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**Ministry of Construction and Urban Development
Government of Mongolia**

**UNDP/GEF Project: Energy Efficiency in New
Construction in the Residential and Commercial
Buildings Sector in Mongolia
(Building Energy Efficiency Project), MON/09/301**

**Project ID: 70071
PIMS: 3571**

TERMINAL EVALUATION REPORT

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SYNOPSIS

Title of UNDP supported GEF financed project: The Country Programme of Mongolia on Energy Efficiency in New Construction in the Residential and Commercial buildings in Mongolia, also called Building Energy Efficiency Project (BEEP)

UNDP Project ID: 00070071

GEF Project ID: 3571

Evaluation time frame: October to January 2014

Date of evaluation report: March 23, 2014

Region and Countries included in the project: Mongolia

GEF Focal Area Objective: CC-SP1: Promoting Energy Efficiency in Residential and Commercial Buildings

Implementing partner and other strategic partners: Ministry of Construction, Urban Development, Government of Mongolia

Evaluation team members: Mr Sandeep Tandon, International Consultant; Ms. Batimaa P., National Consultant.

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The Evaluators would also like to thank all stakeholders including UNDP Mongolia, the Regional UNDP-GEF office in Bangkok, for providing useful insights and the entire BEEP Project Team for their hospitality, informative discussions on their experiences in implementing the BEEP project. Your passion, insights, and perspectives add value to the evaluation process to guide and sustain future development of building energy efficiency program in Mongolia. We hope that this report will contribute towards Government of Mongolia's efforts toward applying energy efficiency in construction of new commercial and residential buildings.

EXECUTIVE SUMMARY

Background

This report summarizes the findings of the Terminal Evaluation Mission conducted from October 21-29, 2013, for “Energy Efficiency in New Construction in the Residential and Commercial Buildings Sector in Mongolia” (hereinafter referred to as BEEP or the Project) which received a US Dollars (USD) 975,000 grant from the Global Environmental Facility (GEF). The project is a successor to UNDP Mongolia’s project on “Commercialization of Super-Insulated Buildings in Mongolia” which demonstrated using straw-bales as construction material to improve the insulation of houses to maintain comfortable temperature and reduce heating requirement.

BEEP project started in July 2009 with USD 340,000 co-financing from KEMCO. The Project received GEF funding approval in December 2009 from GEF Secretariat and formally began as nationally executed (NEX) project with the signing of Project Document (ProDoc) between UNDP and Government of Mongolia’s (GoM) Ministry of Road Transport, Construction and Urban Development¹ on January 7, 2010.

Located in the Eurasia region, Mongolia has a sunny, dry and cold climate. During winters the average temperature stays well below -30 degree Celsius which makes Ulaanbaatar the coldest capital city in the world. Population and economic growth have become increasingly concentrated in Ulaanbaatar as it is the political, industrial, and economic center of the country. It generates 65% of the country’s GDP, 85% of power, and 50% of investments. As a result, Ulaanbaatar’s official population has increased to over 1.3million (nearly 50% of the country’s population) since the start of economic transition in the 1990s. Most of Ulaanbaatar’s in-migrants settle down in peri-urban “ger areas”.

Ulaanbaatar is located in the Tuul river valley surrounded by mountains on all sides. The severe cold weather that lasts for major part of year requires energy to maintain warm comfortable temperature in human dwellings throughout the country. While a vast majority of the residential and commercial buildings built in the past are connected to district heating system, the ger areas are devoid of such facilities and use biomass and coal as fuel for the cook stoves which also serves to heat the space. During winter months absence of calm wind currents, cold ground temperature and the topography (valley and overall altitude) of Ulaanbaatar causes stratification of air creating “inversion layer” which traps the emissions leading to increase in its concentration well above the prescribed limits. While the phenomenon of air inversion during winter season is common to many cities across the world, situation in Ulaanbaatar, in particular, and other cities in Mongolia become serious due to use of coal during long winters.

The national greenhouse gas (GHG) inventory shows that in 2006, Carbon dioxide (CO₂) emissions from solid fuel combustion were estimated at 7.93 million tons of which the energy industry, manufacturing industry, transportation, commercial, residential, and agricultural sectors emitted 79.8%, 3.8%, 2.1%, **2.7%**, **8.5%**, and 0.1%, respectively. The combined emissions from residential sector and commercial sector are 11.2% which is higher than that of industrial, transportation and agricultural sectors. In 2011, the aggregated CO₂ emission from Mongolia

¹ In 2012 this ministry was separated in to Ministry of Road Transport and Ministry of Construction and Development. The latter remained as GoM counterpart on this project.

was 13.04 million tons². This is an increase of about 5 million tons as compared to emissions in 2006.

All the coal fired power plants in Mongolia are cogeneration plants that produce electricity, hot water for district heating and process steam for industries. To meet the heat demand during the cold winter months all major cities have combined heat and power (CHP) plants that use coal. Even though all the houses have grid electricity supply however, since the space heating systems are not spread throughout the city, households in the ger area are left with no other option than to rely on the use of biomass and coal for heating.

Therefore Government of Mongolia, in collaboration with the international development agencies is actively working to reduce the excess heat energy consumption in the building sector and also finding solutions to reduce the environmental stress faced by the capital.

Context and Purpose of the Terminal Evaluation

The purpose of the Terminal Evaluation (TE) for this Project is to evaluate the progress towards the attainment of global environmental objectives, project objectives and outcomes, capture lessons learned and suggest recommendations on major improvements. The TE is to serve as an agent of change and play a critical role in supporting accountability. As such, the TE will serve to:

- promote accountability and transparency, and to assess and disclose levels of project accomplishments;
- synthesize lessons that may help improve the selection, design and implementation of future GEF activities;
- provide feedback on issues that are recurrent across the portfolio and need attention, and on improvements regarding previously identified issues; and,
- contribute to the GEF Evaluation Office databases for aggregation, analysis and reporting on the effectiveness of GEF operations in achieving global environmental benefits and on the quality of monitoring and evaluation across the GEF system.

The objective of BEEP was to reduce the annual growth rate of greenhouse gas (GHG) emissions from buildings sector in Mongolia, by improving the energy utilization efficiency in new construction in the residential and commercial buildings. The objective was to be realized by removal of barriers to make use of improved construction design, materials and practices which results in a building that maintains higher comfort level and reduced energy consumption as compared to buildings of similar type that were constructed in the past.

Assessment of Project Outcomes and Sustainability

Table 1 provides a summary of the terminal evaluation of BEEP.

² <http://www.iea.org/statistics/statisticssearch/report/?country=MONGOLIA&product=indicators&year=2011>

Table 1: Evaluation Ratings

1. Monitoring and Evaluation	Rating³	2. IA & EA Execution	Rating
M&E design at entry	5	Quality of UNDP Implementation	5
M&E Plan Implementation	5	Quality of Execution - Executing Agency	5
Overall quality of M&E	5	Overall quality of Implementation / Execution	5
3. Assessment of Outcomes	Rating	4. Sustainability	Rating
Relevance	6	Financial resources	5
Effectiveness	5	Socio-political	5
Efficiency	5	Institutional framework and governance	5
Overall Project Outcome Rating	5.3	Environmental	6
		Overall likelihood of sustainability	5.25

The overall rating of the project results is Satisfactory (S). This is based on the following outcomes:

- The project was able to achieve the overall objective of reducing energy consumption in buildings that were built using revised Building Construction Norms and Standards (BCNS). The energy intensity in buildings complying with the new BCNS were measured to be 155 kWh/m² as compared to the baseline of 200 kWh measured at the beginning of the project. Overall 60 BCNS were revised directly by the BEEP project, which included three new norms/standards.
- More than 2,000 persons received training on various aspects of energy efficiency in buildings and houses. The training exposed the participants to the concept of energy conservation in building, improvements in building design, use of superior building insulation materials, labeling of materials as well as energy labeling of private houses. Thus, for project's components 1 and 2, the accomplishments exceeded the targets defined in project results framework. The project made significant contribution to reduce certain key technical⁴ barriers that were considered necessary for introducing energy efficiency in building sector.
- BEEP succeeded in bringing together key stakeholders including government officials, academic institutions, building sector professionals such as designers, construction engineers; building material manufacturing companies and their associations, donor agencies; to raise awareness, understanding and importance of including energy efficiency in buildings in the local context and also to overcome investment challenges.
- The Project generated useful information products including a web-site which provides the information about the new design of homes with floor area varying between 30-96m²; promotional materials, TV clips, several articles in the "barilga.mn" journal. These knowledge products and services helped to raise awareness of building energy efficiency systems to a wide range of stakeholders using the Project's structured approach of technical assistance and training.

³ 6=Highly Satisfactory (HS): The project has no shortcomings in the achievement of its objectives; 5=Satisfactory (S): The project has minor shortcomings in the achievement of its objectives; 4=Moderately Satisfactory (MS): The project has moderate shortcomings in the achievement of its objectives; 3=Moderately Unsatisfactory (MU): The project has significant shortcomings in the achievement of its objectives; 2=Unsatisfactory (U) The project has major shortcomings in the achievement of its objectives; 1=Highly Unsatisfactory (HU): The project has severe shortcomings in the achievement of its objectives.

⁴ The commercial barrier due to low prices of electricity and heat still exists

- Project also has brought together the other set of key stakeholders – the house owners, private construction companies and the bank - to raise awareness and *create demand* for energy efficient houses and apartments. The commitment of one of the house construction company to build new houses as per designs developed by BEEP and revised Building Codes Norm and Standards (BCNS), and Xac Bank's commitment to provide loan for energy efficient house, are important accomplishments of BEEP. These are decisive steps towards catalyzing EE into new construction in the housing sector.
- BEEP has provided very good set of studies, reference material, awareness building and advisory support to the government officials of national, provincial and city governments to ensure buildings and houses constructed in future comply with revised BCNS. The technical support to the Ministry of Construction and Urban Development (MoCUD) and Ministry of Environment and Green Developments (MEGD) has been greatly appreciated. Strengthening of testing centers at MUST, and Erdenet, Darkhan and their ability to work directly with the industries are impressive outcomes of BEEP that need to be nurtured and sustained by MoCUD after the end of project.
- A project website (<http://www.beep.mn>) was made to share and disseminate technical information on building energy efficiency technologies.

The overall Project sustainability rating is **Likely**. This is primarily due to:

- The strong commitment of the Ministry of Construction and Urban Development and its Construction Development Centre (CDC) which are supporting the review and updating of BCNS. In 2012 the ministry has issued guidelines for the buildings sector to adhere to updated BCNS in new constructions. The CDC staff received training from BEEP and is sensitized to the concept of building energy efficiency. The CDC approves construction drawings and documents that comply with revised BCNS. The state inspection agency is involved in inspection of commercial and residential buildings during different stages of construction to ensure that the construction is being carried out following the new BCNS. This will, over time, ensure that all the new buildings whether commercial or residential apartment buildings constructed will comply with energy efficiency requirements set out in BCNS. CDC's role becomes crucial in mainstreaming the building energy efficiency and ultimately to process of market transformation.
- Strong commitment of the Ministry of Environment and Green Development which is developing framework for green buildings and launching green cities initiatives, to apply the latest design principles, BCNS and concepts of energy efficient house and building developed by BEEP. To promote energy conservation the MEGD had provided customs duty waiver for energy efficient products being imported into Mongolia and tax benefits to companies importing these products. The ministry is also working to develop incentive mechanisms to promote construction of energy efficient houses and building.
- Commitment by the house construction companies to continue building individual house units according to designs and principles developed by BEEP. One of the house construction companies that partnered with BEEP has made this as a part of its business strategy. Apart from the future plans, this construction company is continuing to build new housing units that comply with updated BCNS and also comply with designs developed by BEEP. More than 220 such homes have been built and another 200 are under construction. It is expected that in Ulaanbaatar more 6000 apartments that will be completed in 2013 and another 8,000 apartments

expected to complete in 2014 will comply with new BCNS and energy efficiency norms developed by BEEP. The government's CDC has approved construction of new buildings that are following the revised BCNS.

- Commitment by Xac Bank to continue to provide loans for energy efficient houses. The bank considers building sector a potentially big market and has a line of credit from "Global Climate Partnership Fund" which is available to it until 2016. Such loan requirements are being handled by its Eco Banking group which consists of ten professionals. The bank does not restrict lending to home buyers only but it also provides loan to local small and medium enterprises who manufacture products meeting the BCNS.
- Associations of Civil Engineers, Building Materials Manufacturers, Doors and Window Manufacturers collaborated with the project to support updating of BCNS. These associations also provided professional help in updating few BCNS and developing voluntary labelling scheme for insulation materials and windows.

Conclusions

- Overall programme goals were met, and for components 1 and 2, the accomplishments of BEEP exceeded the targets defined in project results framework. The project made significant contribution to reduce key technical barriers and highlighted the importance of energy efficiency in the building sector. The project created helped in making energy efficiency in building sector a high priority. It helped to create awareness that initiated the process of transforming the market by gradual increase in the demand for energy efficient houses;
- The project revised 60 BCNS and addressed the availability of key building material by engaging building products manufacturers in the process of revising codes and standards, which ensured that these products are available in local market. The project also developed 42 news designs of energy efficient houses out of which 24 designs were updated based on feedbacks of house owners. The project developed voluntary labelling scheme for locally produced building materials that conform to the BCNS. The label is being use by Mongolian Building Materials Manufacturers' Association and Mongolian Windows and Door Manufacturers Association on a voluntary basis. At a limited level the project succeeded in motivating some 18 'Ger dwellers' to invest and move into houses designed and constructed with the support of BEEP. A number of such house owners are highly satisfied with their decision to invest in a home which is far more comfortable than 'ger' and has helped them to reduce coal consumption by about 50%;
- With regards to the design of the BEEP Project, its goals and objectives expressed in the Project Results Framework were met for all the three outcomes. The design of project was well developed, was kept focused to overcome the barriers in the building sector with the help of three independent but inter-related project activities. The barriers identification was comprehensive and fairly detailed and helped in developing a highly focused project results framework;
- Project efforts were significant in building the capacity of 'buildings sector' to adopt EE measures in new construction, by updating several the BCNS. The Project had successfully demonstrated and convinced the stakeholders involved in the project such as the government agencies and ministries, private builders and private bank, that investments in energy efficient apartment and house does actually reduces the

requirement of heat energy by 30 to 50%. The project successfully developed and demonstrated new designs, use of superior construction materials and construction techniques in small family home (targeted at ger dwellers) which have led to reduction in coal consumption by up to 50% while providing greater comfort to the family;

- While technology solutions for energy efficiency in buildings and homes to reduce energy consumption are simple in nature, their implementation is more complex. This is due to a wide difference in the current building codes and norms than those of 1960s and 1970s according to which around 4,000 buildings were built. Non-availability of good quality construction materials such as insulation foam and triple glazed windows (to reduce the heat losses) in the local market hinders implementation of energy efficiency. BEEP worked with the associations of building materials, windows manufacturers and designed 'labels' for insulations, windows that meet the new BCNS as well as developed voluntary energy labels for EE houses. The project has introduced energy labels to provide publicity create greater awareness and acceptance in the market about the concept of efficient end-use of energy and benefits of energy efficiency in construction.
- The Project reaching 55% of its Bank co-financing target by the EOP is a reflection of multiple unforeseen difficulties faced in implementing component 3 for extending home loan to middle and low income families to built EE home designed under the supervision of BEEP. The Xac Bank's Eco home loan eligibility criteria were too stringent for low income families or the people living in the ger areas. UNDP demonstrated adaptive management by signing memorandum of understanding with Millennium Challenge Account to provide financial support in the form of grant (of 4 – 5 million MNT) to subsidize the cost for energy efficient home, which helped to close 20 home loans with Xac Bank. Some of the other factors that effected the progress of this component were:
 - The process for homeowner to avail loan for new construction, and small house construction companies' ability to build EE houses following BEEP design were entirely dependent on the regularity of cash flow. The payments from home owners to the construction companies did not take place very smoothly during the initial stages of construction due to limited finances available with 'ger dweller', and the construction materials specified to be used were more expensive than originally estimated by the builders. This led to the situations where the small builders did not have enough cash with them to carry-on with the construction which in turn, caused the construction work to stall. The Xac Bank's home loan disbursement was tied to construction progress therefore it could not provide funds until the pre-defined construction milestones were achieved. This created challenging situation and often led to delays in completing the construction on time. As a result PIU's attention was diverted to ensuring the completion of EE house for which MCA grant and Xac Bank loan were availed. Higher overall cost of energy efficient houses, experience of time and cost overrun during the early part of the project led many small construction firms to give up energy efficiency and resort to conventional methods in construction.
 - Furthermore, the dearth of a resource person in PIU with project finance background for financial due diligence and structuring of applications was one of the factor due to which the project fell short of its target of providing loan for 100 building energy efficiency projects.
 - UNDP's MoU with Xac Bank had stringent requirements which restricted the progress on disbursement of home loans. In 2012 the project received a setback due to the directive of UN head quarter advising the country office to terminate the

MoU with the Xac bank. This was considered one of the reasons which is considered as the one of the reasons for the project to not meet the targets under component 3. Nevertheless, the bank continued its portfolio on energy efficiency and provided loan to SMEs engaged in construction and manufacturing of EE products for homes and buildings.

- There does not appear to be any post-project structured arrangement to have technical assistance and advisory support/guidance to MoCUD. Although it is expected that MUST and MACE will cover up for BEEP, the reviewers' view this as a potential gap area as the MoCUD would need additional hand holding support⁵ to fully implement BCNS in commercial buildings and also ensure compliance, replication and continued awareness creation in other major cities for market transformation.

Lessons Learned

- BEEP succeeded in creating awareness among a niche segment of the society and greatly increased awareness of GoM's MoCUD, MoEGD, MoE, and of Construction Development Centre, Center of Standardization and Measurement, the State Department for Infrastructure Inspection, and the General Agency for Specialized Inspection on the importance and benefits of implementing revised BCNS in all new construction of residential buildings. The project benefitted from:
 - Three well defined outcomes in the project's results framework that helped it to: stay focused on addressing the barriers; stay on course in achieving the majority of goals and outcomes. Successful engagement of local associations of building material manufacturers, doors and windows manufacturers, association of civil engineers and Mongolian University of Science and Technology to overcome the barriers in construction sector, has also greatly enhance the knowledge and awareness of each of these organizations. This has largely aided project's sustainability as each of these organization is committed for long term to continue to work on improving the building energy efficiency after the project ends in December 2013,
 - The project's financing component, despite challenges faced by UNDP and the Project team in meeting the project end targets, helped to create awareness among the small home construction companies and private sector bank on the potential for investment in building energy efficiency. This helped to catalyze single family home units being built around Ulaanbaatar which are BCNS compliant use designs and general construction guidelines developed by BEEP. The project's financing component benefitted from the co-financing support from MCA for constructing EE home in the ger area,
- The project's component on accessing energy efficient financing to extend 100 home loans and investment of USD2 million by Xac Bank was developed to extend the benefits of an efficient home with 'ger dweller' as target. Since the 'ger' community falls under the lower income category of the society, the target beneficiary needed additional financial support as they did not fulfil pre-requisite conditions to avail Xac bank's home loan. The additional grant funding of 4 to 5 million MNT which was provided by the MCA became crucial to the success of demonstration of EE houses. As mentioned in the mid-term report, this

⁵ This is general observation and therefore to continue the dialogue with MoCUD the reviewers feel NAMA will help to fill that gap. To continue support to the sector few UNDP country offices have initiated follow up projects such as the "Barriers Removal in Energy-efficient Standards and Labeling" and UNDP India's "Energy Efficiency in steel re-rolling mills", and "Access to Clean Energy Phase-2". The first project listed above is GEF funded while the remaining two have been funded from UNDP's TRAC-2 and other bi-lateral donor's money

component required involvement of a finance/home loan expert in the PIU to improve the outcome, which did not happen due to the non-availability of qualified finance sector professional.

