United Nations Development Programme

„ Building the Local Capacity for Promoting Energy Efficiency in Private and Public Buildings”

Project Code: 00042402

Final Report

Sofia

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1. The Project and context to its development

1.1 Introduction

1.1.1. Context

Bulgaria's energy intensity is 0.38 tons of oil equivalent per thousand US$ of GDP, or more than twice the European Union average. In 2001, the country's electricity intensity was seven times higher than the OECD average, and four times higher than that of Hungary or Turkey. The Government's Three Year National Action Plan on Energy Conservation for 2004-2006 within the National Energy Conservation Program until 2010 identifies a savings potential of 50% in existing building stock, 40% in district heating and 30% in industry, and over USD 100 million in investments with a payback period of 3 years or less. Together these numbers suggest enormous, still untapped potential for cost effective and financially viable investment opportunities in energy efficiency.

While many of the recent energy efficiency initiatives have focused on municipalities and public buildings, the potential for energy savings in private residential and service sector buildings has largely remained unexploited. This has been mainly due to the prevailing institutional barriers, with no clear understanding on the role the public authorities should have with the privately owned building stock as well as the weak framework for facilitating the co-operation between the apartment owners on matters dealing with the maintenance and operation of the building as a whole. While this does not exclude the need for continuing the promotion of energy efficiency investments also in public buildings by addressing the remaining awareness, institutional and other barriers, the private residential buildings and premises of the SMEs present a new, still largely unexploited market segment.

More than 90% of the residential building stock in Bulgaria is privately owned and the predominant share of the dwellings is owner-occupied. More than 60% of the dwellings are situated in multifamily blocks of flats, while nearly 40% of the dwellings are situated in large-panel apartment blocks. According to The National Programme for Refurbishment of Residential Buildings in the Republic of Bulgaria, the average energy savings potential will be equal to about 25-35 kWh/m2,year. The figure for the public buildings is similar. Among the SMEs, small hotels and other tourist facilities are envisaged as the initial target group.

1.1.2. Brief description

The goal of the project is to promote energy efficiency market in buildings by (i) enhancing the awareness and capacity of local architects and engineers to better adopt energy efficiency aspects into the design of new buildings and retrofit of the existing ones; (ii) raising the awareness and building the capacity of the targeted end users to develop and structure financing for economically and financially feasible EE projects, thereby creating a sustainable demand for energy efficiency equipment, materials and related services in the buildings market; (iii) incorporating the energy efficiency aspects more strongly into the ongoing efforts to renovate the existing building stock in general, including the UNDP funded activities to support the renovation of public buildings and private residential and service sector buildings; (iv) building the capacity of the local energy service providers to effectively market their services and to meet the requirements of the targeted financiers to finance EE projects; and (iv) facilitating effective replication and dissemination of the results and institutionalizing the further support needed for the promotion of EE measures in public and private buildings through applicable legal and regulatory measures and organizational arrangements.

The focus is on public buildings owned/managed by the municipalities, private residential and service sector buildings and premises of the local small and medium size enterprises, which together cover about 85% of the total energy use of Bulgaria's building stock.

In the final stage of its lifecycle the project went through important changes designed to facilitate meeting the overall project objective. Mid-term evaluation (MTE) was carried out and some important recommendations were made. Based on the MTE Report a detailed "Management Response" document has been elaborated by the project team and with the support of UNDP. Part of it was the up-date of the strategic project documents including Project Logical Framework. Project indicators, targets and baselines were redesigned according to these recommendations in order to achieve relevant, efficient and informative calculations of project results and better impact for effective adaptive management use. Logical Framework has been thoroughly reviewed and modified to correctly reflect the current situation in the building sector caused primarily by the substantial economic downturn and significant slowdown.

1.2 Problems that the Project sought to address

The main problems that the project seeks to address can be summarized as follows:

- Poor awareness and professional knowledge and skills on sustainable building design both in the design community and at the university level.

This reflects in the training and educational programmes for students and for practicing architects and in the implementation of the new EE norms and regulations and advanced EU practices in the design for the mass building construction. The project aims at overcoming this backwardness through the development of appropriate information materials and a series of comprehensive Guides and tools on sustainable building design and municipal energy planning, elaboration of training programmes, targeted to key stakeholder groups, provision of alternative pilot projects for building new and for retrofit of existing buildings with the participation of prominent international consultants and the distribution of best practice catalogues.

- Poor knowledge and skills in mobilization of investments for the implementation of municipal energy efficiency action plans.

This weakness is targeted by the project with an entirely updated methodology for municipal energy planning, which is focused on all main functions of municipalities and the integrated resource planning (IRP). Essential deliverables of the MEPs are the investment programmes targeted to various appropriate investment sources. Relevant training of municipal officers and managers aims at accelerating the penetration of the updated MEP methodology in municipal practices and the clear, timely investment of EE measures in municipal buildings. The updated MEP methodology aims at extensive test and implementation in numerous Bulgarian municipalities, as well as in over 60 municipalities of over 10 countries in transition of Central and Eastern Europe and former Soviet Union, thus obtaining high recognition and dissemination at EU level.

- Poor knowledge and skills in the design of new highly efficient buildings and in the retrofit of existing ones.

