to support this voluntary adoption, nor was a verification and enforcement prepared for the mandatory or voluntary adoption of the Code.

The Code represents a thermal energy standard, although of a limited scope (see comments at Immediate objective 1 in this section), and it can be concluded that – with the formal adoption by the Higher Planning Council and upcoming official publication – a thermal energy standard has been established. The preparation for future adoption, however, has been of a very limited scope. It may be expected that significant additional work is needed to prepare the grounds for full mandatory adoption of the Code. Whether a fuller adoption of the Code was a realistic objective, if more attention had been given to this issue, remain to be seen given the unstable situation in the Palestinian Territories and the relatively weak governance capacities of the Palestinian Authorities.

25. Set of energy codes and guidelines for buildings established in the PA and endorsed by the PA/MLG (LogFrame Objectively Verifiable Indicators): yes, but in a limited form.

Initiation of a transformation in the construction industry in the Palestine (Development objective 3)

Rating: satisfactory

Evidence of a transformation in the construction sector can only be expected in coming years. It is common, and accepted practice, that a market transformation takes time, and is initiated by a set of policies and programs. A Thermal standard can be a very important element in such transformation, but is rarely the only component.

One stakeholder reports that there is some voluntary adoption of the energy code, before the official publication. There is no indication of the share of the market believed to be in compliance with the Code's requirements, and it is expected that this share is rather low. So far, no indications are available to indicate that a transformation of the construction industry has been initiated.

To put this finding in perspective, it should be noted that a market transformation, especially of the construction industry, often takes a lot of time and effort, and the assumption (in the project document) that this project could initiate such transformation by the planned activities is very optimistic. In reality, professional attention for and voluntary adoption of the energy code requirements by a pro-active share of the market would already signify a good impact on the market given the size and duration of the project, and the result achieved should be view in this perspective and that of the unstable situation in Palestine.

26. Voluntary application of energy code (and guideline) in new buildings design and construction (LogFrame Means of Verification - adapted): very limited

Establishing a cost-effective energy code for buildings (Immediate objective 1)

Rating: marginally satisfactory

An Energy Efficient Building Code has been prepared in this project, with accompanying Guidelines for Energy Efficient Building Design and a software tool to calculate the insulation performance of building shell components. These latter two elements are additional outputs, not listed in the project document, and added because it was felt that these were essential tools for a good implementation of the Code in Palestine.

In preparation of the Code, several reviews were made of the status quo in the Palestinian Territories. These cover:

- Architectural Styles Survey in Palestinian Territories;
- Construction Techniques Survey in Palestinian Territories;
- Construction Materials & Local Market Survey in the Palestinian Territories; and
- Climatic Zoning for Energy Efficient Buildings in the Palestinian Territories (the West Bank and Gaza)

The first three of these are descriptive, providing an extensive overview of the various styles, techniques and materials common in the various parts of the territory. The analytic component of the studies, to create an overview of the most important styles, techniques or materials, is underdeveloped. The outputs are good reports, probably very useful for the professionals and academia active in Palestine, but their direct usefulness for the Energy Code development has been limited.

The climatic zoning study, on the other hand, is very analytic – to a level which is probably impractical. The report includes a very detailed analysis of climatic conditions in Palestine, although some of the steps in the analysis are questionable. Based on a multi-variant analysis, it is recommended to divide the territory in seven zones, most of these no more than 5 to 10 kilometers wide, and one covering no more than approx 3 x 15 km in total. Such detailed analysis, without consideration of the practical requirements of regulating building design, should not be considered good practice, and the result is probably not particularly useful. This zoning has not been used in the energy code, although it is included in an annex.

It should be noted that, due to the security situation during project implementation, all studies were conducted by national experts, without international support and typically without previous experience in energy code development or building energy efficiency regulation. This is not a desirable situation, as is shown by the analytic quality of the outputs, but it was the only option under the circumstances. Keeping this in mind, the three surveys should be considered to be of reasonable quality and useful to the wider process of transforming the construction industry.

Following these surveys and the analysis, the Energy Code itself was developed, based on the pre-existing Jordanian energy code. With the assistance of the Jordanian Royal Scientific Society, this code was adapted to the Palestinian climatic conditions. This underlying rationale was (a) that due security reasons, no international technical support was available, and (b) that the Jordanian and Palestine climate and construction practice are fairly similar. Unfortunately, a planned review of regional and international building codes has not been performed. Although there are probably a lot of similarities, this approach did not take into account that the Jordanian code was already fairly old and not a good example of a modern building energy code. Further, the fact was ignored that a large share of the Palestinian buildings are located in Gaza strip, which has a warm, littoral climate and which requires a different consideration than for the cooler, more inland West Bank areas.

The resulting energy code includes provisions for heat loss reductions through ceilings, roofs and walls of buildings. Requirements are fairly modest (required U-values of 0.9 to 2.2 W/m^2.K for ceilings and roofs; 1.8 to 2.5 W/m^2.K for walls including doors and windows), and there is no differentiation between coastal and inland areas. A cost-effectiveness calculation of the requirements is seriously flawed, lacking an analytic framework and technically incorrect[4]. Even considering the difficult situations under which the project had to perform the preparation of the Code, this is not a good result.

Some stakeholders claim that the code, which targets building shell thermal performance, is too limited in scope. Issues like bio-climatic building design, efficient end-use technologies, and targeting existing buildings are said to have a similar or bigger impact on building energy demand than shell performance. Although these issues can have a similar or bigger impact, this does not imply that they should be included in an energy code, especially not a first energy code being developed under difficult circumstances. Targeting building shell thermal performance is a good and logical first step, and already demanding enough for the Palestinian context. Efficient end-use technologies can be targeted independently, at least until the building is so advanced that an integrated approach is required. Including bio-climatic design strategies in a building energy code

[4] The cost-efficiency calculations only consider heat losses, and ignore heat gains. These are known, especially in a Mediterranean climate, to have a large effect on a buildings energy balance and the impact of insulation of reducing heating demand.

requires a much more advanced level of technical analysis for code development, and for compliance checking on building designs, than is currently available in Palestine. Targeting existing buildings is typically much more complicated than targeting new buildings, and is so far only being introduced in countries with a long history in regulating building energy performance and significantly bigger resources and institutional capacities.

The development of an action plan for the adoption of the energy code has been limited. The project management has undertaken various actions to promote the adoption of the Code by the Palestinian Authority, and the National Code Committee has advocated this step as well. A good analysis of barriers to be addressed for a wider adoption of the Code, however, has not been identified. This is an omission, and the project management should have given this aspect more attention. It should also be realized, however, that the implementation efforts were underestimated in the project document, and that the capacities of the PA to facilitate the adoption of the Code were very limited. The effect of the omission may thus be minimal.

27. Building code review, construction materials review and building designs review provide sufficient information for the development of an energy code (output 1.1): a building code review has not been performed, although this would have been very useful when adopting a building code from another country. The other reviews have provided useful information, although of limited direct relevance for the energy code development.

28. Energy code is technically sound and is cost-effective (output 1.1): the technical quality of the energy code is not very good. Cost-effectiveness has not been properly established.

29. Action plan developed for the adoption of the energy code, based on identification of barriers (output 1.2): this activity has been of a very limited scope, focusing almost only on the adoption, by the PA, of the energy code.

Building local human and resource capacity in energy-saving modalities in the PA (Immediate objective 2)

Rating: highly satisfactory

Extensive attention was given to the development of capacities for the adoption of the thermal standard, especially with private sector professionals and in close collaboration with professional bodies and universities. The project has delivered various outputs beyond what was planned (including a software tool and guidelines), that contribute considerably to the building of professional capacities. This should be considered to be a valuable extension of the expected results of the project.

The training sessions organized by the project, covering several aspects of energy efficient building design, were very well received. All stakeholders felt that these were useful sessions, with lots of new information, and training in the use of energy efficient design tools. The only critique was the training included so many important new aspects, that it was difficult to fully absorb this during the course of the (2 – 3 day) session. Rather than being a negative point, this stresses the urgency of organizing these trainings, and the impact that these have had on the professionals involved. Obviously, training in energy efficient building design was urgently needed, and this was accommodated as much as could be reasonably expected. The more in-depth training that many professionals would like to have (some indicate that an additional two-month training would be welcomed) might be very valuable, but this is beyond the scope of the project. Some international experts were involved in these training sessions, that took place in later stages of the project (when the security situation had improved), and partly in Egypt and Jordan.

The project has made some tools available for professionals, to facilitate the design of energy efficient buildings. The project supported the purchase, by the Palestinian Standards Institute (PSI), of a facility for testing the thermal insulation performance of building and isolation materials. This facility was to be installed in the PSI building in Ramallah, and was supposed to serve public authorities and academia free of charge, and the private sector for a fee. Unfortunately, one essential component needed for the operation of this facility, which was

already in the possession of the PSI, was damaged during transport and there was, and is, no budget to repair or replace this. As a result, the test facility has never been operational, and there is no indication when it will be operational.

The project has also made software tools (Visual DOE-software, a leading software tool for building energy demand simulations) available for universities, to train their students in the use of this package. Universities indicated that this was a very useful addition, but that the licenses for this software had expired and that they had no means to renew these independently.

The reported difficulties should probably mainly be attributed to the difficult societal and political situation in the Palestinian territories, than to the project itself. The project has resulted in a significant awareness of the involved professionals of energy efficient building design, and a much increased knowledge of appropriate design principles. The project has also provided various institutions with tools to facilitate the implementation of energy efficient building design practice, and can't be help responsible for the some of these tools not or no longer functioning.

30. Increased knowledge and expertise in energy-efficient modalities by civil engineers and contractors, via training (output 2.1 / LogFrame Objectively Verifiable Indicators): yes, this has increased significantly

31. Equipment and information made available to local professionals, on building energy efficiency (output 2.1): yes, although this only partially worked as planned.

Wide public adoption of cost-effective energy-saving modalities in buildings by the Palestinian public (Immediate objective 3)

Rating: satisfactory

The project developed and implemented an awareness raising campaign to introduce the concept and rationale of the Energy Efficient Building Code to professionals and the general public. This campaign was also intended to encourage the public to adopt and utilize the recommendations and the materials provided by the project, and to enhance the knowledge of the construction sector, including engineers, contractors, students and workers, about the Code and the Guidelines and their application.

The campaign included the development of three brochures, two posters, a special edition of the journal of the Ministry of Local Government, newsletters, a flyer with a summary of the energy code, and promotional articles like safety hats, banners and pens. The various workshops, organized to increase the knowledge of professionals of energy efficient building design practices, also served to raise awareness about the issue.

Finally, the project team convinced a housing association to implement the code in a complete new neighborhood consisting of 80 residential units. A feasibility study formed the basis for the association's decision.

Overall, the project has focused a lot of attention on introducing the energy code in the construction sector, and on raising awareness and knowledge of involved professionals. The awareness raising campaign has probably also had an impact on promoting a wide public adoption of energy efficient modalities, but this impact appears to be small. Stakeholders claim that the general public's demand for energy efficiency measures is non-existent, and the acceptance of measures proposed by designer limited.

