Low Cost/Low Energy buildings in the Czech Republic

(Capacity Building for the Adoption and Application of Thermal Standards for Buildings)

Project 00014738 PIMS 349

Final Evaluation Report

Contents

1. Executive summary

1.1 Brief description of project

The project was developed in the late 1990s, to address the issue of high energy demand for heating of buildings in the Czech Republic, and the lack of implementation of low-cost and no-cost energy demand reduction measures. The designed total project budget was 1.43 M USD, including 448,000 USD GEF funding. At the end of the project the total budget disbursed was 2.3 M USD due to increased amount of municipal investment and additional investment of private investors.

The development objective of the project was to reduce the CO_2 emissions of the Czech Republic by improving the energy efficiency of the new buildings to be constructed, and thereby simultaneously reducing the operational costs and increase the comfort level of the apartments for their residents. These goals should have the following outcomes in the country:

1. To set up the institutional and other necessary arrangements for the implementation of the project.
2. To develop a low-cost low-energy building concept suited for local conditions and tradition, and through the construction and operation of the building to gain hands on experience with the state of the art design, development, construction and operation of such a building.
3. To facilitate the adoption and construction of low-cost low-energy buildings as a standard, “business-as-usual“ practice nationwide.
4. To strengthen the local project development capacity for the construction of low-cost low-energy buildings and to develop of a pipeline of at least 5-10 projects ready for investments.
5. Review, evaluate and disseminate the intermediate and final results of the project.

1.2 Context and purpose of the evaluation

A final evaluation is intended to assess the relevance, performance and success of the project, focusing on results achieved. 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 is also supposed to document lessons learnt and to make recommendations that might improve the design and implementation of other UNDP/GEF projects. Furthermore, the evaluation is to rate project performance for a given number of aspects.

Key issues in this evaluation include the relevance and quality of the project concept, and specifically the balance between planned efforts and expected impacts; the realization and quality of the planned technical results; the role of the project in the development and introduction of a national building energy standard, 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.

Evaluation indicators have been developed, based on the evaluation issues relevant for UNDP/GEF project evaluations. 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.

1.3 Specific circumstances of this evaluation

This evaluation has been plagued with a lack of information about the implementation of the project and its results. A lot of the information that is usually the basis for an evaluation was unavailable, and many relevant stakeholders were not available for interviews. Further, the evaluation was hindered by the implementing agency making a habit of sending partial or incorrect information in response to questions and a draft evaluation report.

To put matters in the correct perspective, however, it should also be noted that the project manager and project coordinator had left the implementing agency after the project was operationally closed, making it harder for the implementing agency to provide an accurate overview of the project; the project had been only monitoring building energy consumption during the last two years, managed by a person with limited previous involvement in the project; UNDP's focal point for this project had changed, the current focal point was not involved in the operational stages of the project; and the implementing agency was under the impression that no final evaluation would take place and therefore had not retained all records after the operational closure of the project.

The main issues encountered were:

- At the start of the evaluation, the main documents of the project were requested from the implementing agency. Some information was received after several reminders, other essential information was not received. Questions about the availability of information were not answered.
- The implementing agency was responsible for organising meetings with key stakeholders, as agreed with UNDP. Prior to a mission to Prague (were the implementing agency has its offices), an list of stakeholders to meet and an agenda were agreed. Upon arriving at the implementing agency's office, it was learned that more than half the planned interviews were cancelled, including those with the project executing agency, the project director and the project coordinator.
- During the mission, the availability of essential information was discussed with the implementing agency, indicating that the lack of information was hindering a proper evaluation and that results of the project could not be claimed if there was no information indicating what had happened in the project. The implementing agency was offered a few weeks time to prepare essential documentation (including a project final report). Some information was received, but there was (and is) a very substantial amount of information missing about this project. Therefore, it was decided to extend the period during which the implementing agency could provide additional information.
- After this, a draft evaluation report was prepared and circulated baed on the available, incomplete evaluation, with a commenting period of in total 3 months. Comments were received from UNDP and from the implementing agency. Comments by the implementing agency included many challenges to evaluation conclusions and ratings, most of these not supported with a discussion of the underlying observations or evidence to support the claim. A number of comments were rather questionable, including erroneous claims about factual errors in the report.
- During the evaluation, it was discovered that crucial information about the projects results (on investment cost of realised buildings) differs from one report to the next. After discussing this, a new (and different) overview was presented with. When asked to explain the differences, the implementing agency claimed that either initial data were estimates, or that later data might include additional costs that were not yet know when earlier statements were presented. Earlier statements do not indicate that data might be estimates, and later cost statements shows lower costs for buildings than earlier

ones, which cannot be consistent with a claim that additional costs were added. At the time of concluding this report, more than half a year after the initial discussion, no satisfactory explanation of these differences has been received.

- A similar issue is that the implementing agency has presented two conflicting budget statements, both after the project was completed. One was prepared on request of the final evaluator and a different one was presented as part of the implementing agency's comments to the draft evaluation report. When confronted with the differences, the implementing agency claimed that the first overview was based on estimates, while the second was based on audited reports. However, no such claim was made when the first overview was presented, and audited reports do not include the required breakdown of costs for the overview.

The lack of available information and opaque behaviour of the implementing agency have severely limited the efficiency and the quality of this evaluation. Given the various instances in which information provided by the implementing agency was found to be factually incorrect, it was concluded that further claims could not be taken at face value. As there is little opportunity to check facts with this evaluation process (short of conducting additional, independent fact finding, which was out of scope of this evaluations mandate), many issues remain unresolved. Consequently, all conclusions about the evaluation should be considered as tentative.

1.4 Main findings, conclusions, recommendations and lessons learned

1.4.1 Main findings & conclusions - Project Formulation

The project design is a remarkable mixture of good analysis and illogical leaps. The UNDP project document states that new construction is required to be well-insulated, but that most older buildings are poorly insulated. The GEF project brief, on the other hand, hardly discusses the issue of energy consumption in existing buildings and focuses directly on improving energy performance in new construction. Both documents are probably incorrect in their assessment of the situation and what was needed. Nevertheless, the project as implemented made sense overall, despite the poor quality of the project brief and document.

Project components do not add up to a logical composition of activities, with a too large gap between one demonstration project and national adoption of a standard, and an illogical choice to try to establish government for subsidies and the development of more demonstration buildings once a standard would have been adopted. In the context described, this might not have led to any results beyond the single demonstration project. Luckily, the project was not implemented like this and the context description left out that there was already an ongoing drive in the Czech Republic to improve building energy performance standards, a much better starting point to achieve the desired results. Overall, the project document is rather unconvincing piece of work, illogical and inconsistent, and it is hard to understand why this was drafted and approved by UNDP and the GEF, especially as the inconsistencies were clearly recognizable without knowing a single thing about the Czech situation.

1.4.2 Main findings & conclusions - Project Implementation

The overwhelming observation is that this project did what it thought necessary for achieving its objectives, not what the project document said should be done. That in itself points to a commendable level of adaptive management, as well as to a lack of attention for the agreed project design. Good adaptive management practices where accompanied by a great level of attention for involving a wide range of stakeholders in the project and mobilizing local

resources, which is commendable. Administrative duties seem to have received lesser attention, as is demonstrated by the lack of a complete project archive but also by a lack of recording deviations from planned project activities and spending. Although the decisions themselves are not questioned, the cancellation of planned activities and the transfer of budgets between outputs that have occurred should have been discussed by the project steering committee and formally approved, as it is not up to a project manager to decide on new or enlarged spending on activities on his/her own. This also points to a lack of attention by UNDP, which should have noticed these aspects and taken appropriate action during project implementation.

Monitoring and evaluation of the project's implementation was insufficient, with little attention for the ultimate goals of the project, and financial management was weak. Even now, at the end of the project, there is no proper overview of how the project spent its budget, even if there is little reason to doubt that all was spent in accordance with UNDP's rules. Management arrangements for this project include a choice of executing agency for which no clear explanation is available. It was noted that the executing agency was not available for a meeting during the final or mid-term evaluations, and that stakeholder reports indicate that it has hardly been active in recent years. These are all aspects that have limited project's success.

The involvement of stakeholders and their appreciation of the project, however, casts a different light on the project. Despite all issues, some of which are rather serious, the project managed to involve a large group of stakeholders and jointly introduce the concept of low-cost low-energy buildings in the Czech Republic. This has influenced national policies and stakeholder actions, and contributed to better energy performing buildings and lower CO_2 emissions in the country.

1.4.3 Main findings & conclusions - Results

The results of the project lag far behind what the project document planned to be delivered. Demonstration buildings have been constructed, but most of these are not of good quality or not low-cost low-energy buildings. The government has been influenced, not to revise the building energy code, which was already planned, but in the ambition level of the planned revision, which is also important. The key issue of whole building energy efficiency was not addressed, however. Normally, it would be recommended to repair this fault, but the Czech republic must revise their building code before 2009 to comply with EU legislation (EPBD), which includes a requirement to establish building codes that target whole building energy demand, and this will resolve the issue for the country.

Direct CO_2 impacts of the project are very modest given the objectives of the project. There are some final energy savings in the demonstration buildings realized, which are partially offset by the higher cost of electricity. When comparing the listed demonstration buildings to a standard new construction using a natural gas boiler, the project has actually resulted in higher CO_2 emissions than in the standard situation as a result of the introduction of electric heating in three of the five demonstration buildings. There are substantial savings realized with the first two projects, which also have attracted the most attention. Indirect impacts of the project are 10 to 20 times lower than planned, mainly due to a considerable overestimation of potential savings in the project design: if buildings are already insulated to the level present in the Czech Republic prior to the project, it is not possible to reduce energy demand by the claimed 40-50% with improving thermal heat resistance only. As a result, cumulative savings are substantially lower than planned and also considerable less than achieved with building projects in other countries.

The activity level and the kind of impacts achieved by the project are quite acceptable compared to its budget and the national context. What limits sustainability, however, is the quality of the project's outputs: various demonstration buildings do not really demonstrate good low-cost low-energy building principles, falling short on either the low-energy criterion, the low-cost criterion or having design issues, reports of realized energy performances were seriously flawed (correct statements were only prepared after several interventions during the final evaluation) and the project's input in the building standard revision has fallen short on the critical aspect of whole-building energy efficiency.

Stakeholders have been informed about low-energy building designs and awareness was built that this is a desirable and realistic direction for the future. That last part seems to be the key long-term impact of the project. This is an important result, but too limited for a six-year project, even if it was operating on a small budget. Especially relevant in this respect is the quality of the technical outputs: as these are limited, the project's results are likely to become tainted in the longer term. It is only because of the appreciation of stakeholders for this project that the overall rating for results is not completely unsatisfactory.

1.4.4 Recommendations

There are no recommendations regarding corrections in the implementation or results of the project, as it has been operationally closed for two years. Recommended, however, is to improve reporting about the project and specifically:

- To prepare, by someone else than the implementing agency, an accurate overview of spending on this project, correctly listing the outputs or results that budgets have been used for and the type of spending involved.
- To correct the presentation of energy results of the demonstration buildings, properly taking into account the CO_2 impact of using electricity for heating;
- To collect and make available for future reference, as far as possible, reports and other materials prepared within this project.

Further, project management improvements at the GEF and UNDP are recommended, to prevent repetition of past errors:

- For the GEF and UNDP to improve the review of project documents, checking completeness and consistency of project designs.
- For UNDP to improve project oversight.

A further issue that might benefit the country is to communicate the lesson that attention for building shell insulation is not sufficient to achieve energy efficient buildings. This mistake was made by the project; it might benefit others to be warned not to do the same.

1.4.5 Lessons learned

Two important lessons learned in the implementation of the project, not reported earlier, are:

- The 'learning by doing' approach of the project was appreciated by stakeholders, but there was not enough time in the project to really allow for a good communication between all involved experts.
- Different experts like engineers and architects have difficulty understanding each other's approach to building design, and lack a common language to discuss matters.