Apart from the training manuals and practical training, the project contributes to the building of design capacity through alternative pilot design of selected building types – municipal, residential, hotel and SME new and/or existing buildings. To create conditions for shortening the path from the norms and regulations to their practical implementation in the construction market is an essential task of the project. Apart from that, the project aims at the creation of sustainable mechanisms for the multiplication of the project achievements in future, where the pilot projects serve as proofs for the realistic solutions.

- Lack of a sustainable and reliable instrument for information, communication and reference for the key stakeholders in the investment process.

To overcome this gap the project aims at the creation of a clearinghouse (Internet based portal), which consists of an electronic Guide on Sustainable Building Design, Virtual Training Centre, a Catalogue of Good Practices and a Forum for open discussions and exchange of information and experiences.

1.3 Project development and implementation arrangements

The project was designed to meet the objectives of the GEF's Operational Program No 5, "Removal of Barriers to Energy Conservation and Energy Efficiency" with the closest fit to the Climate Change Strategic Priorities No 1 "Transformation of markets for high-volume, commercial, low GHG products or processes" and No 2 "Increased Access to Local Sources of Financing". The authors of the proposal shared this experience and the project approach was built on the view that in order to effectively promote energy efficiency in the private and public buildings, the barriers that need to be addressed are cross-cutting the areas of several strategic priorities, including enabling policy environment and institutional framework, access to financing, sound business models, customer awareness etc. The combining factor is the focus on the buildings market.

The project began in March 2006 with the signing of the Project Document. The Project was implemented by UNDP and the Project Implementing Partner EnEffect (NGO-executed modality). EnEffect is an NGO registered in Bulgaria under the Law on the Legal Persons with Non-Profit Purposes, which has received managerial and technical support from UNDP. Project activities were carried out in the period of March 2006 – September 2010 by a Project Management Unit (PMU) located in Sofia.

2. Main objectives of the Project

The approved Project document sets out the following objective:

The objective of the project is to improve the energy efficiency of the energy use of the private and public buildings in Bulgaria by strengthening the institutional framework, raising the awareness and building the capacity of the targeted end user groups in order to create sustainable demand for energy efficiency investments and related services; building the capacity of the local energy service providers to market their services and to meet the requirements of the targeted financiers to finance EE projects; facilitating effective replication and dissemination of the results;

The original Project Document included 6 Outcomes as follows:

- **Outcome 1**: Enhancing awareness and capacity of the local architects and engineers to adopt energy efficiency aspects into the building design;

- **Outcome 2**: Creating sustainable demand for energy efficiency investments in public buildings;

- **Outcome 3:** Creating sustainable demand for energy efficiency investments in private residential buildings;

- **Outcome 4:** Increasing the demand for energy efficiency investments in private service sector buildings with the initial focus on tourism facilities (hotels etc.);

- **Outcome 5**: Increasing the capacity of the local service providers to effectively market and implement their services;

- **Outcome 6:** Monitoring and Evaluation

3. Achievements of the Project

3.1 Project activities, outputs and successes

A detailed narrative on project activities is provided in Annex 1. Per years the key project outputs include:

2006 - 2010

Project Outcomes	Key Outputs[1]
Outcome 1: Enhancing awareness and capacity of the local architects and engineers to adopt energy efficiency aspects into the building design	1. Book of Regulations for the operation of the Virtual Training Information and Consultancy Center (VTICC) developed.
	2. Training of municipal specialists on Municipal energy planning was accomplished. 172 officers from 60 municipalities were trained.
	3. Training of practicing designers in low energy building design with participation of international consultants was accomplished. Within first session of the training in December 2009 76 designers, representatives of 63 design companies, were trained. In the next session in March 2010 63 experts from 56 design offices participated.
	4. Training seminars on sustainable building design for chief city architects has been carried out. 35 architects from 33 municipalities and 6 representatives of other organizations have been trained.
	5. Training of students in low energy building design was fulfilled. Training program was incorporated in students' curricula and 160 students were trained
	6. Consultations (incl. energy audits) have been provided to investors/designers/builders for new and/or retrofitted buildings. The total number of sites, where consultations were provided is 52.
	7. Development of a pilot building design for residential buildings and SME building (bl. 17 Blagoevgrad, bl.35 UACG, Sofia and SME building in Pravetz) has been accomplished. A set of alternative documentation for the categories: by the norms (class B), low-energy (class A), passive (class A1), 0/+ energy (class A2/3) has been elaborated.
	8. Comparative analyses of the pilot projects have been carried out. Analytical report has been elaborated.
	9. An extensive Guide for energy efficient building design has been developed and printed in 10 books (4 volumes). A digital version of the guide was uploaded on the project site (www.buildingreen.net).
Outcome 2: Creating sustainable demand for energy efficiency investments in public buildings	1. Assistance to the EEA for the development of a national energy efficiency database has been provided.
	2. A study has been carried out (in cooperation with the EEA and EcoEnergy) of municipal energy programs, updated during project implementation, to assess how they address investment projects for energy efficiency and recommend improvements. A final report with analysis has been developed.
	3. A study of the existing incentives for energy efficiency and their impact and propose new ones (in cooperation with the AEE and the BEEF) has been developed. The existing legislation was reviewed and analyzed and