In this respect, it should be considered that a small awareness raising campaign, as was planned as part of this project, is unlikely to have much impact on the general public's awareness and understanding of building energy efficiency, and – especially without an incentive mechanism or a legal requirement for compliance with the code – very little impact on the willingness of the public to act on the information provided. The objective to create a wide public adoption was probably an over-estimation of what can be achieved by a project of this scope and size, and the conclusion that the impact on this aspect has probably been very small should not be considered a failure of the project.

32. Public demand for information about building energy efficiency (output 3.1 / LogFrame Means of Verification): limited

33. Demand for application of energy code / energy efficiency guidelines by the public (output 3.1 / LogFrame Objectively Verifiable Indicators): very limited

Increase regional cooperation (Immediate objective 4)

Rating: satisfactory

The project team has established contacts with the Lebanese team by exchanging materials and information. Members of the Lebanese team participated in the training courses, and several regional meetings have taken place. The Palestinian project team participated in a Lebanese workshop.

The project team has conducted three visits to Jordan, to meet the Royal Scientific Society, the Jordanian Engineering Association, and other relevant experts to enhance regional cooperation and coordination. The project team established contacts with the National Agency for Renewable Energy in Tunisia, regarding their experience in the field of energy efficiency in construction, buildings insulation, solar thermal applications, and codes establishment. The project team conducted a visit to Tunisia in October 2002 to the National Agency of Renewable Energies and relevant institutions, exchanged documents and experiences, and discussed future plans for cooperation and coordination.

A Regional Conference was held in December 2003 in Beirut, Lebanon, which included related institutions of the projects of Palestine, Lebanon, Egypt, Tunisia and Jordan. The Palestinian project was presented there, and best practices were shared among the participants.

One of the training sessions of the Palestinian project was hosted at the Housing and Building Research center (HBRC) in Egypt. As part of this session, the participants were exposed to the Egyptian experience of preparing and implementing Thermal Standards for Building.

34. Exchange of knowledge in the region via workshops, meetings and exchange of documents and experts (output 4.1 / LogFrame Means of Verification): yes, interaction was extensive and well-organized

4.3.2 Sustainability

The project has resulted in a lasting increase in awareness on building energy efficiency in Palestine. Many professionals have been made aware of the relevance of the issue, and have been introduced to design principles to improve the thermal performance of buildings. Stakeholders indicate that this is a highly-valued outcome of the project, and that it has created a desire to be more actively involved with building energy efficiency by many of the parties involved.

The Palestinian Authority has adopted the Energy Efficient Building Code as a by-law, and has set-up a small building codes unit to follow-up on the Code, specifically to liaise with other Ministries and non-governmental organizations about the implementation of the Code. Further, the unit is to work on the development of new codes in other, related areas.

Teaching at universities now includes aspects of building energy consumption and energy code issues, with various courses in the regular program. This is supported by three MoUs, agreed between the Ministry of Local Government and the three universities in Palestine. Various graduation projects deal with energy efficient building designs, or with research about efficient HVAC systems.

The Ministry of Local Government has developed a sustainability plan, for the further development of the energy code. Apart from the setting-up of the building codes unit, this plan embodies the finalization of the legal process of Code adoption, the implement process, and the (further) development and upgrading of the Code. The legal adoption of the code as a Palestinian by-law is almost complete, but the institutional follow-up of compliance monitoring and enforcement has not yet been arranged. The plan lists that a mechanism for incentives and/or

penalties is to be studied and implemented, which is recommendable, but doesn't list any detail as to which mechanisms and/or penalties are to be considered and for which sector.

The implementation process section describes that some steps will be taken to make organizations responsible for the verification of code requirements. This section also lacks detail, for example about the legal basis for that responsibility, the mandate and budget that will be given, and the enforcement steps for non-compliance.

The plan further lists a development and upgrading process for the Code, which includes the setting-up of a committee to oversee this process, the collection of and response to feedback about the Code, and other follow-up steps. Unfortunately, this section also lacks detail, for example about the relationship between the upgrading process and the legal adoption of the code, but also about organizational responsibilities for the various follow-up activities and the funding for that work.

Overall, the sustainability of the project appears to be a mixed result. The training of professionals and the inclusion of building energy efficiency in university training programs seem to have a lasting impact, and are likely to contribute to the further evolvement of building energy efficiency in Palestine in coming years. The developed energy code has been formally adopted, and as such will have a lasting impact as well. The new building code unit will also continue to contribute to the further impact of the project, after its conclusion

The scope of the institutional follow-up to the project, however, is very limited. The adoption of the Code by the Palestinian Authority only covers mandatory adoption for public buildings, but at the moment without a verification and enforcement mechanism, and voluntary adoption for all other buildings, but with an incentive mechanism. The sustainability plan lists many useful activities, which would improve the impact of the project and the continuation of building energy efficiency work after completion of the project. However, given the limited scope and level of detail, and the lack of organizational responsibilities and funding for the planned activities, there is a serious risk that this plan will either be implemented in a very limited way, or not implemented at all.

Given this, the sustainability of this project, to create and implement energy codes for (all) buildings, would benefit from further attention.

Evaluation indicators for this item:

21. The project established a sustainable impact in the country, which will continue independently: yes, but mainly on awareness, attitude and knowledge of involved professionals

22. The project established arrangements with relevant organizations or other instruments to secure a continued impact: only on a limited scale, and essential elements are not included in the arrangements.

5. Recommendations

Before this project, building energy efficiency was almost a non-issue in the Palestinian territories. Now, after the project, the issue is on the agenda with building professionals, and elements have been put into place to give it wider attention with the general public and in the policy arena. This is a valuable outcome of the project, and a significant step forward for energy efficiency in Palestine. It is, however, still a big leap from the current situation to establishing a well-implemented mandatory building energy code, as a means to maximize the energy savings in buildings. These recommendations take into account that the current situation in Palestine may not be ideal for quickly moving forward towards such mandatory codes, and that other trajectories might be more appropriate in addressing energy efficiency in the reality of the Palestinian economy, as well as making better use of the involvement of the professional community if building energy efficiency. Given the – quickly evolving and sometimes chaotic – situation in the Palestinian Territories, these recommendations are best seen as 'food for thought'.

5.1 Corrective actions for the design, implementation, monitoring and evaluation of the project

The main issues for corrective action are to reconsider the implementation strategy for the Energy Efficient Building Code, and to finalize or correct some of the outputs of the project. The implementation strategy for this project has so far been targeted on the adoption of the Energy Code as a mandatory standard for all new buildings, with the current adoption as an interim stage. However, several required elements are missing, to make this a successful strategy:

- The institutional capacities of the Palestinian Authority for the introduction, promotion, compliance checking, enforcement and updating of the energy code appear to be too limited even for the current, limited adoption (mandatory for public buildings only). Substantially more efforts will be needed for a mandatory adoption for all buildings.
- The project has given little attention to the institutional capacity development needed, and a trajectory to improve these will have to start now, after completion of the project. The action plan to prepare for the adoption of the code, implemented during the project, has been of a very limited scope.
- The sustainability plan, intended to prepare the grounds for further adoption and implementation steps, is rather weak, lacking detail, institutional responsibilities and funding.
- The technical foundations of the current energy code are rather weak, and it is likely that the current requirements are not optimal for some parts of the territory, especially the littoral Gaza-strip.

The question to answer is whether the institutional capacities of the Palestinian Authority, for the introduction, promotion, compliance checking, enforcement and updating of the energy code, can be developed quickly enough to engage in a trajectory that will lead to the adoption of a (possibly improved) mandatory energy code for all new buildings, with the necessary policies and procedures in place. This seems to be unlikely, given the current unstable situation in Palestine.

An alternative strategy would be to focus on voluntary adoption of the energy code as the final objective of the current project, and targeting actions on making this as successful as possible. Such strategy could include element like:

- International donors and NGOs are involved in a large share of the construction work in Palestine, and they could make compliance with the Code a requirement for their involvement.
- Compliance checking and enforcement could be developed for voluntary compliance with the code, giving the relevant institutions the time to develop these skills on a smaller and less demanding scale.

- Voluntary compliance could be given a non-financial incentive, e.g. a preferential treatment of the application for permits.
- The development of a national capacity for technical development or improvement of the energy code. Universities are already involved in building energy efficiency research, and it seems likely that, given time, the proper mandate and training, they could take responsibility for much of the technical work needed to upgrade the code.
- Sensitization and training of professionals could continue, and would be especially useful if an attractive incentive mechanism could be created.

Once such strategy bears fruit, a decision to adopt a revised code, mandatory for all buildings, could be reconsidered.

It is recommended that the institutional roles and commitments in the implementation of the energy code are revised, preferably as part of a re-orientation of the implementation strategy, but independently otherwise. This review should include an assessment of the mandates and resources for the various institutions required for a good implementation, and the formulation of actions to improve this if needed.

Some outputs of the current project require correction or upgrading. These are:

- The project website doesn't include the final outputs of the project (Energy Code, Guidelines, Software tool), nor does it mention the newly set-up building code unit. It is recommended to update the website with the latest information.
- The cost-effectiveness calculations for the energy code requirements are flawed. It is recommended to upgrade these, using a more advanced calculation method (e.g., simulations in the purchased Visual DOE software tool), and using a better analytic framework (describing the typical building designs for Palestine).
- No impact analysis was made for the developed building code. It is recommended to estimate the expected impacts, not only to be able to report about expected CO_2-impacts, but especially to be able to report about national energy consumption and energy cost savings. Such analysis would include a good estimate of the impact of the code on typical building designs, estimates of the share of new buildings represented by each design, and a simple model to describe the stock of buildings in Palestine in coming years.

It may be possible to involve one or more of the Palestinian universities for the latter two points, thus building technical capacities at the same time as improving the outputs of the project.

5.2 Actions to follow up or reinforce initial benefits from the project

A relatively simple means to raise the profile of the Energy Code, and stimulate consideration of voluntary adoption by *all* building developers would be to include an item about (voluntary) application of the Code at building permit application forms and building usage application forms. This option could be a low-cost, but probably effective tool to remind developers and designers about the standard.

Demonstration projects, of buildings that have applied the Energy Code requirements, would be a good instrument to disseminate the benefits of the Code to the construction sector (in the construction sector, often only seeing is believing). By also measuring the performance of these buildings, and comparing this to that of similar buildings without energy efficiency measures, the real-life impact of the Code could be established for an impact analysis, and demonstrated to the public.

Dissemination of the benefits of the Code could further be improved by awareness raising campaigns, separately for the professional audience (via the regular channels for professional communication and the Engineering Association), but for the general public it might be preferable to integrate the message with other home or office energy conservation messages.

It could be considered to develop more and/or longer training programs for professionals. Stakeholders reported that the training sessions had been very well accepted, and have significantly raised the awareness of energy efficiency issues as well as the capacities to operate on this. More professionals might benefits from this training, and some might benefit from more extensive courses.