1.4.6 Ratings of project components

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

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

- Conceptualization / Design: Unsatisfactory
- Stakeholder participation: Marginally satisfactory

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

- Implementation Approach: Satisfactory
- Monitoring and Evaluation: Marginally satisfactory
- Stakeholder participation: Highly satisfactory

The overall appreciation of the project results is Marginally satisfactory. Rated elements are:

- Reduced CO2 emissions of the Czech Republic and simultaneously reduced operational costs and increased comfort level in apartments (development objective): Unsatisfactory
- A detailed technical design and the construction of the first low cost - low energy building (results expected 1): Unsatisfactory
- Analysis of the performance of the building (results expected 2): Unsatisfactory
- Increased awareness of decision makers, architects and construction companies regarding the possibilities to increase energy efficiency in buildings with little or no additional costs (results expected 3): Satisfactory
- Revision of the existing standards and/or creation of new ones to increase the energy efficiency in buildings (results expected 4): Marginally satisfactory
- A government plan to promote the adoption of new standards (results expected 5): Unsatisfactory
- A financial mechanism designed, tested and included in a financial plan for future investments (results expected 6): No rating given
- The future potential for developing low-cost low-energy buildings has been assessed and potential investments identified (results expected 7): Unsatisfactory
- Local capacity for project development of similar type of projects has been increased and/or strengthened (results expected 8): Marginally satisfactory
- Training of the relevant stakeholders to apply the new standards (results expected 9): No rating given

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
- Draft final report
- Final report

2.2 Key issues addressed

Key issues in this evaluation include:

- The relevance and quality of the project concept, and specifically the balance between planned efforts and expected impacts;
- The realization and quality of the planned technical results;
- The role of the project in the development and introduction of a national building energy standard, 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:

- Initial desk review of project documentation, including the project document, the mid-term evaluation report and some yearly reports (see annex 4). Further information was received during a visit to the project management. 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. 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.
- 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 or in the progress reports), 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) 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 19 March to 30 June 2007, including a mission to Prague from 1 to 4 May 2007. At this time, the project had been completed for almost two years, during which only post-project monitoring took place. It was decided to execute the final evaluation at this time, to be able to include monitoring results for realized building projects in the final evaluation.

Consequences of this decision were that the project manager had left the project and was not available for discussions; the project coordinator had left the project, was available for discussions but, given the time lapse, didn't remember a lot of details about the implementation phase, and the executing agency didn't agree to an interview, despite various requests. Further, project records had been partially cleared in the meantime. Most considerable effort, most key reports were collected, but some remain available. A project

final report had not been prepared, although it was a required output of the project. Upon request, a report was reconstructed for this final evaluation, focusing mainly on achieved results and including implementation details as far as these were known to current staff of the implementing agency.

It goes without saying that this lack of information severely hindered the evaluation process. Whether a quality evaluation is possible under such circumstances is open for debate; it was continued only for lack of alternative, and a recommendation is to at least evaluate the implementation phase much sooner after concluding the actual work even if results information has to be added at a later stage.

The implementing agency has been given repeated opportunities to present comments and provide evidence regarding issues raised in this evaluation, including a full-day discussion of comments. All comments and additional info has been taken into account in the preparation of this final version of the report, although the evaluator did not agree to all views presented by the implementing agency.

[add if needed:

The implementing agency, SEVEn, wishes to express their views about this evaluation in a separate note. This is included as annex 7 to this report.]

3. The project and its development context

3.1 Project start and duration

The project was developed in the late 1990s, to address the issue of high energy demand for heating of buildings in the Czech Republic, and the lack of implementation of low-cost and no-cost energy demand reduction measures. The project document was signed on 25 Jan 1999, and project implementation commenced a little later, in September 1999, with a planned duration of 42 months (3.5 years). The end date of the project, which was stated originally as March 2003 (but should have been july 2003, 42 months after signing of the project document), was postponed several times, for unspecified reasons:

- The October 2000 Tri-partite review report indicates an original duration of 4 years (48 months), without further discussion;
- A 12-month extension is indicated in the 2003 APR/PIR report; no rationale presented.
- The project continued operating in 2004, indicating a project duration of 54 months which had passed by then.
- The 2006 APR/PIR report (terminal APR/PIR) indicates an originally planned closing date of June 2003, and a revised operational closing date of November 2005. No adjustments to the project time frame a reported in this APR/PIR, although this is specifically requested.
- Monitoring of building energy performance, included in the project design as output 2.3, reportedly continued during 2006.

On 1 May 07, all of the project activities are completed. The current project management reconstructed a final report to support this final evaluation.

3.2 Problems that the project seeks to address

The objective of the project was to reduce the CO_2 emissions of the Czech Republic by improving the energy efficiency of the new buildings to be constructed in the country, and thereby simultaneously reducing the operational costs and increasing the comfort level of the apartments.

The project goal was expected to be achieved by:

i. Developing a design and implementation scheme for construction of new low-cost, low-energy buildings;

ii. Gaining, adopting and disseminating practical experience with developing low-cost low-energy residential buildings among all involved professional groups (architects, designers, developers, construction companies, investors);

iii. Strengthening the local capacity to develop low-cost low-energy building projects, preparing new energy standards for buildings, and designing a financial mechanism for a widespread expansion of similar buildings; and

iv. Ensuring that the investment costs of low-cost low-energy buildings are comparable to the costs of a standard building, and that the investment costs of the building are to be covered by a local investor and not by the project budget itself.

The ultimate objective of the project was to ensure that the construction of low-cost low-energy buildings will be sustainable and can be replicated after project termination.

The designed total project budget was 1.43 M USD, including 448,000 USD GEF funding. At the end of the project the total budget disbursed was 2.3 M USD due to increased amount of municipal investment and additional investment of private investors.

The geographical scope of the project was the whole area of the Czech Republic, constructed pilot low cost / low energy buildings are situated in vicinity of Prague, as well as in the northern and southern part of the Czech Republic.

Baseline activities on the energy performance of buildings were ongoing in the Czech Republic before the development of this project, but many barriers existed for this to become an effective national strategy:

a) Lack of practical experience among professional groups with the technical, economic, social and environmental aspects associated with low-cost low-energy buildings;

b) Lack of information to formulate new standards and proposals to promote the construction of low cost energy efficient buildings based on economic, social and environmental benefits associated with them;

c) Lack of awareness on the part of decision makers, architects, builders and the general public of the possibilities and benefits of increasing the energy efficiency in buildings with little or no extra costs;

d) Lack of expertise in incorporating measures and technologies to increase the energy efficiency in buildings in the planning and construction phases in a cost-effective manner;

e) Remaining residential energy-price subsidies; and

f) Lack of incentives and financial plans to support the higher up-front costs of currently designed energy efficient buildings.

3.3 Immediate and development objectives of the project

The development objective of the project was to reduce the CO_2 emissions of the Czech Republic by improving the energy efficiency of the new buildings to be constructed, and thereby simultaneously reducing the operational costs and increase the comfort level of the apartments for their residents.

These goals should have objectively verifiable outcomes in the country:

(immediate objectives and outputs)

6. To set up the institutional and other necessary arrangements for the implementation of the project.

    6.1. A constituted Project Implementation Unit (PIU), a finalized work plan and detailed terms of reference for the subcontracts, and compilation of national institutions, industry representatives and experts to be engaged in the implementation of various activities associated with the project.

7. To develop a low-cost low-energy building concept suited for local conditions and tradition, and through the construction and operation of the building to gain hands on experience with the state of the art design, development, construction and operation of such a building.

    7.1. A detailed, approved technical design for the first low-cost/low-energy building.

    7.2. A first low-cost low-energy building constructed.

7.3. Report on the building performance over its first year of operation prepared.

8. To facilitate the adoption and construction of low-cost low-energy buildings as a standard, "business-as-usual" practice nationwide.

    8.1. Increased awareness of decision makers, architects, construction companies and general public regarding the possibilities to increase the energy efficiency in buildings with little or no additional costs.

    8.2. Development and adoption of revised national standards for improving the energy efficiency of the buildings.

    8.3. A government plan to promote the adoption of new standards and market penetration of low-cost low-energy buildings formulated.

9. To strengthen the local project development capacity for the construction of low-cost low-energy buildings and to develop of a pipeline of at least 5-10 projects ready for investments.

    9.1. Strengthened local project development capacity for the construction of low-cost low-energy buildings and a pipeline of at least 5-10 new projects to construct low -cost/low-energy buildings ready for investments.

10. Review, evaluate and disseminate the intermediate and final results of the project.

    10.1. Final report (published in Czech and English).

    10.2. Intermediate and final results of the project disseminated nationally and internationally.

3.4 Main stakeholders

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

- The Ministry for Regional Development
- The Ministry of Environment
- The State Environmental Fund
- The Ministry of Industry and Trade
- The Czech Energy Agency
- The Construction Authorities
- The Union of Towns and Communities of the Czech Republic

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

- The Czech Chamber of Authorized Engineers and Technicians in Construction Business
- The Czech Normalization Institute

3.5 Results expected

The expected output of this medium size project will be a removal of barriers to increase the energy efficiency in buildings, including:

a) A detailed technical design and the construction of the first low cost - low energy building;

b) Analysis of the performance of the building;

c) Increased awareness of decision makers, architects and construction companies regarding the possibilities to increase energy efficiency in buildings with little or no additional costs;

d) Revision of the existing standards and/or creation of new ones to increase the energy efficiency in buildings;

e) A government plan to promote the adoption of new standards;

f) A financial mechanism designed, tested and included in a financial plan for future investments;

g) The future potential for developing low-cost low-energy buildings has been assessed and potential investments identified;

h) Local capacity for project development of similar type of projects has been increased and/or strengthened;

i) Training of the relevant stakeholders to apply the new standards; and

j) Final report (published in Czech and English).

The energy consumption for space heating and domestic hot water in the low-cost low-energy building is expected to be up to 70% lower than the average of the existing building stock and 40-50% lower than the energy consumption of the standard new construction. Therefore, the total life-cycle costs of low-energy houses, and primarily their operating costs, will be lower in comparison to those of standard buildings, and will thus help to address the housing needs of medium- and lower-income social groups. The operating costs (including energy, water, maintenance and other) are expected to be up to 60% lower than those of a standard new construction.

3.6 Main decisions and recommendations by the project Steering committee

The project was supervised by a Steering committee, which has met regularly to approve project work and financial plans and to recommend changes and additions to the initially planned activities. Some of the main recommendations made from the steering committee are:

At the second steering committee meeting, March 20, 2000

- The project has to verify the possibility of renewable energy source use for the solutions of all low-cost low-energy buildings;
- The information and awareness activities should include publications in the Chamber of Commerce periodical newsletter, to include project results in the “Catalogue of saving measures“;
- The project results should emphasize the economy of the building operation for the lifetime period of the residential building

At the fifth steering committee meeting, April 4, 2001

- The project should work on the comparison of low-energy buildings with the existing buildings.

It seems that these recommendations were taken into account, as later project work includes these aspects.

4. Findings and Conclusions

4.1 Project Formulation

Little is known about the project design phase. In fact, available information consists of the GEF project brief (undated, presumably written in 1998) and the project document.

The project design is a remarkable mixture of good analysis and illogical leaps. The project document states that new construction is required to be well-insulated, but that most older buildings are poorly insulated. The project brief, on the other hand, hardly discusses the issue of energy consumption in existing buildings and focuses directly on improving energy performance in new construction. Both documents are probably incorrect in their assessment of the situation and what was needed. Nevertheless, the project as implemented made sense overall, despite the poor quality of the project brief and document.

Project components do not add up to a logical composition of activities, with a too large gap between one demonstration project and national adoption of a standard, and an illogical choice for subsidies and the development of more demonstration buildings once a standard would have been adopted. In the context described, this might not have led to any results beyond the single demonstration project. Luckily, the project was not implemented like this and the context description left out that there was already an ongoing drive in the Czech Republic to improve building energy performance standards, a much better starting point to achieve the desired results. Overall, the project document is rather unconvincing piece of work, illogical and inconsistent, and it is hard to understand why this was drafted and approved by UNDP and the GEF, especially as the inconsistencies were clearly recognizable without knowing a single thing about the Czech situation.

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

- Conceptualization / Design: Unsatisfactory
- Stakeholder participation: Marginally satisfactory

4.1.1 Conceptualization/Design (R)

The project design is a remarkable mixture of good analysis and illogical leaps. The document provides an insightful overview of the situation in the Czech Republic (in 1998 / 1999) and indicates that, while new construction meets fairly advanced standards, existing buildings consume far more energy that is economically and ecologically justified. This is an important starting point, supported by information about insulation performances of new and existing construction. This information indeed suggests that new construction is required to be well-insulated, but that most older buildings are poorly insulated.