[1] The reporting on key project outputs reflects cumulative results since project start

	recommendations were envisaged.
	4. Technical, financial and organizational consultations have been provided to 119 municipalities.
	5. Guide on Municipal Energy Planning has been developed. A digital version has been uploaded on the project site and a hard copy was printed.
	6. Municipal energy programs have been developed for 5 pilot municipalities – Smolian, Madan, Gabrovo, Dobrich, Lom
Outcome 3: Creating sustainable demand for energy efficiency investments in private residential buildings	1. Four EE focal points (one-stop information centers) have been established in pilot municipalities – Dobrich, Pazardjik, Gabrovo and Lom.
	2. Information and promotional materials have been developed and distributed to EE centers
	3. Local experts who are working in the EE centers have been trained
	4. An internet site has been developed and regularly updated (www.ee-infocenters.net).
	5. A Manual on Financing of residential buildings has been developed and periodically updated.
Outcome 4: Increasing the demand for energy efficiency investments in private service sector buildings with the initial focus on tourism facilities (hotels etc.)	1. Reference book for sustainable building design and management of hotels has been developed and uploaded on the project web site.
	2. Reference book for sustainable building design and management of hotels has been printed for dissemination.
	3. Seminars and presentations for energy efficiency in Hotels have been organized
	4. Promotional / information brochures for energy efficiency in hotels have been prepared and disseminated
Outcome 5: Increasing the capacity of the local service providers to effectively market and implement their services	1. Catalogue of selected best practices on sustainable/energy efficiency buildings has been elaborated. Digital version containing 100 best practices was uploaded on the project website. A separate book with selected practices was printed for dissemination.
	2. Database of market players in Energy Efficiency field has been developed and regularly updated.
	3. EE Internet portal has been developed and launched (www.buildingreen.net).
Outcome 6: Monitoring and Evaluation	1. Monthly Progress Reports were prepared and submitted to UNDP for each month from September 2006 to September 2010
	2. Monthly financial reports have been prepared and sent to UNDP
	3. Sixteen Quarterly Project Review Reports were developed and submitted to UNDP
	4. Sixteen Quarterly Operating Reports were prepared and sent to UNDP
	5. Five Annual Progress reports were developed and submitted to UNDP
	6. Quarterly Cash-flows have been developed and sent to UNDP
	7. Mid-term evaluation of the project was conduced in September 2008 and Mid-term evaluation report was submitted
	8. Logical Framework has been revised by international consultant; GHG Emission Reduction Benefit Calculations Tables have been elaborated. AWP 2009, AWP 2010, Project results and resources framework (PRRF) have been developed. The purpose was to correctly reflect the changed situation in the building sector caused primarily by the substantial economic downturn and

	significant slowdown of the building sector.
	9. Project Management Board has been established, in which UNDP senior management and the EnEffect Executive Director participated. Eight Management board meetings have been carried out since Management board was established at the beginning of 2009
	10. Terms of reference (ToR) for the activities described in Project results and resources framework (PRRF) were elaborated. The main objective of the ToRs is to facilitate management till the end of the project.
	11. Three Steering Committee meeting have been carried out on 12 July 2007, 11 March 2008 and on 17 September 2009. The new project documents – revised Logical Framework, GHG Emission Reduction Benefit Calculations Tables, revised AWP 2009, AWP 2010, Project results and resources framework (PRRF) – have been approved on the last Steering Committee meeting.
	12. Four Project Implementation Review (PIR) for 2007, 2008, 2009 and 2010 have been developed and submitted to UNDP
	13. Final evaluation of the project has been carried out in July 2010 and a final project evaluation report was submitted in August 2010.
	14. Project final stakeholder meeting was carried out in September 2010.

The key project successes as identified by the project final evaluation team include:

The capacity building project was designed to produce training materials and guides, (incl. class training, distance learning and training by doing), information dissemination campaigns, and demonstration projects. Support provided by the project for development, financing and implementation of energy efficiency projects had immediate measurable impact.

Two products of this project required unique efforts and delivered key impact to current practices. One of them is the Guide on Municipal Energy Planning, which has been already internationally recognized and utilized in several projects in other countries, and the second one is the set of guides on sustainable building design, namely "Green Vitruvius" book, "10 Books on Green Architecture" and a catalogue of "100 Best Practices", that will be available also electronically from the project web site.

As indicated by several architects and project stakeholders interviewed, these books and guides have a potential to change thinking and behavior of architects, students, other professionals, decision makers, and investors in the country in the long-term.

The second focus of the project on creating demand for investment in energy efficient buildings in different sectors might be a subject of fluctuations due to external factors, such as economic development. But even if the actual investment in energy efficient building re/construction would be delayed, the local knowledge and capacity has been built that would allow to develop such energy efficient building effectively also in the future.

The benefits of the project will continue even after the project closure. The project served as a catalyst for actual construction of energy efficient buildings, and an implementation of knowledge and experience gained will continue even after the project is finished without need for additional external financing.

The capacity building project was designed specifically to develop and upgrade skills of national personnel; it was targeted at local professionals, investors and decision makers in Bulgaria. Advanced international practices were incorporated into the local trainings, guides and books. Leading European experts in energy efficient buildings design were hired to lead the training seminars for local professionals.

Although the project was designed to build and develop the local capacity in Bulgaria, during project implementation the project implementing partner had several opportunities also to disseminate the experience gained to other countries in the region.