Palestinian universities may be able to have a bigger role in follow-up of the project. They have already been involved in the project, in various ways, but so far not much in the preparation of technical outputs. In the future, universities could perform parts of the technical analysis, and provide training on energy code issues. It would be advisable, however, to seek the advice of high-level international experts, with a good track record in developing building energy codes (in their own country), on modeling and other issues in the development and application of building energy codes, to bring Palestinian experts up-to-date on best practices.

5.3 Proposals for future directions underlining main objectives

Before considering future steps for regulating building energy performance, it is important that the current step, of the development and complete implementation of a first building energy code, is successfully concluded. This may take quite some time, and a clear focus on this is probably more helpful than considerations about potential future steps in building energy code development.

A logical follow-on to further the energy performance of buildings would be to work on HVAC equipment, appliances and lighting. Especially installed equipment (boilers, water heaters, air conditioners etc) is closely linked to the energy demand for heating and cooling buildings. In this respect, it could also be considered if a solar boiler program would be an option to improve quality of life to residents, whilst preventing the increase in fuel- or electricity-demand for water heating.

In the long term, a building energy performance standard could be considered. This typically integrates building envelope performance with equipment energy efficiency requirements, and often takes the format of a maximum energy demand (for cooling and/or heating) per square meter of interior area (GJ/m^2.year). Such target value is usually adapted to climate zones and building types (residential buildings, offices, hospitals etc), and can be gradually lowered over the years, to further stimulate market transformation. In such stage, it could be considered to also include new additions (of a certain minimum size) to existing buildings in the regulations, thus extending the scope of the regulation and maximizing national and end-user benefits.

Further potential follow-on to the work on the energy code development would be a program to bring local building material manufacturing up to international quality levels, and to certify these products according to internationally recognized standards (preferably ISO or EN test standards). This would have little impact on the energy performance of buildings in Palestine as such (general construction materials have only a small impact on the thermal performance of buildings, and proxy information would suffice for the calculation of thermal performance when locally manufactured, non-certified materials are used), but it would enable the Palestinian building materials industry to compete on an equal level with international suppliers, on the domestic and regional markets.

6. Lessons learned

The project, including its design, implementation and results, shows many insightful lessons. Some of these point to good aspects of the project, and repetition of the underlying practices in other projects would be recommended. Some point to clear failures in project design or implementation, and also provide very useful lessons for future projects. It is impossible to provide a full overview of all lessons learned here, and the project management and the stakeholders involved are encouraged to describe their lessons learned, and report these (e.g., as part of the project final report, in a conference or magazine paper).

Lessons include:

- Good, intensive involvement of stakeholders throughout the project.

  Stakeholder involvement in the project has been remarkably high, and this has had a very positive impact on the projects focus, implementation success and the relevance of the outputs for the country. Various arrangements have been made to stimulate stakeholder involvement:

  - A National Code Committee included all stakeholder groups, and was involved in all decision during the project. All major steps in the project were discussed in this committee, as well as technical outputs. This provided the project with very valuable inputs, on both aspects;
  - The involvement of key national stakeholders in the development of project outputs. National stakeholders have taken responsibility for the development of some of the outputs, have been very active in the promotion of the project in their networks, with use of their resources;
  - Supporting that stakeholders develop their own links and usages of the project outputs. Universities have set-up their own activities alongside the project, making use of the project outputs also for their own purposes. This has been encouraged, and is leading to a significant improvement in the national capacity for implementation of building energy efficiency measures and a good national basis for future work on building energy performance.

  The success of the stakeholder involvement can be explained by these arrangements, and the open and informative management and communication style of the project management. These elements alone are to be considered a good practice, and in combination it is a commendable practice, which should be repeated in similar projects.

- A project approach in line with the capacities of the country

  Building energy code development can be very complex work, requiring experience with regulatory policy and with building energy efficiency. Both were hardly available in Palestine when the project started, and it would have been difficult to perform a complex building energy code development in that setting. The project management choose to scale down the complexity of the work, on the one hand side by adopting and adapting a building energy of another country (Jordan) for use in Palestine, without the need to do much analysis, and on the other hand side to limit the number of elements included in the energy code. This has made the project manageable, and as such it is a good lesson that it is better to complete a scaled-down project than to continue with an overly ambitious one, if the required context and resources are not available.

  An alternative would have been to first improve the national capacities, for example by training national experts (university or government) in the development of building energy codes and exposing them to international best practices. A regional or international cooperation, perhaps with trainings or meetings outside of Palestine, might have provided the required circumstances for such approach. Following this, the available resources for

the development of an energy code might have been much better, allowing for a better development process, with a better reflection of the national conditions and a better analysis of the appropriateness of energy code requirements. This route might have taken more time, but it might also have resulted in a more advanced result.

- In-depth assessment of national regulatory infrastructure

  New regulatory policy, like a thermal standard, is typically characterized by its reliance on other regulatory and institutional aspects. In this case, it is typically dependent on a national building policy, building permit procedures, design and construction compliance checking, product quality assurance, and many more factors. It deviates significantly from other, non-regulatory projects in that many of these aspects are a government prerogative, and it is usually impossible to mitigate any missing elements by project activities. The analysis of this institutional and regulatory framework, as part of the project design, has been limited. A crucial element, the availability of a national verification and enforcement infrastructure, had been – incorrectly – assumed. The project document failed to identify this aspect, and in the implementation of the project little attention was given to the need to build an institutional infrastructure for the implementation of the Energy Code. In future project, into building standards or other regulatory policies, more attention should be given to the regulatory and institutional environment, and activities designed, in good cooperation with the relevant institutions, to upgrade this setting where needed.

Evaluation report Annexes

Annex 1. Terms of Reference for Final Evaluation

1. Introduction

a. UNDP/GEF Monitoring and Evaluation Policy

The Monitoring and Evaluation (M&E) policy at the project level in UNDP/GEF has four objectives: i) to monitor and evaluate results and impacts; ii) to provide a basis for decision making on necessary amendments and improvements; iii) to promote accountability for resource use; and iii) to document, provide feedback on, and disseminate lessons learned. A mix of tools is used to ensure effective project M&E. These might be applied continuously throughout the lifetime of the project – e.g. periodic monitoring of indicators -, or as specific time-bound exercises such as mid-term reviews, audit reports and final evaluations.

In accordance with UNDP/GEF M&E policies and procedures, all regular and medium-sized projects supported by the GEF should undergo a final evaluation upon completion of implementation. A final evaluation of a GEF-funded project (or previous phase) is required before a concept proposal for additional funding (or subsequent phases of the same project) can be considered for inclusion in a GEF work program. However, a final evaluation is not an appraisal of the follow-up phase.

Final evaluations are intended to assess the relevance, performance and success of the project. It looks at early signs of potential impact and sustainability of results, including the contribution to capacity development and the achievement of global environment goals. It will also identify/document lessons learned, suggest actions to be taken at the local level to facilitate effective follow-up of the project in line with its long term development objective and make recommendations that might improve design and implementation of other UNDP/GEF projects.

b. Project background and outputs

The "Capacity Building for the Adoption and Application of Energy Codes for Buildings Project" is part of a regional initiative involving both the Republic of Lebanon and the Palestinian Authority with an initial duration of two years. It is funded by the Global Environment Facility (GEF), executed by UNDP/PAPP and implemented by the Ministry of Local Government.

The activities of the project were implemented by the Ministry of Local Government under the framework of a *Memorandum of Understanding* signed on the 6th of June 2001 with the UNDP/PAPP. The project commenced in April 2001 for an estimated duration of twenty four months, but was subsequently extended until December 2004.

The main objective of this project is to contribute to a measurable reduction in energy consumption in the building sector and to produce global benefits by reducing emissions of CO2 and other greenhouse gases into the atmosphere. As such, and by removing barriers to the establishment and adoption of energy codes for buildings, the project contributes to the reduction of the risk for climate change, and falls under Operational Program 5. The project also contributes to the integration of global environmental concern within national development activities.

The project has the following immediate objectives:

1. Building capacity for adoption and implementation of energy efficiency building codes which ultimately will reduce CO_2 emissions;
2. Facilitate the transfer of international and regional experience and technology in the area of high efficiency building and construction;
3. Opening new horizons for investment in the industry of energy efficient construction materials;
4. Improving the level of awareness of the private sector of the financial and environmental impacts of energy efficiency in buildings; and
5. Improving human comfort in private and public buildings.

2. Objectives of the Evaluation

The overall objective of this final evaluation is to review the performance and the implementation of the "Capacity Building for the Adoption and Application of Energy Codes for Buildings Project", to asses the extent to which the global environment objectives and the improvements targets, as described in the project document, have been achieved and, to analyze the efficiency and cost effectiveness of how the project has moved towards its objectives and outcomes.

In addition, the final evaluation is expected to present main findings and key lessons, including example of good practices for future projects in the country, region and GEF.

The Report of the final evaluation will be targeted at meeting the Evaluation needs of all stakeholders (GEF, UNDP, MLG, and other relevant stakeholders participating in the project).

3. Scope of work

In pursuit of the overall objective and in- line with GEF M&E guidance the following key issues will be addressed during the final evaluation: .

- Analysis of the attainment of global environmental objectives, outcomes/impacts, project objectives, and delivery and completion of project outputs/activities (based on indicators).
- Evaluation of project achievements according to GEF Project Review Criteria:
- Implementation approach
- Country ownership/Drivenness
- Stakeholder participation
- Sustainability
- Replication approach
- Financial planning
- Cost-effectiveness
- Assessment of the project's monitoring and evaluation systems

The main stakeholders of the evaluation include:

- The managing institutions (Ministry of Local Government, National Coordinator, and National Project Manager and UNDP/PAPP)
- Contracted institutions responsible for the implementation of project activities, such as Engineering Associations both in West Bank and Gaza, Palestinian Standards Institution, Universities, NGOs, research centers.

4. Methodology

The evaluation process will be carried out through a period of XXX days, including a field mission to the Palestinian Territories where the Palestinian Ministry of Local Government (MLG) and UNDP / GEF will be represented in addition to the consultant. The consultant will coordinate and work with the MLG and UNDP/PAPP, and other stakeholders if required.

The methodology will cover:

4.1. Preparatory stage :

- Preliminary desk study review of relevant documentation provided by UNDP/PAPP and MLG
- Circulation of information with main stakeholders to determine the key issues to be addressed during the mission in the Palestinian Territories.
- Submission of Inception Report

4.2. Field Mission :

- Briefing for evaluators

- Desk study review of all relevant project documentation.
- Interviews and meetings with the senior management of the MLG, project management and staff, target energy consumers, UNDP/PAPP, and other stakeholders.
- Validation of preliminary findings of the mission with the MLG and UNDP

4.3. Preparation of Final evaluation Report

- Submission of first draft report and circulation for comments, and feedbacks from Palestinian MLG and UNDP
- Preparation of final evaluation report

5. Products

The main product of the evaluation will be a comprehensive report, not exceeding 50 pages (excluding the annexes) including a 3-5 pages on recommendations for sustaining the goals of the project. The outline of the terminal evaluation report should fit to the guidelines developed by GEF and UNDP for projects final evaluation (annexes 1 and 2) and should include:

- Executive summary
- Introduction
- Project and its development context
- Findings and conclusions
    1. Project formulation and process of planning
    2. Implementation arrangements
    3. Results and impacts
- Recommendations and future initiatives
- Lessons learned
- Annexes

The final Terminal Evaluation Report is to be submitted to UNDP and upon clearance by the participating UNDP offices and UNDP-GEF (Regional Coordination Unit in Beirut and M&E Unit in NY) it will be submitted to the GEF M&E Unit.