The main problem addressed by the project, however, is energy demand in new construction, disregarding that according to the same document new buildings are already fairly energy efficient, and the main issue to be addressed is the energy performance of old buildings. There are good reasons to focus on new buildings, not mentioned in the project document, like the common fact that new building improvements are much easier and cheaper to implement; that better energy performance levels, once implemented result over time in a large share of the building stock being better energy performing; there was a large untapped potential for cost-efficient energy performance improvements even at the more advanced standards of that date; and a medium-sized project budget probably would not be sufficient to even start working on the issue of existing buildings.

The project brief, on the other hand, hardly discusses the issue of energy consumption in existing buildings and focuses directly on improving energy performance in new construction. According to the brief, new construction is of rather poor energy quality and in dire need of attention; the project document describes that this is already well underway. The project design, which is largely similar between the two documents, is built on the presumption that there is little experience with low-cost buildings that are of good energy quality, and that it is needed to demonstrate this in the Czech Republic in order to convince the government and the public of their potential.

The project design consisted of five components, two of which (setting up implementation arrangements and writing and disseminating final results) should not have been listed as objectives at all, as these are standard operational issues. The remain objectives are (objective 2) to develop and construct a single low-cost low-energy building; (objective 3) to use this to convince the government that a standard should be set requiring all new construction to be low-cost low-energy; and (objective 4) to strengthen local capacities resulting in a pipeline of 5 to 10 low-cost low-energy building projects, designed and ready for interested investors. The objective regarding new national standards included that the government should consider subsidy schemes, which is an illogical combination of measures as this would subsidize what would be required anyway (if the project would succeed in introducing LC/LE requirements as a building energy standard). The suggested follow-up of national implementation after a single demonstration project is a rather large step, quite likely too big under any circumstances. Finally, if national standards would be adopted (as is the goal of objective 3), there would be little need for the development of a project pipeline of 5 to 10 projects to further promote what would be required by then.

Looking back on the project, the original presumption that there was a need to demonstrate low-cost low-energy buildings seems to have been correct. The situation regarding new construction prior to the project was probably not as gloom as described in the project brief, but also not as advantageous as described in the project document. Several demonstration projects were developed and this has influenced an already ongoing government process of setting more ambitious energy performance standards for new construction.

Nevertheless, the project document is rather unconvincing piece of work, illogical and inconsistent, and it is hard to understand why this was drafted and approved by UNDP and the GEF, especially as the inconsistencies were clearly recognizable without knowing a single thing about the Czech situation.

Evaluation indicators for this item:

1. Project design targets root causes of building energy consumption: In a way, but the design is poorly substantiated and illogical.
2. Project design (summarized in LogFrame) is appropriate and suitable for the national context: Some elements were appropriate, other were not.
3. Project design includes sufficient indicators to track progress and measure outputs: the design doesn't include any success indicators.

Rating: Unsatisfactory.

4.1.2 Country-ownership/Drive

The project seems to have targeted an urgent national need, as it was well-received by national stakeholders and the government and there is a general appreciation of what the project has done. The design does not indicate other government policies working towards

the same goal or national strategies targeting building energy performance, although both seem to have been in place during the project.

The project seems to have been designed by a few individuals from an NGO and a university, together with UNDP. Whether this was driven by national stakeholders or government demands is impossible to assess, given the lack of information about the project design process.

Evaluation indicators for this item:

4. Project concept originates from within and is supported by national institutions: No information available.

5. Project concept targets pressing national environmental and development needs: Yes, although this is not sufficiently expressed in the design.

4.1.3 Stakeholder participation (R)

There is no information about stakeholder involvement during the project design phase. None of the stakeholders involved in later stages of the project reported having been involved in the design, suggesting that stakeholder involvement was weak. Given the lack of information and the elapsed time, it is possible that previous stakeholder representatives were involved in that stage.

Evaluation indicators for this item:

6. Stakeholders have been actively and passively informed about the project design: No indications

7. Key stakeholders have been consulted about core project decisions and have provided significant input into the project design: No indications

Rating: Marginally satisfactory

4.1.4 Replication approach

The project design refers to previous initiatives by other donors in the Czech Republic, and tries to draw lessons from these. The design further puts a lot of attention on communicating experiences and lessons and results, especially within the country.

Evaluation indicators for this item:

8. Project has communicated lessons learned and sought cooperation with new or ongoing projects of similar concept: Yes, and the design includes provisions for the continuation of this.

4.1.5 UNDP comparative advantage

The project, while on the surface a technical development project, in reality was a project to communicate possibilities (for better buildings) in the country. This was primarily to assist a government drive for more ambitious building energy performance standards, and the design includes a lot of attention for working with national and local counterparts, both government institutions and private sector stakeholders. This type of activity is a close match with UNDP's core competences.

As energy efficiency projects were quite new to both the GEF and UNDP in the late 1990s, it is not surprising to there was little exchange of experience with other UNDP-implemented projects during the project development stage. The design included components for the exchange of experiences during implementation, however.

Evaluation indicators for this item:

9. Project is linked with other projects or programs in the sector via well-developed management arrangements: There are provisions to facilitate this.

4.2 Project Implementation

The overwhelming observation is that this project did what it needed to do to achieve its objectives, not what the project document said it should be doing. That in itself points to a commendable level of adaptive management, as well as to a lack of attention for the agreed project design. Good adaptive management practices where accompanied by a great level of attention for involving a wide range of stakeholders in the project and mobilizing local resources. Administrative duties seem to have received lesser attention, as is demonstrated by the lack of a complete project archive but also by a lack of recording decisions to deviate from planned project activities and spending. Although the decisions themselves are not questioned, the cancellation of planned activities and the transfer of budgets between outputs that have occurred should have been discussed by the project steering committee and formally approved, as it is not up to a project manager to decide on new or enlarged spending on activities on his/her own. This also points to a lack of attention by UNDP, which should have noticed these aspects and taken appropriate action during project implementation.

Monitoring and evaluation of the project's implementation was insufficient, with little attention for the ultimate goals of the project, and financial management did not include a monitoring of cost per component of the project. It is noted that this is customary for all projects started before UNDP changed to the Atlas project management system, and current projects are usually managed taking into account component / output budgets. Even now, at the end of the project, there is no proper overview on what topics the project spent its budget, even if audits confirm that all was spent in accordance with UNDP's rules. Management arrangements for this project include an illogical choice of executing agency. These are all aspects that weight heavily on the project's success.

The involvement of stakeholders and their appreciation of the project, however, cast a different light on the project. Despite all issues, some serious, the project managed to involve a large group of stakeholders and jointly introduce the concept of low-cost low-energy buildings in the Czech Republic. This has influenced national policies and stakeholder actions, and contributed to better energy performing buildings and lower CO_2 emissions in the country.

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

- Implementation Approach: Satisfactory
- Monitoring and Evaluation: Marginally satisfactory
- Stakeholder participation: Highly satisfactory

4.2.1 Implementation Approach (R)

The implementation process is characterized by a clear focus on demonstrating the benefits of low-cost, low-energy housing to the country, adapting to changes in the implementing environment of the project and building close relationships with stakeholders. Implementation seems to have been driven by project management's perceptions about what was needed to communicate the importance of low-energy buildings than by what was

detailed in the project document. As the design in the project document was rather weak, that has had some benefits in this case, but it is not a good practice anyway.

Implementation decisions were hardly recorded or formalized via steering committee or tri-partite review decisions, including decisions to redirect spending between outputs. Similarly, there has been insufficient attention for the tracking of results achieved with the project. It is noteworthy that the project objective as presented by the project is different from that in the project document, even in some formal PIR reports.

The project has cooperated well with national experts in its operations, and involved international expertise in its early stages. This has worked very well, and it seems that national experts have developed capacities to design and construct low-cost, low-energy buildings. This not only contributes to long-term national capacities, it is probably also much more convincing for other parties if national experts have realized good results in the project. One aspect of building design, heating and hot water systems, was a bit underdeveloped in the project. This area seems to have been a weak area in building design in the Czech Republic prior to the project and the project might have done better by employing outside expertise to counteract the lack of experience of Czech designers. It was observed that some demonstration buildings includes rather curious heating and hot water installation designs, while others has state-of-the-art systems. No-one seemed to have noticed the difference, however.

The project further failed to differentiate between the energy and environmental impacts of electricity and natural gas heating, treating both final energy uses as similar. Primary energy use and resulting carbon emissions differ by a factor of 3 to 6. This was only corrected after interventions during the final evaluation. It is quite likely that buildings that have been promoted as low-energy are not low-carbon at all, and also not low on their future energy cost, due to the introduction of outdated electric resistance heating and water heating systems.

The project implementation period was considerable longer than scheduled and many extensions of the duration have happened without a recorded rationale. Although some justification for the delays can be observed, project implementation has probably takes too long, more than 6 years, for a relatively small demonstration and communication project operating in a favorable project environment.

Evaluation indicators for this item:

10. Logical Framework is used as a management tool during implementation: No. Although reports refer to a framework to report results, it has had limited use in directing the project.

11. Implementation management is adaptive to changes in the project environment: Yes, very much so. The project has adapted remarkable well to changing needs of the country, but failed to properly record changes in the project's implementation.

12. ICT have been used to support project implementation and dissemination: Yes, a project website was established as a sub-site of the website of the implementing agency. The sub-site is no longer online now, but seems to have been adequate during the project.

13. The project established suitable operational relations between involved institutions and key stakeholders: Yes, the project established excellent operational and strategic relationships, among other aspects involving government building code experts in the technical work of the project.

14. The project employed the required technical capacities and made appropriate use of these: Yes, overall it did, with the exception of heating installations expertise.

Rating: Satisfactory

4.2.2 Monitoring and evaluation (R)

Monitoring is definitely a weak point of this project. Progress monitoring focused primarily on the realization of demonstration buildings and their energy performance. Reporting on the wider uptake of energy efficient building practices is much weaker, and reporting on the end goal of the project, national adoption of a low-cost, low-energy building standard was close to non-existent. This does not reflect the actual work in the project, with a lot of attention for this end-goal, but does indicate poor reporting.

The availability of project documentation is especially worrisome. Apparently, the implementing organization cleaned up a lot of documentation after they had operationally closed the project. The implementing agency reported that no-one informed them that a final evaluation would take place at some point, and that record-keeping would be expected anyway. A project final report, although required and even listed as a project output, was not produced by the implementing agency (nor requested by the executing agency or UNDP). Such a report would probably have provided a lot of information necessary to properly evaluate the project, or to communicate its lessons to other projects in other countries. Current staff of implementing agency reconstructed a final report for the purpose of this final evaluation, which is well-appreciated. This report provides a good overview of the results achieved with the demonstration buildings, but fairly little information about the actual implementation process and challenges, not surprisingly as none of the current staff was involved in the actual execution of the project.

The project has monitored the energy performance of the first two demonstration buildings during approximately 2 years after their construction. Due to the late realization of the demonstration buildings, this monitoring continued after the project was operationally closed. Measurement data was used to calculate the energy and CO_2 emission savings, but these calculations were severely flawed. Further, demonstration building investment costs were monitored; the information presented on this issue was also severely flawed.

The project document proscribes yearly external reviews by an independent consultant of the progress and intermediary results of the project. There is no indication that these have taken place or what has happened with the relatively large budget reservation for this component. Yearly external reviews appear to be overly elaborate for a small project like this, but in the absence of a formal decision not to do the yearly external reviews the conclusion can only be that the project failed to perform these required evaluations.

The project did undergo an unscheduled mid-term evaluation in September 2002, three years after its start. This evaluation was conducted in parallel with a larger work plan evaluation initiated by the GEF, by an evaluator involved in this larger evaluation. The two evaluations are (officially) independent, but some interaction may have been present as it is hard to imagine that one evaluator can make two different observations of one project at the same time. That in itself, however, is not a problem.

The mid-term evaluation report concluded that the project is well-designed, that implementation is going well, that the increase of awareness of decision makers had been met and that the end-goal of the project, to revise energy standards according to the results of the demonstration project was superseded by the need for the Czech Republic to harmonize standards with EU regulations. It further discusses that the expectation that this small project would change the market in all of the Czech Republic is a bit unrealistic. It

recommends (only) that the project arranges for post-project monitoring of demonstration buildings and the dissemination of those results. It should be noted that monitoring of results was planned and budgeted to take place within the project, as well as dissemination of those findings.