3.2 Achievement of project objectives

The updated project logical framework matrix, has defined 27 project indicators and targets. Twenty five targets have been met or exceeded the defined targets. Two targets 4f) and 6c) have not been fulfilled. Target 4f) "On-site study of advanced international practices" has been cancelled. The study tour was not included in the original Project Document, Work Plan and budget

The Target 6c) "Draft standards for low energy/passive/0-energy buildings proposed" has not been fully met, because no new standards have been proposed. However, low-energy and passive house standards have been checked, analyzed and recommended for use in Bulgaria, arguments for the development of such new standard have been provided, alternative building designs were made, and a comparative analysis of pilot project results is under development in order to evaluate the investment costs necessary to reach different level of energy efficiency, and the analysis – once finalized – is planned to be submitted to the Energy Efficiency Agency and the Ministry of Regional Development and Public Works for review and potential future proposal of more energy efficient norms

The progress made by the project to achieve its Objectives was rated very satisfactory by the final evaluation team because 25 project indicators from 27 have been achieved.

Table: Objectives evaluation matrix (taken from PIR 2010)

Indicator from Logframe	Baseline level	Target level at the end of project	Level at 30 June 2010
Indicator 1: tCO2eq emission reductions from buildings influenced by project activities(over their lifecycle to 2020)	0 tCO2eq	125,000 tCO2eq	144 741 tCO2eq
Indicator 2: Conditions assured for the adoption of the recommendations made in the frame of the project into the design of new buildings and retrofit of existing buildings	Obligatory building codes in force for new buildings. Voluntary "best practices" for energy efficient building design not adequately adopted by the local professionals yet	Project trainees include best practice project recommendations in 40 % of all new constructions and in retrofit of existing buildings they are involved by 2020	40 %
Indicator 3: m2 of the floor area in public buildings; private residential	0 m2 floor area	132,000 m2 floor area by the project close	264 030 m2

buildings; and private service sector buildings influenced by the project			
Indicator 4: Networks of skilled specialists built in municipalities and in the building design society, who could make difference in local energy policies and building design towards sustainable local development and low-energy buildings	The local professionals lack awareness and capacity on energy efficiency aspects of building design	a) consulting teams of at least 3 EE local focal points; b) At least 150 municipal officers of at least 60 municipalities trained on MEP c) Practicing architects / engineers of 30 design offices trained on sustainable building design d) At least 30 chief municipal architects approached / trained on sustainable building design e) At least 150 students approached / trained on sustainable building design by the end of the project and at least 300 by 2020 f) on-site study of advanced international practices	a) 8 experts working in 4 EE local focal points b) 172 officers, 60 municipalities c) Training December 2009 - 76 designers, representatives of 63 design companies; training March 2010 - 63 experts from 56 design offices d) 35 architects from 33 municipalities e) 160 students f) N/A
Indicator 5: Consultations (incl. energy audits) provided to investors / designers / builders for new and/or retrofitted buildings (summarized and documented)	Key participants in the investment process have poor awareness on basic principles of energy efficient building design and on financing of energy efficient projects. Only 10% of projects could obtain consultancy from	Consulting practices well established in the VTICC and 40 consultations performed	52 consultations

	other sources		
Indicator 6: Pilot buildings designed (new buildings for construction or existing buildings for retrofit) and analyzed. Draft standards for EE buildings proposed	No concrete showcases on the adoption of best energy efficiency practices into the design of new buildings and the retrofit of existing buildings. Draft standards for low energy buildings and knowledge of cost consequences very low or not available at all	a) At least 6 EE designs executed for at least 12,000 m2 of floor area by the project end b) At least 8,000 tons of CO2 emissions reduced by 2020 c) Draft standards for low energy / passive / 0-energy buildings proposed	a) 6 EE designs; Floor area: 14 066 m2; b) tCO2: 14 944 c) Standards for low energy / passive / 0-energy buildings compared and analyzed for implementation in Bulgaria
Indicator 7: Available training instruments for EE building design	No comprehensive clearinghouse for energy efficient design available	a) A comprehensive handbook/guide on energy efficient building design b) Targeted training programs on sustainable building design	a) A comprehensive handbook/guide on energy efficient building design developed and printed in 10 books (4 volumes) b) Targeted training programs on sustainable building design developed and implemented in training of practicing designers and students in architecture
Indicator 8: Assistance to the central and local authorities to promote and enforce the actual implementation of EE measures, thus shortening of implementation period of energy efficiency measures	No monitoring of energy audits in terms of to what extent they lead to actual implementation of proposed EE measures Poor incentives and/or enforcement for building owners to carry out energy audits and implement the recommended	Shorten the path between completion of energy audits of buildings and actual EE improvements implementation from currently estimated 6 years to 3 years required by law, thus resulting in increase in EE investment by $ 3.5 million by year 2020	15 627 283 USD 10-11 months