6. Expected qualifications of the Evaluator/Evaluator Team

- Advanced degree in energy related field;
- At least 5 years' working experience with activities promoting energy efficiency in the commercial, public and residential sectors, including topics such as public awareness raising and marketing, energy sector management, institutional capacity building and financing;
- Experience in the evaluation of technical assistance projects, preferably with UNDP or other United Nations development agencies and major donors;
- Updated knowledge of UNDP/GEF policies, strategies, and analysis of expected impacts in terms of global benefits;
- Demonstrated ability to assess complex situations in order to succinctly and clearly distillate critical issues and draw forward looking conclusions;
- Excellent oral and writing communication skills in English;

7. Implementation Arrangements

Management Arrangements

For the support of the Consultant and for efficient performance of the work, UNDP/PAPP and MLG will provide with all available information and data related to project, as well as office facilities to the consultant in the various appropriate locations.

Proposed Timeframe

The proposed evaluation period is . The following table shows the activities to be undertaken during the proposed period.

Activity	Timing	Comments
Review of existing and relevant information		Documents to be provided by the project components
Visit to the Palestinian Project Component		meeting with collaborating institutions (MLG, UNDP/PAPP, Engineering Associations, etc)
Preparation of final evaluation reports		

Annex 2. Evaluation Itinerary

The itinerary followed is described in the evaluation outline developed for this evaluation, which is repeated here.

1. Introduction

This evaluation outline describes the approach proposed for the evaluation of the UNDP/GEF project "Capacity Building For the Adoption and Application of Energy Codes for Buildings" (PAL/99/G35), the assessment of its contribution to capacity development and global environmental goals, and the identification of lessons learned, recommendations for future projects and forward vision recommendations regarding the sustainability of project outputs.

1.1 Background for this Evaluation

The project "Capacity Building for the Adoption and Application of Energy Codes for Buildings" (further: the project) is funded by the Global Environment Facility (GEF), executed by the United Nations Development Program – Program of Assistance to the Palestinian People (UNDP-PAPP), and implemented by the Palestinian Authority Ministry of Local Government (PA-MLG). The project falls under the Climate Change focal area, and aims at enabling energy conservation in Buildings through the establishment of an Energy Code for Buildings in the Palestinian Territories, and the provision of capacity building and information dissemination to enable its future adoption and application.

UNDP requests this evaluation is to review the performance and the implementation of the project, to asses the extent to which the global environment objectives and the improvements targets, as described in the project document, have been achieved and, to analyze the efficiency and cost effectiveness of how the project has moved towards its objectives and outcomes. In addition, the final evaluation is expected to present main findings and key lessons, including example of good practices for future projects in the country, region and GEF. The Report of the final evaluation will be targeted at meeting the Evaluation needs of all stakeholders (GEF, UNDP, MLG, and other relevant stakeholders participating in the project).

This outline describes the proposed approach for this evaluation and its strategy, planning and deliverables, in accordance with the Terms of Reference (ToR) provided by UNDP/PAPP.

1.2 Evaluation Issues

The ToR prescribes the GEF Project Review Criteria as the framework for this evaluation, and lists the documents to be reviewed and the stakeholders to be consulted. For some of the evaluation components (specifically Findings and Conclusions), the GEF criteria specify which elements need to be addressed in the evaluation.

According to the GEF Project Review Criteria, the evaluation should include the following issues (a full description of these issues is included as Annex I). Items marked with an (R) should also be rated in one of four classes.

1. Executive summary
   - Brief description of project
   - Context and purpose of the evaluation
   - Main findings, conclusions, recommendations and lessons learned
2. Introduction
   - Purpose of the evaluation
   - Key issues addressed
   - Methodology of the evaluation
   - Structure of the evaluation
3. The project and its development context
   - Project start and duration
   - Problems that the project seeks to address

- Immediate and development objectives of the project
- Main stakeholders
- Results expected

4. Findings and Conclusions

   4.1 Project Formulation
   - Conceptualization/Design (R)
   - Country-ownership/Drivenness
   - Stakeholder participation (R)
   - Replication approach
   - UNDP comparative advantage

   4.2 Project Implementation
   - Implementation Approach (R)
   - Monitoring and evaluation (R)
   - Stakeholder participation (R)
   - Financial Planning
   - Sustainability
   - Execution and implementation modalities

   4.3 Results
   - Attainment of Outcomes/ Achievement of objectives (R)
   - Sustainability

5 Recommendations
- Corrective actions for the design, implementation, monitoring and evaluation of the project;
- Actions to follow up or reinforce initial benefits from the project;
- Proposals for future directions underlining main objectives;

6 Lessons learned
- This should highlight the best and worst practices in addressing issues relating to relevance, performance and success.

These evaluation issues form the basis for the proposed evaluation. The projects relevance, performance and success, as well as emerging impact and sustainability of results, will be assessed against indicators for the above issues.

These indicators will be taken from the Project Document, as far as possible, supplemented with additional indicators where needed. A full list of evaluation indicators will be prepared at the start of the evaluation, based on the above issues, and the project documentation. It should be noted that the availability of information, and the limitations in time and budget for the evaluation will limit the extend to which evaluation indicators can be assessed. The indicators will provide the framework for the fact finding, analysis, ratings and recommendations of the evaluation.

1.3 Organization and approach of the evaluation

This evaluation will be performed as an external, independent assessment of the project, including a desk review of available project documentation (including the project document, progress reports, outputs and other sources of information), interviews with UNDP/PAPP and PA-MLG program officers, the national project manager, the national coordinator, and selected stakeholders (Engineering Associations, Palestinian Standards Institute, Universities, etc). These interviews will take place during a (one week) visit to Jerusalem. Further information will be gathered by telephone interviews and email enquiries to the people involved in the project. External experts may be contacted to gather background information or references and to check project data.

2. Evaluation Strategy

This evaluation aims at assessing the projects relevance, performance and success, early signs of impact and sustainability of results, identifying lessons learned, and making recommendations for the sustainability of project outputs and for future projects . For this, evaluation indicators will be developed, based on the evaluation issues stated in paragraph 1.2. The indicators are intended to measure the performance, management and impact of the project and will guide the evaluation process.

2.1 Evaluation Indicators

Evaluation indicators serve to measure the performance of the project on several aspects. An indicator targets an important, measurable aspect of an evaluation issue, with the aim to make a complex, principally qualitative issue measurable and (semi-) quantifiable. During the evaluation, fact-finding focuses on collecting data regarding these indicators (next to general qualitative and contextual information about the project), and during the analysis the projects results are valued against indicators (ranging from below to above what has been / might have been expected or was implied in the project design). Given the extent of the project and the complexity of the subject, not all aspects (of all issues) can be targeted during this evaluation. The evaluation indicators will therefore be selected to cover a large proportion of the project, but the availability of data and access to information sources will be taken into account. The evaluation indicators will be developed in close co-operation with UNDP program officers.

Although monitoring and evaluation is often a part of a project design, and ideally an integrated management tool, usually not all relevant evaluation aspects where foreseen at the initiation of a project and duly monitored during project execution. Additionally, a final evaluation often includes issues (specifically about project design and impact / outcome) that are of lesser relevance during project execution and can only be assessed ex-post. Therefore, it is often needed to develop additional indicators to assess project design issues, the impact on stakeholders and the long-term impact (or early signs of this) of the project. These will be developed during the desk review of the project documentation, based on the (listed) evaluation issues. Draft evaluation indicators will be presented to the program officers and executors for review and comments, before these are finalized.

The development of the evaluation indicators will be structured according to the following system:

<table>
<tr><th>Activity</th><th>I Direct output</th><th>II Direct effects</th><th>III External effects</th><th>IV Final outcome</th></tr>
<tr><td>Project activity A</td><td>Direct result (e.g. report or standard published, website developed) of one activity</td><td rowspan="2">Indirect result / effect on target group (e.g. report or standard used by target group, website used by target group) of one or a few activities</td><td rowspan="3">External results in targeted countries (e.g. adoption of building code legislation, installation of enforcement infrastructure, based on reports or building codes, websites, training etc) as a result of a group of activities</td><td rowspan="3">Final results in targeted countries (e.g. transformation of building market, changes in thermal performance of buildings, CO_2-emission reductions) as a result of the whole project</td></tr>
<tr><td>Project activity B</td><td></td></tr>
<tr><td>Project activity C</td><td></td><td></td></tr>
<tr><td>Etc</td><td></td><td></td><td></td><td></td></tr>
</table>

Category I direct outputs are usually monitored through progress reports (as they are normally a direct output of the work to be done) and do not require specifically designed evaluation indicators. These outputs are usually delivered during the course of the project, can easily be observed and give an indication of the efficiency of the project.

Category II direct effects are usually a direct effect of activities, but are often not measured during the course of a project (though they could provide valuable information to the program

management). These effects can usually be observed during or shortly after the completion of an activity, can be measured by enquiries, surveys, interviews etc and give an indication of the efficiency of the project.

Category III external effects are an indirect result of project activities. These are usually (for projects like the development of thermal standards / building codes) the result of activities that target groups in target countries engage in as a result of project activities (e.g. government adopting thermal standard / building code legislation following participation in the project). These effects are usually more difficult to monitor, as they occur some time after completion of activities (typical time delays differ a lot, but a six months to one year delay would be a reasonable assumption) and are usually the result of more inputs (one being the project). External effects can be measured in a variety of ways, including interviews, surveys, observations, dependent on the type of effect, and give an indication of the effectiveness of the project.

Category IV final outcome is the final effect of the project in a target country (the market situation, building stock, energy consumption, etc). These are usually long-term effects of projects and can only be measured after longer periods (typically starting after three to five years, with effects lasting more than 10 years). Possible measurements include building market and building stock analyses and energy consumption analysis, but it can be difficult to prove a direct relationship between project activities and changes in market and stock. The final outcome is always the result of many activities, can give an indication of the effectiveness of a project but is not always very helpful for an evaluation of a single project.

Since the details of the 'Capacity Building for the Adoption and Application of Thermal Standards for Buildings' project are not yet known, it is difficult to indicate whether observable effects can be expected in all categories. Based on the information provided, and on an understanding of the typical development of building standards, it may be expected that there will be observable effects in category I (direct outputs), category II (direct effects) and category III (external effects). It is unlikely that the Final outcomes (category IV) will be substantial, although it may be possible (dependent on the project duration and the results achieved) that there are indications of early effects in the market. Directly observable effects in the building stock (and resulting carbon emissions) will likely be impossible to observe, although it may be possible to calculate the likely long-term impact of a thermal standard development in these fields.