- While the bank played an important role to support the gradual process of market transformation by supporting investments in 'green houses' by buyers, suppliers and construction companies, but the concept of energy efficiency itself being new therefore due to lack of demand and a combination of factors cited above the co-financing target could not be achieved.
- As the UNDP funds are meant for providing technical assistance and training, a risk sharing mechanism should be designed with the support of a multi-lateral institution which traditionally work with private banks. For instance, the Development Credit Authority mechanism of the United States Agency for International Development is specifically developed to mitigate project risks by supporting the private sector banks or project developer in a particular sector to demonstrate new concepts.
- The building sector in Mongolia is vast and growing rapidly. The project succeeded in addressing the key technical barriers identified which prevent the building sector adopting energy efficiency, demonstrated energy efficient house units and catalyzed the market to certain extent. BEEP, however, did not have sufficient resources to work with large companies engaged in the construction of commercial buildings to ensure compliance with revised BCNS and achieve faster replication and demand for energy efficient houses and apartments in other cities. The GoM will need to engage few large construction companies in partnership mode to demonstrate saving and long term benefits to the occupants/tenants in energy efficient building.
- To accelerate the replication of energy efficient buildings and reduce the energy consumption in buildings the GoM will need to periodically review the pricing of energy to develop a two-part tariff. The tariff will have to include the cost of energy demand (based on the area) and actual energy consumption (on a monthly basis). This pricing can be applied to the commercial buildings initially and over a period of time can be extended to residential sector for house and apartments exceeding a particular area.

Recommendations

With the GEF-funded BEEP project terminating on December 31, 2013, the following recommendations are being provided:

Recommendation 1: Improving energy efficiency in Mongolia's building sector has huge potential for which MoEGD and MoCUD will require technical assistance.

As the building construction sector is growing rapidly the ministries will require technical assistance to ensure all new construction of commercial and residential building complies with the new BCNS. The MoEGD plans to develop standards for green buildings and green sub-districts. Both the areas provide opportunity to continue and build up on the work already done by BEEP and assist in market transformation of building energy efficiency, and GEF funding support may be considered since this would lead to reduction in GHG emissions. The Nationally Appropriate Mitigation Actions in the construction sector can serve as the vehicle for GEF and UNDP CO to support the GoM in scaling up its efforts and achieving further reductions in GHG emissions. It will also

provide an opportunity to advance institutional strengthening of agencies such as the CDC and State Departments for Infrastructure Inspection, regional centres that received BEEP TA and training. Further, as much of the groundwork has already been done in the building sector by BEEP, which is followed by the GoM's plan to provide financial resource through Clean Air Fund and incentivise EE, and local private bank is committed to work in the sector, therefore GEF funding will be able to leverage much higher amount of local financial resource as co-financing, with tangible results.

Recommendation 2: Improve capacity of MoCUD and its agencies to ensure all new commercial and residential apartments buildings are designed and constructed following new building codes norms and standard throughout the country. Ministry of Construction and Urban Development along with its two concerned agencies the Construction Development Center, and the State Department for Infrastructure Inspection will require further support to strengthen its functions. This can be done by developing a strategic plan which would: set a target for energy efficient buildings; continue and expand activities of BEEP for wider replication across country, develop a set of activities to engage people in 'Ger' to reduce the utilization of fuel (primarily coal) through better insulation and improved stove. Provide financial incentives (conditional grant) for small house owners (area less than ~ 35m²) to avail bank loan and move to an efficient house. Develop clear strategies for awareness creation; strengthen material supply chains; strengthen compliance through mandatory regulation, inspection and independent verification.

Recommendation 3: GoM funding towards EE in buildings should be designed for two target end users - (a) retrofitting the government buildings as per new BCNS, and (b) individual home owners and Ger dweller to avail bank financing for constructing EE houses as per new BCNS. Government is the single largest owner of commercial buildings in capital city and for that reason the single largest consumer of energy for space heating. Therefore, government should make annual budget allocation towards retrofitting certain specific area of its building to improve insulation and install windows that meet the revised BCNS. Large volume procurement of building material will help to reduce the cost of these products (due to economies of scale) and make these affordable for individual home owners for retrofitting. Also reduced consumption of heat energy in commercial buildings will likely make spare capacity available for other areas of city. To encourage people living in ger to build energy efficient houses, government must provide them financial incentives (similar to the MCA grant) so that they receive technical support in design, construction from Mongolian Association of Civil Engineers, and possible loan from the bank. With the experience of BEEP, GoM will need to engage multi- and bi-lateral institutions such as IFC and kfW to provide line of credit to local private banks to catalyze sales and construction of energy efficient home in ger districts in UB and throughout the country.

Recommendation 4: GoM needs to review the pricing of energy to develop a two-part tariff to include the cost of energy demand (based on the area) and actual monthly consumption. To accelerate the adoption of the concepts of energy efficiency in new construction and its replication the GoM will need to pay attention to the pricing of heat energy. The current price structure does not provide incentive to end-user to conserve energy by investing in energy efficient products and appliances. This pricing can be applied to the commercial buildings initially and over a period of time can be

extended to residential sector for house and apartments exceeding a particular floor area.

Recommendation 5: Organization such as MACE should be strengthened to continue the awareness raising on energy efficiency in buildings as well as exchange of **experience and lessons internationally**. MACE should take the lead to host seminars and workshops or annual events on “Green Buildings” and form a ‘Green Buildings Council’. The council’s activities could follow the activities, events of the government and voluntary organizations such as European Commission’s Green Building Programme (<http://iet.jrc.ec.europa.eu/energyefficiency/greenbuilding>); Sweden Green Building Council (<http://www.sgbc.se/in-english>); US Green Buildings Council (<http://www.usgbc.org/>). MACE or the appointed agency can also gather the developing country perspective on importance of green buildings, for instance, from India’s experience through the Indian Green Building Council, which also includes information on green home, green buildings and green townships. (<http://www.igbc.in/site/igbc/index.jsp>).

ABBREVIATIONS

Acronym	Meaning
ADB	Asian Development Bank
APR	Annual Project Review
AWP	Annual Work Plan
BCNS	Building Code, Norms and Standards
BEEP	Building Energy Efficiency Project
CDR	Combined Delivery Report
CHP	Combined Heat and Power
CO	Country Office (of UNDP)
CO ₂	Carbon dioxide
ECC	Energy Conservation Centre
EE	Energy Efficiency
GEF	Global Environment Facility
<i>Ger</i>	Traditional Mongolian round nomadic family felt tent
<i>ger area</i>	Areas with a mix of <i>ger</i> and private houses
GHG	Greenhouse Gases
GIZ	Gesellschaft für Internationale Zusammenarbeit
GoM	Government of Mongolia
HOB	Heat Only Boiler
HVAC	Heating, Ventilation and Air Conditioning
ISO	International Standards Organization
KEMCO	Korea Energy Management Corporation
LFA	Logical Framework Analysis
M&E	Monitoring and Evaluation
MACE	Mongolian Association of Civil Engineers
MBMMA	Mongolian Building Materials Manufacturers Association
MWDMA	Mongolia Windows and Door Manufacturers Association
MCA	Millennium Challenge Account
MoE	Ministry of Energy
MoEGD	Ministry of Environment and Green Development
MoCUD	Ministry of Construction and Urban Development
MTR	Mid-Term Review
MUST	Mongolian University of Science and Technology
NGO	Non-Governmental Organization
NPD	National Project Director
NPM	National Project Manager
PMU/PIU	Project Management Unit / Project Implementation Unit
PIR	Project Implementation Report
PPM	Project Planning Matrix
SME	Small and Medium Enterprise
S&L	Standards and Labelling
TA	Technical Assistance
ToR	Terms of Reference
UNFCCC	UN Framework Convention on Climate Change
UB	Ulaanbaatar
WB	World Bank

1. INTRODUCTION

This report summarizes the findings of the Terminal Evaluation Mission conducted from October 21-29, 2013, for “Energy Efficiency in New Construction in the Residential and Commercial Buildings Sector in Mongolia” (hereinafter referred to as BEEP or the Project) which received a USD 975,000 grant from the Global Environmental Facility (GEF). The project is a successor to UNDP Mongolia’s program for Commercialization of Super-Insulated Buildings which demonstrated using straw-bales as construction material to improve the insulation of houses to maintain comfortable temperature and reduce space heating requirements. The BEEP project started in July 2009 with USD 340,000 co-financing from KEMCO. The Project received GEF funding approval in December 2009 from GEF Secretariat and formally began as nationally executed (NEX) project. The signing of Project Document (ProDoc) between UNDP and Government of Mongolia’s Ministry of Road Transport, Construction and Urban Development⁶ took place on January 7, 2010.

Landlocked and located close to central Eurasia, Mongolia’s climate is sunny, arid and cold. Winter temperatures fall below -30 degrees Celsius making Ulaanbaatar the coldest capital city in the world. Since the start of economic transition in the 1990s the population and economic growth have become increasingly concentrated in Ulaanbaatar. Its official population has risen to over 1.3 million⁷ and is estimated to be over 40% of the country’s population. It is the political, industrial, and economic center of the country and generates 65% of the country’s GDP, 85% of power, and 50% of investments.

The majority of commercial and residential apartment buildings in Ulaanbaatar built in the past are connected to CHP. However, the rapid growth of capital led by in-migration from other parts of the country and new construction did not bring about as much capacity addition of CHP. Most of Ulaanbaatar’s in-migrants settled in the peri-urban “ger areas” do not have full access to services of district combined heat and power (CHP) plants to meet the heating requirements. Therefore, in the ger area coal remains the main source of energy to meet the heating requirement during the cold winter months. As a consequence of continuous use of coal the air quality of ger areas in particular, and rest of Ulaanbaatar in general, gets adversely affected.

During the winter months absence of calm wind currents, cold ground temperature and the topography (valley and overall altitude) of Ulaanbaatar causes stratification of air creating “inversion layer” which traps the emissions leading to increase in its concentration well above the prescribed limits. While the phenomenon of air inversion during winter season is common to many cities across the world, the situation in Ulaanbaatar and other cities in Mongolia become serious due to long winters that last seven to eight months.

The other sources of emissions in and around Ulaanbaatar besides the use of coal in homes are vehicles and industries. However, the emissions from these other sources

⁶ In 2012 the Ministry of Road Transport, Construction and Urban Development branched off into two separate ministries. The Ministry of Construction and Urban Development became the project counterpart since then.

⁷ The population of Ulaanbaatar in 2009 was 929,000, however it is estimated that over past four years it has increased significantly due to in-migration of people from other parts of country. The figure presented here is estimated.

are relatively less when compared to contributions of houses and commercial buildings. CO₂ emissions from fuel combustion increased at an annual growth rate of 2.3 per cent⁸ between 2000 to 2006. As per the national communication in 2006 the emissions were at 7.925 million tons, where as in 2011, the aggregated Carbon dioxide emission from Mongolia was 13.04 million tons⁹.

At the national level, 78% of Mongolia's electricity generation and 90% of heating requirement is met from coal¹⁰. The remaining requirement of electricity is met from small diesel power units that contribute 7%, hydro-electricity contribute 3%, solar and wind based generation contribute about 1%. The balance 11% electricity is met through import from Russia into the Western and Central Energy Systems. Recent trends indicate rising demand for energy by the mining industry and rapid growth in the population of Ulaanbaatar.

All the coal fired power plants are cogeneration plants that produce electricity, hot water for district heating and process steam for industries. To meet the heat demand for cold winter months all major cities have combined heat and power (CHP) plants. However, the capacity addition of CHP has not happened in past at the same rate to match the rapidly growing demand in cities. Ulaanbataar has no spare capacity to meet the heating requirement of growing population, compelling households in the ger area to use biomass and coal for heating even though all the houses in ger area have grid electricity.

Government of Mongolia is, therefore, actively working on finding various ways to reduce the energy demand by improving efficiency of end-use of energy, and towards finding solutions to reduce the GHG emissions and improving air quality in cities.

1.1 Background

The Government of Mongolia signed the United Nation Framework Convention on Climate change on June 12, 1992 at the Earth Summit in Rio and the Great Khural of Mongolia ratified it on September 30, 1993. The general commitments of the United Nations Framework Convention on Climate Change (UNFCCC), which apply to all the Parties, include the development and communication of programs containing measures to (a) mitigate climate change and to facilitate adaptation to climate change; (b) promote and co-operate in development, application and diffusion of relevant technologies, practices and processes; and (c) to take climate change considerations into account in relevant social, economic and environmental policies and actions.

Mongolia's system of building controls, based on the former Soviet Union's system of building energy efficiency Norms, Regulations and Standards from the 1960-70's, is outdated makes compliance complicated, and hence required to be completely updated. There are 517 applicable norms and standards that are applicable to buildings, of which around one-third are still in Russian, around another one-third are translated directly from Russian into Mongolian, and remaining one-third are tailored to Mongolian conditions and published in Mongolian. The energy efficiency requirements of the Building Code Norms and Standards (BCNS) also largely refer to socialist period construction methods and materials which are no longer in use.

⁸ Mongolia Second National Communications, 2010

⁹ <http://www.iea.org/statistics/statisticssearch/report/?country=MONGOLIA&product=indicators&year=2011>

¹⁰ http://www.sacc.ch/upload/ado2013-mongolia_867.pdf

Mongolia's capital Ulaanbaatar is also the largest city in the country with population of 1.3 million and highest number of buildings. It is estimated that 40% of the total population of Ulaanbaatar lives in apartments, 35% in houses and 25% in ger. Around 60% of the families in Ulaanbaatar live in 'ger area' which consists of a mixture of two types of dwelling units – 'ger' and informally constructed private house. A ger is a traditional Mongolian felt tent known as 'ger' and, in slightly larger informally constructed private houses that are generally built with minimal levels of insulation and have high ventilation heat losses. In ger areas, buildings are heated with traditional stoves which use biomass and coal. The usage of coal takes during the winter months which last from November to April. The use of fossil fuel for cooking as well as for space heating energy contributes to deterioration of ambient air quality that poses a serious threat to human health in urban areas of Mongolia, particularly in Ulaanbaatar city. Both ger and small private houses are estimated to use on average around 4 to 5 tons of coal and 1.5 tons of fuel wood annually for space heating.

The energy sector of Mongolia use 60-80 per cent of solid fuels/coal for generation of electricity and heat in power plants, and is the country's largest contributor to GHG emissions. The cold climate, the reliance on coal with low energy content and inefficient combustion in cook-stoves contribute to a high rate of carbon dioxide (CO₂) release. In 2006, CO₂ emissions from solid fuel combustion were estimated at 7.93 million metric tons, of which the energy industry, manufacturing industry, transportation, commercial, residential, and agricultural sectors contributed 79.8%, 3.8%, 2.1%, 2.7%, 8.5%, and 0.1%, respectively.

With an eight month long heating season, heating is the primary building energy demand and coal is the main heating fuel in urban areas, as Mongolia currently has no domestic gas or oil supplies. Buildings are generally supplied by space heating and domestic hot water from combined heat and power (CHP) plants, or from district heat only boilers (HOB), both burning coal. The rapidly growing apartment and commercial property development which is currently underway offers an opportunity to construct buildings that consumes less energy as compared to those that have been built in the past or any in different stages of construction.

1.2 Terminal Evaluation

1.2.1 Purpose of the Evaluation

In accordance with UNDP and GEF Monitoring and Evaluation policies and procedures, all full and medium-sized UNDP support GEF financed projects are required to undergo a Terminal Evaluation (TE) upon completion of implementation of a project to provide a comprehensive and systematic account of the performance of the completed project by evaluating its design, process of implementation and achievements vis-à-vis GEF project objectives and any agreed changes during project implementation. As such, the TE for this Project is expected to:

- promote accountability and transparency, and to assess and disclose levels of project accomplishments;
- synthesize lessons that may help improve the selection, design and implementation of future GEF activities;

- provide feedback on recurrent issues across the portfolio, attention needed, and on improvements regarding previously identified issues;
- contribute to the GEF Evaluation Office databases for aggregation, analysis and reporting on effectiveness of GEF operations in achieving global environmental benefits and on the quality of monitoring and evaluation across the GEF system.

This TE was prepared to:

- be undertaken independent of project management to ensure independent quality assurance;
- apply UNDP-GEF norms and standards for evaluations;
- assess achievements of outputs and outcomes, likelihood of the sustainability of outcomes; and if the project met the minimum M&E requirements;
- report basic data of the evaluation and the project, as well as provide lessons from the Project on broader applicability.

TE mission was undertaken in Ulaanbaatar, Mongolia from October 20 to 29, 2013. The Terms of Reference (ToRs) for the TE are contained in Appendix A.

Key issues addressed on this TE include:

- Assessing the impact of the entire Project duration from 2009 to the presence, and accounting for project progress and accomplishments;
- Assessing the roles of the various Project partners including associations, private construction companies, Energy Conservation Centres and academic institutions;
- Providing recommendations for post-project support to the building sector considering the large number of government and private buildings that appear to be in need of guidance and financial support to reduce energy consumption.

Outputs from this TE are expected to provide guidance in charting future directions on sustaining market transformation of energy efficiency in commercial and residential buildings in Mongolia.

1.2.2 Evaluation Scope and Methodology

The methodology adopted for this evaluation includes:

- Review of project documentation (AWP, CDR, APR/PIRs, meeting minutes of Advisory Committees) and pertinent background information;
- Interviews with key project personnel including the Project Manager, technical advisors, demonstration project proponents, potential investors, relevant UNDP staff, and GEF Operational Focal Point ;
- Interview with relevant stakeholders from Government, academia, private sector entities;
- Field visits to selected project sites and interviews with beneficiaries and key stakeholders.

A full list of documents reviewed and people interviewed is given in Appendix B. A detailed itinerary of the Mission is shown in Appendix C. The Evaluation Mission for the project was comprised of one international expert and one national expert.

1.2.3 Structure of the Evaluation

This evaluation report is presented as follows:

- An overview of project achievements from the commencement of operations in July 2009 with support from KEMCO and signing of Prodoc in January 2010;
- An assessment of project results based on project objectives and outcomes through relevance, effectiveness and efficiency criteria;
- Assessment of sustainability of Project outcomes;
- Assessment of monitoring and evaluation systems;
- Assessment of progress that affected Project outcomes and sustainability; and
- Lessons learned and recommendations.