	energy efficiency measures		
Indicator 9: Existing guidelines for municipal energy planning (MEP) updated and upgraded to reflect the current political and economic situation	Existing guidelines do not fully correspond to current conditions in the country after its accession to the European Union. Mandatory requirements for municipalities to prepare municipal energy plans, do not necessarily lead to actual investments, thus zero CO2 reduction achieved	a) A guide on MEP and a set of "best practices" developed and disseminated b) MEPs for 5 selected pilot municipalities, based on the updated guidelines developed and updated	a) A guide on MEP developed b) MEPs for 5 municipalities developed - Smolyan, Madan, Gabrovo, Dobrich, Lom
Indicator 10: Instruments to increase awareness of local building home owners / managers and the interest to EE building retrofit	Inadequate support available for private home owners and housing associations to provide sustainable building management, investment in energy efficiency, financing schemes, and incentives	a) 3 EE focal points (one-stop information offices) established (re: 3.1) b) A set of best practices developed, disseminated in electronic format (re: 3.2) c) A Manual on Financing of residential buildings for publication in Internet (re: 3.3)	a) 4 EE focal points established in Dobrich, Pazardjik, Gabrovo, Lom b) N/A – cancelled by MB on 21.01.2010 c) Manual on Financing of residential buildings developed and maintained in Internet
Indicator 11: Amount of investments into EE retrofits in private residential buildings	Newly adopted National Program for Refurbishment of Residential Buildings still not initiated	a) Study on the barriers to the renovation of the existing residential buildings – analytical report b) Amount of investments leveraged for EE retrofits in private residential buildings reaching $ 10 million	a) Study on the barriers to the renovation of the existing residential buildings – analytical report b) $ 18 044 820

		by the end of the project	
Indicator 12: Increased availability of information necessary for developing energy efficiency projects in target groups	Very limited investments in EE retrofit of private service sector buildings. Low awareness / interest among the owners of private service sector buildings to invest in energy efficiency	Development of an electronic reference book for energy efficiency in hotels with a set of best practices for energy efficiency improvements in hotels, disseminated to 4000 hotel owners / managers	Electronic reference book for energy efficiency in hotels developed
Indicator 13: Easy to use source of comprehensive information about the design of new EE buildings and the retrofit of existing ones and about the leading national and international practices developed	Newly established associations do not have enough capacity to represent local energy service providers to facilitate information dissemination, organisation of training, networking etc.	a) 5% additional reduction of energy consumption achieved as a result of implemented architectural and structural EE measures, promoted by the project b) 4 catalogues of "best practices" published and disseminated c) An energy efficiency portal in Internet established and regularly updated and, as applicable, upgraded	a) 6 % additional reduction b) Catalogue of best practices developed for print and for Internet c) EE internet portal developed and launched (www.buildingreen.net)

4. Summary and evaluation of the Project activities

The Project played a considerable role within national efforts to build capacity for promoting energy efficiency in private and public buildings. Notable impact was achieved in two areas – energy efficiency (EE) in buildings and municipal energy planning (MEP).

As regards energy efficiency in buildings many valuable outputs were delivered – high quality training developed with international consultants; training guides, materials and programs; trained experts and pilot projects. Training programs and trainings themselves were developed and implemented by notorious experts from University of Dublin, Passive House Institute in Darmstadt, Germany and the Innsbruck University, Austria.

Unfortunately in the midst of the project financial crisis occurred and its negative impact hampered realization of some pilot projects. However other pilots were implemented successfully and economic analyses based on the pilot projects showed that the concept of passive house has a basis in Bulgaria. The analyses also revealed that the legislation and norms should be amended in this regard.

In the field of MEP substantial success was also achieved. Municipal representatives were trained in MEP, energy programs of pilot municipalities were developed, manuals and informational materials were developed and disseminated and technical support and consultation have been provided. Guide on MEP was developed and European recognition of the MEP methodology developed within the project was achieved. Cooperation with municipalities brought another significant result – creation of EE centres that served as local focal points for energy efficiency in residential buildings.

Project stakeholders have recognized the importance of the project results and have expressed their willingness to continue working using the knowledge acquired and best practices and recommendations made within the project. In fact transferring the main results to the beneficiaries and stakeholders is one of the main guarantees for the project sustainability.

LESSONS LEARNED

Lessons related to Project design

- There were certain shortcomings of the project design at the very beginning. Logical framework was not precisely elaborated and indicators, baselines and targets were recognized as irrelevant at later stage during mid-term evaluation. So it became necessary objectives and indicators to be modified. Main lesson is that all these components should have been precisely defined in the project document.

- A CO_2 emission reduction calculation methodology was not included in the project document. This caused difficulties in monitoring and evaluation of this important indicator. The system for tracking and monitoring of the CO_2 emissions was developed later on.

- Avoid the project to critically depend on third parties that are out of direct control of the project. The still non-existent legal entities (housing association, cooperative, etc) is a major legal barrier preventing investment and utilization of debt financing for energy efficiency as well as other reconstruction of such condominium buildings. Underestimation of a market situation, or an unexpected decline in economic development due to financial crises, leads to inability to attract investors in new low-energy buildings. Where possible, do not rely on a third-party co-financing, if it is not contractually bound before the project document is approved. This concerns specifically a potential third party investor into construction of a new low-energy building and/or retrofit of existing building – if the investor is not contractually bound to finance such construction, the project implementation is in a high risk, which can be effectively minimized by a binding contractual arrangements. If it is not possible to contractually bind a third party, such as government/parliament to pass certain legislation, or another international or private financial source to provide co-financing, an alternative solution should be developed and alternative activities defined in the project document already that would allow to reach project goals and objectives if the envisaged third-party activities and/or cofinancing will not materialize.

- International best practices and know-how should be carefully selected for transfer to fit the local market conditions/situation. Not all international best practices are suitable for specific conditions in a certain phase of country development. A careful analysis of appropriateness of a

transfer of international know-how, technologies and best practices should be performed and only those measures transferred that fit local culture, phase of development, and economic (and political) situation.