Direct outputs can be evaluated by a comparison to the deliverables and output stated in the project document and usually do not require the definition of additional evaluation indicators. It will be analyzed whether the project document includes the necessary indicators covering category III external effects (where relevant and feasible) and category II effects (for other subjects), which will then be adopted as evaluation indicators for the evaluation issues. If needed, additional indicators will be developed, as described before.

Given the scope of this evaluation, the number of indicators will be limited to one or two (max. three) per evaluation issue, with more focus on (and more than one indicator for) issues that require a (semi-quantitative) rating next to a (qualitative) assessment.

Data collection and Analysis

The proposed approach for this evaluation will include three main components:

- The desk review of (all kinds of) project documentation, including the project document, progress reports, and outputs. This review will serve to (a) generate an overview of the project, its context, proceedings, outputs and outcome; (b) develop a list of evaluation indicators for the assessment of the project; and (c) to collect data regarding the evaluation issues and indicators. Further documentation (e.g. workshop reports, financial statements) may be needed to answer specific issues, in which case these documents will be requested from the project manager or consultant. When necessary, additional information on project activities may be requested from the project management and/or reference information may be collected from independent experts;

- Interviews with project officers and (representatives of) major stakeholders involved in the project. These interviews will serve to (a) complete the overview of the project, in its context, and the relevance and (future) impact of the projects outcomes according to the involved organizations and stakeholders; (b) complete the fact finding regarding the evaluation issues and indicators; and (c) assist in the assessment of the project by asking the involved organizations about their impression of the projects results on specific issues (indicators), where relevant. During these interviews, fact finding will be supported by questionnaires developed during the desk review phase (semi-structured interviews).
- The analysis of the collected information, and assessment of the projects relevance, performance, success and potential impact. Collected data will be analyzed and structured according to the evaluation indicators. Where target values for evaluation indicators exist (in the project proposal or elsewhere), the observed results of the project will be compared to these target values. Where these target values do not exist a status quo description will be given and an assessment of the projects results based on a review of the project documentation (and the implied assumptions in it), reference information from similar developments (of thermal standards) in other environments, stakeholders opinions and the evaluators judgment. Where requested, a rating will be given based on this information. Together with the overview and contextual information, this will form the basis for the draft and final evaluation report, which will also include conclusions, recommendations and lessons learned.

Recommendations and lessons learned

The recommendations will be based on the data collected and analyzed and will focus on the evaluation issues (see paragraph 1.2) and the evaluation indicators. The recommendations and lessons learned will include:

- Remarkable practices and lessons learned regarding the project and its development context;
- Remarkable practices and lessons learned regarding project formulation;
- Remarkable practices and lessons learned regarding project implementation and management;
- Recommendations regarding major problems, outstanding issues or possible improvements in the projects design, implementation, monitoring or management;
- Recommendations regarding the follow-up of the project to reinforce the full implementation of the projects results and/or directions for future work aiming at similar objectives.

3. Deliverables & Planning

The planning of this evaluation is constrained by the time necessary to collect all relevant information, to (logistically) prepare a mission to Beirut and meet the relevant parties, and to allow sufficient time for commenting by the involved parties. The indicated planning thus depends on the availability of the necessary documents, people and comments, and can only be The planning of this evaluation is constrained by the time necessary to collect all relevant information, to (logistically) prepare a mission to Jerusalem and meet the relevant parties, and to allow sufficient time for commenting by the involved parties. The indicated planning thus depends on the availability of the necessary documents, people and comments, and can only be guaranteed for (the planning of) own activities.

Deliverables of the evaluation

The deliverables of the evaluation are:

- List of evaluation indicators
- Questionnaires to be used during interviews

- Interviews reports (summary versions)
- Draft final report
- Final report

The list of evaluation indicators will be drafted during the desk review of project documentation and will be sent to the UNDP program officers for review. Comments will be reflected in the final version of the evaluation indicators, to be finalized at the end of the desk review stage.

At the end of the desk review stage, questionnaires will be prepared to support fact finding during the interviews with involved parties in Beirut. The questionnaires will be made available to UNDP for review.

Interviews with the project management and major stakeholders (as listed in the ToR) will be conducted in Jerusalem. The interviews will be semi-structured, assisted by the questionnaires (implying that there is no strict format for the interviews, but that the questionnaires will be used to raise issues with the interviewees and to guide the direction of the meetings). It is expected that interviews will on average take between one and two hours, that all interviews can be arranged within the same week, and that the UNDP country office can arrange the interviews. Summary reports (approx. 1 page) will be made from each of the interviews, to be annexed to the evaluation report. The interviews will be followed by a wrap-up / debriefing meeting with UNDP (in the same week), to discuss the evaluation in general, and the initial conclusions from the evaluation.

The final report will be drafted within two weeks after completion of the interviews (and debriefing meeting), and will provide a complete overview of the evaluation as described in this outline. The report will be structured along the following lines:

- Executive summary
- Introduction
- The project and its development context
- Findings and Conclusions
  - Project formulation
  - Implementation
  - Results
- Recommendations
- Lessons learned
- Annexes

The draft final report will be sent to UNDP, to be circulated among involved parties, for comments and feedback. Issues raised by the involved parties will be reflected in the final report, unless there are discrepancies in the opinions and/or findings of the involved parties and the evaluator, in which case these will be explained in an annex to the report. The final report is due within two weeks after receiving the UNDP feedback on the draft final report.

Annex to the Evaluation Outline: Scope of the Evaluation

(Copied from: Explanation on Terminology Provided in the GEF Guidelines to Terminal Evaluations)

The scope of the evaluation includes the review and assessment of the Project's formulation, implementation and results. In addition to a descriptive assessment, all criteria marked with (R) should be rated using the following divisions: Highly Satisfactory, Satisfactory, Marginally Satisfactory, Unsatisfactory. (Annex 1)

The following is a breakdown of the Evaluation scope and components:

1. Executive summary

- Brief description of project
- Context and purpose of the evaluation

- Main findings, conclusions, recommendations and lessons learned

2. Introduction

- Purpose of the evaluation
- Key issues addressed
- Methodology of the evaluation
- Structure of the evaluation

3. The project and its development context

- Project start and duration
- Problems that the project seeks to address
- Immediate and development objectives of the project
- Main stakeholders
- Results expected

4. Findings and Conclusions

4.1 - Project Formulation

Conceptualization/Design (R). This should assess the approach used in design and an appreciation of the appropriateness of problem conceptualization and whether the selected intervention strategy addressed the root causes and principal threats in the project area. It should also include an assessment of the logical framework and whether the different project components and activities proposed to achieve the objective were appropriate, viable and responded to contextual institutional, legal and regulatory settings of the project. It should also assess the indicators defined for guiding implementation and measurement of achievement and whether lessons from other relevant projects (e.g., same focal area) were incorporated into project design.

Country-ownership/Drivenness: Assess the extent to which the project idea/conceptualization had its origin within national, sectoral and development plans and focuses on national environment and development interests.

Stakeholder participation (R) Assess information dissemination, consultation, and "stakeholder" participation in design stages.

Replication approach: Determine the ways in which lessons and experiences coming out of the project were/are to be replicated or scaled up in the design and implementation of other projects (this also related to actual practices undertaken during implementation).

UNDP comparative advantage: The consideration of linkages between projects and other interventions within the sector and the definition of clear and appropriate indicators and management arrangements at the design stage.

4.2 - Project Implementation

Implementation Approach (R): This should include assessments of the following aspects:

- The use of the logical framework as a management tool during implementation and any changes made to this as a response to changing conditions and/or feedback from M and E activities if required;
- Other elements that indicate adaptive management such as comprehensive and realistic work plans routinely developed that reflect adaptive management and/or; changes in management arrangements to enhance implementation;

- The project's use/establishment of electronic information technologies to support implementation, participation and monitoring, as well as other project activities;
- The general operational relationships between the institutions involved and others and how these relationships have contributed to effective implementation and achievement of project objectives;
- Technical capacities associated with the project and their role in project development, management and achievements;

Monitoring and evaluation (R): Including an assessment as to whether there has been adequate periodic oversight of activities during implementation to establish the extent to which inputs, work schedules, other required actions and outputs are proceeding according to plan; whether formal evaluations have been held and whether action has been taken on the results of this monitoring oversight and evaluation reports.

Stakeholder participation (R): This should include assessments of the mechanisms for information dissemination in project implementation and the extent of stakeholder participation in management, emphasizing the following:

- The production and dissemination of information generated by the project;
- Local resource users and NGOs participation in project implementation and decision making and an analysis of the strengths and weaknesses of the approach adopted by the project in this arena;
- The establishment of partnerships and collaborative relationships developed by the project with local, national and international entities and the effects they have had on project implementation;
- Involvement of governmental institutions in project implementation, the extent of governmental support of the project;

Financial Planning: Including an assessment of:

- The actual project cost by objectives, outputs, activities
- The cost-effectiveness of achievements
- Financial management (including disbursement issues)

Sustainability: Extent to which the benefits of the project will continue, within or outside the project domain, after it has come to an end. Relevant factors include for example: development of a sustainability strategy, mainstreaming project objectives into the economy or community production activities.

Execution and implementation modalities: This should consider the effectiveness of the UNDP counterpart and Project Co-ordination Unit participation in selection, recruitment, assignment of experts, consultants and national counterpart staff members and in the definition of tasks and responsibilities; quantity, quality and timeliness of inputs for the project with respect to execution responsibilities, enactment of necessary legislation and budgetary provisions and extent to which these may have affected implementation and sustainability of the Project; quality and timeliness of inputs by UNDP and GoC and other parties responsible for providing inputs to the project, and the extent to which this may have affected the smooth implementation of the project.

4.3 - Results

Attainment of Outcomes/ Achievement of objectives (R): Including a description and rating of the extent to which the project's objectives (environmental and developmental) were achieved using Highly Satisfactory, Satisfactory, Marginally Satisfactory, and Unsatisfactory ratings. If the project did not establish a baseline (initial conditions), the evaluators should seek to determine it through

the use of special methodologies so that achievements, results and impacts can be properly established.

Sustainability: Including an appreciation of the extent to which benefits continue, within or outside the project domain after GEF assistance/external assistance in this phase has come to an end.

5 - Recommendations

- Corrective actions for the design, implementation, monitoring and evaluation of the project;
- Actions to follow up or reinforce initial benefits from the project;
- Proposals for future directions underlining main objectives;

6 - Lessons learned

This should highlight the best and worst practices in addressing issues relating to relevance, performance and success.