The MTE report discusses some of the delay in the implementation of the project, but failed to note that the project could never finish on time, even taking into account the reported one-year delay(it should originally have finished within a few months of the MTE). Further, there is no discussion of the inconsistencies in the project design, technical aspects of the buildings, the lack of yearly external reviews, steering committee or TPR decisions for changes in the project or of a project logical framework. It also fails to discuss the consequences of its findings: if the end-goal of the project (revising energy standards) is no longer relevant, then the relevance of the whole project should have been discussed. No project discussion of or follow-up to the MTE is reported, although it does appear that recommendations were implemented.

This observation leads to some conclusions regarding project oversight: Although there are various instances where the UNDP might have been expected to intervene to keep the project on track, very few of these were reported in the MTE. Although UNDP has its own responsibilities in project supervision, it can reasonably assume that there is no specific reason for concern if an outside evaluation concludes that all is well. This does not justify all findings (e.g., the long delays in the project and the lack of delivery on many of the projects outputs should have been noted, independent of an evaluation), but it is an factor to take into account

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: The project has undergone some monitoring and evaluation, but both qualitatively and quantitatively less than was planned or might reasonably be expected.

Rating: Marginally satisfactory

4.2.3 Stakeholder participation (R)

Stakeholder participation in the project seems to have been excellent. Stakeholders participated in both the steering of the project and its execution, and the project has made sure to involve people that deal with building energy performance issues as part of their normal responsibilities in institutions and business.

More specifically, four committees comprising of different stakeholders have been active on this project:

Expert committee, comprised of university employees and representatives of major institutions: Czech Energy Agency, the Ministry of Industry and Trade, the Ministry of the Environment, Community of Architects, and the Czech Chamber of Authorized Engineers and Technicians. The expert committee along with building design teams that have worked on the methodological foundations for the proposals for low-cost and low-energy buildings.

Investor's committee included representatives of the municipalities which were potential investors. Municipal representatives cooperated in the search for suitable properties and securing financing.

Public architectural committee that was the jury for a design competition. The committee evaluated the 18 proposals that participated in the architectural competition for low-cost and low-energy residential buildings and selected 3 winners which were then further detailed for the cities of Sušice, Železný Brod and Humpolec. The basic conditions of the competition required the design of a residential building having 10 housing units (60-80m^2/apartment) and investment costs comparable to standard construction (max. 25,000 CZK/ m^2).

Design teams that were predominantly composed of architects and designers and experts in modeling the energy qualities of buildings and their technical systems. Design teams have worked closely with all parties participating in the construction process. They have organized consultations at each phase of the construction, and later during project implementation they performed quality control of the work of construction companies. Project designers also participated in the pre-selection of building sites due to the specific spatial and building orientation requirements for low-energy and low-cost buildings.

Evaluation indicators for this item:

16. The project properly involved national and local stakeholders in implementation and decision making: Yes, to a very large extent.

17. The project properly involved government and other relevant institutions in implementation and decision making: Yes, it involved many government stakeholders in its operations.

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

Rating: Highly satisfactory

4.2.4 Financial Planning

The designed total project budget was 1,43 M USD, including 448.000 USD GEF funding. At the end of the project the total budget disbursed was almost 3 M USD due to increased amount of municipal investment and additional investment of private investors.

Co-financing for this project consisted of investments in the demonstration buildings. Originally, one building was planned to be constructed; later, four more buildings were added. One could debate whether all buildings actually constitute a demonstration for this project, as one of the buildings, a single-family house equipped with a large and expensive ground-source heat pump, is not a low-cost building at all (large parts of the installations were sponsored), even if this is reported otherwise in project documentation. Further, both electrically heated buildings are not low-energy buildings as intended in this project, as the primary energy demand and CO_2 emission both buildings is higher than that of a standard gas-heated new building. These two are marked in the overview below.

Building	Location	Construction cost	Remarks
Apartments	Sušice	$ 585,956	
Apartments	Železný Brod	$ 805,810	
Family houses	Roztoky	$ 583,370	
Family houses	Odolená voda	$ 341,806	Not low-energy
Family house	Říčany	$ 146,488	Not low-cost & not low-energy

Exchange rate: CZK 1000 = USD 48.83 (July 2007)

The total amount of investments delivered for the construction of low-cost, low-energy housing is USD 2,463,430, of which USD 1,975,136 is undisputed. This is at least double the amount indicated in the project document.

During the implementation of the project, no records were kept of spending per objective or output of the project. For this final evaluation, the implementing agency made a reconstruction of spending per output, as listed in the original project budget. It is noted that a few months later a second, different budget statement was presented. At that time (but not when presenting the budget), the implementing agency claimed that the budget presented here was based on estimates. Since there is no way of establishing which of the two budgets (if any) is correct, no statement is presented here; both statements are included in annex 6. Observations discussed here are relevant for both budgets, apart from the exact numbers presented.

Reflecting on the budget, it is noted that:

- Total spending adds up to USD 448,001, or 100% of the available budget. The USD 1 difference is probably a result of rounding off numbers, and no reason for concern.
- There have been yearly UNDP budget revisions for this project, basically transferring spending from one year to the next. As spending was not managed or recorded per objective / output, there have been no budget revision underlying the despite substantial changes in activities. This is not uncommon for projects initiated by UNDP before the introduction of the Atlas system, but is still not a good practice. In this case, five of the outputs have recorded spending, but no there is no delivery of the planned result.
- The spending overview indicates that actual spending is a very close match with the project budget, much closer than usually observed, even on components that the project has certainly not implemented (like the development of a financial mechanism and plan). It is highly unlikely that actual spending matched planned spending so neatly, especially for a long and ever-changing project like this.
- A possible explanation is that the project during implementation has booked costs to components for which a budget was available, whether the activity belonged to that component or not. Another more likely possible explanation is that the project didn't take account of budgets per component, spent budgets as seen fit and that spending was attributed to components to match the original budget during the budget reconstruction that took place recently.
- It is clear that the reported budget is not a reliable account of actual spending, that such a reliable account of spending per output does not exist. It is also clear that this is a highly undesirable situation, especially as this strongly suggests that the project has spent its funds without taking into account if these matched planned spending.
- It is likely that the totals for categories of spending (national consultants, etc) is more reliable, as this is also how UNDP typically registers its costs. .
- Approx. 80% of the budget was spent on national consultancy, in line with the project's approach to involve national experts as much as possible and with the project's strategy of providing advice and design consultancy for buildings, but no investment support. As this is a good strategy, a high amount of spending on national consultancy can be supported. It is unclear, however, if this budget included project management cost (also implemented by national consultants).
- A rather small share of the budget, approx 2%, was spent on international consultancy. As the project tried to introduce new concepts in the country, some of which were also

new to national experts, this was probably a too low share. A bit more international expertise might have provide useful direction on aspects that were (and are) not well understood, like heating installations.

- Approx. USD 20,000 is reported as spending on monitoring & evaluation, which is a rather high amount taking into account that no yearly reviews have taken place, only a limited mid-term evaluation, and the final evaluation is not charged to the project budget. This also suggests that spending may have been registered under different headings than they should have.
- Reports of financial audits are available for the years 2000 to 2004. The implementing agency reported that audits were conducted in all years of implementation, however, no reports were encountered for the years 1999, 2005 and 2006. Spending in these years was below USD 100,000 and it there is no requirement to conduct external financial audits in year when expenditure is below that threshold. All available reports approved spending.
- Overall, the only certainty seems to be that USD 448,000 was spent to achieve the project's results..

Evaluation indicators for this item:

19. The actual spending on project activities was cost-effective and proportional to the projects objectives: Impossible to say, given the lack of information on spending and on actual activities of the project. The budget seems to be moderate in comparison to the objectives and results of the project.

20. Financial management was timely and adequate: No, the lack of information about the use of budgets was insufficient to properly manage the project towards its intended outputs and objectives..

No rating is required for the financial management of the project, so that observation that financial management was unsatisfactory for this project does not constitute an evaluation rating.

4.2.5 Sustainability

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.

4.2.6 Execution and implementation modalities

Management arrangements for this project were somewhat unusual, with a university environmental center as executing agency and an NGO implementing the project, for what basically is a project aiming to further government policy. The arrangement seems to have worked well in reality, with the implementing agency in the lead role, having established good relations with relevant government departments. The role of the executing agency remains rather opaque, however, especially as it has been reported several times that it has hardly had any real involvement in the project. The role of national project director was assumed by a representative of the Ministry of the Environment, which had no formal role in the project, but is a logical candidate, also as executing agency.

The executing agency was not available for questions, both during the mid-term and the final evaluations. A complicating factor is that the leader of the environmental centre is also a leading politician in the Czech Republic, and a former Minister for the Environment. There is no indication of any foul play in this university center obtaining the role of executing agency, but a logical explanation is missing, and this is worrisome.

UNDP oversight of the project was insufficient. There are various issues that should have been noticed during project implementation and corrected, but for which no action was taken. These include the lack of budget control (for spending per activity), changes in activities and project implementation without proper steering committee or tri-partite review decisions, almost unmotivated extensions of project duration, the lack of several outputs at the end of the project without explanation and the lack of securing that project documentation remained intact after operationally closing the project. When criticizing UNDP, however, it should be taken into account that the mid-term evaluation didn't raise most of the above issues, even didn't advice UNDP to be more on top of this relatively small project, and as a result UNDP could reasonably have assumed that a more limited supervision was adequate. This justifies some of the observations of (too) little supervision, but not all.

There is no indication that UNDP assisted in the selection of experts, other than for evaluations, or provided specific expertise to the project. The need was for this was also rather limited, as the implementing agency was quite capable of doing so on their own. Nevertheless, it could have been helpful if UNDP had insisted on the involvement of a bit more international expertise in the project, in recognition of the fact that the low-cost low-energy building concept was new to the country. UNDP did provide terms of reference for a project manager, and it is interesting to note that these didn't include a requirement to have training or experience in low-energy building design, or in buildings at all, even though this was the key aspect of the project. As the results of the project show a serious lack of understanding of building energy issues, the lack of requiring this expertise is likely to have diminished the quality of the project

Evaluation indicators for this item:

23. UNDP provided adequate oversight of the project and assignment of the required experts: Oversight was too limited, with various issues that should have been better addressed. It is likely that the lack of oversight has contributed to a reduced quality of the project.

4.3 Results

The results of the project lag far behind what the project document planned to deliver. Demonstration buildings have been constructed, but most of these are not of good quality or not low-cost low-energy buildings. As far as can be established, the government has been influenced, not to initiate a revision of the building energy code, which was happening regularly on its own, but in the ambition level of the planned revision, which is also important. The key issue of whole building energy efficiency was not addressed, however, and will have to be repaired before 2009 in an EU-required building code revision.

Direct CO_2 impacts of the project are very modest given the objectives of the project. There are some final energy savings in the demonstration buildings realized, which are partially offset by the higher cost of electricity. When comparing the listed demonstration buildings to a standard new construction using a natural gas boiler, the project has actually resulted in higher CO_2 emissions than in the standard situation as a result of the introduction of electric heating in three of the five demonstration buildings. It appears that natural gas heating or any other more fuel-efficient source of energy was not an option for two of these three demonstrations, but the lack of attention in the project for the carbon content of fuels used raises questions nevertheless.

There are substantial savings realized with the first two projects, which also have attracted the most attention. Indirect impacts of the project are 10 to 20 times lower than planned, mainly due to a considerable overestimation of potential savings in the project design. Cumulative savings are also considerable less than achieved in similar projects in other countries.

The activity level and the scope of the impacts achieved by the project are quite reasonable compared to its budget and the national context. What limits sustainability, however, is the quality of the project's outputs: many demonstration buildings do not really demonstrate good low-cost low-energy building principles, reports of realized energy performances were seriously flawed and the project's input in the building standard revision has fallen short on the critical aspect of whole-building energy efficiency.