This evaluation report is prepared in accordance with GEF's "Guidelines for GEF Agencies in Conducting Terminal Evaluations, Evaluation Document No. 3" of 2008: <http://www.thegef.org/gef/sites/thegef.org/files/documents/Policies-TEguidelines7-31.pdf>

The Evaluation also meets conditions set by the UNDP Document entitled "UNDP GEF – Terminal Evaluation Guideline" (<http://erc.undp.org/resources/docs/UNDP-GEF-TE-Guide.pdf>) and the UNDP Document entitled "Handbook on Planning, Monitoring and Evaluating for Development Results", 2009: (<http://www.undp.org/evaluation/handbook/documents/english/pme-handbook.pdf>)

and the "Addendum June 2011 Evaluation": <http://www.undp.org/evaluation/documents/HandBook/addendum/Evaluation-Addendum-June-2011.pdf>

1.2.4 Project Implementation Arrangements

The project is implemented over a period of four and half years beginning in mid-2009. The Project implementation adheres to National Execution Modality (NEX). The Ministry of Foreign Affairs and Trade (MFAT) is the focal point for coordinating UNDP's technical cooperation in Mongolia. The Implementing Partner of the project was Ministry for Construction and Urban Development as designated agency to implement the project and is responsible for the timely delivery of inputs and outputs and for coordination with all other responsible parties including other line ministries, relevant government agencies, and local government authorities.

The project was designed to receive high-level guidance and oversight from a Project Board (PB) responsible for making consensus based management decisions for the project. PB contains three roles:

- Executive role for representing the project ownership,

- Senior Supplier role to provide guidance regarding the technical feasibility of the project, and
- Senior Beneficiary role to ensure the realization of project benefits from the perspective of project beneficiaries.

UNDP Mongolia offered project implementation assurance by assisting in monitoring project budgets and expenditures, recruited and contracted project personnel and consultant services, procured equipment, and provided other assistance upon request of MoCUD. UNDP Mongolia also has monitored the project implementation and achievement of the project outcomes/outputs and ensured the efficient use of donor funds.

UNDP Korea, facilitated mobilization of the resources for BEEP, and provided assistance in receiving cost-sharing contributions from the ROK Government in accordance with the payment schedule, monitoring the progress, issues, and risks through UNDP Mongolia. The GEF Regional Technical Advisor for Climate Change (UNDP-GEF Regional Coordination Unit) provided quality assurance for the project through the UNDP CO.

The day-to-day management of the project was carried out by Project Implementation Unit (PIU) located at the MoCUD. The PIU managed by the Project Manager (PM) and supported by three professional staffs as Policy and Institutional Development Officer, responsible for Outcome 1, Training and Technical Development Officer, responsible for Outcome 2, Energy Efficiency Finance Officer, responsible for Outcome 3, Administration and Finance Officer, translator/interpreter with extra secretarial duties and driver. The PM designated for the entire duration of the project had the responsibility to ensure that the project produced the results specified in the project document to the required standard of quality and within the specified time and cost.

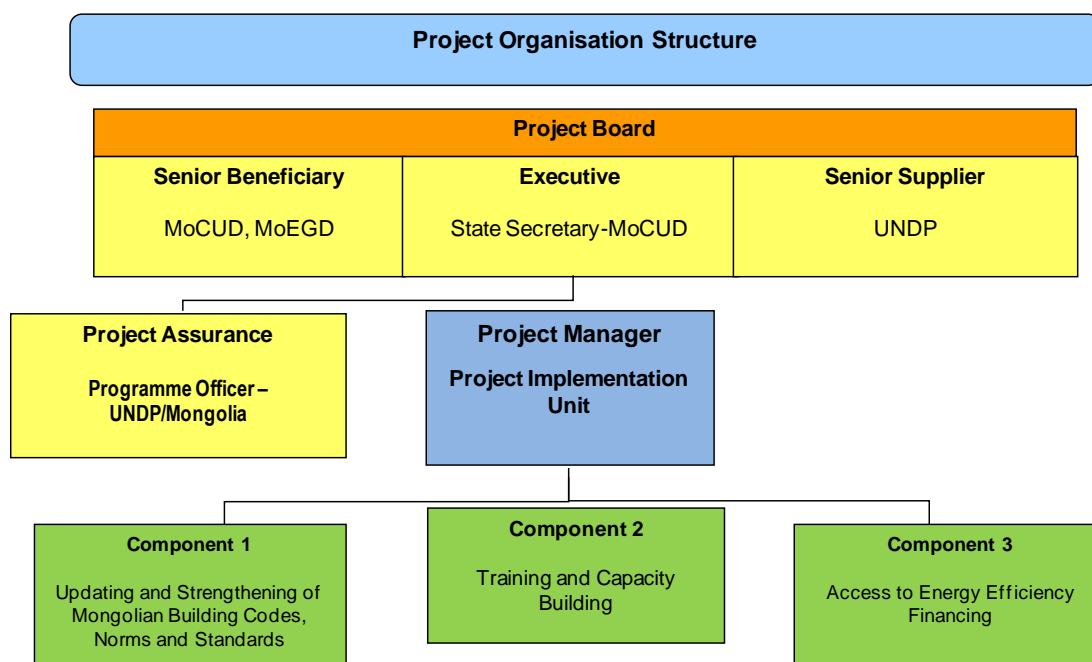
The PM works under the guidance of a National Project Director (NPD), a senior level official of MCUD appointed by the Minister. The NPD was responsible for ensuring the proper implementation of the project on behalf of the Government. In doing so, the NPD was responsible for overseeing proper project implementation for the Government of Mongolia. Also an alternate NPD nominated by the Minister to ensure smooth operation of the project in the absence of NPD.

The PIU reported to the Project Board (PB - formerly Project Steering Committee) which had the responsible for making management decisions particularly when the guidance was required by the Project Manager. The role of PB is critical in project monitoring and evaluations by quality assuring these processes and products, and using evaluations for performance improvement, accountability and learning. In addition, the PB approved the appointment and responsibilities of the Project Manager and any delegation of its Project Assurance responsibilities. Based on the approved Annual Work Plan, the Project Board considered and approved the quarterly plans and also approved any essential deviations from the original plans.

In order to ensure UNDP's ultimate accountability for the project results, PB decisions were made in accordance to standards to ensure management for development results, best value money, fairness, integrity, transparency and effective international competition. The Project Board of BEEP was chaired by the State Secretary of MoCUD.

An organogram of BEEP implementation arrangements is provide on Figure 1.

Figure 1: BEEP Project Implementation Arrangements



2. BEEP DESCRIPTION AND DEVELOPMENT CONTEXT

2.1 BEEP Start and Duration

The BEEP project document (ProDoc) was signed on 7th January 2010 with formal Project operations commencing with the Inception Workshop on June 4-6, 2010. The ProDoc indicates a Project Terminal date of 31st December 2013. The project ended as per original plan without any deviations. All the project funds were fully utilized by 31st December 2013.

2.2 Problems that BEEP Sought to Address

The main problems the project intended to address were the followings:

- a. Outdated BCNS
- b. Lack of compliance with current BCNS energy Efficiency Requirements
- c. The existing BCNS System not aligned for Independent Certification
- d. Lack of availability of key insulation materials
- e. Growing numbers of energy inefficient buildings being built
- f. Lack of knowledge of large private house owners in energy efficiency
- g. Lack of knowledge of key construction techniques
- h. Housing mortgage market still developing
- i. Limited awareness of value of insulation

2.3 Objectives of BEEP

The objective of the project was to reduce the annual growth rate of GHG emissions from the buildings sector in Mongolia, by providing technical assistance, training and financing to improve the energy utilization efficiency in new construction in the residential and commercial buildings sector. This objective intended to be fulfilled by helping to solve problems in building energy efficiency construction systems, construction practices, and investment patterns. The building sub-sectors being addressed in the project comprised of new construction sector, commercial, apartment buildings and private houses, and new large private houses not connected to infrastructure systems.

The target of the project was to achieve reduction in energy consumption of buildings that fully comply with the BCNS energy performance; reduction in energy intensity of compliant building from 150 to 135kWh/m²-year; and reduction of CO₂ emissions by 63,000 tons over 20 years.

2.4 Main Stakeholders

The main stakeholders of BEEP are listed in an approximate order of ownership and involvement:

- Ministry of Construction and Urban Development is the primary stakeholder of the project and designated National Executing Agency. The ministry is

responsible for development and control of the country's construction sector and for developing and administering the building codes, norms and standards. The ministry is committed to the project for the benefits it will provide to Mongolia and to the global environment.

- Ministry for Environment and Green Development is an important GoM stakeholder on this project as it has the primary responsibility to develop policy guidelines and implementation plan to pursue Green development agenda. It also has the responsibility to protect environment, natural resources, and is working towards reducing country's overall GHG emissions growth trends.
- Construction Development Center is the state owned enterprise under the Ministry of Construction and Urban Development which became functional in 2012. It oversees the implementation of policies and directives of the ministry in the construction sector. It grants approval to all the building construction by reviewing the construction documents and therefore the centre plays a vital role in directing the building construction industry to adhere to energy efficiency norms and practices.
- Mongolian Windows and Doors Manufactures Association (MWDMA) is a not-for-profit organization with 60 members that are involved in manufacturing of doors and high thermal insulation windows. The association actively worked with BEEP to develop two new standards and come up with energy efficiency label for windows. The association also collaborated with the Mongolian University of Science and Technology's Building Energy Efficiency Centre on testing of new window panel to ensure compliance to new BCNS before launching the product in the market.
- Xac Bank is a private sector bank headquartered in Ulaanbaatar, which started its operation in 2001. It is one of Mongolia's largest bank serving individuals, small and medium side enterprises and corporations with a range of banking services. It operates in all 21 provinces of Mongolia. The bank has ECO banking group which is working with international donor agencies towards distribution of energy efficient cook-stoves and high insulation ger blankets with an aim to reduce emissions and improve the air quality.
- Mongolian Civil Engineers Association (MACE) was established in 1996 as a Non Governmental Organization which helped to setup an Energy Conservation Centre in Ulaanbaatar which was built using straw bales under previous UNDP project thus MACE brings continuity to BEEP. It has a large membership base with several hundred professionals and companies from both the Building Construction and Civil Engineering fields. The MACE will continue to disseminate the work done under BEEP by maintaining its website for next five years after, end of project.
- Energy Conservation Center (ECC) at MACE and MUST along with two similar centers in Erdnet and Darkhan were upgraded to carryout research, monitoring and verification work in the buildings sector. The main activity of the ECC is to provide training to architects and construction engineers, and advisory services to individuals on building energy efficient houses. It also provides designs and drawings of EE house at discounted price between 1,500 - 4,000MNT for individual house with area less than 100 square-meters.

- Energy and Environment Project, Millennium Challenge Account - Mongolia was involved in providing grant assistance to improve the air quality in Ulaanbaatar by introducing efficient cook stoves and energy efficient home in the ger district that will reduce emissions and to support production of renewable energy sources.
- Building Materials Manufacturers' Association of Mongolia is a not-for-profit organization with 150 members that are engaged in production and manufacturing of building materials used in the building sector. The association provided resource persons to the project who assisted in developing training materials and conducting training programs. The association worked with the BEEP to develop and launch labels for insulation materials that conformed to the revised BCNS.

2.5 Expected Results

To achieve overall goal and objectives, BEEP activities comprised of three integrated outputs that were designed to jointly address the problems that prevent widespread adoption of energy efficiency in the wider Mongolian buildings sector. Each of the three components consisted of specific activities designed to address specific set of barriers.

Component 1: Mongolian Energy Efficiency Building Codes, Norms, and Standards Updated and Strengthened

This component involved the development of new mandatory BCNS energy efficiency systems that would be simpler to understand, would require higher or new energy efficiency levels in some critical building elements that would be more strictly enforced and that would lead to higher overall energy efficiency levels being achieved in practice across new buildings. Following five activities were planned to perform under this component:

1. *Development of a More Effective BCNS Energy Efficiency System* that involved the establishment of overarching building energy efficiency code performance requirements covering objectives, functional requirements, and performance principles and coverage,
2. *Development of New Energy Efficiency Mandatory BCNS Documents* that included the consensus based development with MoCUD and other relevant agencies and stakeholders of an integrated suite of mandatory energy efficiency BCNS requirements,
3. *Development of Voluntary Energy Efficiency Guidelines* planned to develop voluntary energy efficiency guidelines for those small buildings that would not initially be covered by the mandatory requirements of the new BCNS energy efficiency system,
4. *Development of Building Energy Monitoring and Reporting System* which involved institutionalizing the regular data gathering, monitoring, analysis and reporting of the energy performance of buildings,
5. *Strengthening of Building Control Agencies* which identified the capacity building requirements and inform the design of Activity 2 under component 2 on technical support and training.

Component 2: Trainings provided and Awareness raised

This component involved the development and implementation of capacity building technical development, certification and awareness measures for enhanced energy efficiency in buildings. The component provided for training and technical support needs of construction sector stakeholders, including building control bodies and officials, financial and funding bodies, testing and certification bodies and providers, designers, specifiers, developers, construction companies, and building owners and tenants. Following two specific activities were implemented under this component.

1. *Technical Support for Improved Building Energy Efficient Technologies* intended to provide technical development, support and certification for key energy efficiency technologies and systems,
2. *Technical Support, Training, Awareness and Communication* to enhance local technical and managerial capacity to design, finance, construct, manage, and maintain energy efficiency in buildings. The component also focused on improving the operation of the four existing Energy Conservation Centers (ECCs) in Ulaanbaatar, Erdenet and Darkhan as well as by part-time contracting of construction professionals in the three Mongolian regional centers at Dalanzadgad, Dornod and Khovd.

Component 3: Access to Energy Efficiency Financing Facilitated

This component was designed to facilitate an access to financing for energy efficient building approaches, technologies and systems by bridging the gap between energy efficiency supply and demand. After conducting a market analysis of potential demand, the project worked to build the capacity for both the demand and supply-sides, and Xac Bank has made arrangements to provide \$2 million of its own funds for building energy efficiency loans. The bank proposed that normal commercial interest rates and loan duration periods for this type of financing be applied to ensure ongoing sustainability post-project and to avoid undermining the development of a healthy commercial mortgage market.

Under this component, BEEP provided technical assistance to help identify suitable projects, raise awareness of the demand-side, i.e. prospective customers, on the availability of financing, build the capacity of those customers to apply for loans, and build the capacity of XacBank to evaluate the proposed energy efficiency projects, and hence manage the loan risks by appropriate loan due diligence and risk management mechanisms for the disbursement and credit management of the new building energy efficiency loans. Following four specific activities were planned to perform under this component:

1. *Market Analysis and Establishment of Energy Efficiency Financing* to analyse potential new building energy efficiency financing by market segment and by market players and influencer to ensure accurate targeting of awareness and capacity building efforts,
2. *Training in Energy Efficiency Financing* involved providing training and ongoing support for Xac Bank on financing support schemes including due diligence of

proposed loan and their underlying technologies, the risks of loan not performing as expected and the means to mitigate the risks,

3. *Raising Awareness and Building Capacity of Energy Efficiency Financing* that mainly involved identification of suitable construction materials and publicity, conducting workshops for commercial, government, and residential building developers, designers, construction companies, owners and tenants on how to access energy efficiency financing.
4. *Sustaining Energy Efficiency Financing Support* to work closely across all energy efficiency financing elements with stakeholders who are likely to be able and willing to continue to pursue the project objectives after the project ends in 2013.

Section 3 provides the details on the actual outcomes and outputs of BEEP.

3. FINDINGS

3.1 Project Design and Formulation

3.1.1 Analysis of LFA / Results Framework

The project has been greatly assisted by a clear project results framework which has very well laid out all the project outcomes, indicators which are SMART¹¹, and quantifiable.

Following are the two minor observations of the reviewers on the analysis of Project Result Framework (PRF) included in the ProDoc and the review of other project reports and documents:

- The PRF has detailed out the outcomes, indicators along with the baselines and target, however, no 'Outputs' are mentioned against each of the Outcomes. This created ambiguity while reviewing the PRF during the terminal evaluation as no output has been defined for each of the component.
- During the project inception workshop, changes were proposed to the project's overall indicators. However the revised baseline and target numbers were not incorporated in the PIR. As a result all the reporting has remained on the target mentioned in the PRF. In this report, the overall project has been reviewed against the target indicators recommended during the inception workshop.

3.1.2 Project Risks and Mitigation Measures

While most of the assumptions and risks provided in the Project Planning Matrix (PPM) are reasonable in the realm of risk assessments of BEEP, there are two additional assumptions that should have been included:

- "Continuing low cost of energy" which makes any additional investment to improve energy efficiency of home and buildings financially unattractive due to long pay-back period;
- "inadequacy of collaterals among ger dweller", which made financing of energy efficient houses and demonstration of migrating a family from 'ger' to energy efficient house, an additional hurdle to be overcome by BEEP

3.1.3 Lessons from Other Relevant Projects Incorporated into BEEP Design

A review of previous, on-going projects and initiatives related to Building Energy Efficiency was carried out during the design phase of BEEP. A brief description of these projects, including the UNDP-GEF supported 'Commercialization of Super-Insulated Buildings in Mongolia' which was predecessor to BEEP and other projects led by GoM, various other development agencies have been included in the ProDoc.

The detailed barrier analysis of each of Mongolia's building sub-sector provides thorough background and description of a variety of issues faced by the sector including brief mention of the plausible approach to be adapted to overcome these myriad barriers. This

¹¹ SMART – Specific, Measureable, Achievable, Realistic and Time-bound

analysis and a well developed results framework provided well defined route map that were incorporated in design of BEEP. This greatly helped the project to stay on course and meet the target.

3.1.4 Planned Stakeholder Participation

BEEP's planned stakeholder participation activities were holistic and well thought-out to include all levels of stakeholders from policy makers to end-users. MoCUD, MoEGD and MoE, and other central government agencies worked with the Project to improve their respective policies and regulations. All of these stakeholders were represented during the June 2010 Inception Consultation Workshop where they shared their experiences, perceptions and opinions on the accelerated development of the sector. This design approach was excellent representing a holistic approach to stakeholder engagement from regulators to financiers, suppliers and installation personnel.

The stakeholder participation continued in various activities of the project creating synergizes with BEEP. As BEEP worked towards its one of its prime goal of reducing the barriers, the stakeholders' assisted in reviewing and updating BCNS, offering comments and providing acceptance to the final draft. Some stakeholders received training from BEEP to offer their respective services/products in the market. Stakeholder participation in BEEP continued all through and can be highlighted as another major factor supporting project's sustainability.

3.1.5 Replication Approach

The following activities of BEEP Project had a sound replication approach:

- Updating and developing of more than 60 BCNS, standards, harmonization of Building Codes with those of International Standards Organization has helped the construction industry and boosted the confidence of professionals and the government. This outcome has helped the project to reduce certain key technical barrier identified in the ProDoc that were considered main factors to implementation of energy efficiency in the building sector;
- Enhancing building energy efficiency awareness and promotion in Ulaanbaatar and other major cities where there are no energy efficient buildings and houses;
- Focusing on the dissemination of current BEEP support in urban areas with demonstration projects and information dissemination using BEEP web portal;
- Facilitating cooperation amongst various stakeholders during seminars, workshops and other public events.

3.1.6 UNDP Comparative Advantage

The strength of UNDPs involvement to implement BEEP is its long-term involvement in providing technical assistance for energy efficiency development to developing countries with a focus on environment and energy security. UNDP Mongolia having implemented three projects on energy and environment during the past decade, it has developed a strong relationship with the Government of Mongolia. Further, it has a unique experience in developing local capacity and effectively working with multiple stakeholders from public and private sectors, technical experts, and other international

bi- and multi-lateral organizations. UNDP's attributes include a multi-dimensional development perspective, and the ability to address cross-sectoral issues and inclusiveness in building local capacity.