7 - Evaluation report Annexes

- Evaluation ToRs
- Itinerary
- List of persons interviewed
- List of documents reviewed

Comments by stakeholders (only in case of discrepancies with evaluation findings and conclusions)

Annex 3. Evaluation Indicators

This evaluation aims at assessing the projects relevance, performance and success, early signs of impact and sustainability of results, identifying lessons learned, and making recommendations for the sustainability of project outputs and for future projects. For this, evaluation indicators will be developed, based on the evaluation issues stated in the Terms of Reference and the GEF Project Review Criteria. The indicators are intended to measure the performance, management and impact of the project and will guide the evaluation process. Data will be collected to assess the performance of the project, via a review of project documentation and outputs, and interviews with key persons (during a mission to Jerusalem).

Indicators for the evaluation of project formulation[5]

- Conceptualization/Design (R)
  1. Project design targets root causes of building energy consumption
  2. Project design (summarized in LogFrame) is appropriate and suitable for the national context
  3. Project design includes sufficient indicators to track progress and measure outputs
- Country-ownership/Drivenness
  4. Project concept originates from within and is supported by national institutions
  5. Project concept targets pressing national environmental and development needs
- Stakeholder participation (R)
  6. Stakeholders have been actively and passively informed about the project and its results
  7. Key stakeholders have been consulted about core project decisions and have provided significant input into the project
- Replication approach
  8. Project has communicated lessons learned and sought cooperation with new or ongoing projects of similar concept
- UNDP comparative advantage
  9. Project is linked with other projects or programs in the sector via well-developed management arrangements

Indicators for the evaluation of project implementation

- Implementation Approach (R)
  10. Logical Framework is used as a management tool during implementation
  11. Implementation management is adaptive to changes in the project environment
  12. ICT have been used to support project implementation and dissemination
  13. The project established suitable operational relations between involved institutions and key stakeholders
  14. The project employed the required technical capacities and made appropriate use of these

[5] These indicators are based on the GEF Project Review Criteria. Indicators have been selected to represent a large segment of the identified evaluation issues in a single, measurable item. Valuations of the evaluation issues (were applicable) will represent an average of the performance on the indicators for that issue.

- Monitoring and evaluation (R)

  15. The project has established progress monitoring and has undergone regular evaluations, which have led to required adaptations of the implementation

- Stakeholder participation (R)

  16. The project properly involved national and local stakeholders in implementation and decision making

  17. The project properly involved government and other relevant institutions in implementation and decision making

  18. The project disseminated the required information to all relevant stakeholders

- Financial Planning

  19. The actual spending on project activities was cost-effective and proportional to the projects objectives

  20. Financial management was timely and adequate

- Sustainability

  21. The project established a sustainable impact in the country, which will continue independently

  22. The project established arrangements with relevant organizations or other instruments to secure a continued impact

- Execution and implementation modalities

  23. UNDP provided adequate oversight of the project and assignment of the required experts

Indicators for the evaluation of project results:

Project Development and Immediate Objectives (evaluating final outcome / impact of the project, related to Attainment of Outcomes/ Achievement of objectives (R) and Sustainability)

- Reduce greenhouse gas emissions (Development objective 1)

  24. Projected emission reductions based on realized project results (baseline: annual energy saving of 0.011 / 0.025 MTOE pa, and 0.1 Mton CO_2 emission reduction – ProDoc annex 8 / LogFrame Objectively Verifiable Indicators)

- Establish thermal energy standards for buildings and prepare grounds for future adoption of the standard as an energy code for buildings (Development objective 2)

  25. Set of energy codes and guidelines for buildings established in the PA and endorsed by the PA/MLG (LogFrame Objectively Verifiable Indicators)

- Initiation of a transformation in the construction industry in Palestine (Development objective 3)

  26. Voluntary application of energy code (and guideline) in new buildings design and construction (LogFrame Means of Verification - adapted)

- Establishing a cost-effective energy code for buildings (Immediate objective 1)

  27. Building code review, construction materials review and building designs review provide sufficient information for the development of an energy code (output 1.1)

  28. Energy code is technically sound and is cost-effective (output 1.1)

  29. Action plan developed for the adoption of the energy code, based on identification of barriers (output 1.2)

- Building local human and resource capacity in energy-saving modalities in the PA (Immediate objective 2)

  30. Increased knowledge and expertise in energy-efficient modalities by civil engineers and contractors, via training (output 2.1 / LogFrame Objectively Verifiable Indicators)

  31. Equipment and information made available to local professionals, on building energy efficiency (output 2.1)

- Wide public adoption of cost-effective energy-saving modalities in buildings by the Palestinian public (Immediate objective 3)

  32. Public demand for information about building energy efficiency (output 3.1 / LogFrame Means of Verification)

  33. Demand for application of energy code / energy efficiency guidelines by the public (output 3.1 / LogFrame Objectively Verifiable Indicators)

- Increase regional cooperation (Immediate objective 4)

  34. Exchange of knowledge in the region via workshops, meetings and exchange of documents and experts (output 4.1 / LogFrame Means of Verification)

Annex 4. List of documents reviewed

The list of documents reviewed has been expanded during the evaluation process, primarily to allow for a detailed analysis of the technical outputs.

Reviewed documents are:

- Project Document
- Annual Project Implementation Reports
- Reports of tripartite meetings
- Terminal Report
- Sustainability Plan,
- Key Project Outputs:
    - Climatic Zoning for Energy efficient Buildings in the Palestinian Territories (the West Bank and Gaza)
    - Architectural Styles Survey in Palestinian Territories
    - Construction Techniques Survey in Palestinian Territories
    - Construction Materials & Local Market Survey in the Palestinian Territories
    - Cost Efficiency Of Thermal Insulation
    - Software Selection Report
    - Energy Efficient Building Code (English summary)
    - Guidelines for Energy Efficient Building Design (English summary)
    - Software tool

Annex 5. List of persons interviewed

Interviewed stakeholders are:

Tuesday 8 November

- Dr. Khalid Qawasmi, Minister of Local Government
- Ohood Enaia, Energy Code for Buildings National Coordinator
- Chairman of the Engineers Association West Bank & members of the Association of Engineering firms
- Members of the National Code Committee

Wednesday 9 November

- Dr. Riyad Abdel Karim, Al-Najah University
- Palestinian Energy & Environment Research Center (PEC)
- Deputy Minister of Local Government
- Dr. Afif Hasan, Birzet University, Mechanical Engineering Department

Thursday 10 November

- Palestinian Standards Institute
- Islamic University of Gaza (Video Conference)

Annex 6. Summary interview reports

Introduction

This report includes summary reports of the interviews conducted for the final project evaluation of the project 'Capacity Building For the Adoption and Application of Energy Codes for Buildings', during a mission to Jerusalem on 7th – 11th November 2005.

In addition to the interviews reported here, the project manager, Hanan Yamin, provided an extensive briefing of the development of the project. A debriefing meeting with UNDP, concluded the mission to Jerusalem. The information from these two meetings is included in the final evaluation report, and is not separately reported here.

Dr. Khalid Qawasmi, Minister of Local Government

Questions:

1. Overall impression of the project?
2. Observed best and worst practices in project implementation?
3. National need for building standard – relationship with / root in national policies?
4. Issues covered by project sufficient to improve energy performance of buildings?
5. Palestinian Authority and professional bodies endorse voluntary and mandatory implementation of thermal standard?
6. Policy makers, professionals and the general public are properly aware of the need for and practicalities of the energy code?
7. Suggestions for follow-up work to sustain project outcome?

Key issues:

- Dr. Qawasmi has been involved in the project in two roles: now as the Minister of Local Government, and previously as the Chairman of the Engineering Association.
- The project is an opportunity for the Palestinian Authority to develop its own codes for the energy performance of buildings. More work is needed, but the project signifies an important step.
- Some considerations about the development of the energy code are: the considerable variation in temperatures; the high cost of energy in the Palestine territories; the importance of energy savings, for the Palestinian Authority and households alike.
- It is further important to note that heating is the main source of household energy consumption, used five months per year, or around 100 days per year continuously. Air conditioning is used almost only in public buildings.
- The project has received a lot of support from Palestinian civil society organizations.
- The true challenge for the project was to transform the idea of an Energy Code into a reality. This is almost completed: The Code has been approved by the Cabinet, and will be published in the next issue of the Palestinian Gazette (official newspaper).
- Implementation of the Energy Code will be gradual: initially, mandatory adoption will apply only to public buildings (government-owned buildings). Mandatory adoption for all buildings will be discussed at a later stage.
- The main driving force for the development and implementation of the Code is the economic benefit, from reduced energy consumption.
- The general public seems to be ready for adoption the Energy Code, but it will be very important to raise awareness of the Code and the underlying concept, and to demonstrate how the Code works in practice.

- The PA has an agreement with the Engineering Association, that the EA checks building designs. This agreement doesn't cover building construction, and thus not the thermal insulation characteristics of a building.
- Building owners have to obtain a permit from the municipality before they are allowed to use a building (after it has been designed and constructed). A compliance check of the energy code requirements could be added to the municipalities' mandate.
- Following up on the Energy Code project, the Minister suggests:
    - Awareness raising campaigns about the Code, to the general public and to municipalities and professional bodies;
    - A replication of the Code development project, for other aspects;
    - A continued regional cooperation on Code development, since climatic and regional conditions are similar in neighboring states.
- The Minister expresses his appreciation for the very cooperative work of all involved parties, and the good outcome of the project. He also expresses his gratitude for the UNDP support for the development of the Energy Code.

Ohood Enaia, Energy Code for Buildings National Coordinator

Questions:

General

1. Overall impression of the project?
2. Observed best and worst practices in project implementation?
3. Suggestions for follow-up work to sustain project outcome?

Project management issues

4. Time line of the project?
5. Key issues during project implementation?
6. Interaction with government institutions and project steering committee?
7. Interaction with key non-governmental stakeholders and the general public?
8. Implementation arrangements for energy code: adoption, enforcement mechanism?
9. Exchange of experiences and lessons with other projects & programs?
10. Monitoring progress and adapting implementation arrangements?
11. Financial management / disbursement rate?
12. Any outstanding project activities?

Key issues:

- The Energy Code has been developed, according to plan, with some delays.
- The Ministry of Local Government has set up a small unit to follow-up on the Energy Code, specifically to liaise with other Ministries and non-governmental organizations about the implementation of the Code. Further, the unit is to work on the development of new codes in other, related areas.
- The project has suffered from the political situation. It was executed during the second *Intifada*, and had to deal with the travel constraints, relocations of government facilities and other constraints as a result of that.
- The project's objectives didn't change as a result of this, but activities had to be adapted and it was necessary to extend the duration of the project to make up for lost time.