Stakeholders have been informed about low-energy building designs and awareness was built that this is a desirable and realistic direction for the future. That last part seems to be the key long-term impact of the project. This is an important result, but too limited for a six-year project, even if it was operating on a small budget. Especially relevant in this respect is the quality of the technical outputs: as these are limited, the project's results are likely to become tainted in the longer term. It is only because of the appreciation of stakeholders for this project that the overall rating for results is not completely unsatisfactory.

The overall appreciation of the project results is Marginally satisfactory. Rated elements are:

- Reduced CO2 emissions of the Czech Republic and simultaneously reduced operational costs and increased comfort level in apartments (development objective): Unsatisfactory
- A detailed technical design and the construction of the first low cost - low energy building (results expected 1): Unsatisfactory
- Analysis of the performance of the building (results expected 2): Unsatisfactory
- Increased awareness of decision makers, architects and construction companies regarding the possibilities to increase energy efficiency in buildings with little or no additional costs (results expected 3): Satisfactory

- Revision of the existing standards and/or creation of new ones to increase the energy efficiency in buildings (results expected 4): Marginally satisfactory
- A government plan to promote the adoption of new standards (results expected 5): Unsatisfactory
- A financial mechanism designed, tested and included in a financial plan for future investments (results expected 6): No rating given
- The future potential for developing low-cost low-energy buildings has been assessed and potential investments identified (results expected 7): Unsatisfactory
- Local capacity for project development of similar type of projects has been increased and/or strengthened (results expected 8): Marginally satisfactory
- Training of the relevant stakeholders to apply the new standards (results expected 9): No rating given

4.3.1 Attainment of Outcomes/ Achievement of objectives (R)

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

Reduced CO2 emissions of the Czech Republic and simultaneously reduced operational costs and increased comfort level in apartments (development objective)

Direct impacts of the project are on average very modest compared to the objectives of the project. There are some final energy savings in the demonstration buildings realized, which are partially offset by the higher cost of electricity. When comparing the listed demonstration buildings to a standard new construction using a natural gas boiler, the project has actually resulted in higher CO_2 emissions than in the standard situation as a result of the introduction of electric heating in three of the five demonstration buildings. There are substantial savings realized with the first two projects, which also have attracted the most attention.

It is argued, by the implementing agency, that electricity was the only available source of energy for two of the three sites. Further, it was argued that electricity was selected as the energy source for heating and hot water at the third site because the future occupants wanted this. It is not possible to verify the implementing agency's claim that only electricity was available. Initially, the implementing agency argued that electricity was not available on the third site also, which was visited during the evaluation, claiming that the draft evaluation report incorrectly stated that natural gas was available. After checking the facts, the implementing agency withdrew their comment for this particular project but not for the other two. This raises the question whether its claim about the other two sits, which cannot be verified without another mission and an in-depth investigation, is correct. Apart from that, there is no evidence that other options, like oil or liquid gas tanks, have been analysed and presented to owners with a comparison of cost and CO_2 emissions, as might have been expected for demonstration projects seeking to reduce CO_2 emissions.

Whether future occupants didn't want natural gas heating at the third building site can't be verified. When visiting the buildings, the heating system and specifically the use of natural gas versus electricity was discussed with the architect and building occupants. At that time, the occupants didn't mention a deliberate choice for electricity nor did they seem to be aware of the issues relevant for this choice, like long-term cost consequences. Given the language barrier, however, this observation should not be given too much weight. In general,

however, natural gas heating is a very common option in the Czech Republic, without negative connotations. The key aspect, however, is that the project decided to include this building as a demonstration for this project, despite the negative CO_2-consequences of (unnecessary) electric heating. Even if builders and other parties wanted to go ahead with the building and electric heating, the project was free to withdraw its support to this third demonstration building (one was required according to the project document, and the second building was already a good example of low cost-low energy construction). Not only failed the project to do so, it also failed to notice the issue, even in its reporting on the energy impacts of the demonstration projects.

Despite the demonstration projects, the project has helped introduce a more stringent new building energy code in the Czech Republic. New codes have been forthcoming at intervals for more than a decade in the Czech Republic, and the country's EU Accession (in 2004) and the need to implement a the European Energy Performance in Buildings Directive also has driven the development of a new building code.

Nevertheless, it is reasonable to assume, based on stakeholder views, that the project has influenced national code developments for some years, resulting in the 2005 building code update including a definition of low cost – low energy construction. There is no requirement for low cost-low energy construction, however, and it is unclear if the building code is requiring better energy performances than would have happened otherwise. Given that stakeholders in general seem to be positive about the impact of the project, for this discussion it will be assumed that the project has positively influenced the discussion about energy performance requirements in the 2005-building code revision, impacting new construction in the years after.

This impact will likely last until 2009, when the country is expected to introduce a fully EPBD-compliant energy code, which is even more stringent. The Czech Republic has also updated its building codes in 2002, but the project reportedly had little impact on this, not surprisingly as code development usually takes a few years and the work for the 2002 update must have been almost finished when the project started. Consequently, the project could claim to have an (indirect) impact on four years of new construction in the Czech Republic, with decreased energy demand for decades to come (for GEF purposes, a 20 year lifetime should be applied). It should be taken into account that the project was not the only factor at play, and perhaps not even the biggest one (which most likely was EU Accession), but still considerable. A GEF causality factor between 40% (level 2, modest and substantial) and 60% (level 3, substantial but modest) should be applied to all savings.

The implementing agency further claimed that the project has influenced an energy management act. Despite repeated requests, however, no information was presented about how this act was influenced, what requirements were introduced or even what this act covers. Therefore, any potential impact via this act cannot be taken into account.

Unfortunately, the project has never endeavored to estimate to impact of new, better energy codes on energy demand and CO_2 emission reduction, in itself a big omission. This also makes it quite difficult to assess the actual impact of the project.

As indirect impacts via national energy codes were the end-goal of the project, a tentative calculation of these impacts is presented here. The reader is asked to keep in mind that this calculation relies heavily on assumptions, and is no more than a first approximation of the real impacts.

It was reported that the 2005-code has introduced building shell insulation requirements equivalent to R=5 for roofs and R=4 for walls. 2002-code requirements are unknown; 1998-code requirements were R=3 for roofs and R=2 for walls. It is assumed that 2002-code

requirements are in the middle of the 1998 and 2005 requirements, at R=4 for roofs and R=3 for walls. The 2005-code does not include requirements for heating systems or overall building energy consumption (and is thus, by the way, not compliant with the EPBD).

The energy consumption impact of insulation requirements is hard to assess without detailed building energy modeling tools or measurements, which are not available for this tentative calculation.

When building insulation standards are at a reasonable level, as was the case in the Czech Republic with the 2002-code, it is often assumed that the heating energy demand of a building comprises of two major parts (excluding sanitary hot water heating), roughly equal in size: ventilation losses and transmission losses. The increase in insulation value (R-value) introduced with the building code affects (almost) only transmission losses, and reduces these with approx 20% (2005 compared to 2002). The resulting decrease in heating energy demand is approx. 10%. Compared to a standardized energy demand of 80 kWh/m^2 per year (reference value for project), this amounts to a saving of 8 kWh/m^2 per year for all new construction.

According to the Czech statistical yearbook 2004, new construction of housing amounted to 1.876 million m^2 in 2003, and this volume is increasing. Assuming a new construction volume of 2 million m^2 per year for the years 2005 to 2009, a total energy demand reduction of 8 kWh/m^2.year x 2 million m^2/year x 4 years of construction x 20 years of lifetime = 320 GWh will be achieved.

Assuming a carbon factor of 0.19 kgCO_2/kWh (standard natural gas factor), this energy saving is equal to 61 kton CO_2 cumulatively. Not taking into account the upcoming 2009-revision of energy standards cumulative savings would be 1.5 times larger, amounting to approx 150 kton CO_2. After applying the causality factor, relevant indirect emission savings from the project amount to 25 to 35 kton CO_2 cumulatively, considerably less than the planned 650 kton emission reduction. When not taking into account the upcoming 2009-revision, accumulated savings are 60 to 90 kton CO_2. The difference is primarily a result from a considerable overestimation of potential savings from better energy performing buildings: it was assumed that buildings in this project would consume 40-50% less energy than standard new construction, that a new building code would make this level mandatory, and that all savings could be attributed exclusively to the project. This led to an overestimation of expected savings by approximately a factor 10.

24. Projected emission reductions based on realized project results (target: annual emission saving of 650,000 tons CO_2 p.a. in 2010 – Project Document, Expected end-of-project situation): No, Indirect impacts of the project are 10 to 20 times lower than planned, mainly due to a considerable overestimation of potential savings in the project design: if buildings are already insulated to the level present in the Czech Republic prior to the project, it is not possible to reduce energy demand by the claimed 40-50% with improving thermal heat resistance only. As a result, cumulative savings are substantially lower than planned and also considerable less than achieved with building projects in other countries.

Rating: Unsatisfactory

A detailed technical design and the construction of the first low cost - low energy building (results expected 1)

SEVEn carried out a basic assessment of the possible construction of LC/LE buildings in the Czech Republic and created several work teams which traveled to study low-energy buildings

in the Czech Republic, Austria, Germany, and Great Britain. With the announcement of the public architectural competition, the project supported the activity of the work teams, which created 18 conceptual designs. The three best designs were further elaborated, all were designed with regard to minimizing heat losses. The following table provides an overview of the demonstration buildings in this project.

Town	No apts.	Building floor area	Cost (CZK)	Specific cost (CZK/m^2)	Specific cost (USD/m^2)	Characteristics
Sušice	9	855	12 000 000	14 035	685	Apartment building
Železný Brod	12	842	16 500 000	19 599	957	Apartment building
Humpolec	16	1500	24 000 000	16 000	781	Not built – detailed design only
Roztoky	4	540	10 000 000	18 519	904	4 x family house (in row)
Odolená Voda	3	340	7 000 000	20 588	1005	3 x family house (in row)
Řičany	1	149	3 000 000	20 134	983	Single family house

NB Reported construction costs are most probably estimates, as it is unlikely that all real construction cost would sum up to nicely rounded figures. Real construction cost are unknown.

Several designs were observed during this evaluation. The first design (Sušice) was quite unusual, including a new design principle of layering thermal zones. It is unclear where this principle originates from, as it is not common internationally and has also not been used again in the demonstration projects. The design included a mixture of concrete and wood construction details, with various measures to limit thermal bridges. The insulation performance of the building is quite acceptable, resulting in a substantially reduced energy demand, but the design is experimental rather than a demonstration. In a response, the implementing agency indicated that calculations underpin this design solution, and that self-standing load-bearing constructions were used for loggias and corridors to prevent thermal bridges. It is recognized that the insulation performance of the design is quite acceptable indeed, and that thermal bridges between some thermal zones (living rooms vs. loggias, utility rooms vs. corridors) were interrupted by these measures. The issue raised, however, is that some thermal bridges that are important in this design (between living room and utility rooms) have not been interrupted and that the specific, unusual design does not allow to do so unless very elaborate measures are taken. Therefore, it is observed in this evaluation that this design, although with a good energy performance, has some issues that hinder wider replication.

The second building, in Železný Brod, is a good demonstration of the potential of low-cost low-energy buildings. It is based on a good, integrated design, including a concrete skeleton, sufficient building shell insulation in logical places and good heating and hot water installations. The hot water system included solar thermal collectors and boilers, correctly combined with a natural gas system.

A series of family houses in Roztoky was visited. These houses are wooden frame-constructions, with a lot of thermal insulation in walls, floors and roofs. Designs were optimized for low-cost, and the strive for lowest cost has left its mark on the construction quality. Outside walls were constructed without a second water barrier or protection of the first water barrier on the outside, which can lead to substantial water damages to the construction if the outside cladding is damaged. In its response, the implementing agency claims that such a construction is well-accepted and that a water barrier on the outside would lead to condensation issues within the wall. According to consulted industry experts, the use of (only) outside cladding is an established practice indeed, except for ground-floor

walls as these can easily be damaged which can have devastating effects on the construction. It is recommended that an additional layer of protection (e.g., wooden boards) is mounted on the ground-floor walls of these houses, to protect the water-resistant layer from damage. Adding a water-protective foil on the outside of such walls is a well-established practice, and can be done without introducing condensation risks when selecting the appropriate type of foil. When asked, the implementing agency was not aware of these foils.