3.1.7 Linkages between BEEP and Other Interventions within the Sector

In addition to BEEP, there were six other projects on the themes of air quality improvement and energy efficiency. Two projects were of Government of Mongolia aiming to develop and increase the use of smokeless fuel to reduce air pollution in ger area, and to provide apartments, houses and access to services in urban area. The remaining four projects are supported by international development agencies such as GIZ, Asian Development Bank. These projects have been aiming at providing cost- and energy- efficient affordable housing, improving ger insulation and improving insulation of more than 400 panel buildings in Ulaanbaatar. Though there are no direct inter-linkages between these projects, many of these would derive benefit from the work done by BEEP which has helped to significantly reduce key technical barriers to energy efficiency in the building sector.

3.1.8 Management Arrangements

The BEEP is a nationally implemented project (NEX) with MoCUD as an implementing partner where it has control over Project operations that were managed under a Project Implementation Unit (PIU) from its office location in Ulaanbaatar. The Project's National Project Director (NPD) was appointed by MoCUD, and assumed responsibility for overall coordination, supervision, monitoring and clearance of the detailed work plan.

For supervising and guiding the project implementation, a Project Steering Committee (PSC) was established with the participation of the MoCUD, UNDP Mongolia, Xac Bank, MoEGD, State Specialized Inspection Agency, Mongolian Agency for Standardization and Metrology, Construction and Development Centre, School of Civil Engineering and Architecture Mongolian University of Science and Technology and PIU staff. The responsibilities of the PSC were to:

- Provide the necessary political support to the project implementation;
- Provide guidance and direction to the project and provide feedback on project work plans and progress reports;
- Mobilize cost-sharing and follow-up financing;
- Approve main project outputs;
- Assure coordination between the project and other ongoing government activities and programmes;
- Assure all stakeholders are appropriately involved in the project planning and management;
- Facilitate linkages with high-level decision-making.

A Project Implementation Unit was established to oversee the day-to-day management of the Project, led by a full time National Project Manager (NPM) and supported by professional staff and an administrative assistant. The PIU's responsibility included preparation of plans and monitoring reports as per UNDP-GEF requirements.

The UNDP Country Office had the responsibility of monitoring the progress towards intended results through regular contacts with the PIU, progress monitoring visits on implementation matters and problem solving. UNDP also provided administrative support upon request and ensured financial oversight.

At the time of start of project there were no government frameworks were in place to support building energy efficiency. The BEEP, through its various activities and work with a cross section of stakeholders such as architects, engineers, products manufacturer raised awareness especially among the policy makers in MoCUD and MoEGD about the importance of energy efficiency. While MoCUD made compliance to BCNS a necessary requirement, MoEGD established a working group to develop regulation on Economic Incentives for Energy Efficiency and Green Buildings. The PIU staff were members of the working group and provided the necessary technical inputs. The regulation was reviewed jointly by the MoEGD and MoCUD in December 2013 before its enforcement sometime in 2014.

The BEEP PIU also made important contribution to the Ministry of Energy in drafting the Energy Conservation Law. The law covers building and industrial sectors besides power sector, and will have provision for financial incentive which will be provided for implementing energy efficiency.

3.2 Project Implementation

The project has been greatly assisted by a clear project results framework which has very well laid out project outcomes, indicators that are SMART, and quantifiable. Also, the barrier analysis carried during the project design phase provides a good background and context for the project to work. UNDP CO office has been creative in obtaining collaboration support of partners such as MCA, GIZ (although it did not materialize), KEMCO and Xac Bank, in addition to the GEF grant. The efforts of PIU paid off with all the targets associated with technical assistance and training being met and over-achieved in many cases. The project has been successful in getting full support and attention of various ministries, government agencies and academic institution.

The clearly defined results framework has helped the Project achieve its targets with the development of revised BCNS, and beginning of new construction of houses and apartment buildings compliant with new BCNS, and increased awareness and understanding (although there is no indicator) among various stakeholders on the importance of energy efficient building in context of improving air quality in Ulaanbaatar, and in national context of reducing the trend of Mongolia's share in global GHG emissions. During the entire period of 4½ years the project remained highly relevant.

3.2.1 Adaptive Management

Since the commencement of BEEP in July 2009 with co-financing from KEMCO and as full-fledged project in January 2010 with GEF grant, the Project had to adapt to changing circumstances resulting in a number of adaptive management measures being undertaken by the PIU and UNDP CO. Beginning July 2009 the implementation of BEEP could be divided into three phases:

- The first phase in 2009 lasted for about one year in which project activities started with the co-financing support of the KEMCO prior to GEF funding commitment;

- The second phase in 2010 is the period when project began functioning as a NEX with the signing of ProDoc in January 2010 and followed all the GEF reporting requirements;
- The third phase in 2012 is identified with the disassociation with Xac Bank for which the project provided funds for risk sharing. The withdrawal was as result of the directive UNDP country office received from the UNDP headquarters. The project team, nevertheless continued informal interaction with the Xac bank staff and provided technical support for due diligence on the energy efficiency aspect of new houses based on which the bank provided mortgage in 2013.

Most of the adaptive management decisions were made at PSC meetings where Project implementation issues were discussed, and action taken to address the outcome of implementation.

3.2.2 Partnership Arrangements and Stakeholders Interaction

BEEP fostered a number of strategic partnership arrangements with several of the stakeholders mentioned below. The relationships helped to widen and spread across the subject of building energy efficiency, and also brought together a variety of professionals and local manufacturers who are important players in continuing and expanding the building energy efficiency work beyond BEEP.

- Millennium Challenge Account – UNDP signed an MOU with Millennium Challenge Account as its activities targeted at 'ger' overlapped with BEEP and provided synergies. The involvement of MCA with BEEP is being noted as critical to the success of extending the home-loan to ger family (through Xac Bank), and overall demonstration of EE homes in ger areas.
- Xac Bank – UNDP signed an MOU to act as a stakeholder in the BEEP project and provide co-financing of USD 2million in home loans. The involvement of private sector bank, in spite of various challenges and its commitment to support energy efficiency in building sector added an important dimension to the project's sustainability.
- Energy Efficient Centres (UB, Erdenet, Darkhan) – Received capacity building support from BEEP in the form of training on various aspects and supply of test instruments to highlight the importance of energy efficiency in buildings. These centres are functioning independently with support of BEEP and providing advisory functions.
- Mongolian Association of Civil Engineers – an importance stakeholder which brought together several architects and construction sector professional to various trainings programs organized by BEEP. Trainings was one of the main component of the project and critical to local capacity building effort in which MACE played a very important role. BEEP also built the capacity of MACE which allows its staff to provide training and consulting services at nominal cost for constructing energy efficient home, independent of BEEP. Thus it is contributing to project's sustainability.
- Mongolian Windows and Doors Manufacturers' – assisted BEEP in revising two BCNS relating to windows as the old standards were barrier to introduction of new types of energy saving windows. The association with 60 members worked with BEEP and test facility as MUST to ensure the compliance of new windows

and glazing with current BCNS. The association also worked with BEEP to develop and launch energy label for windows which will be used before the closing of BEEP project.

- Building Material Manufacturers' Association of Mongolia – BEEP engaged the local manufacturers of building material. Through them BEEP also addressed the barrier of insulating materials by using Extruded Poly-styrene, Expandable Poly-styrene, and Rock-wool in different demonstration activities. BEEP also took initiative to develop a voluntary labeling scheme which informs the buyers about the insulation materials' compliance with new BCNS.
- Mongolian University of Science and Technology (MUST) – The Building Energy Efficiency Centre at MUST received financial support from BEEP to procure testing equipment and instruments for carrying out energy audits. The centre has tested building materials and products of about 30 companies, conducted 160 thermal performance audits. The centre also provides training to construction specialists on offers advice on building material usage. The staff of MUST also worked with BEEP and developed training materials and modules, seven technical books on HVAC and software for calculating building thermal performance.
- Barilga MN. Journal – Several articles and technical papers of PIU staff were published in the journal, which helped the process of information dissemination and awareness creation.
- ATA Construction Company, Pyramid Industries, Burkhant Khus LLC, Archsys LLC, Icon LLC, Khaikhan Bar LLC, Sart Sharaid LLC, Tsast Suvraga LLC, Urkh LLC, Janjin Urgee LLC, Super Assist LLC, Khukh Mongol LLC, Gereen Bairshil LLC, New Vorm, and Mongol Bazalt are the small construction companies and local manufacturing firms that worked with BEEP in construction of EE small houses, updating BCNS and developing labels for insulation materials.
- Consulting organizations and individual technical experts who have assisted in the various components of BEEP in developing designs of houses, formulation of policy measures, capacity building and training of stakeholders, market assessments, and awareness raising workshops.

3.2.3 Feedback from M&E Activities Used for Adaptive Management

There is evidence that M&E activities were discussed at PSC meetings and used as the primary means of adaptively managing BEEP and to overcome technical and administrative problems. Over 4 year of GEF support to BEEP, 5 PSC meetings were held, providing management inputs. Issues were raised in various projects reports such as PIRs, APRs, mid-term review and were discussed during these meetings and acted upon.

3.2.4 Project Finance

A summary of the BEEP Project expenditures is provided in Table 2. The expenditures provided to the Evaluation Team are from UNDP's "Combined Delivery Reports" (CDRs), while the annual planned expenditures are based on the Annual Work Plans. The Project expenditures are as of December 31, 2013. The entire planned budget has been utilized by end of project and there are no funds left.

The table also shows the budget utilization level by the project activities and by the year as well. The expenditures towards the technical energy audits conducted by PIU as a part of capacity building, training and verification of energy savings in BCNS compliant houses and apartment were charged to the M&E budget line item. As a result the actual disbursements during the first two years of the project on M&E were high, which is also the main reason behind this component overshooting its original budget.

BEEP Co-financing details are presented on Table 3. The co-financing from the GoM amounted to USD 52,707 slightly above the USD50,000 pledged in the ProDoc. These funds were mainly utilized for the components 1 and 2 of the Project towards overcoming the barriers to building energy efficiency. The loan disbursed by Xac bank for 18 mortgages was USD 126,000. The co-financing figure could have been higher, however the stringent requirements of the MOU between UNDP and Xac Bank in addition to the challenges faced by the bank in attracting the interested clients who cited high cost of energy efficient house and high interest rate of mortgage were some of the key factors that restricted the disbursement by the bank. While GIZ has committed USD 150,000 for in-kind support to BEEP through its own project but due to the delayed start of BEEP this co-financing could not be utilized.

On the positive side, the project was successful in obtaining financial support of estimated USD 56,000 from Millennium Challenge Account towards the construction of energy efficient houses in the ger area. Additionally, Xac Bank continued its effort and expanded the portfolio of 'green loans' to include small and medium enterprises'. It provided loans worth USD 1million to SME engaged in manufacturing and production of energy efficient windows complying with revised BCNS. The Xac Bank's loan to SME and house mortgages aggregating to USD 1.126 million mobilized USD 1.03 million as equity contribution of the borrowers. The reviewers view this as an important offshoot of the project to catalyze the market and overcome supply chain issues and nurture the nascent building energy efficiency market.

Table 2: Project Budget and Expenditures for 2010-2013 (in USD as of December 31, 2013)

Project Activities	2009	2010	2011	2012	2013	Total Disbursed	Total Planned for Project	Utilized
Outcome 1: EE provisions of Mongolian BCNS updated and strengthened	81,959	130,631	159,543	142,473	17,493	532,100	532,100	100%
Outcome 2: Training and Awareness building	58,708	91,751	101,769	59,617	116,155	428,000	428,000	100%
Outcome 3: Facilitating Access to Energy Efficiency financing	9,211	3,656	-	27,262	-	40,129	155,500	26%
Monitoring and Evaluation	128,277	86,475	1,653	-	68,298	284,703	169,332	168%
Project Management	95,655	73,531	73,000	80,211	56,003	378,400	378,400	100%
Total Amount Spent(Actual)	373,811	386,043	335,965	309,564	257,949	1,663,332	1,663,332	100%
Total (Cumulative Actual)	373,811	759,854	1,095,819	1,405,383	1,663,332			
Annual Planned Disbursement	496,400	426,980	412,298	361,584	215,389			
% Expended of Planned Disbursement	75%	90%	81%	86%	120%			

Note: GEF funding was not utilized for project activities carried for Outcome 3.

**Table 3: Commitment, expenditure, balance left by different donors for BEEP project
(as of December 31, 2013)**

Co-financing (type/source)	UNDP own financing (US\$)		Government of Mongolia (US\$)		Partner Agency (US\$)		Total (mill. US\$)	
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
Grants	975,000	975,000					975,000	975,000
TRAC Funds	300,000	300,000					300,000	300,000
Loans/Concessions					2,000,000	1,126,000	2,000,000	1,126,000
In-kind support			50,000	52,707			50,000	52,707
Others:								
• KEMCO					340,000	388,333	340,000	388,333
• GIZ					150,000	-	150,000	-
• MCA					Nil	56,000	Nil	56,000
Totals	1,275,000	1,275,000	50,000	52,707	2,490,000	1,570,333	3,815,000	2,898,040

3.2.5 M&E Design at Entry and Implementation

Ratings of the Project's Monitoring and Evaluation system¹² are as follows:

- M&E design at entry – 5;
- M&E plan during implementation – 5;

The design of the Project's M&E activities was satisfactory based on the Project Results Framework containing several quantitative indicators that were measurable. As such, it was rather straightforward to quantify the effectiveness of the project outcomes since the targets and indicators in the results framework were quite clear. More importantly, the vast and rapidly growing building construction market has shown a shift in complying with the revised BCNS in residential apartments and private house construction. This achievement through lowering of the technical barriers provides a good indicator that the Project's M&E activities were effective in improving the capacity of MoCUD and its agencies, Centre for Standardization and Measurement as well as private construction companies and private sector bank.

The implementation of the M&E plan was satisfactory based on PIU's reports and the review of PIRs. The project was monitored through the following M& E activities starting with an Inception Workshop and Report in June 2010:

- Quarterly Periodic status/ progress reports
- Annual Project Implementation reports
- Mid-term evaluation
- Annual financial audits
- Annual meetings of the Project Board
- Field visits by the UNDP PO
- Project review and field visit by UNDP GEF RTA
- Terminal evaluation

Regular monitoring and evaluation of the project activities have helped it to stay on course and budget while being able to accomplish the targets within the original overall time frame. The ratings provided to the project in PIR remained consistent with the ratings provide in mid-term review and in the terminal evaluation. The expenditures towards the technical energy audits conducted by PIU as a part of capacity building, training and verification of energy savings in BCNS compliant houses and apartment were charged to the M&E budget line item. As a result the actual disbursements during the first two years of the project on M&E were high, which is also the main reason behind this component overshooting its original budget.

3.2.6 UNDP and Executing Partner Performance

Ratings of UNDP (Implementing Agency) and the MoCUD (Executing Agency) performance¹³ are as follows:

¹² 6 = HS or Highly Satisfactory: There were no shortcomings; 5 = S or Satisfactory: There were minor shortcomings, 4 = MS or Moderately Satisfactory: There were moderate shortcomings;

3 = MU or Moderately Unsatisfactory: There were significant shortcomings;

2 = U or Unsatisfactory: There were major shortcomings; 1 = HU or Highly Unsatisfactory.

¹³ Ibid

- Quality of UNDP Implementation – 5;
- Quality of Execution – MoCUD – 5;
- Overall Quality of Implementation/Execution – 5.

These satisfactory ratings are based on the evidence provided by the Project Board (Project Steering Committee) meeting minutes on the discussions and approval for actions by MoCUD and UNDP officers. The other reports which provided feedback on quality of execution were the mid-term review and Project Implementation Reports for 2011, 2012 and 2013. There was no PIR that provides a record of activities carried out and accomplishments for the first year of the project (2010), however this does not impact overall quality of project execution, as the required corrective actions were taken (and recorded) in the second and third year of the project.

UNDP PO held regular meetings with National Project Manager and visited the PIU to monitor the work, discuss the progress and plans for the upcoming month. Regular visits are made by the PO to beneficiary households once a quarter, especially during the construction season. Field visit by the PO was made to the Darkhan City ECC and construction site of EE houses. PO also attends and opens every workshop and training organized by the BEEP.

The PIU through NPM maintained contact with the NPD and met on ad-hoc basis. Project Steering Committee meetings were organized annually and overall five meetings were held. The project inception workshop was held in June 2010 in which several key stakeholders participated and provided feedback to project's goals and objectives. In 2012 the mid-term review of the project was carried out.

The withdrawal of UNDP financial support (TRAC funds) from component 3 on the advice of UNDP headquarters, did however effect the execution of activities under this particular component. The withdrawal was made in the third year of the project. By that time major efforts on capacity building, training, and financing had been expended by the project which brought out positive results. The project fell short of achieving the targeted co-financing as the MOU had to be terminated and there were no formal interaction between UNDP and the bank.

3.3 Project Results

Assessment of BEEP achievements and shortcomings are provided in this section against the 2009 Project results framework. Each outcome was evaluated against individual criterion of:

- *Relevance* – the extent to which the outcome is suited to local and national development priorities and organizational policies, including changes over time;
- *Effectiveness* – the extent to which an objective was achieved or how likely it is to be achieved;
- *Efficiency* – the extent to which results were delivered with the least costly resources possible.

The Project outcomes were rated based on the following scale:

- *6: Highly Satisfactory (HS):* The project has no shortcomings in the achievement of its objectives;

- 5: *Satisfactory (S)*: The project has minor shortcomings in the achievement of its objectives;
- 4: *Moderately Satisfactory (MS)*: The project has moderate shortcomings in the achievement of its objectives;
- 3: *Moderately Unsatisfactory (MU)*: The project has significant shortcomings in the achievement of its objectives;
- 2: *Unsatisfactory (U)*: The project has major shortcomings in the achievement of its objectives;
- 1: *Highly Unsatisfactory (HU)*: The project has severe shortcomings in the achievement of its objectives.

3.3.1 Overall Results

Overall Project Objective: Reduction in the annual growth rate of GHG emissions from the buildings sector in Mongolia by improving the energy utilization efficiency in new construction in the residential and commercial buildings sector.

<p>Intended End of Project (EOP) Outcome: Change in specific energy consumption in buildings (kWh/m²/yr)</p> <ul style="list-style-type: none"> ⇒ Baseline existing construction sector buildings - 350 ⇒ New construction buildings that do not fully comply with BCNS EE requirements - 215; ⇒ New buildings that fully comply with existing BCNS EE requirements - 175 ⇒ Private houses – 500
<p>Actual EOP Outcome:</p> <ul style="list-style-type: none"> ⇒ <i>A satisfactory outcome has been achieved for reducing the specific energy consumption from 215 to 165 kWh/m²/yr in the new construction sector buildings which are not fully complying with the new BCNS requirements.</i> ⇒ <i>A satisfactory outcome has been achieved by project's contribution in reducing the specific energy consumption from 175 to 155 kWh/m²/yr in buildings that fully comply with the new EE BCNS requirements.</i> ⇒ <i>A highly satisfactory outcome has been achieved in the contribution made by the project in reducing the specific energy consumption from 500 to 247 kWh/m²/yr in private house that fully comply with the exiting EE BCNS requirement.</i>

Overall, the project has been successful in raising the awareness and availability of quality knowledge products on energy efficiency building design and construction that did not exist prior to Project. It has revised 60 BCNS and addressed the availability of key building material, developed designs of energy efficient house leading to the successful demonstration of individual houses built as per revised BCNS. Although at a limited level, but project succeeded in motivating 'Ger dwellers' to invest and move into such houses. A number of such house owners are highly satisfied with their decision to invest in a home which is far more comfortable than 'ger' and has helped them to reduce fuel consumption by 50%.