- It was felt that the time available for the project was too limited, even though the Code has been developed within the (extended) time frame of the project. The time limitations are particularly relevant for the outreach towards professionals and the public.
- All changes have been reported in the (yearly) Project Implementation Reports. There has been no update or revision of the project document, following the difficulties experienced.
- The project document gave little direction about the quantitative and qualitative aspects of the (technical and institutional) objectives. The project management unit was required to determine this based on their own judgment.
- During the project, more outputs have been delivered than originally planned.
    - Thermal insulation calculation software has been developed, although this was not listed in the project document;
    - Building energy consumption modeling software has been purchased, for use by the project team but also for use in training and education but civil society partners;
    - For the training of professionals in Gaza-strip, a cooperation was developed with the Small-grants project;
    - Some pilot-buildings, implementing the Energy Code, have been developed during the projects.
- The use of computer modeling tools for building energy consumption was difficult, due to the high input data requirements (specifically: weather files) of the software tool used (Visual DOE3).
- The Higher Planning Council, a national coordination body for building planning issues, chaired by the Ministry of Local Government, can be used to promote the Energy Code (and related standards), and specific solutions of energy-efficient building products;.
- The involvement of government institutions in the project needs further development, in the future.
- The most relevant outcome of the project for the Palestine society is that they have learned how to develop a code, in cooperation between government and civil society sectors. This code represents the first Palestinian Authority standard for buildings, and important newly learned elements are: public consultations; cooperating with other Ministries; and private sector involvement.
- The project has had a significant impact on society: around 300 engineers have been trained in building energy performance; 22 trainers have been educated; universities have been involved and now teach on the energy efficiency of buildings; and there have been a lot of voluntary inputs for non-government parties in the Code development process.
- Regional cooperation has been mutually beneficial to this project, and similar projects in other countries. There have been frequent exchanges with Energy Code / Thermal standard development projects in Egypt, Lebanon and Tunisia, and PMUs have assisted each other.
- The simplicity in the approach chosen (by the PMU) for the implementation of the project is a major element of its success: there are only a few requirements to be met for the Energy Code, which makes this easy to handle by stakeholders.
- The systematic way of Code development and the involvement of stakeholders, have contributed to the acceptance of the result by the Palestinian society. Being involved in the development process has made the stakeholders ‘hungry’ for more involvement with building energy efficiency developments.
- When the project started, building energy efficiency was considered a luxury; at the end of the project, the involved parties see it as a necessity.

- The formal, structural involvement of institutions in the project has been rather limited. The involvement of persons from these institutions was fine, but there was a (too) limited organizational follow-up to this.
- During the project, there was not enough time to develop a Code covering more than thermal insulation. This is viewed as a limitation of the current Code.
- The availability of materials for thermal insulation (specifically building insulation materials) is problematic in the Palestinian territories. This has been noticed during the project, but it could not be resolved under the mandate of the project.
- The PMU has developed a sustainability plan, indicating the follow-up the project should have. This plan lists the set-up of a new coordination unit (completed); the completion of the legal adoption of the code (approved by cabinet); the implementation process (to be initiated); and a development and upgrading process (to be initiated).
- Suggestions for the follow-up of the project are:
    - Awareness raising of energy code issues, with professionals and the general public;
    - More training of professionals, including longer, more in-depth training courses;
    - A consideration of the extension of the Code to include more building energy aspects.

Chairman of the Engineers Association West Bank & members of the Association of Engineering firms

Questions:

1. Overall impression of the project?
2. Issues covered by project sufficient to improve energy performance of buildings?
3. Development of technical outputs– applicability, data availability, technical inputs, modeling, adoption process, updating requirements?
    - climate zoning;
    - architectural styles survey;
    - construction techniques survey;
    - construction materials survey;
    - cost-efficiency analysis;
    - energy code
4. Capacity building / training of professionals in thermal standard & technical guide?
5. Equipment and information made available to local professionals?
6. Role of professional bodies / civil society in energy code development?
7. Energy code is applied in new buildings – to what extent?
8. Suggestions for follow-up work to sustain project outcome?

Key issues:

- The project is appreciated. The engineers have benefited from a scientific perspective, but the practical implementation is difficult.
- The Energy Code could work well, but more is to be done on raising awareness on the Energy Code. Engineers can understand the energy efficiency issues, but the public needs to be convinced of the benefits of the Energy Code.
- About 90% of all buildings are privately owned, and poverty is an issue to consider when deciding about the implementation of the Code.

- The Higher Planning Council has decided to implement the Code for public buildings, and voluntarily for all buildings. Some Ministries, however, have not adopted this decision, and are not yet enforced to do so.
- It is debated whether engineers in the Palestinian territories already has sufficient knowledge about thermal insulation. The calculation method developed for the Energy Code is certainly a benefit for all engineers.
- A simple calculation tool, as the one developed during the project, is considered to be sufficient for small buildings. A modeling in a design software tool (like the Visual DOE3 software adopted in this project) would be too complex for that, and only justified for large buildings.
- The training provided during the project was appreciated, but it was considered to be too limited. The courses were fairly short (few days), but contained a lot of information. It was difficult to fully absorb all the information during the courses, and additional training, especially on the practical application of energy code requirements, would have been appreciated.
- Suggestions for follow-up work include:
    - Awareness raising campaigns, targeting contractors, investors and the public;
    - Extended training courses, including more time for exercises on practicalities.

Members of the National Code Committee

Questions:

1. Overall impression of the project?
2. Observed best and worst practices in project implementation?
3. National need for energy code – relationship with / root in national policies?
4. Relevant institutions and stakeholders adequately involved in project decisions and implementation?
5. Policy makers, professionals and the general public are properly aware of the need for and practicalities of thermal standard?
6. Promotional or endorsement plans or programs to support to adoption of the Energy Code?
7. Suggestions for follow-up work to sustain project outcome?

Key issues:

- The project has been essential to the Palestinian society. It was the first Palestinian standard development project, and a pilot for more work in this area.
- Energy efficiency is important for the Palestinian territories, which imports all its energy. Energy costs are significant in the Palestinian territories. Given that building development is the main form of investment, an energy code for buildings should be considered a priority.
- The added investment cost for compliance with the Energy Code is a considerable barrier for successful implementation of the Code. A legal instrument (e.g., a law) will be required for the enforcement of the Code.
- Securing the involvement of the right local stakeholders in the project has taken much effort. This paid off well, and top-level professionals have volunteered much time and expertise to the project.
- The National Code Committee was a well-functioning unit. The exchange of experience between members with different backgrounds has been very beneficial. The members feel

that they have been able to push the project forward, and have made a considerable impact.

- Training provided during the project, to all kinds of engineers (architects, mechanical engineers, electrical engineers; students and experienced professionals), was well-received by the trainees.
- The project budget was limited, which required the project management to seek voluntary contributions from private sector parties. Constant attention was needed for saving money.
- The project started as an outside initiative, with little institutional commitment in the Palestinian society. This has improved somewhat during implementation, but more and longer efforts would have been needed to secure a full institutional backing of the Energy Code implementation.
- The involvement of decision-makers in the Code development was difficult. After a chance of government, no-one is pushing the implementation of the Energy Code any more.
- Palestinian people seem ready to adopt the concept of investing in building energy efficiency. An outreach, to the general public, is necessary, however, to explain the potential of energy cost savings. The public outreach during the project has been limited.
- Verification and enforcement of the Energy Code has not yet been developed. An option would be to ask the Engineering Association to check compliance with the energy code requirements when checking building designs. Additionally, the Ministry of Local Government could make compliance with the energy code an element of the requirements for a permit for using a new building. On-site inspections of new building developments could be executed by municipalities.

Dr. Riyad Abdel Karim, Al-Najah University

Questions:

1. Overall impression of the project?
2. Observed best and worst practices in project implementation?
3. Development of technical outputs– applicability, data availability, technical inputs, modeling, adoption process, updating requirements?
   - climate zoning;
   - architectural styles survey;
   - construction techniques survey;
   - construction materials survey;
   - cost-efficiency analysis;
   - energy code
4. Capacity building / training of professionals in energy code & technical guide?
5. Issues covered by project sufficient to improve energy performance of buildings?
6. Policy makers, professionals and the general public are properly aware of the need for and practicalities of energy code?
7. Any specific technical or implementation issues?
8. Suggestions for follow-up work to sustain project outcome?

Key issues:

- Dr. Riyad was a member of the National Code Committee, and participated in several workshops of the project.
- Some of the technical materials produced during the project have been included in the training program of the Architectural and the Engineering studies at Al-Najah University.

Teaching about building energy consumption already existed before the project, but some elements have been added to the teaching program in response

- Several student graduation projects have been devoted to building energy efficiency and the energy code. This is intended to train the students in this field, but also to work on improvements of the energy code.
- The project was an important step in the right direction. In the Palestinian territories, there is a real problem with new building's energy consumption, and a law is needed to enforce the current standard, as well as a compliance checking procedure, including on-site inspections. There is appreciation of the work done, but the implementation will be a hard challenge.
- In the early stages of the project, the involvement of universities was very limited. This has improved later on, but only with the personal involvement of faculty. An institutional involvement in the project did not evolve.
- Dr. Riyad has the impression that the project could have benefited more from the capacities of the three Palestinian universities. Some of the experts involved in the preparation of project outputs were probably less-qualified than available university teachers, and the university research centre could have been involved in some of the experiments conducted for the project (a test centre for this work was set-up in Ramallah).
- There are some concerns regarding the quality of some of the outputs:
  - The energy code deals only with thermal insulation, thereby ignoring an important issues like passive solar design;
  - In the development of the climatic zoning for the energy code, no attention was given to rainfall issues, and the resulting climatic zones are sometimes very small-sized.
- Some aspects that should have been given more attention in the project are:
  - How to verify compliance with the energy code;
  - How to train people in implementing the energy code requirements.
- For the follow-up of the project, it is suggested to do research into locally manufactured building materials, and ways to improve the materials and integrate these in building designs (complying with the Code).
- A specific suggestion is to research options to produce locally manufactured insulation materials, using locally grown natural fibers.

Palestinian Energy & Environment Research Center (PEC)

Questions:

1. Overall impression of the project?
2. Observed best and worst practices in project implementation?
3. Development of technical outputs– applicability, data availability, technical inputs, modeling, adoption process, updating requirements?
   - climate zoning;
   - architectural styles survey;
   - construction techniques survey;
   - construction materials survey;
   - cost-efficiency analysis;
   - energy code
4. Capacity building / training of professionals in energy code & technical guide?
5. Issues covered by project sufficient to improve energy performance of buildings?

6. Policy makers, professionals and the general public are properly aware of the need for and practicalities of energy code?
7. Any specific technical or implementation issues?
8. Suggestions for follow-up work to sustain project outcome?