Following a discussion on this building, the implementing agency provided an overview of the materials used for the walls (see annex 7). An analysis of these details learns that there are two more issues with the wall construction:

- The construction is somewhat unusual, leaving empty space between the load-bearing elements of the construction. Although this doesn't directly affect the quality and energy performance of the construction, other solutions would have been simpler.
- A brief calculation of the insulation characteristics of the wall components points to an overall insulation value of R=3.5 to 3.75. This is only somewhat better than the pre-project minimum requirement of R=2 and worse than the 2005-requirement of R=4 for walls. Given that this is a brief calculation, it cannot be stated with certainty that the wall construction would not comply with 2005-requirements, but it is certainly not better than is currently required.

As the increased insulation performance of these buildings is supposed to be the main energy efficiency characteristic, responsible for the reduced energy demand, this raises some very serious concerns about the reported energy performance for these buildings. It is claimed, in data provided by the implementing agency, that these buildings would consume only 26% of the energy needed for heating a standard house. Although walls are not the only part of a building insulation shell, they are the most important part, and the insulation performance characteristics as provided are not consistent with the claimed energy performance. Since the wall construction details have been heavily debated, it can only be concluded that the energy performance data are false.

The heating system was a mixture of cost-cutting and ill-sense, including a hydraulic (hot water) heating system fired by an electric resistance heating element, and a very large sanitary hot water tank also heated with electric resistance elements. This no doubt was cheaper than connecting the buildings to the natural gas grid, that runs only meters from the houses, and installing gas-fired boilers. The architect's rationale for this was that the cost of electric heating is not so high, as electricity rates are still substantially subsidized. Nevertheless, it can be expected that subsidies will be abolished in the near future, leaving the inhabitants with substantially higher energy bills. The ill-sense in this solution is that there is little reason for installing a hydraulic system if one uses electric resistance heating: the cost of the hydraulic system, with pipes and pumps, is likely to be much higher than the cost of installing decent electric resistance heaters in every room (as is common in warm climates). The energy cost is also higher, as the hydraulic system introduces pumping energy losses and heat losses in the pipes. Finally, although the energy demand of the houses is relatively low when comparing the end-use (in electricity) with that of a standard building, the primary energy use including electricity generation conversion losses is considerably higher than that of a standard, natural-gas heated new building, and the associated CO_2-emissions are more than double those of a standard building. Overall, the building has more characteristics of a low-cost design at the expense of quality, than of a low-cost low-energy building. It should never have been listed as a demonstration building for this project.

Other buildings were not observed. It was noted that a listed project, a single family house in Řičany, included a ground-source heat pump with heat exchanger pipes drilled to a depth of more than 60m and other rather expensive energy measures. When asked, some stakeholders mentioned that most of these expensive features were sponsored by businesses wanting to promote a technology, so that these didn't influence the cost of the building. It could not be established whether this is true. Data provided by the implementing agency indicate that the energy options installed in this building had an extra cost of approx. CSK 500,000, equivalent to 20% of the overall cost of the building without these extras. This seems to indicate that the building does not meet the project's standard for low cost, which is no or a maximum of 10% additional investment. A further remarkable feature of this building is its energy consumption: this is indicated as 43.6 kWh/m2 per year, when heated with a ground-source heat pump. As a good ground-source heat pump should have a COP (ratio between delivered and used energy) of at least 3 to 4, this would indicate that the energy performance of the construction of this building (not taking into account the heat pump) would be around 150 kWh/year, or around twice the reference value for standard buildings. This either indicates that the building design is wrong or that something is severely wrong with the presented energy data. As the building also doesn't comply with the cost-criterion, it should not be listed as a low-cost low-energy building.

In a response to evaluation remarks, the implementing agency indicated that low-cost low-energy buildings should be evaluated on those two aspects only: whether these are low cost (no or max 10% additional investment) and low-energy (max 50 kWh/m2 per year in delivered energy). The evaluator does not agree to this, for two reasons:

- Demonstration buildings are intended to show others that it is possible to realize normal buildings with a low energy demand for no or little extra cost. This, however, starts with demonstrating that the buildings comply with normal expectations, such as no additional risk of damage to walls or condensation at interior walls due to special design choices. There is little point in demonstrating that you can construct houses with a low energy for normal construction costs at a reduced quality of the construction. Therefore, this aspect is taken into account.
- The project aims to reduce CO_2 emissions, not delivered energy. Therefore, the CO_2 content of the delivered energy (electricity, natural gas etc) should be taken into account.

It is rather remarkable that no-one in the project implementing unit seems to have noticed these illogical matters or has given any consideration to primary energy demand and CO_2 emissions, during or after the project.

25. First low cost / low energy building realized based on sound technical design (baseline no design experience present in country): Buildings were constructed, but the majority of the designs is flawed and/or not low-cost, low-energy. Some demonstration buildings have resulted in increased, not reduced CO_2 emissions.

Rating: Unsatisfactory

Analysis of the performance of the building (results expected 2)

For a period of one year, two residential buildings (in Sušice and Železný Brod) were monitored with respect to the behavior of tenants and consumption of energy for heating. This monitoring consisted of measuring the temperature and moisture in three apartments of each building. In addition, the annual consumption of natural gas for the water boiler was measured. The measurements showed that both buildings met the parameters for low-

energy buildings from both an energy and cost standpoint. Other buildings were not measured; reported energy consumption data are calculated data.

The analysis of performance, when originally evaluated, was of low quality. Although measurements themselves were conducted properly, the translation of measurements into meaningful data included various errors than should not occur with professional organizations. Data where not differentiated for electricity and natural gas demand, and reported data varied between documents. Construction cost data was especially poor and varied between reports even afte the project was closed, and no baseline was indicated. Most of this, but not all, was corrected after substantial interventions during a final evaluation mission. Remaining issues include a proper comparison of CO_2 emissions of demonstration buildings with standard ones (corrected in the data reported here) and a lack of correcting for the additional electricity demand of condensing boilers. The building in Roztoky also use wood stoves for heating, which is not taken into account in the energy calculations. Further, data provided by the implementing agency incorrectly list the energy source for houses in Roztoky as natural gas (it is electricity), and the calculation of CO_2 emission savings is incorrect (both corrected here).

Town	Building floor area	Energy source	Specific energy consumption (kWh/m^2.year)	Specific CO_2 emission (kg CO_2/m^2.year)	Final energy consumption building (MWh/year)	Final energy savings (MWh/yr)	Emission savings (ton CO^2/year)
Reference		*NG*	*80*	*15.2*			
Sušice	855	NG	42	8.0	36.1	32.5	6.2
Železný Brod	842	NG	28	5.3	23.6	43.8	8.3
Roztoky	540	E	21*	24.6	11.3	31.9	- 5.1
Odolená Voda	340	E	34*	39.8	11.6	15.6	17.6
Řičany	149	E	43.6*	51	6.5	5.4	6.3
Total	**2726**				**88.9**	**129.1**	**33.3**

E = electricity; NG = natural gas
* = calculated, not measured
carbon emission factor: electricity 1.17 kg CO_2/kWh; natural gas 0.19 kg CO_2/kWh

When doing a proper assessment of impacts, it is clear that the project managed to increase CO_2 emissions with one demonstration project, instead of decreasing them. This is quite a remarkable performance, not seen very often in climate change mitigation projects. Further, given that energy performance data for at least two buildings (Roztoky and Ricany) is inconsistent with construction details, the above data might be incorrect. At least for the buildings in Roztoky, it is likely that actual energy demand is closer to the standard value of 80 kWh/m2 than the reported 21 kWh/m2, especially when taking into account the energy used in wood stoves.

Whether this project has actually managed to reduce the CO_2 emissions of demonstration buildings remains to be seen, however. The first two buildings seem to result in reduced emissions, and this is consistent with observed facts. The third building leads to increased emissions even if taking into account the (probably too low) energy performance indicated in data by the implementing agency. There is insufficient information for a discussion on the fourth building, and especially whether electricity is really the only available source of energy, and data for the fifth building are again questionable. Average results currently indicate a reduction of 33.3 kton CO_2/year, or approx 40%, but that result is based on the assumptions that the building in Roztoky is as energy efficient as claimed and that electricity is the only

realistic option for heating for the last two demonstration buildings. Further, it includes emission savings for the building in Ricany, which does not meet the low-cost criterion.

It is further important to note that the implementing agency has reported different numbers in different reports, and that numbers changed over time even if there were no changes in the underlying facts (e.g., construction costs of buildings).

26. Building energy performance analyzed against proper baseline (baseline: no performance data available): Measurements were done, but calculations were of rather poor quality, even though these measurements were made a priority in the last years of the project.

Rating: Unsatisfactory

Increased awareness of decision makers, architects and construction companies regarding the possibilities to increase energy efficiency in buildings with little or no additional costs (results expected 3)

The project issued a publication entitled "Atlas of low-energy buildings" containing various examples of low-energy buildings in surrounding countries. 3000 copies of the Atlas were printed. An additional source of information for the public are two CD-ROMs: "ECOHOUSES" and "LC/LE residential building for the town Uherské Hradiště", which were prepared in cooperation with the league of ecological alternatives and the city of Uherské Hradiště. This has helped raise awareness for building energy efficiency.

Stakeholders report that the various professionals are more aware of building energy efficiency issues than before the project. It is impossible to establish to what extent this is a result of the project.

27. Decision makers, architects and construction companies aware of low or no-cost energy efficiency options (baseline: no awareness): Awareness has improved, but it is impossible to say to what extent this is the result of the project and if the level of awareness is sufficient. No level was specified, however, and the results are deemed to be sufficient for a small project.

Rating: Satisfactory

Revision of the existing standards and/or creation of new ones to increase the energy efficiency in buildings (results expected 4)

As far as can be established, the government has been influenced, not to initiate a revision of the building energy code, which was happening regularly on its own, but in the ambition level of the planned revision, which is also important. The project did, in its working groups, include people that were developing revised building energy codes for the government. By exposing these to the project, low-cost low-energy design principles were introduced in the national standard revision process. Stakeholders report that this has been instrumental in driving forward more ambitious energy standards for buildings.

There is no requirement for low cost-low energy construction, however, and it is unclear if the building code is requiring better energy performances than would have happened otherwise. Given that stakeholders in general seem to be positive about the impact of the project, for this discussion it will be assumed that the project has positively influenced the discussion

about energy performance requirements in the 2005-building code revision, impacting new construction in the years after.

It should be noted that the revised standard that was influenced by the project (2005-revision) relates only to the thermal insulation performance of the building shell irrespective of the heating system. By doing so, the standard only regulates heat losses from buildings, and not directly the energy demand, and issue which will have to be repaired soon as part of EU obligations to implement the EPBD directive. As seen with some of the buildings in this project, this omission can result in higher energy demands in reality, if poor-performing heating systems and/or electric heating is selected. So, although the project has helped in the revision of standards, it failed to address an important loophole in the standard, and the resulting standard cannot really be classified as an energy efficiency standard.

28. National building energy performance standard revised as a result of project activities (baseline: no revision planned): The project influenced the standard revision, but it was not the only factor. The resulting standard has an important loophole.

Rating: Marginally satisfactory

A government plan to promote the adoption of new standards (results expected 5)

There is no evidence indicating that the project has developed or co-developed a government plan for the adoption of a new standard. It rather seems that standard revisions every few years are normal practice in the Czech Republic, handled by the government within its normal operations.

The implementing agency further claimed that the project has influenced an energy management act. Despite repeated requests, however, no information was presented about how this act was influenced, what requirements were introduced or even what this act covers. Apart from that, the project document clearly stipulates that the project should support the government with a plan to promote new standards, which is something different that influencing it to adopt regulations.

29. Government promotion plan developed and adopted (baseline: no plan): No plan developed. There is no indication of activity on this output.

Rating: Unsatisfactory

A financial mechanism designed, tested and included in a financial plan for future investments (results expected 6)

There is no evidence indicating that the project has worked on financial mechanisms for the promotion of low-cost low-energy buildings. In the project design, this result is linked to the government's introduction of new mandatory standards, in which case financial mechanisms do not make sense. It is therefore difficult to rate this result.

30. Financial mechanism designed, tested and included in a government or municipality financial plan for future investments (baseline: no mechanism): No, but it is not clear what should have been done.