BEEP and its project partners, ECC at MUST and other regional centers have carried out energy audits in single family houses and apartments that comply with new EE BCNS. The project has recorded actual energy consumption figures from these audits.

During the 4½-year life of BEEP, 3,314 tons of CO₂ equivalent greenhouse gas emissions were avoided as a result of reduced energy required in 223 homes and 1919

apartments in Ulaanbaatar that have been built as per direct support of BEEP and occupied in 2013.

Table 4 summarizes the GHG reduction estimates (using GEF guidelines) that were generated during BEEP.

Table 4: Summary of CO₂ Reductions from the Project

Direct emission reduction, tons of CO ₂ (t CO ₂) over a 20 year period	
Individual homes	14,450
Residential Apartments	51,820
Total direct emission reduction, t CO₂	66,270
Total direct post-project emission reduction, t CO₂ (10 years)	0
Indirect emission reduction, t CO ₂	
Indirect bottom-up emission reductions, t CO₂	441,007
Indirect top-down emission reduction, t CO₂	273,275

Direct emission reductions were based on the following assumptions:

- Since the updating of BCNS by 2011 all the new building constructions from that year onwards have followed the revised standards and norms. These buildings have better energy utilization efficiency.
- Out of 6,387 new apartments (average floor area of 50 square meters) that were built as per new BCNS, about 50% received direct support from BEEP. It is estimated that 25% of 6,387 were occupied in 2013 and contributed to reduced energy consumption and GHG emissions. Similarly, it is assumed that out of all 8,965 apartments that will be available in 2014 about 60% will get occupied in the same year and contribute to energy savings from 2014 onwards. A conservative estimated annual growth rate of 10% has been considered for new energy efficient apartments from 2015 onwards.
- Energy savings due to reduced coal consumption in 223 new individual houses that were built with technical assistance of BEEP and as per new BCNS. People who shifted from ger to energy efficient home reported reduction in their annual coal consumption by 50% for space heating.

Post-project direct emission reduction is not calculated since there is no post-project GEF funding for the building constructions sector of Mongolia.

Indirect emission reductions consist of:

- Bottom up reductions based on a 20-year life of energy efficient home and apartments, and a replication factor of 3 for market transformation; and
- Top-down reductions based on a 60% causality factor, since at present the regulatory measures are to a large extent being followed voluntarily.

3.3.2 Outcome 1: Energy Efficiency provisions of the Mongolian BCNS updated and Strengthened

Intended Outcome 1:

- ⇒ New energy efficiency standards developed covering – (i) building energy efficiency performance modelling; (ii) methods for determining the total thermal resistance of parts of building; (iii) Thermo-technics of construction materials; (iv) methods of determining the thermal resistance of insulation materials; (v) space heating system energy efficiency; (vi) domestic hot-water system energy efficiency; (vii) thermal resistance of external walls; (viii) thermal resistance of ground floors, basements, and foundations; (ix) thermal resistance of roofs and insulated ceilings; (x) thermal resistance of windows; (xi) Air tightness, leakage and ventilation; (xii) energy efficient lighting system
- ⇒ Government officials trained in the operation and enforcement of the new BCNS energy efficiency provisions
- ⇒ 85% of newly constructed buildings meet the update BCNS energy efficiency requirements by 2015
- ⇒ Building energy monitoring and reporting system developed and implemented

Actual Outcome 1:

- ⇒ A highly satisfactory outcome has been achieved with the development of 12 new energy efficiency standards covering the topics and areas mentioned above. This includes three new building norms and updating of three existing building norms to incorporate various aspects of efficient utilization of energy. As many building codes and standards have cross-reference with other building construction codes and norms, the BEEP altogether developed and updated 60 new standards on building energy efficiency standards, of these 22 new standards are under review by the technical committee of GoM.
- ⇒ A highly satisfactory outcome has been achieved in the project's ability to convince the local government agencies for enforcement of the new BCNSs which started in 2012. All new public and apartment building design drawings are required to be in compliance with the new standards and have to be approved by the Administration for Land Affairs, Construction, Geodesy, and Cartography.
- ⇒ A highly satisfactory outcome has been achieved with 2 trainings aimed to introduce the newly approved building norms and standards within the project and operation and enforcement procedures of norms were organized for relevant government officials at the Ministry of Road, Transportation, Construction and Urban Development, Administration of Land Affairs, Construction, Geodesy and Cartography and state inspectors from the General Agency for Specialized Inspection, covering in total about 90 people. Also, about 100 professionals/officers of local Departments of Land affairs, Construction, Urban development, Local Inspection Agencies, construction companies from 8 provinces of Dundgobi, Umnogobi, Dornod, Sukhbaatar, Khentii, Khovd, Uvs, and Bayan-Ulgii were exposed to the newly developed BCNSs and enforcement mechanism from training workshops that were conducted in three regional centers.
- ⇒ A satisfactory outcome has been achieved in the development of a building energy monitoring and reporting system.

Rating: *relevance:* 6
 effectiveness: 6
 efficiency: 5
 overall rating: 5.7

The purpose of this component was to provide the necessary technical assistance to overcome the barriers in the building construction sector. These barriers were identified as complex and outdated BCNS developed in the 1960s of which approximately 520 BCNS were meant for the building sectors. These BCNS were complex, written in Russian and referred to construction materials which are no longer in use. The other barriers were non-availability of key insulation materials; lack of knowledge about Energy Efficiency in the building construction sector which is rapidly growing, lack of compliance and certification with the old BCNS.

The PIU of BEEP diligently worked and produced 60 new BCNS which includes 3 new norms for energy efficiency in buildings; 12 books and handouts. The government agencies, academic institutions, construction companies; product suppliers' capacity was built. The project worked very closely with the government ministries and various agencies including private companies and professionals in building sector of Mongolia to enhance the awareness of 'Green home and Green Buildings'.

BEEP has also addressed the barrier of insulating material by engaging local manufacturing companies that produce Extruded Poly-styrene (EPS), Expandable Poly-styrene (XPS), and Rock-wool. There are 20 companies in Mongolia which manufacture EPS, three that manufacture XPS and two that manufacture rock-wool which are used as insulation materials. BEEP also took initiative to develop a labeling scheme which informed the buyers about the insulation materials' compliance with new BCNS. The project involved BMMAM in this innovative information dissemination exercise. Currently there are three firms that manufacture three different types of BCNS compliant insulation material that are mentioned above.

Further, the project's ability to convince the MoCUD and CDC to approve the building construction designs and drawings that followed new EE BCNS can be cited as another important achievement of BEEP, which will change the course of building construction sector by introducing the concept of energy efficiency. This also paves the way for green building industry in Mongolia.

3.3.3 Outcome 2: Training and Awareness Program

Intended Outcome 2:

- ⇒ 4 new building EE technologies supported New building EE technologies supported and necessary training provided
- ⇒ 4 existing Energy Conservation Centers in UB, Darkhan and Erdenet supported
- ⇒ 3 new regional centre EE advisory services in Dalanzadgad, Dornod and Khovd introduced and operating effectively
- ⇒ 12 training courses completed by end of project
- ⇒ 500 trainees trained in building EE technologies by end of project
- ⇒ 200 trainees providing building EE services by end of project
- ⇒ 6 publicity campaigns completed by end of project
- ⇒ 9,000 buildings applying EE by 2012

Actual Outcome 2:

- ⇒ A highly satisfactory outcome has been achieved in technological studies covering the investigation of potential new environmentally friendly EE construction technologies available in local market, its design solution, durability, weather protection, EE engineering aspects was carried out in cooperation with International and National consultants. The 4 EE housing technologies introduced included - Insulated Masonry; Timber Framed, Structures; Insulated Panels and Insulated concrete. In addition three technology manuals were published and disseminated to the Energy Conservation Centers (ECC), and libraries of professional institutions such as the National Library of Mongolia, Library at the Mongolian University of Science and Technology, Library at the Land affairs, Construction, Geodesy and Cartography Administration, universities and other interested parties. Energy Efficient house designs with size between approximately 30 m² and 90 m² and envelopes that include Insulated masonry, Timber Framed, and Structural insulated panel were developed and offered to interested households free of charge. EE houses have been constructed in ger districts according to these designs. Further, a manual on "Technology of insulated concrete form" was published and distributed to Energy Conservation Centers, libraries of related educational and training institutions. These were also placed on BEEP web site to download for free. Although all planned activities were completed two additional new technologies and housing designs were introduced and a handbook on housing design has been developed. A TV program covering Light Steel-framed Housing Technology was developed and broadcasted for awareness creation.
- ⇒ A satisfactory outcome has been achieved in strengthening the operation of Energy Conservation Centre (ECC) in Ulaanbaatar, Darkhan and Erdenet through project trainings and workshops. ECCs were provided with three new equipments for testing and certifying thermal performance of buildings, namely the thermal image analyzer, heat flow and thermal resistance measuring equipment. Several ECC staffs were provided with trainings on operation and maintenance of these equipments. BEEP also cooperated with ECC at the MUST which procured "Window thermal resistance measuring set" and tested 10 packages of windows. In collaboration with ECC at Darkhan a training workshop was organized on timber-frame housing technologies for interested public involving 25 individuals. The project provided support all 4 existing ECCs which included conduct of training courses on EE technologies, energy audits in 60 private and public houses and thermal performance tests for buildings;
- ⇒ A satisfactory outcome has been achieved in providing training to the Local Land affairs, Construction and Urban development departments of the Khovd, Dornod and Umnogobi. These agencies were provided with testing equipments for building energy auditing and on-the-job building EE training. More than 60 participants attended representing local construction companies.
- ⇒ A satisfactory outcome has been achieved in 2 trainings covering in total almost construction sector professionals, including design and construction engineers, were organized within the project. Weekly trainings were organized on a regular basis for interested households through ECC.s at Ulaanbaatar, Darkhan and Erdenet cities. In 2012, more than 250 households received training on EE housing technology and Green Building Programm conducted by PIU. Training of trainers on Building EE technology was organized and 30 individuals attended from EECs, and regional centers.
- ⇒ A highly satisfactory outcome has been achieved in training for building energy efficiency services. Overall more than 400 professionals were trained. In 2011 250 construction sector professionals received the training in building EE technologies. In

2012-2013 another 186 professionals mainly HVAC engineers and 84 architects participated in EE technology trainings and were provided with 8 different kinds of handbooks on EE technology.;

- ⇒ A highly satisfactory outcome has been achieved on 6 publicity campaigns completed by end of project. The project used various means to raise public awareness on the importance of energy efficiency, short TV programme, newspaper articles and interviews, web-based information. The project team participated in three exhibitions on housing & green housing technology in which more than 5,000 visitors received handouts. Additionally a series of TV publicity campaigns on EE building technologies and was broadcast several times;
- ⇒ A moderately satisfactory outcome has been achieved for number of buildings applying for energy efficiency by 2012. About 3100 buildings that received approval from the government for construction were in compliance with the new BCNSs.

Rating: *relevance:* 6
 effectiveness: 5
 efficiency: 5
 overall rating: 5.3

The purpose of this component was to provide training to the stakeholders and increase the general awareness about the energy efficiency in the building sector. The component was separate from the project component 3, which has capacity building and training activities targeted at banking sector officials.

During the course of project more than 30 training programmes were conducted in which more than 2200 persons participated. Awareness of 'energy efficiency' potential in building sector; steps required to develop and accelerate market have been raised among key stakeholders including GoM policymakers, building sector professionals construction and building material supply companies. Awareness creation work has been carried out using various medium such as website, publication in local journals and through TV programs. The knowledge products, regular trainings have increased the awareness of the sector professionals and government officials on the issue and actions required towards conserving energy.

3.3.4 Outcome 3: Access to Energy Efficiency Financing facilitated

Intended Outcome 3:

- ⇒ At least 4 training events and workshops conducted for Xac Bank and other FI's loan officers on how to assess and conduct due diligence of energy efficiency investments
- ⇒ At least 100 loans provided to BEE projects by end of PY4
- ⇒ USD2M invested by banks/FIs in building EE and reinvested in building EE as loans repaid by 2013FIs
- ⇒ Workshops conducted to raise awareness and build the capacity of commercial, government and residential property owners to access financing for energy efficiency improvements

Actual Outcome 3:

- ⇒ A satisfactory outcome has been achieved in providing training courses for bank and financial institution staff. The project organized two trainings in cooperation with XacBank and the Mongolian Mortgage Corporation on EE housing financing in which

30 banking sector specialists and 30 loan officers participated. In 2012, two trainings were conducted for loan officers of branches of Xac Bank. The bank distributed 18 mortgages in cooperation with BEEP and has an 'Eco mortgage product' which is an offshoot of working with the project. It is aimed at SME which are involved in production or manufacturing of EE products for building construction sector. Xac Bank has long term commitment to work on building energy efficiency through its Eco Banking Department which has a staff strength of 10 persons;

- ⇒ A satisfactory outcome has been achieved for number of financing schemes lending to building EE projects. In 2011, 10 households benefitted from Xac Bank loan, and 60 others from the Savings Bank of Mongolia, while in 2012, 14 households received housing loans from Xac Bank and 60 from savings bank of Mongolia. Although the formal relationship between UNDP and Xac Bank was terminated, the bank has continued lending for energy efficient house. In 2013, 42 loans were provided by Xac Bank for energy efficient houses for which BEEP contributed to the technical evaluation and verification of energy efficiency level of houses;
- ⇒ A satisfactory outcome has been achieved on Volume of investments in building EE projects funded by banks/FIs. Xac Bank provided additional housing loans of approximately USD 126,000 to households that received direct support from the project. The XAC bank offers an eco loan for EE home and has a mortgage product for SME manufacturing EE products. It has provided mortgage to nine SME aggregating to USD 1million;
- ⇒ Workshops were conducted to raise awareness and build the capacity of construction sector professionals, engineers, technical workers and government personnel in the sphere of energy efficiency. A training package covering policy, planning, and technology and construction aspects of different building technologies was developed and delivered to relevant parties. Weekly trainings were conducted by the project in 2010 that engaged about 1,400 households. In 2011, 60 architects, design engineers benefited from the Timber framed housing training organized in cooperation with the Canadian wooden framed housing technology project. In 2013, trainings were provided to 456 individual households and public campaign were held to provide information on EE housing loans;

Rating: *relevance:* 5
 effectiveness: 5
 efficiency: 5
 overall rating: 5

The purpose of the component was to provide the necessary capacity building support the banking sector professionals on the concept and nuance of building energy efficiency and help them to consider energy efficiency as an important parameter while reviewing the home loans. To a large extent, the Project made good progress on organizing training for banking sector professionals and loan officers. At the closure of relationship between UNDP and Xac Bank, 18 loans were approved by the bank and 16 loans were disbursed aggregating to USD 126,000. The final number undershot the goals set by both sides and the target defined in the BEEP Project Results Framework. However, the experience gained from the collaboration has opened a new territory for XacBank and provided the necessary ground work for future success of the banks in the area of energy efficient housing loans.

The bank's USD 1 million 'green loans' to SME involved in manufacturing of vacuum sealed windows demonstrates its long term commitment to Mongolia's building sector. Evaluators considered this as important contribution to encourage local business to manufacture and produce goods compliant to BCNS which are required for building sectors. Local manufacturing is also considered important as it has several *multiplier effects* in terms of employment generation, reducing the cost of products (as compared to importing) and ensuring long-term availability of products throughout the country, which would greatly help to spread the benefits of energy conservation.

The Project through the PIU provided sufficient exposure, training and technical materials to the professional, government officials and households on ways to improve efficiency of energy use in home, through use of building codes, norms and materials. The project was made good start on training and capacity building which needs to be continued on a regular basis after the project ends. A major issue with the loan disbursement mentioned was the high cost of energy efficient houses (single family unit) and high banks interest rate.

3.3.5 Overall Evaluation of Project

The overall rating of project results is Satisfactory based on the following outcomes:

- Overall programme goals were met, and for component 1 and 2, the accomplishments of BEEP exceeded the targets defined in project results framework. The project made significant contribution to reduce certain main technical barriers (that were identified in the barrier analysis) for making energy efficiency in building sector a high priority. Based on the outcome of the audits conducted by PIU in small houses and apartments constructed following the BCNS, the project managed to achieve its overall target of reducing the specific energy consumption. The GHG tracking tool projects plausible emissions reduction over a ten-year period and indicate a lowering of overall emissions from the buildings sector, which is much higher than the original estimates arrived at the time of project start in 2010.
- The energy saving figures are based on the actual field measurement data from thermal audits conducted in home designed by PMU. The energy saved measured in the newly designed houses using construction materials and insulation approved under the revised BCNS, met or exceeded the targets. Also, the number of house (apartments) being constructed and being made available to people is much higher than originally estimated in the Project document.
- The project did very well in bringing together key policy and decision makers as well as officials from, academic institutions, professionals such as designers, construction engineers, building material manufacturing companies and their associations, government agencies, to raise awareness, understanding and importance of building energy efficiency in the local context to overcome investment challenges ;
- The Project generated useful information products including an informative BEEP website (<http://www.beep.mn>) that provides technical information on new design of small size home (area up to 90m²); promotional materials, several articles in the "barilga.mn" journal, and TV clips. These knowledge products and services helped to raise awareness of building energy efficiency systems to a wide range of stakeholders using the Project's structured approach of technical assistance and training;

- Project has brought together other key stakeholders such as the house owners, potential buyers of new apartments, private construction companies and private bank, to raise awareness and remove the identified barriers. The commitment of one of the house construction company to build new houses as per designs developed by BEEP and revised BCNS, and Xac Bank's commitment to provide loan for energy efficient house, are important steps towards catalyzing EE into new construction in the housing sector and ensuring sustainability after the end of project in 2013;
- BEEP has provided very good set of studies, reference materials, awareness building and advisory support for developing and updating BCNS for buildings and houses to conserve energy. The technical support to the Ministry of Construction and Urban Development and Ministry of Environment and Green Developments has been greatly appreciated. Setting up of testing centers at MUST, and Erdenet, Darkhan are impressive outcomes that need to be nurtured and sustained by MoCUD after the end of project;
- Evaluators observed that although BEEP was a national level project, it mainly remained focused in Ulaanbaatar with limited interaction with stakeholders in other major cities of Mongolia other than the two cities of Erdenet and Darkhan. Also, BEEP's interaction with the commercial and largest size building companies was not visible. The reasons that could be attributed to this situation are low level of awareness about 'energy efficiency', low prices of energy and a lack of demand for energy efficient apartments.
- The construction companies involved in construction of buildings (commercial and residential) often resist implementing energy efficiency since it increases the overall cost of construction. Further, as experience has shown elsewhere, that the companies involved in constructing such a building either sells them (as apartments) or give it on lease (as commercial building). Since the construction company is not the one who pays for energy, therefore, it sees no incentive in making investments that reduce the energy consumption.
- Most of the trainings were concentrated for construction sector professionals which to an extent limited the capacity building in other provinces of country. Only eight regional trainings out of 34 were organized.
- The houses built in the ger area were distributed randomly in different places which limited the collective awareness creation and contribution in reducing air pollution in spite of the fact that individually each house made positively contribute in reduction of GHG emissions by reducing fuel consumption by half.