- Develop a detailed market study during the project preparatory phase if necessary. A detailed knowledge of a local market, situation and practices is critical for successful design of a development project and effective involvement of third-party stakeholders in the project implementation. When designing the project proposal, a detailed insight, knowledge and understanding of local situation, practices, market, and culture is essential for planning realistic and feasible activities to be specified in a project document.

- Logframe indicators and targets should be properly designed and reflect achievements by the end of the project implementation. Special attention should be paid to development of a consistent and truly logical project logframe including indicators and their targets that are easily verifiable and measure key project results. The project logframe including its indicators does not serve only to evaluate project results and to provide a feedback to project funding agencies, but if properly defined and implemented, it primarily helps project management to effectively manage the project on a daily basis.

- Asses impacts on project targets when changing project outputs/activities. The period between the initial project idea, development of the project document and actual project implementation lasts typically several years, 5 to 7 years. In today's rapidly changing world, and especially in countries with economies in transition and in developing countries, during this period the local situation might change significantly and it will require updating the originally planned project activities. Thus we consider updates and changes of originally planned project outputs and activities, as specified in annual work plans, to be integral and natural part of project implementation. In some cases the changed project outputs/activities might even negatively influence the originally planned project goals, objectives and outcomes. In order to minimize potential negative impacts of the project changes to overall project objectives and outcomes, we suggest, when submitting proposals for changes in project activities/outputs for approval, to always evaluate impacts of those changes on originally planned project indicators and objectives.

Lessons related to the Project implementation, management and adaptive management

- It cannot be expected that individual members of the project team would be able to work for the project for its lifetime. However a clear strategy to ensure capacity and continuity of project management should have been obtained from the Project Implementing Partner. Some poorly coordinated hand-overs of project management and gaps in capacity caused certain setbacks and delays.

- For such a complex project the Project Management Unit (PMU) should have been very flexible. Shift in project context (economic crisis and significant slowdown of the building sector) in the project course caused certain weaknesses and flows in its implementation. Moreover changed situation made irrelevant some important project elements. This is another reason to enforce a major change and redesign the indicators, baselines and targets within Logical Framework, to introduce a system for measuring CO_2 emissions reduction and establish a Management board, which main function was to enhance the management in the second half of the project implementation period. Since all these changes were enforced there was a substantial improvement of the implementation process, the project got on track and have proceeded according to the new LFM and AWPs.

- Use of adequate project management tools and management accounting tools. If the project management relies only on the GEF/UNDP required formats of reporting, including

project plans and progress reports as the only tool for daily project management, it is difficult, if not impossible, to have easy to use overview and control of project development and status. For more complex projects it would be critical for effective project implementation and management to utilize more flexible tools and techniques that allow for having easily accessible, daily overview and control of the actual up-to-date status of the project, including budget vs. actual expenditures, deadlines and planned activities vs. their actual status and delivery, etc.

- Planned budgets should be transferred into budgets for calendar/fiscal year. Project budget, as it is usually proposed and approved in the Project Document, is planned for Year 1, 2 etc, because it is not clear, when exactly the project will start, if approved. On the other hand, for proper project management and financial planning, including planning of cash expenditures of GEF/UNDP, it is necessary to have financial budgets specified and adjusted for each concrete calendar/fiscal year.

ANNEX 1 Summary of achievements of Project Outcomes

Outcome 1: Enhancing awareness and capacity of the local architects and engineers to adopt energy efficiency aspects into the building design

Book of Regulations for the operation of the Virtual Training Information and Consultancy Center (VTICC) has been elaborated. VTICC has been established with first training course on Municipal Energy Planning (MEP). Package of training materials for municipal specialists working in local focal points has been elaborated and used.

Awareness raising and capacity building of the local practicing designers, engineers and municipal officers to apply energy efficiency in their work was one of the most important results of the project. The project has trained 172 municipal officers from 60 municipalities on municipal energy planning. In a close relation training of chef city architects "Role and functions of the chief city architects in low energy building design" was carried out. 35 architects from 33 municipalities and 6 representatives of other organizations (Bulgarian residential building association, Chamber of Architects in Bulgaria (CAB), Union of Architects in Bulgaria (UAB), Ministry of regional development and public works, National association of municipalities in Bulgaria (NAMRB) have been trained.

The training in low energy building design was implemented amidst broad professional interest. It was carried out in two sessions. The first one took place in December 2009 and attracted totally 76 representatives of 63 design companies from all over the country. According to participants the main reason for such interest was the program, that was professionally developed, and selection of the main lecturer prof. Vivienne Brophy from School of Architecture to the University College of Dublin, Ireland.

The second session of the training was implemented in March 2010 and was attended by 63 experts from 56 design offices. The whole training was carried out by prof. Rainer Pfluger of Innsbruck University, representing also Passive House Institute in Darmstadt, Germany.

Training in low energy building design was accomplished with the training of 160 students from University of Architecture Civil Engineering and Geodesy (UACEG). Tailor made educational program was developed and incorporated in students' curricula. Since the education year 2010-2011 training module for energy efficiency in building design and construction will be introduces in the regular curricula, which will increase 5 to 6 times the number of students influenced by this training module.

Other component within this outcome included consultations and energy audits. They have been provided to different stakeholders for new and/or retrofitted buildings. 52 sites/buildings have received more than 160 consultations, which have been provided for the design and financing of new buildings and for retrofitting of existing buildings.