Rating: No rating given

The future potential for developing low-cost low-energy buildings has been assessed and potential investments identified (results expected 7)

There is no indication that the project has assessed the future potential for developing low-cost low-energy buildings, or any other assessment relating to larger-scale implications of low-energy building designs.

The implementing agency claims that several hundred more low-cost low-energy buildings were constructed following the project (and inspired by it). That will be discussed in the next section. Here, it suffices to state that follow-up activity is not a substitute for the assessment the project should have conducted.

31. Overview of energy potential and investment needs for low energy buildings in the Czech Republic (baseline: no information available): Not available, and it seems that no activity was undertaken for this result.

Rating: Unsatisfactory

Local capacity for project development of similar type of projects has been increased and/or strengthened (results expected 8)

The project has reached out to a variety of stakeholders to increase capacity for the development of low-cost low-energy buildings. Low-energy building information was distributed to professional experts, municipalities and general public. Two conferences were organized:

- 7th International Conference – Section "Low-energy buildings"-12 lectures (2000)
- 8th International Conference – Section "Low energy residential buildings" – 16 lectures, (2002)

Results from the project were presented at several international workshops in Czech republic and abroad, articles were published in specialized magazines and newspapers and Regular consultations for towns and the public were organized.

The information disseminated by the project was well-received by stakeholders, and it is reported that understanding of the low-cost low-energy building concept is much better now than it was prior to the project. This is probably a result of project activities, combined with a general drive towards energy conservation and harmonization of standards and practices with the EU. It is impossible to disentangle the impacts of the project versus other influences, but stakeholders report that the project's impact was considerable.

The project has resulted in five demonstration buildings instead of the one that was originally planned. This is reported, in project implementation reports, as contributing to the planned result of a developed project pipeline. It is doubtful if this is correct, as the realized buildings seem to have received more project support than one would expect for a project pipeline development.

Although there is no indication that the project left behind a pipeline of projects ready for development by others, there is information that several hundred low-cost low-energy houses are being built in recent years, with an expected increase of 900 to 950 single family houses and 120 to 150 reseidential apartment buildings being constructed in the period up to 2010. This cannot be linked directly to the project, but it does indicate an emerging local capacity for developing low-energy buildings.

32. Project pipeline of 5 to 10 low cost / low energy buildings developed (baseline: no development planned): No pipeline was developed. More demonstration buildings were developed, but that does not constitute a pipeline. There are, however, indications of an emerging local capacity for developing low-energy buildings.

Rating: Marginally satisfactory

Training of the relevant stakeholders to apply the new standards (results expected 9)

There is no indication that the project has been active promoting the application of a revised building code or has trained stakeholders in its application. It should be taken into account that the most relevant revision was issued in 2005, when the project was about to finalize. As standards development or revision usually takes a few years, and the project was intended to last for 3.5 years only, this training might have been a difficult issue anyway. Further, there are no indications that stakeholders lacked the capacity to implement building energy codes in general, and the revision follows-on to previous standards and hardly includes completely new aspects.

In its reply to the draft report, the implementing agency reported that training of the relevant stakeholders is provided several times a year by institutions like ABF, universities or the National construction centre. It s not clear what this training encompasses and if it is (or was) linked to the project.

33. Stakeholders trained in application of new national building energy performance standards (baseline: insufficient capacities with stakeholders): There are no indications that this happened, but it is also not clear that stakeholder capacities to implement a national standard are insufficient.

Rating: No rating given.

4.3.2 Sustainability

The project's impact is sustainable in that it has contributed to a building energy code revision, which is there to stay. It has also help raise awareness for building energy efficiency issues, and informed professionals on energy efficient building design principles.

Putting things in perspective, it is important to note that the project was a small initiative, with a total GEF budget under USD 500,000. It operated in a country that was going through the EU Accession process, including adoption of EU regulation and wide-spread harmonization of attitudes and practices with European Union countries. EU pre-accession budgets far outpace the GEF Budget (to be clear: the total GEF budget, not for this project or even the climate change area) and have been followed-on by structural funds budgets that are even bigger. It is not reasonable to assume that such a small project can change the whole building sector in a country without an EU accession process in the background, and it is absolutely ludicrous to assume this under those conditions, even if the project document did.

The activity level and the scope of the impacts achieved by the project are quite reasonable compared to its budget and the national context. What limits sustainability, however, is the quality of the project's outputs: many demonstration buildings do not really demonstrate good low-cost low-energy building principles, reports of realized energy performances were seriously flawed and the project's input in the building standard revision has fallen short on the critical aspect of whole-building energy efficiency. These were the critical aspects of the

project, and a sustainable impact can only be assumed if the project has delivered results that actually benefit the country.

The energy efficiency aspects not addressed by the project will (have to) be corrected by the next, EU-required revision of building energy codes. Had this not been the case, then a substantial revision of the results of the project would have been needed. Overall, it appears that the building energy code (or standard) work of the project is appreciated by directly involved stakeholders, but is likely to be of little impact in the longer run. The long-term impact of the demonstration buildings is likely to be limited when it is clear that many of these fall short by the now-introduced whole-building energy efficiency concept. What really remains seems to be the awareness raising that the project has achieved and the information provided to professionals about low-energy building designs. This is an important impact, but a bit limited for a six-year project, even if it was operating on a small budget. Especially relevant in this respect is the quality of the technical outputs: as these are limited, the project's results are likely to become tainted in the longer term.

Evaluation indicators for this item:

21. The project established a sustainable impact in the country, which will continue independently: a sustainable impact in awareness raising, but probably not on other aspects.

22. The project established arrangements with relevant organizations or other instruments to secure a continued impact: No, no such arrangements were encountered.

5. Recommendations

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

As this is the final evaluation, two years after the project was operationally closed, there is little point in recommending corrections to the implementation of the project. What might benefit from improvement is the reporting about the project, and specifically:

- To prepare an accurate overview of spending on this project, correctly listing the outputs or results budgets have been used for and the type of spending involved;
- To correct the presentation of energy results of the demonstration buildings, correctly taking into account the CO_2 impact of using electricity for heating;
- To collect and make available for future reference, as far as possible, reports and other materials prepared within this project.

Specific issues are UNDP and GEF procedures for approval of projects, and UNDP oversight of this project. It was identified that a project document was approved that included various errors and inconsistencies, all easily recognizable before the start of the project for a careful reviewer. Apparently, the review was not so careful, and UNDP and GEF are strongly advised to consider how this might have happened and how it can be prevented from happening again. Secondly, UNDP oversight for this project was insufficient, not strict enough in direction the proper arrangements for this project and inaction when intervention was needed. Improving the oversight procedures is recommended. These recommendations will not benefit this project, but might help prevent future failures.

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

Probably the best thing this project can do for the country is to communicate the lesson that attention for building shell insulation is not sufficient to achieve energy efficient buildings. Project management was under the mistaken impression that they were construction good demonstration buildings, and in most cases they were wrong. Communicating this openly might provide a lesson for others, thus providing directions for future work.

5.3 Proposals for future directions underlining main objectives

Future projects will take place under a different framework, of the European Union's Energy Performance of Buildings Directive. This includes an obligation to implement building energy codes that target whole-building energy consumption. It is also likely that the EU will lead the way for future building energy efficiency matters. Since the context for which this project was developed is no longer relevant, is not useful to propose future projects based on an outdated framework. Future projects will have to take European regulation as a starting point, and do a completely new analysis of the needs of the country.

What might be useful is to conduct similar demonstrating projects in other countries. Although this project failed in many aspects, the concept of demonstration projects itself was actually reconfirmed. Naturally, this would need to include a better project development and better implementation, preventing the issues described earlier in this report.

6. Lessons learned

The project, including its design, implementation and results, shows many insightful lessons. Some of these point to excellent aspects of the project, and repetition of the underlying practices in other projects would be recommended. Some point to clear failures in this project, 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 separately.

Two important lessons learned in the implementation of the project, not reported earlier, are:

- The project has adopted a 'learning by doing' approach, encouraging stakeholders to learn how to develop low-energy buildings by doing it themselves. This was appreciated by stakeholders, but there was not enough time in the project to really allow for a good communication between all involved experts. A next time, more attention could be given to explaining a few basic concepts to all experts, also to provide a common language for interdisciplinary communication.
- Communication between different types of experts is very complicated and takes much more time than might be expected. Engineers and architects have difficulty understanding each other's approach to building design, and lack a common language to discuss matters. In this project, it was observed that various experts could talk for months without actually understanding each other. More time and perhaps a different approach are needed.

Evaluation report Annexes

Annex 1 Terms of Reference For Final project Evaluation

Terms of Reference are not included, as these were replaced with the evaluation itinerary presented in annex 2.

Annex 2 Evaluation itinerary

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

Introduction

This evaluation outline describes the approach proposed for the evaluation of the UNDP/GEF project "Capacity Building For the Adoption and Application of Thermal Standards for Buildings", 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.

Background for this Evaluation

The project "Low Cost / Low Energy Buildings in the Czech Republic" (further: the project) is funded by the Global Environment Facility (GEF), managed by the United Nations Development Program (UNDP), and implemented by SEVEn. The project falls under the Climate Change focal area, and aims at enabling energy conservation in Buildings through the development of a demonstration project and the establishment of national energy performance standards for new buildings.

To evaluate the project results and impacts; promote accountability for resource use; document, provide feedback on and disseminate lessons learned; and provide forward vision recommendations to complement and sustain project outputs, UNDP requests this final project evaluation. This outline describes the proposed approach for this evaluation and its strategy, planning and deliverables, in accordance with the Terms of Reference provided by UNDP.

Evaluation Issues

The ToR describe the issues that need to be addressed in the final evaluation, the documents to be reviewed and the stakeholders to be consulted. For some of the evaluation components (specifically Findings and Conclusions), the ToR specify which elements need to be addressed in the evaluation.

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/Driveness
- 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 are 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.

Organization and approach of the evaluation

This evaluation is 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 project officers, the implementing agency, the project manager, and stakeholders. These interviews will take place during a visit to the Czech Republic. External experts may be contacted to gather background information or references and to check project data.

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.

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.

Based on the information provided, and on an understanding of the typical development of building standards, be observable effects may be expected 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 an energy performance standard 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 is 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.

- 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.

Deliverables & Planning

The planning of this evaluation is constrained by the time necessary to collect all relevant information, to (logistically) prepare a mission to the Czech republic 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
- 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.

Interviews with the project management and major stakeholders (as listed in the ToR) will be conducted in Prague. The interviews will be semi-structured, assisted by the evaluation outlines (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). The interviews will be followed by a 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 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. 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 Lebanon).

Indicators for the evaluation of project formulation[1]

- 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/Drive
    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

[1] These indicators are based on the Terms of Reference for Final Project Evaluation. 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.