Overall project ratings are provided on Table 5.

Table 5: Ratings for Each Project Outcome¹⁴

¹⁴ 6 = HS or Highly Satisfactory: There were no shortcomings;
 5 = S or Satisfactory: There were minor shortcomings;
 4 = MS or Moderately Satisfactory: There were moderate shortcomings;
 3 = MU or Moderately Unsatisfactory: There were significant shortcomings;
 2 = U or Unsatisfactory: There were major shortcomings;
 1 = HU or Highly Unsatisfactory.

	Relevance	Effectiveness	Efficiency	Overall Rating
Monitoring and Evaluation:				
M&E design at entry	-	-	-	5
M&E plan implementation	-	-	-	5
Overall quality of M&E	-	-	-	5
UNDP and Executing Partner Performance:				
Quality of UNDP implementation	-	-	-	5
Quality of Execution – MoCUD	-	-	-	5
Overall quality of implementation/execution	-	-	-	5
Overall Results				
Outcomes:				
Outcome 1: Energy efficiency provisions of the Mongolian building code, norms and related Standards updated and strengthened	6	6	5	5.7
Outcome 2: Training and awareness programmes	6	5	5	5.3
Outcome 3: Access to energy efficiency financing facilitated	5	5	5	5
Overall Rating:	6	5	5	5.3

3.3.6 Country Ownership and Drivenness

The main driver for the BEEP in Mongolia is the Government of Mongolia's focus to reduce excess energy use in the building sector since the combined emissions from residential sector and commercial building sector are 11.2% which is higher than that of industrial, transportation and agricultural sectors. This makes buildings the single largest sector that contributes to high level of GHG emissions and causes air quality issue¹⁵. The GoM has recognized that improving the energy utilization in the building sector would greatly help in meeting its UNFCCC commitment as well as help to improve the local air quality especially during the cold weather conditions. Therefore GOM is continuing to support a large number of initiatives and projects supported by bi-lateral and multi-lateral development agencies to reduce GHG emissions and to improve the air quality. The GoM through its two ministries – Ministry of Construction and Urban Development and Ministry of Environment and Green Development is fully committed to the cause of improving energy efficiency in buildings and reducing country's GHG emissions.

Although no specific financial commitment has been made by GoM for providing financial incentives, it is anticipated that the Energy Conservation Law, when enacted by the parliament, will provide grants to people who shift to energy efficient houses. The MoEGD is in the process of developing its strategy to promote green growth where towns of population of 20,000 will locally generate electricity from waste. The other financial incentives being formulated would provide benefits to buildings that have energy rating class of 'A' and 'B' which denote low levels of annual energy consumption. The PIU staff were also members of the working group constituted by the ministry and

¹⁵ World Bank discussion paper no.66082 "Mongolia Air Quality Analysis of Ulaanbaatar – Improving air quality to reduce health impact": (refer Executive Summary on page no. xiii – "the main source of ground level air pollution are coal and wood burning for heating of individual residences in ger areas.... The other significant sources of ground level PM concentrations are emissions from power plants, heat only boilers....."

provided technical support to the ministry in formulating the strategy, incentives to promote energy efficiency and green buildings.

3.3.7 Mainstreaming

GEF financed projects are key elements in UNDP country programs, therefore, the objectives and outcomes of the project should align with UNDP country programme strategies. UNDP Mongolia's Country Programme Action Plan 2012-2016 signed between UNDP and GoM in January 2012, entails working towards reducing air pollution in cities with a combination of long-term technology and policy measures to reduce air pollution and emissions through improved energy efficiency. The CPAP specifically states that energy efficiency in building sector will be further strengthened as a long-term measure for abatement of air pollution and emission reduction.

BEEP has made positive contribution in mainstreaming the project outcomes through policy formulation, overcoming the barriers to implement efficient utilization of energy in buildings, demonstrating the reduction of coal consumption in small houses in ger areas to reduce air pollution. The reduced level of air pollution benefits the entire society and also it reduces the environmental stress caused by high level of CO₂ emissions.

3.3.8 Sustainability of Project Outcomes

In assessing Project sustainability, the evaluators asked “how likely will the Project outcomes be sustained after BEEP ends?”. Sustainability of these objectives was evaluated on the four areas defined by GEF in the dimensions of financial risks, socio-economic risks, institutional framework and governance, and environmental factors, using a simple ranking scheme mentioned below. :

- 4 = *Likely (L)*: negligible risks to sustainability, with key outcomes expected to continue in foreseeable future;
- 3 = *Moderately Likely (ML)*: moderate risks to sustainability but expectations that at least some outcomes will be sustained;
- 2 = *Moderately Unlikely (MU)*: significant risks to sustainability; and
- 1 = *Unlikely (U)*: severe risks to sustainability.

Overall rating is equivalent to the lowest sustainability ranking score of the 4 dimensions.

Assessment of financial risk involves reviewing the likelihood of financial and economic resources not being available once the GEF grant assistance ends, and reviewing factors and financial risks that may jeopardize the sustainability of project outcomes. Socio-economic risk assessment require reviewing factors such as level of stakeholder ownership (including ownership by government and other key stakeholders) will be sufficient to allow for the project outcomes to be sustained, and is there sufficient public/stakeholder awareness in support of the project's long-term objectives?

Institutional framework and governance risks are the legal framework, policies, governance structures and processes within which the project operates pose risks that may jeopardize the sustainability of project benefits. Finally, the environmental risks are factors or ongoing activities that may pose an environmental threat to the sustainability of project outcomes.

Factors or project outputs that improve its sustainability are – development of suitable organizational arrangements by public and private sector; development of policy and regulatory frameworks that further the project objectives; identification and involvement of champions and, mainstreaming project activities into the economy or community's activities.

The project due to its wide stakeholder relationship the PMU managed for BEEP, greatly helped to mitigate a number risks such as relevance and acceptance of work done under the project. Also, PMU staff was engaged in a number of high-level government committees to support energy efficiency, thereby ensuring that key government ministries were in close touch with the activities of the project and its outputs.

The overall Project sustainability rating is **Likely**. This is primarily due to:

- The strong commitment of Ministry of Construction and Urban Development and its Construction Development Centre which are supporting the review and updating of BCNS. The ministry has issued guidelines for the buildings sector to adhere to updated BCNS in new construction. The CDC approves construction drawings and documents that comply with revised BCNS. The state inspection agency is involved in inspection of commercial and residential buildings during different stages of construction to ensure that building construction is being carried out as per the approved plan and drawings.
- Ministry of Environment and Green Development is developing a framework for green buildings and launching green cities initiatives, which will apply the latest design principles, BCNS and concepts of energy efficient house and building developed by BEEP. Further, GoM is finalizing plans to provide financial resource through Clean Air Fund and incentivize EE.
- Commitment by the house construction companies to continue building individual house units which follow designs and principles developed by BEEP. One of the house construction companies who partnered on the BEEP project has made this as a part of its future business strategy. These construction companies are continuing to build new housing units that comply with BCNS and also comply with designs norms set by BEEP. More than 220 such homes have been built and another 200 are under construction. As per the report of CDC it is expected that more **6000 apartments** that will be ready in 2013 will comply with new BCNS and energy efficiency norms developed by BEEP. The government's CDC since 2012 has approved construction of new buildings that are following the revised BCNS.
- Commitment by Xac Bank to continue to provide loans for energy efficient housing, which it considers a potentially big market and had a line of credit from "Global Climate Partnership Fund" available to it until 2016. Such types of loan requirements are being handled by its Eco Banking group which consists of ten professionals. The bank has expanded its mortgage services beyond loans to home buyers but it is also extending loans to local small and medium enterprise who manufacture products meeting the BCNS requirement for energy efficient homes.
- In the past four years of the project more than 2,000 persons received training which included, government official, building sector professionals, individual house owners, bank staff. Capacity of Mongol University of Science and Technology and three other Energy Conservation Centers in Ulaanbaatar, Darkhan, Erdenet has been built

on various aspects of building energy efficiency. Three new regional EE advisory centres received training from BEEP to conduct testing and energy audits of home. The staff in these centres is sufficiently trained and competent to carry out work in the sector independently.

- Associations of Civil Engineers, Building Materials Manufacturers, Doors and Window Manufacturers have collaborated with the project, provided professional advice and products that meet the new BCNS and the requirements of new energy efficient homes.

3.3.9 Catalytic Role and Impact

In addition to sustainability the terminal evaluations are required to include an assessment of catalytic or replication effect played by the GEF financed project. The four parameters that are considered for assessing the catalytic role of the project are: production of public goods; demonstration; replication and, scaling up.

BEEP's contribution extended over all the four parameters starting with modification of existing BCNS and development of three new BCNS which led to introduction of new construction techniques and use of materials. This was followed by demonstration and providing hands-on training by working with private housing construction companies to build new houses for families in the ger area. The experience gained during construction with the improved design, material use has been fully utilized by a construction company and a private sector bank which applied these principles to new grass-roots project outside of BEEP. Finally, since the BCNS are owned by the government, CDC since 2012 is working towards ensuring that these are followed in all new construction at a national level. The project's catalytic role can be considered significant as it has helped to overcome a majority of technical barriers through a series of ground-laying work that span all the four parameter of catalytic role. BEEP has been effective to set the ground for scaling-up by host government and local stake holders when it closed in December 2013.

GEF financed projects are required to describe the extent to which the project has achieved or progressing towards the achievement of impacts. In that respect, BEEP has created impact among several private, not-for-profit organizations and government ministries. The revision of BCNS to include current norms and standards which are easier to follow have helped industries and private bank to make investments critical to building energy efficiency and to the cause of overall energy conservation in building sector. The project's contribution to reduce specific energy consumption in apartments and small houses are significant since the underlying BCNS have been accepted by GoM. The project has also contributed in drafting of Energy Conservation Law which is expected to be passed by the parliament and assisted MoEGD to formulate guidelines to facilitate construction of green buildings. BEEP, therefore, has made an impact towards achieving the reduction of energy consumption in small private houses, apartments and, in future, in commercial buildings. The full impact of BEEP would likely be at the country level and will be visible after about 5 to 6 years.

4. CONCLUSIONS, RECOMMENDATIONS AND LESSONS

4.1 Conclusions

- Overall programme goals were met, and for components 1 and 2, the accomplishments of BEEP exceeded the targets defined in project results framework. The project made significant contribution to overcome all the barriers that were identified for making energy efficiency in building sector a high priority. It helped to create greater awareness about the importance of energy efficiency in building and gradually increasing the demand for energy efficient homes since 2009. As a result of BEEP:
 - Key stakeholders were brought together including government officials, academic institutions, professionals such as designers, construction engineers, building material manufacturing companies and their associations, government agencies, academic institution, donor agency and banks and end customers to raise awareness and remove some of the identified barriers;
 - Useful information products were prepared including a web-site which provides the information about the new design of small size home (area up to 35m²); promotional materials, an informative BEEP website, several article in barilga.mn journal, and TV clips. These knowledge products and services helped to raise awareness of building energy efficiency systems to a wide range of stakeholders using the Project's structured approach of technical assistance and training;
 - Project also brought another important set of key stakeholders together – house owners, manufacturers, private construction companies and bank – who are important to creating and servicing the demand for energy efficient home and assist in removing some of the identified technical barriers. The commitment of one of the house construction company to build new houses as per designs developed by BEEP and revised BCNS, and Xac Bank's commitment to provide loan for energy efficient house, are important steps towards catalyzing EE into new construction in the housing sector;
- With regards to the design of the BEEP Project, its goals and objectives as expressed in the Project Results Framework were met for all three outcomes. The design of project was well developed, focused on overcoming the barriers in the building sector of Mongolia with the help of three independent but inter-related project activities. The barriers identification was comprehensive and fairly detailed and helped in developing a highly focused project results framework.
- BEEP has provided very good set of studies, reference materials, awareness building and advisory support for developing and updating BCNS for buildings and houses to conserve energy. The technical support to the Ministries of Construction and Urban Development, Ministry of Environment and Green Developments has been greatly appreciated. Setting up of testing centers at MUST, and Erdenet, Darkhan are impressive outcomes that need to be nurtured and sustained by MoCUD after the end of project.
- Project efforts were significant in building the capacity of 'buildings sector' to adopt EE measures in new construction, by updating several the BCNS. The Project had successfully demonstrated and convinced all the concerned stakeholders (listed under

section 2.4) to invest in energy efficient apartment and house which lowers the requirement of heat energy between 30 to 50%. The project successfully developed and demonstrated the new designs of small family home (targeted at ger dwellers) which have led to reduction in coal consumption by 50% while providing better comfort to the family;

- While technology several solutions for energy efficiency in buildings and home to reduce energy consumption are simple in nature, their implementation is more complex. This is due to a wide difference in the current building codes and norms and those of 1960s and 1970 according to which a large number of buildings were built (around 4,000), and non-availability of good quality construction materials such as insulation foam and triple glazed windows to reduce the heat losses. The BEEP worked with the associations of building materials and windows manufacturers and designed 'labels' for insulations, windows the meet the new BCNS as well as developed energy labels for EE houses. The project has been successful in providing publicity to various energy efficiency labels to create greater awareness and acceptance in the market about the concept of efficient end use of energy and energy construction to reduce harmful emissions.
- The Project reaching 55% of its Bank co-financing target by the EOP is a reflection of the unforeseen difficulties faced in implementing component 3 for extending home loan to families to built EE home design under supervision of BEEP.
- Evaluators observed that although BEEP was a national level project, it mainly remained focused in Ulaanbaatar with limited interaction with stakeholders in other major cities of Mongolia other than the two cities of Erdenet and Darkhan. Also, BEEP's interaction with the commercial and largest size building companies was not visible during the mission and from the review of project progress reports. The reasons that could be attributed to this situation are low level of awareness about 'energy efficiency', low prices of energy and a lack of demand for energy efficient buildings. While only one private company has committed to building energy efficient private homes, dialogue by government with other building construction companies will need to be undertaken to understand their reservations and devise ways to address them.
- There does not appear to be any post-project structured arrangement to have technical assistance and advisory support/guidance to MoCUD. Although it is expected that MUST and MACE will cover up for BEEP, the reviewers' view this as a potential gap area as the MoCUD would need additional hand holding support to fully implement BCNS in commercial buildings and also ensure compliance, replication in other major cities which is needed for market transformation.

4.2 Lessons Learned

- BEEP succeeded in create awareness among a niche segment of the society and greatly increased awareness of GoM's MoCUD, MoEGD, MoE, and of Construction Development Centre, Center of Standardization and Measurement and the State Department for Infrastructure Inspection, the General Agency for Specialized Inspection on the importance and benefits of implementing revised BCNS in all new construction of residential buildings. The project benefitted from:

- three well defined outcomes in the project's results framework that helped it to: stay focused on addressing the barriers; stay on course in achieving the majority of goals and outcomes. successful engagement of local associations of building material manufacturers, doors and windows manufacturers, association of civil engineers and Mongolian University of Science and Technology to overcome the barriers in construction sector, has also greatly enhance the knowledge and awareness of each of these organizations. This has largely aided project's sustainability as each of these organizations is committed for long term to continue to work on improving the building energy efficiency after the project ends in December 2013
- The project's financing component, despite challenges faced by UNDP and Project team in meeting the project end targets, helped to create awareness among the small home construction companies and private sector bank on the potential and benefits from investment in building energy efficiency, and helped to catalyze single family home units being built around Ulaanbaatar following designs and BCNS developed by BEEP. The project's financing component benefitted from the co-financing support from MCA for constructing EE home in the ger area.
- This also provided an important indication that the making a family shift from a 'ger' into an energy efficient home will not just happen on the merits of energy efficiency without an financial incentive in the form of a grant which serves as 'deal sweetener' and helps the family to bridge the additional cost involved in building a home with superior design, materials and complying with the BCNS in new construction.
- The project's component on accessing energy efficient financing to extend 100 home loans and investment of USD2 million by Xac Bank needed additional financial support as the target beneficiary did not fall into bank's loan criteria. The bank did play an important role to support the gradual process of market transformation by supporting investments in 'green buildings' by buyers, suppliers and construction companies. As mentioned in the mid-term report, this component required involvement of a finance/home loan expert in the PIU to improve the outcome, which did not happen to non-availability of finance sector professional.
- As the UNDP funds are meant for providing technical assistance and training, engaging another bi-lateral or multi-lateral for the risk sharing mechanism should be designed with support of a multi-lateral institution which traditionally work with private banks or USAID's Development Credit Authority mechanism which specifically developed to mitigate project risks by supporting the private sector banks or project developer in a particular sector to demonstrate new concepts.
- The building sector in Mongolia is vast and growing rapidly. The project succeeded in addressing the barriers identified which prevented the building sector adopting energy efficiency and demonstrated energy efficient house units and **catalyzed the market to a certain extent.** BEEP, however, did not have sufficient resources to work with large companies engaged in the construction of commercial buildings to ensure compliance with revised BCNS and achieve faster replication and demand for energy efficient houses and apartments in other cities. The GoM will need to engage few large construction companies in partnership mode to demonstrate saving and long term benefits to the occupants/tenants in energy efficient building.
- To accelerate the replication of energy efficient buildings in and around Ulaanbaatar and other cities, and reduce the energy consumption in buildings, the GoM will need to

review the pricing of energy to develop a two-part tariff to include the cost of energy demand (based on the area) and actual monthly consumption. This pricing can be applied to the commercial buildings initially and over a period of time can be extended to residential sector for house and apartments exceeding a particular area.

- The application of energy efficiency principles are slow to be accepted by large construction companies that are involved in constructing buildings either for commercial or residential purpose. This is due to the lack of demand in the market for such buildings, low energy prices, high cost of construction due to superior designs and materials and lack of awareness in the society about energy conservation. Also the companies constructing such buildings either sell portions of the buildings as apartments (residential) or lease it out (commercial). Since the original builder is not the occupant, it does not incur any operating cost (mainly heat, electricity and water usage) associated with the use of building and therefore pays more attention towards the capital cost. The occupants however cannot do much to improve the efficiency as the cost of retro-fitting in a newly constructed building is not economical. Ultimately the price of energy plays a pivotal role in improving the payback period of such investments. This paradoxical situation can be overcome by three pronged approach. First by making BCNS mandatory in every building or house constructed in Mongolia. Second, creation of public awareness about the benefits of energy efficiency to individual and to the society which will create demand in the market. Third, a gradual rationalization of energy tariffs.

4.3 Recommendations

With the GEF-funded BEEP project terminating on December 31, 2013, the following recommendations are being provided:

Recommendation 1: Improving energy efficiency in Mongolia's building sector has huge potential for which MoEGD and MoCUD will require technical assistance.