Key issues:

- The Palestinian Energy & Environmental Research Center (PEC) was a member of the Steering Committee of the project. PEC was already working on residential energy efficiency, and is now a partner in a proposal for an EU-funded project 'Mediterranean energy efficiency in the construction sector'.
- The project was needed for the Palestinian society.
- The Energy Code targets only thermal insulation of new buildings, and is sufficient for that aspects, but fails to consider other important aspects, such as:
    - Bio-climatic building design;
    - Efficient end-use technologies; and
    - Cost-benefit analyses.
    - Further, the Code does not target existing buildings
- To the surprise of the PEC, the Code refers to traditional building designs typical for Egypt and Iraq, but not for Palestine. Further, the Guideline for the Energy Code lists 15 examples of thermal insulation options, but more options have been describes before, for example in a publication of the Jordanian Rock Wool Industries.
- The data reported in the Energy Code and underlying documentation about wind speed and solar radiation is not very precise. Some data may be erroneous, as reported values do not match those in other publications.
- The analysis of thermal insulation materials in the guideline is highly appreciated, and so is the software tool developed for calculating the thermal transmittance values of a building component. However, a wider distribution of the tool and more training of its application would be required.
- Further, it would be beneficial to provide some examples of the impact of thermal insulation on buildings and on the energy cost benefits of complying with the energy code.

Deputy Minister of Local Government

Questions:

1. Overall impression of the project?
2. Observed best and worst practices in project implementation?
3. Project has benefited from interaction with other, similar projects?
4. All relevant stakeholders were properly informed about the project?
5. Action Plan for the adoption of the Energy Code – interim results?
6. Public demand for information about the code – how much?
7. Energy Code is applied in new buildings – to what extent?
8. Project team development was adequately initiated and supervised by UNDP?

Key issues:

- The Deputy Minister expresses his appreciation of the project, for several reasons:

- It is instrumental for the Palestinian Authority for developing a national identity, and governance over their territory;
- Since all energy is imported, saving energy is of direct importance to the Palestinian economy;
- The implementation of the code will create economic opportunities (new business, jobs);
- Thermal insulation will lead to a better comfort in houses;
- The cooperation with various stakeholders, in the development of the project, has been vary beneficial;
- The opportunity to cooperate in the region, with Jordan, Lebanon and Tunisia, has been very beneficial as well.

- The Deputy Ministers takes a personal interest in the project, and has stimulated his son to devote his university graduation project to the Energy Code.
- Now that the Code has been finalized, it is important to start developing more, similar or standards or codes projects, as well as to strengthen the relationship with Palestinian universities.
- The Code signifies a first step, and it is important to institutionalize the Code, and to raise public awareness for its implementation.
- The inclusion of all parties, in the steering committee of the project and by giving each a part of the project, was very important and very beneficial to the project.
- Developing the Code has taken much more time than previously expected, mainly due to the political situation in previous years. More flexibility would have been needed in the implementation of the project, to properly adapt to this constraint.
- The project was originally proposed by UNDP, and has managed the project very well since.
- The Ministry of Local Government is committed to continue the project without UNDP-support, until the Energy Code is part of the Palestinian culture.
- Proposed next steps are:
  - The further develop the Energy Code;
  - The continue working with the Engineering Association; and
  - To raise public awareness for the Energy Code.

Dr. Afif Hasan, Birzet University, Mechanical Engineering Department

Questions:

1. Overall impression of the project?
2. Observed best and worst practices in project implementation?
3. Development of technical outputs– applicability, data availability, technical inputs, modeling, adoption process, updating requirements?
   - climate zoning;
   - architectural styles survey;
   - construction techniques survey;
   - construction materials survey;
   - cost-efficiency analysis;
   - energy code
4. Capacity building / training of professionals in energy code & technical guide?

5. Issues covered by project sufficient to improve energy performance of buildings?
6. Policy makers, professionals and the general public are properly aware of the need for and practicalities of energy code?
7. Any specific technical or implementation issues?
8. Suggestions for follow-up work to sustain project outcome?

Key issues:

- A strong element in the project was the inclusion of many different stakeholders in the project. The involvement of university researchers in the preparation of technical outputs, however, could have been better.
- The training workshops, which were a major part of the outreach activities of the project, were very condensed and intensive sessions, with sometimes too much information to absorb in the given time. More time for exercises and practicing would have been needed.
- For future work, universities could provide training on energy code issues, after having been brought up-to-date themselves.
- Teaching at the university now includes aspects of building energy consumption and energy code issues, with various courses in the regular program. Various graduation projects deal with energy efficient building designs, or with research into efficient HVAC systems.
- The climatic zoning for the energy code would have required more, and more accurate data. There are questions about the validity of some of the input data used for the zoning, about the exclusion of humidity from analysis, and about the number of zones (initially seven, later five zones).
- The Energy Code is based on the pre-existing Jordanian Energy Code, with the value of the thermal insulation requirements changed following an estimate of the differences between Jordan and the Palestinian Territories. Although this is a rather simplified procedure, it was probably the best solution, as the Palestinian society wasn't ready for a more detailed analysis.

Palestinian Standards Institute

1. Overall impression of the project?
2. Observed best and worst practices in project implementation?
3. Development of technical outputs– applicability, data availability, technical inputs, modeling, adoption process, updating requirements?
   - climate zoning;
   - architectural styles survey;
   - construction techniques survey;
   - construction materials survey;
   - cost-efficiency analysis;
   - energy code
4. Verification, certification and enforcement mechanism in place for voluntary and developed for mandatory implementation?
5. Key stakeholders (Higher Council of Planning, Engineering Association) accept and endorse energy code?
6. All relevant stakeholders were properly informed about the project?
7. Suggestions for follow-up work to sustain project outcome?

Key issues:

- The overall appreciation of the project is very good. Given the high cost of energy, an Energy Code could be very useful when implemented in the future.
- The actual implementation of the code is difficult. The mandate to implement is yet unclear, and travel restrictions make it difficult to organize on-site inspections of buildings.
- The Palestinian Standards Institute (PSI) was involved in the steering committee of the project, and participated in various workshops. The workshops were well appreciated: a good audience, good discussions, and a successful approach. The development process of the Energy Code has initiated discussions about other needed standards and codes.
- PSI currently has approx 200 standards for construction materials, and is in the process of adapting Palestinian Standards to the Energy Code, and specifically the classification of the thermal conductivity of building materials.
- PSI has established a test facility for building materials and insulation materials, via the purchase of a testing device. This purchase was financed by the project, with a contribution from PSI. The test facility will be available for materials manufacturers at a fee, and to governments and researchers for free.
- For the operation of the test device, a chiller is needed. PSI had such chiller in its facilities in Nablus, and was planning to transport and use that chiller for setting up the test facility in Ramallah. Unfortunately, the chiller was critically damaged during transport. PSI wants to repair the chiller, but lacks the funds to do so.
- The supplier of the testing device couldn't provide training for the test operators. Such training was also not foreseen at the purchase. However, it is now deemed necessary. A testing device similar to the one PSI purchased is operational at the Royal Scientific Society in Jordan. So far, there have been no contacts to establish the opportunity for training of operators at that institute.
- PSI has not received any requests for the testing of building or insulation materials. Although it is estimated that the building materials industry is starting to develop energy efficient building materials, the lack of requests for testing is an indication that this development is not yet significant.
- The most important outputs of the project are the construction materials survey and the construction techniques survey. Good elements in the implementation of the project were the workshops and the technical committees set-up for the Energy Code development.
- The construction sector is beginning to respond to the energy code, and there is some voluntary adoption of the code. There is also a bit of awareness of the energy performance of buildings, which didn't exist prior to the project. In its adoption of the code, however, the construction sector is first assessing the cost benefits associated with its implementation.
- Following up on the project, the most important step is the formal adoption of the Energy Code, and the initiation of compliance checking. The main responsibility for this step rests with the Ministry of Local Government and with the municipalities, with a further role for the Ministry of Public Works and Buildings, BNEDCAR, and the PSI.

Islamic University of Gaza (Video Conference)

1. Overall impression of the project?
2. Issues covered by project sufficient to improve energy performance of buildings?
3. Development of technical outputs– applicability, data availability, technical inputs, modeling, adoption process, updating requirements?
    - climate zoning;
    - architectural styles survey;
    - construction techniques survey;
    - construction materials survey;

- cost-efficiency analysis;
- energy code

4. Capacity building / training of professionals in thermal standard & technical guide?
5. Role of professional bodies / civil society in energy code development?
6. Energy code is applied in new buildings – to what extent?
7. Suggestions for follow-up work to sustain project outcome?

Key issues:

- Overall, the project has been very successful, and has generated much knowledge, for a small budget.
- The Energy Code and the Energy Code Guideline are very beneficial outputs for the whole region. These are considered to be very useful for teaching purposes as well. All students at the faculty of engineering have been exposed to the Code and the Guidebook.
- In Gaza, more than 240 engineers have received trained about the Energy Code, and have received a copy of it. The training included an explanation of the principles of the energy code, and a training in the use of the Visual DOE3.1 software tool for calculating building energy consumption. Engineers from local firms and from municipalities have participated in the training.
- The thermal insulation requirements included in the Code are not the only relevant issues for building energy efficiency. Other aspects (orientation, thermal mass, design) can have a bigger impact than thermal insulation, but cannot be captured in a Code.
- The implementation of the Code in reality is a challenge. It was estimated that private builders would not be interested in adoption of the energy code requirements. The Code should be implemented as a law, to make sure that International donors, who provide funding for a significant share of new buildings, would strive for compliance with the requirements of the energy code. A special committee should oversee the implementation of the Code.
- During the project, some efforts were made to raise awareness with the public about the benefits of an energy code. More attention is needed, though, to inform the public about the long-term benefits of investing in energy efficient buildings.
- The thermal characteristics of local building materials are unknown. Each supplier describes different characteristics, and not in a standardized format. A survey of construction materials would be very important.
- There has been some involvement of local manufacturers of insulation materials in Gaza. The most common insulation material is polystyrene, but it is hardly used for building purposes. The local manufacturers recognize that their market would grow if the Energy Code is adopted.
- The construction sector was not properly involved in the project. It might be useful to set-up some specialized training workshops, for engineers working in construction companies.
- The voluntary adoption of the Energy Code has been very limited, so far. The University has decided that all its new buildings should comply with the energy code.
- The project had purchased the Visual DOE3.1 software tool for calculating building energy consumption, also for its partners (such as the Islamic University of Gaza). The data requirements for the use of this, however, are considerable. Especially the need to have complete weather files and building materials details are a burden, and because of this the software is hardly used in practice. It should also be noted that the purchase was for a time-limited use of the software, and this time has now expired. New licenses, of this or similar tools, would be required, at least for teaching and training purposes.

- Recommendations regarding the project are:
  - To complete the legal and regulatory work;
  - For the Ministry of Local Government, to issue a memorandum to municipalities that they are not to give a license for the use of buildings that do not comply with the Energy Code;
  - For the Engineer Association to indicate that all new building designs, in the West Bank and Gaza, should comply with the Energy Code; to ask engineers to obey the requirements of the Code; and to develop tools for compliance checking on building sites;
  - To establish a laboratory to test the thermal characteristics of local building materials; and
  - To develop an advanced training course of building energy efficiency, organized by the Engineering Association.
- Suggestions for further work on the Energy Code are:
  - To formally adopt the Code;
  - To develop specialized, and longer, training courses, specifically on the use on building energy consumption modeling software (e.g., one to two months courses, in Egypt or Jordan);
  - To initiate pilot projects; and
  - To raise public awareness.