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

- 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)

Reduced CO2 emissions of the Czech Republic and simultaneously reduced operational costs and increased comfort level in apartments (development objective)

24. Projected emission reductions based on realized project results (target: annual emission saving of 650,000 tons CO_2 p.a. in 2010 – Project Document, Expected end-of-project situation)

A detailed technical design and the construction of the first low cost - low energy building (results expected 1)

25. First low cost / low energy building realized based on sound technical design (baseline no design experience present in country)

Analysis of the performance of the building (results expected 2)

26. Building energy performance analyzed against proper baseline (baseline: no performance data available)

Increased awareness of decision makers, architects and construction companies regarding the possibilities to increase energy efficiency in buildings with little or no additional costs (results expected 3)

27. Decision makers, architects and construction companies aware of low or no-cost energy efficiency options (baseline: no awareness)

Revision of the existing standards and/or creation of new ones to increase the energy efficiency in buildings (results expected 4)

28. National building energy performance standard revised as a result of project activities (baseline: no revision planned)

A government plan to promote the adoption of new standards (results expected 5)

29. Government promotion plan developed and adopted (baseline: no plan)

A financial mechanism designed, tested and included in a financial plan for future investments (results expected 6)

30. Financial mechanism designed, tested and included in a government or municipality financial plan for future investments (baseline: no mechanism)

The future potential for developing low-cost low-energy buildings has been assessed and potential investments identified (results expected 7)

31. Overview of energy potential and investment needs for low energy buildings in the Czech Republic (baseline: no information available)

Local capacity for project development of similar type of projects has been increased and/or strengthened (results expected 8)

32. Project pipeline of 5 to 10 low cost / low energy buildings developed (baseline: no development planned)

Training of the relevant stakeholders to apply the new standards (results expected 9)

33. Stakeholders trained in application of new national building energy performance standards (baseline: insufficient capacities with stakeholders)

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:

- UNDP Project Document
- GEF Project brief
- Annual Project Implementation Reports 2000, 2002, 2003, 2004 and 2006 and an Annual Project Report for 2001.
- Report of tripartite meeting in 2000; no further TPR reports available and it is unclear if additional tri-partite review meetings have taken place
- Initial and final budget statement, final budget statement reconstructed by the implementing agency
- Key Project Outputs
- Original and corrected overview of realized building energy performance
- Mid-term evaluation report
- Financial audit reports for the years 2000 to 2004
- Translated summaries of the 2nd, 4th, 5th and 6th steering committee minutes, all in 2000 and 2001 (originals are in Czech)

Several other documents are reported to be present, but were not encountered at the implementing agency's office or forwarded by UNDP or the implementing agency. These include:

- Financial report 1999 – Combined Delivery Report With Encumbrance
- Financial report 2005 – Combined Delivery Report With Encumbrance
- Project budget - award 14738 Period 1999-2006
- Application for project implementation time extension (28/2/2005)
- Request for project implementation time extension approved (11/3/2005)
- Steering committee minutes of 1st meeting – 20/10/1999
- Steering committee minutes of 3rd meeting – 20/3/2000
- Tripartite report 22nd March 2002
- Annual work plan period 19/11/2003 – 31/12/2004*
- Annual work plan period 31/12/2004 – 31/12/2005*
- PIR report 2001
- APR / PIR report 2005

* These reports have not been requested and would usually not be reviewed for a final evaluation

Annex 5 List of persons interviewed

Interviewed stakeholders are:

- Jarouslav Maroušek, director, SEVEn (implementing agency)
- Pavel Kárník, consultant, SEVEn (implementing agency)
- Pavel Vaněček, architect, Union Arch spol.s r.o. (architect first demonstration building)
- Vladimir Ždára, building engineer (engineer for first demonstration building)
- Arch. Horný, architect, (architect second demonstration building)
- František Kulhánek, Czech Technical University in Prague (member of steering committee)
- Irena Plockova, Ministry of Industry and Trade (member of steering committee)
- Michal Pastvinský, Ministry of the Environment (member of steering committee)
- Petra Neuwirthová, former project coordinator, informal discussion only.

Building sites visited are:

- Roztoky
- Železný Brod

Annex 6 First and second budget statement presented by implementing agency

First budget statement

NB The implementing agency later claimed that this budget was based on estimates.

Component:	Planned Budget	Total spending	National consultants	International Consultants	Training	Travel	Monitoring & Evaluation
(a) Analysis of the concept of low-cost/low-energy building and preparation of the construction	$42,250	$42,264	$25,669	$6,015		$10,580	
(b) Selection of site and investor/municipality, finalization of the technical design, and the actual construction	$180,750	$180,676	$161,763	$4,563		$14,350	
(c) Analysis of the performance of the building and dissemination of the information and lessons learnt	$46,500	$46,639	$36,891		$8,279		$1,469
(d) Proposal for new/revised standards	$23,500	$23,470	$16,019				$7,451
(e) Facilitation of the adoption of new/revised standards	$28,000	$28,002	$25,944		$2,058		
(f) Development of a financial mechanism and plan	$14,240	$14,191	$11,591			$900	$1,700
(g) Development of a pipeline of 5-10 projects for future investments	$46,000	$45,991	$33,036		$3,611	$1,200	$8,144
(h) Strengthening local project development capacities	$23,140	$23,149	$19,571		$3,578		
(i) Organization of training workshops and seminars to apply the new guidelines	$32,000	$32,002	$27,051		$4,951		
(j) Monitoring and evaluation of adoption of new standards and energy savings of new buildings	$11,620	$11,617	$7,057		$1,511	$900	$2,149
Total	$448,000	$448,001	$364,592	$10,578	$23,988	$27,930	$20,913

Second budget statement

Component:	Planned Budget	Revised Budget*	Total spending	National consultants	International Consultants	Training	Travel	Monitoring & Evaluation	Other
(a) Analysis of the concept of low-cost/low-energy building and preparation of the construction ($42,250);	$42 250		$48 083	$23 669	$10 015	$2 000	8819		$3 580
(b) Selection of site and investor/municipality, finalization of the technical design, and the actual construction ($180,750);	$180 750		$172 574	$136 625	$7 563	$14 780	$4 364		$9 241
(c) Analysis of the performance of the building and dissemination of the information and lessons learnt ($46,500);	$46 500		$45 522	$20 891	$2 614	$20 548			$1 469
(d) Proposal for new/revised standards($23,500);	$23 500		$23 470	$19 534					$3 936
(e) Facilitation of the adoption of new/revised standards ($28,000)	$28 000		$28 002	$25 944		$970			$1 088
(f) Development of a financial mechanism and plan ($14,240)	$14 240		$14 191	$11 591			$900		$1 700
(g) Development of a pipeline of 5-10 projects for future investments ($46,000)	$46 000		$42 990	$33 036		$3 611	$2 200		$4 144
(h) Strengthening local project development capacities ($23,140)	$23 140		$22 547	$9 571		$12 716			$260
(i) Organization of training workshops and seminars to apply the new guidelines($32,000)	$32 000		$35 002	$17 051		$17 304			$647
(j) Monitoring and evaluation of adoption of new standards and energy savings of new buildings ($11,620);	$11 620		$15 619	$7 057		$1 511	$2 900		$4 152
Total	$448 000		$448 000	$304 969	$20 192	$73 440	$19 183	$0	$30 217

Annex 7 Technical details of wall composition in Roztoky

Walls were insulated with a combination of mineral wool and an external facade insulation system, applied over the timber frame.

Wooden frame wall composition in Roztoky u Prahy

From inside out:

- 12,5 mm plasterboard
- 70 mm mineral wool layer
- vapour barrier (with sealed joints)
- 150 mm wooden frame - load-bearing construction / mineral wool
- 12 mm OSB board (compressed wood-chips) - as a bracing layer and a basis for another insulation layer
- 60 mm mineral wool layer (BEK company ETICS system)
- silicate facade plaster with reinforcing mesh and silicate coloured paint - these external layers have low water vapour diffusion resistance

Comments to Evaluation Report

Project: Low-cost Low-energy Buildings in the Czech Republic

CEH/98/G35

Based on the Project Document, the objective of the project was to reduce the CO_2 emissions of the Czech Republic by improving the energy efficiency of the new buildings to be constructed in the country, and thereby simultaneously reducing the operational costs and increasing the comfort level of the apartments.

The UNDP/GEF input to the project in the amount of 448,000 USD was allocated as a direct project cost to cover "soft" activities excluding direct investment costs. The amount of 980,000 USD was estimated as the local investors' contribution.

The project goal was expected to be achieved by:

GOAL 1 - Developing a design and implementation scheme for construction of new low-cost, low-energy buildings;

Main results:

- Project Implementation Unit created valuable expert group which analyzed existing experience and developed the methodology of low-cost low-energy building in the Czech Republic. The team of experts created the 3D simulation model for evaluation of energy performance of buildings. The model was used for verification of low-cost low-energy buildings design. The energy concept was based on the optimized combination of disposal solution and thermal insulation of envelope structures of the building accompanied by an efficient energy technology and renewables (if possible). Based on the international working meetings the international standard for specific energy consumption for heating of low-energy residential buildings 50 kWh/m^2 was stipulated.
-

GOAL 2 - Gaining, adopting and disseminating practical experience with developing low-cost low-energy residential buildings among all involved professional groups (architects, designers, developers, construction companies, investors);

Main results:

- The practical experience was gained on the three demonstration projects (Sušice, Humpolec, Železný Brod). The projects were

designed by a large team of experts (architects, civil engineers, energy experts, economists, project developers, investors). The two of the three pilot projects were financed and built by municipality investors. The real operation of these buildings was monitored (10 meters installed). The measurement confirmed the expected energy efficiency results. As non of the building exceeded 50 kWh/m^2, low-energy standard was reached in all the buildings. The total investment costs exceeded the planned amount of 980,000 USD (expected local investors participation).

Thanks to the energy performance, design and quality of the construction, the residential building for the town of Sušice has been awarded the price „Energy Project of the year 2003".

The residential building for the town of Železný Brod has been awarded the price „Energy Project of the year 2005".

The award „Energy Project" is one of the most prestigious competition in the Czech Republic organized by the Ministry of the Industry and Trade, by The Czech Energy Agency and ABF Foundation too.

- The wide range of dissemination expert meeting, seminars, conferences and other educational activities were organized for strengthening of the visibility of the project.

GOAL 3 - Strengthening the local capacity to develop low-cost low-energy building projects, preparing new energy standards for buildings, and designing a financial mechanism for a widespread expansion of similar buildings;

Main results:

- As the key approach of the project was „learning – by – doing" a pipeline of many of other project was derived by the previous members of working teams. About 10 private investors decided to follow the principals and implemented low-cost low-energy design created by followers of the project. One of the project "Family houses in Roztoky u Prahy has been awarded the price „Energy Project of the year 2002". In addition the Retirement Home in Proseč town was built in the low-cost low-energy standard and another one has been prepared for construction in the Bechyně town.

GOAL 4 - Ensuring that the investment costs of low-cost low-energy buildings are comparable to the costs of a standard building, and that the investment costs of the building are to be covered by a local investor and not by the project budget itself. The ultimate objective of the project was to ensure that the construction of low-cost low-energy buildings will be sustainable and can be replicated after project termination.

Main results:

- Based on the Czech statistical data the average investment cost range fluctuated between 15 – 25 000,- CZK /m^2 in the years 2002 – 2005. As non of the constructed low-cost low-energy buildings exceeded 21 000,- CZK/m^2 there is no doubt that the goal of the low-cost building was fulfilled. All of the investment costs were spent by the local investors (mainly municipalities).
  The disadvantage of this approach is that each investor influenced the project design, e.g. decision about heating source.

The main project results were in more details described in Annual Project Reports or Project Implementation Reviews. Following the project activities all of the spending are recorded in budget lines and documented by the standard accounting evidence.

The project results and all expenditures were annually audited by the independent audit company nominated by the UNDP. All the results were involving the following statement:

"… The project goals met its aims and objectives and produced planned outputs. The disbursement have been made accordance with the project document, financial rules, regulations, practices and procedure of the government and are accordance with UNDP rules and regulations. The project disbursements are valid and supported by adequate documentation. ….".

During the project implementation were organized Tripartite Reviews always with very good results.

In conclusion the project has reached its main goals and fulfills all of the expectations in the area of introduction of low-cost low-energy buildings in the Czech market. Special empathies were put on practical implementation of low-cost low-energy buildings including competition in the Czech market. The project was not purely theoretical to demonstrate an ideal low-cost low-energy building inspire of the fact that the three pilot projects succeeded to be close to this ideal model. Other projects in the pipeline derived from the three pilot projects were slightly distorted by investors' needs and requirements. In spite of the fact that the decrease of CO_2 emissions would have been even larger the goal of low cost and low energy consumption was always reached. The most important result of the project is that residential buildings with energy consumption for heating decreased by fifty or more percent can be built for the same cost as standard residential building construction in the CR. This result is better than the project requirements.

In the light of above described facts the final Evaluation Report prepared by an independent evaluator does not reflect reality. We could understand that the evaluator derived wrong view on technical solution based on several small details which do not play significant role in total energy consumption or cost and we are willing to continue in discussion on technical features.

Nevertheless, we have to strictly refuse all of his statements concerning project expenditures and budgeting. We insist on keeping all the UNDP rules during the project implementation valid in the years 1999 – 2006. All the changes of internal structure of the budget or changes in activities were communicated and approved in advance.

From our point of view the whole evaluation deals with many small details and does not reflect the most important results and positive contribution to energy efficiency improvement in the CR. Upon the whole we have found the Evaluation Report as not reflecting the facts truly and its analyses not to be fair. We still believe that our project was very well managed and we can prove it has reached excellent results. Based on the contrast of the Evaluation Report, visible results and positive impacts of the project in the Czech Republic we recommend not approving the Evaluation Report.

Jaroslav Maroušek

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