As the building construction sector is growing rapidly the ministries will require technical assistance to ensure all new construction of commercial and residential building complies with the new BCNS. The MoEGD plans to develop standards for green buildings and green sub-districts. Both the areas provide opportunity to continue and build up on the work already done by BEEP and assist in market transformation of building energy efficiency, and GEF funding support may be considered since this would lead to reduction in GHG emissions. The Nationally Appropriate Mitigation Actions in the construction sector can serve as the vehicle for GEF and UNDP CO to support the GoM in scaling up its efforts and achieving further reductions in GHG emissions. It will also provide an opportunity to advance institutional strengthening of agencies such as the CDC and State Departments for Infrastructure Inspection, regional centres that received BEEP TA and training. Further, as much of the groundwork has already been done in the building sector by BEEP, which is followed by the GoM's plan to provide financial resource through Clean Air Fund and incentivise EE, and local private bank is committed to work in the sector, therefore GEF funding will be able to leverage much higher amount of local financial resource as co-financing, with tangible results.

Recommendation 2: Improve capacity of MoCUD and its agencies to ensure all new commercial and residential apartments buildings are designed and constructed following new building codes norms and standard throughout the country.

Ministry of Construction and Urban Development along with its two concerned

agencies the Construction Development Center, and the State Department for Infrastructure Inspection will require further support to strengthen its functions. This can be done by developing a strategic plan which would: set a target for energy efficient buildings; continue and expand activities of BEEP for wider replication across country, develop a set of activities to engage people in 'Ger' to reduce the utilization of fuel (primarily coal) through better insulation and improved stoves. Provide financial incentives (conditional grant) for small house owners (area less than ~ 35m²) to avail bank loan and move to an efficient house. Develop clear strategies for awareness creation; strengthen material supply chains; strengthen compliance through mandatory regulation, inspection and independent verification.

Recommendation 3: GoM funding towards EE in buildings should be designed for two target end users - (a) retrofitting the government buildings as per new BCNS, and (b) individual home owners and Ger dweller to avail bank financing for constructing EE houses as per new BCNS. Government is the single largest owner of commercial buildings in capital city and for that reason the single largest consumer of energy for space heating. Therefore, government should make annual budget allocation towards retrofitting certain specific area of its building to improve insulation and install windows that meet the revised BCNS. Large volume procurement of building material will help to reduce the cost of these products (due to economies of scale) and make these affordable for individual home owners for retrofitting. Also reduced consumption of heat energy in commercial buildings will likely make spare capacity available for other areas of city. To encourage people living in ger to build energy efficient houses, government must provide them financial incentives (similar to the MCA grant) so that they receive technical support in design, construction from Mongolian Association of Civil Engineers, and possible loan from the bank. With the experience of BEEP, GoM will need to engage multi- and bi-lateral institutions such as IFC and kfW to provide line of credit to local private banks to catalyze sales and construction of energy efficient home in ger districts in UB and throughout the country.

Recommendation 4: GoM needs to review the pricing of energy to develop a two-part tariff to include the cost of energy demand (based on the area) and actual monthly consumption. To accelerate the adoption of the concepts of energy efficiency in new construction and its replication the GoM will need to pay attention to the pricing of heat energy. The current price structure does not provide incentive to end-user to conserve energy by investing in energy efficient products and appliances. This pricing can be applied to the commercial buildings initially and over a period of time can be extended to residential sector for house and apartments exceeding a particular floor area.

Recommendation 5: Organization such as MACE should be strengthened to continue the awareness raising on energy efficiency in buildings as well as exchange of experience and lessons internationally. MACE should take the lead to host seminars and workshops or annual events on "Green Buildings" and form a 'Green Buildings Council'. The council's activities could follow the activities, events of the government and voluntary organizations such as European Commission's Green Building Programme (<http://iet.jrc.ec.europa.eu/energyefficiency/greenbuilding>); Sweden Green Building Council (<http://www.sgbc.se/in-english>); US Green Buildings Council (<http://www.usgbc.org/>). MACE or the appointed agency can also gather the developing country perspective on importance of green buildings, for instance, from India's

experience through the Indian Green Building Council, which also includes information on green home, green buildings and green townships. (<http://www.igbc.in/site/igbc/index.jsp>).

Recommendation 6: The PIU should document its achievements and impacts in the building sector by publishing articles jointly with MUST, in local journals and new magazine. Also the same team should contribute article in international workshops and seminars such as those organised from time to time by the above mentioned green building councils; the American Council for an Energy Efficient Economy (www.aceee.org); European Council for Energy Efficient Economy (www.eceee.org) or by the European Commission.

APPENDIX A – MISSION TERMS OF REFERENCE FOR PROJECT FINAL EVALUATION

1. INTRODUCTION

In accordance with UNDP and GEF M&E policies and procedures, all full and medium-sized UNDP support GEF financed projects are required to undergo a terminal evaluation upon completion of implementation. These terms of reference (TOR) sets out the expectations for a Terminal Evaluation (TE) of the Energy Efficiency in New Construction in the Residential and Commercial Buildings Sector. The essentials of the project to be evaluated are as follows:

2. PROJECT SUMMARY TABLE

Project Title:	Energy Efficiency in New Construction in the Residential and Commercial Buildings Sector, MON/09/3			
GEF Project ID:			<i>at endorsement (Million US\$)</i>	<i>at completion (Million US\$)</i>
UNDP Project ID:	00070071	GEF financing:	0.975	0.872
Country:	Mongolia	IA/EA own:	xxxx	xxxx
Region:	East Asia	Government:	0.50	0.50
Focal Area:	Climate Change	Other:	2.790	0.755
FA Objectives, (OP/SP):	CC-SP1	Total co-financing:	2.840	0.805
Executing Agency:	UNDP	Total Project Cost:	3.815	1.677
Other Partners involved:		ProDoc Signature (date project began):		May 2009
		(Operational) Closing Date:	Oct 2013	Dec 2013

3. OBJECTIVE AND SCOPE

The Government of Mongolia signed the United Nations Framework Convention on Climate Change (UNFCCC) on 12 June 1992, the Great Khural (Parliament) ratified it on 30 September 1993, and the date of entry into force was 15 December 1999.

The Government of Mongolia recognizes the major contribution that improved building energy efficiency would provide to meeting its UNFCCC and other environmental commitments, as well as the related need to reduce major local environmental effects of excessive and inefficient building fuel use (esp. extreme urban air pollution in winter, growing deforestation due to excessive fuel wood and construction timber use), reduce fuel poverty (particularly in urban *ger* areas where the majority of poor urban families live), and improve economic development through enhanced insulation materials and building energy saving systems leading to lower energy, and in particular heating, costs for buildings.

The project GOAL was the reduction in the annual growth rate of GHG emissions from the buildings sector in Mongolia. BEEP contributed to the reduction of greenhouse gas emissions through the

transformation of the Mongolian buildings market towards more energy-efficient building technologies and services, sustainable private house insulation and energy efficiency financing mechanisms. The project was funded by UNDP, KEMCO, GEF and with financial contribution of the Government of Mongolia and began in 2009 and will be terminated by December 31, 2013.

This Project needs to undergo evaluation upon completion of implementation to identify performance levels, achievements and lessons learned. A result oriented evaluation of the project is to ensure that all key milestones were met and the degree to which these milestones have had a lasting impact on the Mongolian Government's tendency to maintain and build strong energy efficient policy in the future.

OBJECTIVE

The objective of the terminal evaluation are to assess the achievement of project results, and to draw lessons that can both improve the sustainability of benefit from this project, and aid in the overall enhancement of UNDP programming.

In order to achieve the project objective, the project key Components are as follows.

Outcome 1: Updating and Strengthening of Mongolian Energy Efficiency Building Codes, Norms, and Standards (BCNS)

Outcome 2: Training and Awareness

Outcome 3: Facilitating Access to Energy Efficiency Financing

This is a medium sized project with project implementation duration of 48 months, and funded by the Global Environment Facility (GEF) and UNDP. The TE will be conducted according to the guidance, rules and procedures established by UNDP and GEF as reflected in the UNDP Evaluation Guidance for GEF Financed Projects.

The objectives of the evaluation are to assess the achievement of project results, and to draw lessons that can both improve the sustainability of benefits from this project, and aid in the overall enhancement of UNDP programming.

4. EVALUATION APPROACH AND METHOD

An overall approach and method¹⁶ for conducting project terminal evaluations of UNDP supported GEF financed projects has developed over time. The evaluator(s) is(are) expected to frame the evaluation effort using the criteria of **relevance, effectiveness, efficiency, sustainability, and impact**, as defined and explained in the UNDP Guidance for Conducting Terminal Evaluations of UNDP-supported, GEF-financed Projects. The international consultant will be the team leader and coordinate the evaluation process to ensure quality of the report and its timely submission. The national consultant will provide supportive roles both in terms of professional back up, translation etc. The evaluation team is expected to become well versed as to the project objectives, historical developments, institutional and management mechanisms, activities and status of accomplishments. Information will be gathered through document review, group and individual interviews and site visits. A set of questions covering each of these criteria have been drafted. The evaluator(s) is(are) expected to amend, complete and submit this matrix as part of an evaluation inception report, and shall include it as an annex to the final report.

The evaluation must provide evidence-based information that is credible, reliable and useful. The evaluator is expected to follow a participatory and consultative approach ensuring close engagement with government counterparts, in particular the GEF operational focal point, UNDP Country Office, project team, UNDP GEF Technical Adviser based in the region and key stakeholders. The evaluator is expected to conduct a field mission to Ulaanbaatar, including the project sites. Interviews will be held with the following individuals and organizations at a minimum, but not limited to:

- National Project Director (NPD)

¹⁶ For additional information on methods, see the [Handbook on Planning, Monitoring and Evaluating for Development Results](#), Chapter 7, pg. 163

- Project Technical Manager
- Project Manager
- Project Administrative Assistance
- UNDP financial Office
- UNDP procurement officer
- Project Steering Committee members
- Relevant project stakeholders and personnel, but not limited to:
 - Relevant departments of the Ministry for Environment and Green development
 - Ministry of Construction and Urban Development
 - Ministry of Energy
 - MCA Mongolia
 - Xac Bank
 - NGOs as Building Materials Manufacturers' association of Mongolia, and Mongolian Windows and Doors Manufacturers' association
 - Mongolian Civil Engineers Association
 - Main stakeholders as Energy conservation centers and ATA trade LLC and representatives of households
 - Research institutions and experts in the country, where applicable
 - Relevant personnel at UNDP country office in Mongolia

The evaluator will review all relevant sources of information, such as the project document, inception workshop report, annual work and financial plans, project reports – including Annual APR/PIR (2011 to 2013), project budget revisions, quarterly reports, Minutes of Project Technical Committee/Project Steering Committee meetings, Back-to-Office Reports of UNDP staff (if any), Study reports/Conference proceedings/government guidelines, etc., midterm review, progress reports, GEF focal area tracking tools, project files, national strategic and legal documents, and any other materials that the evaluator considers useful for this evidence-based assessment such as terms of reference for past consultants' assignments and summary of the results; past audit reports (if any). Documents that the project team will provide to the evaluator.

5. EVALUATION CRITERIA & RATINGS

An assessment of project performance will be carried out, based against expectations set out in the Project Logical Framework/Results Framework, which provides performance and impact indicators for project implementation along with their corresponding means of verification. The evaluation will at a minimum cover the criteria of: **relevance, effectiveness, efficiency, sustainability and impact**. Ratings must be provided on the following performance criteria. The completed table must be included in the evaluation executive summary.

Evaluation Ratings:			
1. Monitoring and Evaluation	<i>rating</i>	2. IA& EA Execution	<i>rating</i>
M&E design at entry		Quality of UNDP Implementation	
M&E Plan Implementation		Quality of Execution - Executing Agency	
Overall quality of M&E		Overall quality of Implementation / Execution	

3. Assessment of Outcomes	rating	4. Sustainability	rating
Relevance		Financial resources:	
Effectiveness		Socio-political:	
Efficiency		Institutional framework and governance:	
Overall Project Outcome Rating		Environmental :	
		Overall likelihood of sustainability:	

6. PROJECT FINANCE / COFINANCE

The Evaluation will assess the key financial aspects of the project, including the extent of co-financing planned and realized. Project cost and funding data will be required, including annual expenditures. Variances between planned and actual expenditures will need to be assessed and explained. Results from recent financial audits, as available, should be taken into consideration. The evaluator(s) will receive assistance from the Country Office (CO) and Project Team to obtain financial data in order to complete the co-financing table below, which will be included in the terminal evaluation report.

Co-financing (type/source)	UNDP own financing (mill. US\$)		Government (mill. US\$)		Partner Agency (mill. US\$)		Total (mill. US\$)	
	Planned	Actual	Planned	Actual	Planned	Actual	Actual	Actual
• In-kind support								
• in cash								
Totals								

7. MAINSTREAMING

UNDP supported GEF financed projects are key components in UNDP country programming, as well as regional and global programmes. The evaluation will assess the extent to which the project was successfully mainstreamed with other UNDP priorities, including poverty alleviation, improved governance, the prevention and recovery from natural disasters, and gender.

8. IMPACT

The evaluators will assess the extent to which the project is achieving impacts or progressing towards the achievement of impacts. Key findings that should be brought out in the evaluations include whether the project has demonstrated: a) verifiable improvements in ecological status, b) verifiable reductions in stress on ecological systems, and/or c) demonstrated progress towards these impact achievements.¹⁷

9. CONCLUSIONS, RECOMMENDATIONS & LESSONS

The evaluation report must include a chapter providing a set of **conclusions, recommendations and lessons**.

¹⁷ A useful tool for gauging progress to impact is the Review of Outcomes to Impacts (ROtI) method developed by the GEF Evaluation Office: [ROtI Handbook 2009](#)

10. IMPLEMENTATION ARRANGEMENTS

The principal responsibility for managing this evaluation resides with the UNDP CO in Mongolia. The UNDP CO will contract the evaluators and ensure the timely provision of per diems and travel arrangements within the country for the evaluation team. The Project Team will be responsible for liaising with the Evaluators team to set up stakeholder interviews, arrange field visits, coordinate with the Government etc.

Throughout the period of evaluation, the evaluation team will liaise closely with the UNDP Resident Representative/Deputy Resident Representative/Programme Analyst/Senior M&E Adviser/Project Manager, UNDP GEF RTA, the concerned agencies of the Government, any members of the international team of experts under the project and the counterpart staff assigned to the project. The team can raise or discuss any issue or topic it deems necessary to fulfil its task, the team, however, is not authorized to make any commitments to any part on behalf of UNDP/GEF or the Government.

Logistics

The team will conduct a mission visit to Ulanbataar and selected project sites, to meet with relevant project stakeholders. This visit will also include meetings with the officials of UNDP, the Implementing Partner, stakeholders from other institutions and ministries related to the project.

After the initial briefing by UNDP Resident Coordinator/DRR/Programme Analyst/Project Manager, the review team will meet with the National Project Director, the officials of the Implementing Partner, and GEF Operational Focal Point as required.

11. EVALUATION TIMEFRAME

The total duration of the evaluation will be 25 days according to the following plan:

Activity	Timing	Completion Date
Preparation	2 days	<i>9 September</i>
Evaluation Mission	12 days	<i>12-23 September</i>
Draft Evaluation Report	6 days	<i>4 October</i>
Final Report	5 day	<i>14 October</i>

12. EVALUATION DELIVERABLES

The evaluation team is expected to deliver the following:

Deliverable	Content	Timing	Responsibilities
Inception Report	Evaluator provides clarifications on timing and method	No later than 2 weeks before the evaluation mission.	Evaluator submits to UNDP CO
Presentation	Initial Findings	End of evaluation mission	To project management, UNDP CO
Draft Final Report	Full report, (per annexed template) with annexes	Within 3 weeks of the evaluation mission	Sent to CO, reviewed by RTA, PCU, GEF OFPs
Final Report*	Revised report	Within 1 week of receiving UNDP comments on draft	Sent to CO for uploading to UNDP ERC.

*When submitting the final evaluation report, the evaluator is required also to provide an 'audit trail', detailing how all received comments have (and have not) been addressed in the final evaluation report.

13. TEAM COMPOSITION

The evaluation team will be composed of 1 international and 1 national evaluator¹⁸. The individual experts in the team needs to have good technical knowledge of the Energy Efficiency in the commercial and residential buildings sector and climate change projects and national context of energy efficiency project and program implementation in Mongolia, possess good evaluation experience, and writing skills to carry out the assignment. The consultants shall have prior experience in evaluating similar projects. Experience with GEF financed projects is an advantage. International evaluator will be designated as the team leader and will be responsible for quality and timely submission of the report. The allocation of tasks in the execution of this TOR shall be decided mutually between the International and National consultants. The evaluators selected should not have participated in the project preparation and/or implementation and should not have conflict of interest with project related activities.

The international consultant must present the following qualifications and professional background:

- Minimum of ten years accumulated and recognized professional technical experience in energy efficiency (in the construction sector) and climate change projects Knowledge of UNDP and GEF;
- Minimum of five years of project evaluation and/or implementation experience in the result-based management framework, adaptive management and UNDP or GEF Monitoring and Evaluation Policy;
- Technical knowledge in the targeted focal area(s);
- Post-Graduate in Engineering, Management or Business;
- Demonstrated ability to assess complex situations, succinctly, distils critical issues, and draw forward-looking conclusions and recommendations;
- Ability and experience to lead multi-disciplinary and national teams, and deliver quality reports within the given time;
- Familiar with developing countries context or regional situations relevant to that of Mongolia;
- Experience with multilateral and bilateral supported energy efficiency and climate change projects;
- Comprehensive knowledge of international energy efficient construction industry best practices;
- Excellent report writing and communication skills in English.

The evaluation team shall conduct debriefing for the UNDP Country Office, Project Manager, and Implementing Partner towards the end of the evaluation mission. The international consultant shall lead presentation of the draft review findings and recommendations. Lead drafting and finalization of the terminal evaluation report. The evaluation team shall review the tracking tool. If it is not available, review the required information to complete the tracking tool as required for climate change mitigation projects.