Pilot building design was another important output. Such design was developed for residential buildings and SME building. A set of documentation was elaborated for a multifamily residential building (bl. 17, Blagoevgrad), student's hostel of UACEG (bl.35, Sofia) and SME building (in Pravetz). Different categories have been covered - by the norms (class B), low-energy (class A), passive (class A1), 0/+ energy (class A2/3). After that a comparative analysis of the pilot projects has been carried out to demonstrate the economic dimensions of different types of low energy buildings and their applicability in Bulgaria.

Within this outcome a series of guides for energy efficient building design has been also developed. It comprises an introductory guide for green building design "Green Vitruvius" and a unique comprehensive collection "Ten Books for Green Architecture" (organized in 4 volumes), which contain professional information on all aspects of green/sustainable architecture. In addition, a catalogue with 100 successful practices in low energy building design was compiled

and prepared for print, as well as for publication in the electronic Clearing House www.buildingreen.net.

Outcome 2: Creating sustainable demand for energy efficiency investments in public buildings;

This component was devoted to EE in municipalities and public buildings. In this regard assistance to the Energy Efficiency Agency (EEA) has been provided for the development of a national energy efficiency database. Both parties have cooperated in establishment, upgrade and use of a database for energy efficiency in building stock in Bulgaria. EnEffect and EEA have exchanged relevant information, aligned their approaches and cooperated in implementation of specific tasks related to the main objective.

A study has been carried out, once again in cooperation with the EEA (and Municipal Energy Efficiency Network EcoEnergy), of municipal energy programs, updated during project implementation. Main goal was to measure and assess how municipalities address investment projects for energy efficiency and recommended improvements. Selected number of municipalities filled in questionaries, especially designed for this purpose, relevant information was collected and final report with analysis has been developed.

A study related to the existing legislation in energy efficiency was carried out in cooperation with the AEE and the Bulgarian Energy Efficiency Fund (BEEF). Its main objective was to identify and describe existing legislative incentives for energy efficiency in buildings and to assess their impact. As a result the existing incentives were collected, described and classified. All this information has been analyzed and recommendations for further incentives have been made.

Big amount of work within this outcome was dedicated to municipalities. Technical consultations to municipalities how to apply the updated MEP methodology have been provided. Results from consultations were summarized in three six-month reports. Consultations concerning the preparation of the municipal energy programmes, on financing the EE projects, on reporting and calculation the EE measures have been provided to 119 municipalities.

In the same direction was development of the Guide on Municipal Energy Planning. It is a practical tool illustrated by good practices for elaboration of a municipal energy programs. The guide was developed in a digital version that was uploaded on the project site and a printed hard copy. As far as the Guide has been highly recognized by the EC and recommended for implementation in other new EU member states, it was translated, printed and disseminated in English language, and later on translated and published in more than 10 European languages.

Based on the developed evaluation criteria for assessing the municipal programs five municipalities were selected to serve this evaluation – Varna, Dobrich, Belene, Lom and Gabrovo. Varna, Dobrich and Gabrovo municipalities were visited and the energy programs discussed and additional data were collected. The five municipal energy programmes were analyzed and recommendations for their improvement were proposed. Based on this work the Project improved the template for development of municipal energy efficiency programme and 2 municipalities (Belene and Gabrovo) have been chosen to test this template. Many meetings with Mayors of municipalities have been conducted during 2007-2008 - Gabrovo, Belene, Popovo, Krivodol, Montana, Dobric, Lom, Madan, Razgrad. As a result of the evaluation 5 municipalities – Dobrich, Madan, Smolyan, Gabrovo and Lom have been chosen as pilot ones and agreements were signed. The municipal energy programmes of these municipalities were updated and adopted by the Municipal Councils thus enhancing their capacity to manage and apply energy efficiency measures.

After the call for proposals for Operational program "Regional Development" started, consortium has been established between EnEffect and Elana Investments in order to assist municipalities, when preparing their applications and extracting the projects for Structural funding.

Outcome 3: Creating sustainable demand for energy efficiency investments in private residential buildings;

Cooperation with municipalities was also spread out into the area of residential buildings. Concept for the establishment and functioning of the local focal points, (one-stop information centers) was created in cooperation with Bulgarian Housing Association (BHA). In a tight coordination with pilot municipalities four EE focal points have been established in municipalities of Dobrich, Pazardjik, Gabrovo and Lom. The inauguration ceremonies were attended by the Mayors of the municipalities, representatives of the local media – newspapers and cable TV, representatives of the central media, local businesses and school headmasters. In the EE information centers the citizens obtain up-to-date information about possible technical and organizational measures for energy efficiency improvement, energy efficient materials, products, appliances and technologies, the currently enforced regulatory framework in that field, available opportunities for project financing from specialized public funds, good practices and examples of successfully implemented projects.

Besides the printed and digital promotional and information materials providing data for different energy efficiency projects, people receive consultations from specially trained municipal experts. An internet site of the centers has been developed and regularly updated afterwards: www.ee-infocenter.net.

Thematic exhibition of best practices on energy efficiency in some European municipalities took place within the inaugurations of the local focal points.

From November 2008 – June 2010, more then 260 consultations have been given in the three information centers in Dobrich, Lom and Gabrovo.

In addition, a Manual on financing of residential buildings has been developed and periodically updated in Internet.

Outcome 4: Increasing the demand for energy efficiency investments in private service sector buildings with the initial focus on tourism facilities (hotels etc.);

Seminar for Hotels has been organized in February during the Exhibition "Hotels and restaurants" in NDK, Sofia. Around 70 Managers of hotels presented. Also promotional/information brochure for energy efficiency in hotels has been disseminated to architectural companies and small and medium hotels through catalogue "Hotels and Restaurants".

Presentation of the Project has been organized for 12 owners of hotels from Bansko in 2007. Financial and technical consultations have been provided to 4 of them. E-mails were sent to more than 2000 small and medium size hotels in Bulgaria with information for the opportunities to implement energy efficiency measures in the frames of the Project.

Work on increasing the interest of the private sector in EE investments resulted in preparation of the electronic reference book for energy efficiency in hotels. Certain amount of relevant information and reference materials were gathered, analyzed and processed. The final text was consulted with experts and after its finalization the reference book was uploaded on the project internet site and printed within the series "Ten Books for Green Architecture".

The project actually has implemented extensive activities targeted to hotel owners/managers, much more than just development of an electronic reference book, as stated in the revised target. The electronic reference book is supplemented by the "Guide on Sustainable Hotels Design and Management". In addition to this, numerous consultations with hotel owners were held, energy efficient retrofits of hotels have been prepared, actual designs developed and optimized, financing scheme proposed, and the owners of the hotels were ready to apply for financing.

One of major sources of financing for projects in hotels was envisaged to be the EU Structural Fund, specifically the Operational Program "Competitiveness". However, as hotels and tourist industry have been excluded from this program at the end, the hotel owners have decided to postpone and reduce the scope of their investment.

The developed energy efficiency retrofit projects in hotels will – most probably – be implemented in some way, perhaps over a longer period of time, in several phases, and perhaps with a reduced scope. Based on the knowledge of the local market and its analysis, both the project implementing partner EnEffect and the evaluation team believe that the designed energy efficiency projects in hotels will be implemented in the future.

Outcome 5: Increasing the capacity of the local service providers to effectively market and implement their services;

For increasing capacity of local service providers a catalogue of 100 selected successful practices on energy efficient buildings has been developed. Digital version of the catalogue was uploaded on the project website and a hard copy was printed in addition to the series "Ten Books for Green Architecture".

Database of market players in Energy Efficiency field has been developed and regularly updated as well.

EE Internet portal has been developed and made public. All materials produced within the project have been uploaded on the site in an appropriate format and structure (www.buildingreen.net).

Outcome 6: Monitoring and Evaluation

Regular work within this outcome included day to day management and producing of periodical progress and financial reports:

- Monthly Progress Reports were prepared and submitted to UNDP for each month from September 2006 to September 2010
- Monthly financial reports have been prepared and sent to UNDP
- Sixteen Quarterly Project Review Reports were developed and submitted to UNDP
- Sixteen Quarterly Operating Reports were prepared and sent to UNDP
- Five Annual Progress reports were developed and submitted to UNDP
- Quarterly Cash-flows have been developed and sent to UNDP
- Four Project Implementation Review (PIR) for 2007, 2008, 2009 and 2010 have been developed and submitted to UNDP

Mid-term evaluation of the project was conduced in September 2008 and Mid-term evaluation report was submitted.

Following the recommendations of the Mid-term evaluator a Project Management Board has been established (comprising UNDP senior management and the EnEffect Executive Director) as a main leverage for better monitoring and evaluation of the project. Ten management board meetings took place in the period October 2008 – May 2010 providing guidance for project implementation, making decisions and solving different managerial issues.

Also at the beginning of 2009 a short-term consultant was hired to retrofit the project indicators, targets and baselines to facilitate the relevant, efficient and informative calculations of project results and impact for effective adaptive management use. The consultant thoroughly reviewed and modified the Logical Framework to correctly reflect the current situation in the building sector caused primarily by the substantial economic downturn and significant slowdown of the building sector. He has submitted a methodology for calculation of GHG Emission Reduction Benefit with Tables. Management Board accepted the report and the methodology for the calculation of CO_2 emissions reduction made by the consultant.

Logical Framework has been revised by international consultant; GHG Emission Reduction Benefit Calculations Tables have been elaborated. AWP 2009, AWP 2010, Project results and resources framework (PRRF) have been developed. The purpose was to correctly reflect the changed situation in the building sector caused primarily by the substantial economic downturn and significant slowdown of the building sector. On a Management Board meeting on 30.03.2009 all updated project documents: Revised Logical Framework, PRRF, AWP 2009 and AWP 2010 have been discussed and accepted.

Terms of reference (ToR) for the activities described in project documents were elaborated. The main objective of the ToRs was to facilitate management till the end of the project. ToRs were presented before Management board and approved on 6 July 2009.

Three steering committee meetings were carried out on 12 July 2007, 11 March 2008 and on 17 September 2009. Members of the committee, who are the main project stakeholders, have been informed about the project progress and have discussed its main achievements. They also stated support for the project of the institutions they represent. Finally, forum adopted strategic project documents developed and enforced in the Q1 2009, namely PRRF, Work plan 2009 – 2010, revised Logical framework and six month no cost extension of the project till the end of September 2010.

Final evaluation of the project has been carried out in July 2010 and a final project evaluation report was submitted in August 2010.

Project final stakeholder meeting was carried out in September 2010.