¹⁸ Also called consultant

APPENDIX B – MISSION ITINERARY

MISSION AGENDA FOR MR. SANDEEP TANDON, International Consultant FROM OCTOBER 20 – TO OCTOBER 30, 2013

20th October, Sunday

Arrival in Ulaanbaatar, Mongolia

21st October, Monday

Time	Name	Position and Institution	Location
10:00-12:00	Ms. Bunchingiv B.	Team Leader	UN house
13:00-16:00	Mr. Munkhbayar B. Ms. Batima P. Mr. Tsogt A. Ms. Myagmar D.	National Project Coordinator National Consultant Policy & Institutional Development Officer Training & Technical Development Officer	BEEP office

22nd October, Tuesday

Time	Name	Position and Institution	Location
09:00-10:00	Mr. Thomas Eriksson	UNDP DRR	UN House
10:30-12:00	Mr. Ganbat	Officer, Division of Clean Technology & Science National Project Director	Ministry of Environment and Green Development#308
13:00-14:00	Mr. Gantumur B	Energy Conservation Center , Mongolian Association of Civil Engineers (MACE)	MACE office
14:30-15:30	Ms. Tuul G	Head of ECO Banking Department, XacBank	Xac Bank, Head Office Building
16:00-17:00	Mr. Tsedensamba	Director of Dep. Construction and Building Materials Policy Implementation and Coordination	Ministry of Construction and Urban Development

23rd October, Wednesday

Time	Name	Position and Institution	Location
09:00-10:00	Ms. Enkhtuul	Technical Expert of Construction & Road section	Center of Standardization and Measurement#117
10:30-11:30	Ms. Delgermaa	Manager, ATA Trade LLC	ATA office
14:00-15:00	Ms. Enkhtuya		Ministry of Energy
15:30-16:30	Ms. Otgonbayar	Executive Director, Mongolia Windows and Door Manufacturers Association	MDWMA

24th October, Thursday

Time	Name	Position and Institution	Location
09:00-12:00	Visit 3 households built EE House	House Owners	Ger Housing area of UB

13:30-15:00	Ms. Bilguun B.	Manager of Energy Efficiency Center Mongolian University of Science & Technology (MUST)	#131 MUST building
15:30-17:30	Ms. Bolormaa B.	Senior Lecturer and Consulting Engineer, Environmental Engineering Department	#203 SCEA MUST

25th October, Friday

Time	Name	Position and Institution	Location
14:00-15:00	Mr. Gantulga D.	Vice Director, Construction Development Center	CDC
16:00-17:00	Ms. Regzedmaa	Head of Finance Dep.	Pyramid Industry LLC

28th October, Monday

Time	Name	Position and Institution	Location
10:00-11:00	Ms. Jargal D.	Chairman of State Dep. for Infrastructure Inspection	General Agency for Specialized Inspection
14:30-15:30	Mr. Lkhagvadorj O.	Executive Director, Building Material Manufacturers' Association of Mongolia	BMMAM

29th October, Tuesday

Time	Name	Position and Institution	Location
12:00-13:00	Mr. Thomas Eriksson, Ms Bunchin B, and Mr Mukhbayar	UNDP-Deputy Resident Representative	UN house

30th October, Wednesday

Departure from Ulaanbaatar, Mongolia

Total number of meetings conducted: 20

APPENDIX C – LIST OF PERSONS INTERVIEWED

This is a listing of persons contacted in Mongolia (unless otherwise noted) during the Final Evaluation Period only. The Evaluators regret any omissions to this list.

- 1) Mr Thomas Eriksson, Deputy Resident Representative, UNDP Mongolia
- 2) Dr Ing. Bunchingiv Bazartseren, Environment Team Leader, UNDP Mongolia
- 3) Mr Tsedensamba Banzragch, Director General (National Project Director) Department of Construction and Building Materials, Ministry of Construction and Urban Development
- 4) Ms Bayantuul Baasanjav, Senior Officer, International Cooperation Division, Ministry of Construction and Urban Development
- 5) Mr B. Mukhbayar, National Project Manager, BEEP Project Implementation Unit
- 6) Mr Tsogt Ayurzana, Policy and Institutional Development Officer, BEEP PIU
- 7) Ms Myagmar Dovchin, Training and Technical Development Officer, BEEP PIU
- 8) Ms Battsetseg, Secretary and Translator, BEEP PIU
- 9) Mr Gantumur Baasankhu, Executive Director, Mongolia Association of Civil Engineers
- 10) Ms Tuul Galzagd, Director Eco Banking Department (EBD), Xac Bank
- 11) Mr Spike Hosch, Senior Project Development Officer (EBD), Xac Bank
- 12) Mr Isaiah Usher, Business Development Manager, EBD, Xac Bank
- 13) Mr Mathew Edwards, Business Development Manager, EBD, Xac Bank
- 14) Ms Bilguun Buyantogtokh, Manager, Building Energy Efficiency Centre, Mongolia University of Science and Technology
- 15) Mr Gankhuyag, Janjindorj, Engineer, Building Energy Efficiency Centre, Mongolia University of Science and Technology
- 16) Ms Bolormaa Byambaa, Senior Lecturer, Environmental Engineering Department, Mongolia University of Science and Technology
- 17) Mr Dorjpalam Gantulga, Deputy Director, Director of Norm and Normative Department
- 18) Ms Otgonbayar Bayarmagnai, Executive Director, Mongolian Windows and Door Manufacturers Association
- 19) Ms Tumenbaatar T., General Director, Pyramid Industry Company Limited
- 20) Ms Jargal Dorjnyam, Chairman of State Department for Infrastructure Inspection, the General Agency for Specialized Inspection, Regulatory Agency of Government of Mongolia
- 21) Mr Tserendash Sugarragchaa, National Coordinator, Integrated Resource Management in Asian Cities, GIZ
- 22) Mr Lkhagvadorj Ochirbat, Executive Director, Building Material Manufacturers' Association of Mongolia
- 23) Mr Och Naidanjav, General Secretary, Building Material Manufacturers' Association of Mongolia
- 24) Mr Dorjpalam Gantulga, Deputy Director, Construction Development Centre
- 25) Ms Enkhtuul Technical Expert of Construction & Road section, Center of Standardization and Measurement
- 26) Three households

APPENDIX D – LIST OF DOCUMENTS REVIEWED

1. UNDP-GEF “Building Energy Efficiency”, Project Document, 2010;
2. Mid Term Review report
3. Inception workshop report
4. Annual Work Plan
5. Combined Delivery Report
6. Project Implementation Report
7. House/Apartment Energy Audit Report prepared by Building Energy Efficiency Center of Mongolian University of Science and Technology
8. August 2013 MACE News - Newsletter of Mongolian Association of Civil Engineers
9. Minutes of meetings
10. MOU with GIZ
11. MOU with between UNDP CO and MCA Mongolia
12. Risk share agreement between UNDP CO and Xacbank
13. 4 BNbS and 56 standards
14. Outcomes (14 publications) of the project
15. Training handouts (4 handouts)
16. Training programmes and Evaluation reports of trainings (34 trainings)
17. House designs (drawings)
18. Articles published in barilga.mn journals
19. 10 TV broadcasting materials
20. Assessment report on buildings under construction in Ulaanbaatar (B.Zundui, Research and Information Department, CDC)

APPENDIX E – COMPLETED TRACKING TOOL

Tracking Tool for Climate Change Mitigation Projects (For Terminal Evaluation)		
Special Notes: reporting on lifetime emissions avoided		
Lifetime direct GHG emissions avoided: Lifetime direct GHG emissions avoided are the emissions reductions attributable to the investments made during the project's supervised Manual for Energy Efficiency and Renewable Energy Projects Manual for Transportation Projects		
For LULUCF projects, the definitions of "lifetime direct and indirect" apply. Lifetime length is defined to be 20 years, unless a different number of years is deemed appropriate. For emission or		
General Data	Results	Notes
at Terminal Evaluation		
Project Title	Energy Efficiency in new construction of the residential and commercial buildings in Mongolia	
GEF ID	3571	
Agency Project ID	70071	
Country	Mongolia	
Region	EAP	
GEF Agency	UNDP	
Date of Council/CEO Approval	December 7, 2009	Month DD, YYYY (e.g., May 12, 2010)
GEF Grant (US\$)	975,000	
Date of submission of the tracking tool	November 12, 2013	Month DD, YYYY (e.g., May 12, 2010)
Is the project consistent with the priorities identified in National Communications, Technology Needs Assessment, or other Enabling Activities under the UNFCCC?	1	Yes = 1, No = 0
Is the project linked to carbon finance?	0	Yes = 1, No = 0
Cumulative cofinancing realized (US\$)	1,608,707	
Cumulative additional resources mobilized (US\$)	50,000	additional resources means beyond the cofinancing committed at CEO endorsement
Objective 2: Energy Efficiency		
Please specify if the project targets any of the following areas		
Lighting		Yes = 1, No = 0
Appliances (white goods)		Yes = 1, No = 0
Equipment		Yes = 1, No = 0
Cook stoves		Yes = 1, No = 0
Existing building	1	Yes = 1, No = 0
New building	1	Yes = 1, No = 0
Industrial processes		Yes = 1, No = 0
Synergy with phase-out of ozone depleting substances		Yes = 1, No = 0
Other (please specify)		
Policy and regulatory framework	5	0: not an objective/component 1: no policy/regulation/strategy in place 2: policy/regulation/strategy discussed and proposed 3: policy/regulation/strategy proposed but not adopted 4: policy/regulation/strategy adopted but not enforced 5: policy/regulation/strategy enforced
Establishment of financial facilities (e.g., credit lines, risk guarantees, revolving funds)	5	0: not an objective/component 1: no facility in place 2: facilities discussed and proposed 3: facilities proposed but not operationalized/funded 4: facilities operationalized/funded but have no demand 5: facilities operationalized/funded and have sufficient demand
Capacity building	5	0: not an objective/component 1: no capacity built 2: information disseminated/awareness raised 3: training delivered 4: institutional/human capacity strengthened 5: institutional/human capacity utilized and sustained
Lifetime energy saved	21,894,812	MJ (Million Joule, IEA unit converter: http://www.iea.org/stats/unit.asp) Fuel savings should be converted to energy savings by using the net calorific value of the specific fuel. These energy savings are then totaled over the respective lifetime of the investments.
Lifetime direct GHG emissions avoided	3,314	tonnes CO2eq (see Special Notes above)
Lifetime direct post-project GHG emissions avoided	-	tonnes CO2eq (see Special Notes above)
Lifetime indirect GHG emissions avoided (bottom-up)	441,007	tonnes CO2eq (see Special Notes above)
Lifetime indirect GHG emissions avoided (top-down)	273,275	tonnes CO2eq (see Special Notes above)
Objective 6: Enabling Activities		
Please specify the number of Enabling Activities for the project (for a multiple country project, please put the number of countries/assessments)		
National Communication		
Technology Needs Assessment		
Nationally Appropriate Mitigation Actions		
Other		
Does the project include Measurement, Reporting and Verification (MRV) activities?	1	Yes = 1, No = 0

APPENDIX F – EVALUATION QUESTION MATRIX

Evaluative Criteria	Questions	Indicators	Sources ¹⁹	Methodology ²⁰
Relevance: How does the project relate to the main objectives of the GEF focal area, and to the environment and development priorities at the local, regional and national levels?				
<ul style="list-style-type: none"> Is the project relevant to National priorities and commitment under international conventions? <u>Yes, the project is highly relevant to the rapidly growing construction sector of Mongolia. Interventions made by BEEP are very timely for influencing the rate of growth of GHG emissions from this particular sector.</u> 	Is the project country-driven? <u>Yes, through the JNNSM Phase I or otherwise referred to as the National Solar Mission that was initiated in January 2010.</u>	Existence of Construction Development Centre	Key project partners & stakeholders	Interviews with relevant stakeholders
	Does the project adequately take into account the national realities, both in terms of institutional and policy framework in its design and its implementation? <u>While the Project correctly assumed improving the energy utilization efficiency in the building sector would reduce GHG emissions, the design did not consider that the price of energy was and is still a critical factor in getting the house owners and private builders to pay attention to EE.</u>		Information shared by program partners, Project management unit	Interviews and document review,
	<ul style="list-style-type: none"> How effective is the project in terms of supporting and facilitating building sector in moving towards adopting energy efficiency concepts/principles in new residential and commercial buildings? <u>The Project has been effective in supporting and facilitating the improvement of knowledge of government agencies, building sector professionals, material suppliers, private construction companies. Some of the house construction companies have already started building new houses using concepts developed by BEEP. The project has laid down principles for commercial buildings also, however BEEP's engagement with construction companies involved with commercial building remained limited.</u> 	Construction of individual houses follow designs developed by BEEP; availability of EE building materials; investments by Xac Bank	Meeting with program partners, visits to new homes built with BEEP support and visit to housing construction site	Interviews and document review, GHG reduction calculations
	<ul style="list-style-type: none"> What was the level of stakeholder participation in project design and ownership in project implementation? <u>MoCUD's participation in Project design and ownership has been high. The project stakeholders have credited the Project with providing training,</u> 		Meeting with program partners	Interviews and document review

¹⁹ Various sources, but not limited to project document, project reports, national policies & strategies, key project partners & stakeholders, needs assessment studies, data collected throughout monitoring and evaluation, data reported in project annual & quarterly reports etc.

²⁰ Various methodologies, but not limited to Data analysis, Documents analysis, Interviews with project team, Interviews with relevant stakeholders etc.

	<u>technical materials and technical advice to ministries, construction companies and bank which is helping to transform the building sector.</u>			
<ul style="list-style-type: none"> Is the project internally coherent in its design? 	<ul style="list-style-type: none"> Are there logical linkages between expected results of the project (log frame) and the project design (in terms of project components, choice of partners, structure, delivery mechanism, scope, budget, use of resources etc.)? <u>There are logical linkages between targets of the various outputs. However, there are couple of end-of-project targets that are not easy to measure.</u> 		<ul style="list-style-type: none"> Data and information degenerated by project; PIRs 	<ul style="list-style-type: none"> Interviews and document review
	<ul style="list-style-type: none"> Does the project achieve its expected outcomes? If not, enumerate the reasons <u>Yes, the main outcome of reducing the GHG emissions from new construction in the building sectors through revised BCNS, availability of superior material, designs, and enhanced knowledge of building sector professional, will be met by EOP</u> 	<ul style="list-style-type: none"> Individual house construction follow BCNS, designs developed by BEEP; availability of EE building materials; 	<ul style="list-style-type: none"> Data and information degenerated by project; PIRs 	<ul style="list-style-type: none"> Interviews and document review, GHG calculations
	<ul style="list-style-type: none"> Did the project made satisfactory accomplishment in achieving project outputs vis-à-vis the targets and related delivery of inputs and activities? <u>Most of the Project outputs were delivered satisfactorily. The exception include the shortfall in the approval of bank loans for building energy efficient individual homes, and less than target investment by bank in building energy efficiency as the targeted beneficiary for home loans did not meet the bank's eligibility criteria.</u> 			
<ul style="list-style-type: none"> Does the project provide relevant lessons and experiences for other similar projects in the future? 	<ul style="list-style-type: none"> Has the experience of the project provided relevant lessons for other future projects targeted at similar objectives? State the lessons learnt. <u>BEEP with three outcomes was well designed to stay focused in achieving the broad goal. Though it had two GEF supported outcome, the third outcome involving co-financing from bank was important to attract private financing for the cause of building energy efficiency. In spite of less than target achievement in co-financing by bank, its continued commitment for the cause of building EE has helped the project's sustainability.</u> 	<ul style="list-style-type: none"> n/a 	<ul style="list-style-type: none"> Information shared by PMC, interaction with project stakeholders 	<ul style="list-style-type: none"> Interviews, document review

Effectiveness: The extent to which an objective has been achieved or how likely it is to be achieved?				
<ul style="list-style-type: none"> Has the project been effective in achieving the expected outcomes and objectives? <i>Yes.</i> 	<ul style="list-style-type: none"> Whether the performance measurement indicators and targets used in the project monitoring system are accomplished and able to achieve desired project outcomes within 31st December 2013? <i>Yes. <u>With the exception of one, BEEP will successfully accomplish all the overall targets by EOP. In most cases the targets have been exceeded, especially for Outcomes 1 and 2.</u></i> 		<ul style="list-style-type: none"> PIR, ProDoc, stakeholder interviews 	<ul style="list-style-type: none"> Document analysis, site visits
<ul style="list-style-type: none"> How is risk and risk mitigation being managed? 	<ul style="list-style-type: none"> How well are risks, assumptions and impact drivers being managed? <i>The action taken by PIU satisfactorily dealt with the risks during project implementation phase. Towards the EOP the rating of all possible risk remains 'low'.</i> 		<ul style="list-style-type: none"> PIR, ProDoc, stakeholder interviews 	<ul style="list-style-type: none"> Document analysis, site visits
	<ul style="list-style-type: none"> What was the quality of risk mitigation strategies developed? Were these sufficient? <i>The project risk and mitigation measures developed were adequate to manage the overall risk of the project.</i> 		<ul style="list-style-type: none"> PIR, ProDoc, stakeholder interviews 	<ul style="list-style-type: none"> Document analysis, site visits
	<ul style="list-style-type: none"> Are there clear strategies for risk mitigation related with long-term sustainability of the project? <i>The project risk and mitigation plan has covered all possible scenarios and ways to address them. Towards the EOP the only long-term risk to sustainability is enforcement by the GoM and compliance to the revised BCNS and home designs by private sector. These have been addressed in Section 4 of this report under 'recommendations'.</i> 		<ul style="list-style-type: none"> PIR, ProDoc, stakeholder interviews 	<ul style="list-style-type: none"> Document analysis, site visits
<ul style="list-style-type: none"> Consideration of recommendations and reporting of information 	<ul style="list-style-type: none"> Did the project consider Midterm Review recommendations conducted in February – March 2012 and reflected in the subsequent project activities? Reporting of the fuels reduction in each of the model energy efficient housing units. <i>The PIU and UNDP CO took action on the recommendation provided in the MTR.</i> 		<ul style="list-style-type: none"> PIR, ProDoc, stakeholder interviews 	<ul style="list-style-type: none"> Document analysis, site visits
<ul style="list-style-type: none"> What lessons can be drawn regarding effectiveness for other similar projects in the future? 	<ul style="list-style-type: none"> What lessons have been learned from the project regarding achievement of outcomes? <i>A well developed and succinct PPM, and well designed project with limited number of outcomes helped the PIU stay on course and focused to achieve the overall objective. The design and number of outcome greatly increased the project's impact, efficiency and effectiveness in training and capacity building efforts.</i> 		<ul style="list-style-type: none"> PIR, ProDoc, stakeholder interviews 	<ul style="list-style-type: none"> Document analysis, site visits
	<ul style="list-style-type: none"> What changes could have been made (if any) to the project design in 		<ul style="list-style-type: none"> PIR, 	<ul style="list-style-type: none"> Document

	<p>order to improve the achievement of the project's expected results?</p> <p><u>Financing activity required skills and experience of the same sector to engage banking sector and open up an altogether new sector for investments. The risk sharing mechanism is standard practice applied with private sector banks for which other multilateral and bi-lateral organizations' engagement becomes important since UNDP's financial resources are meant for capacity building and training.</u></p>		ProDoc, stakeholder interviews	analysis, site visits
Efficiency: Was the project implemented efficiently, in-line with international and national norms and standards and delivered results with the least costly resources possible?				
<ul style="list-style-type: none"> Was project support provided in an efficient way? <u>Yes, the project met its target of updating BCNS, training construction sector professionals, and corresponding GHG reduction, which were achieved within budget.</u> 	<ul style="list-style-type: none"> How do the project management systems, including progress reporting, administrative and financial systems and monitoring and evaluation system were operating as effective management tools, aid in effective implementation and provide sufficient basis for evaluating performance and decision making? <u>The project management was carried out the PIU which assisted in procurement process towards providing resources for capacity building using UNDP/GEF funds. Project Board met regularly and took decisions on advancing the project towards its goal of overcoming the barriers for energy efficiency in the construction sector of Mongolia. The data analysis carried out shows signs that market transformation in the residential sector is at nascent stage (beginning to happen) and all project targets have been met. This is indicative of effective project implementation. One area that was lacking was the presence of a full time Project Finance officer within the PIU. It is very likely that with one person dedicated to the specialised requirements of the banking sector would have helped project meet its co-financing goal.</u> 	•	• PIR, ProDoc, stakeholder interviews	• Document analysis, site visits
	<ul style="list-style-type: none"> How effective was the adaptive management practiced under the project and lessons learnt? <u>Effective, given that project has reached its targets for updating BCNS and training, capacity building, as well as able to leverage financing from Millennium Challenge Account in addition to home loan from Xac Bank to increase the reach of energy efficiency financing.</u> 	•	• PIR, ProDoc, stakeholder interviews	• Document analysis, site visits
	<ul style="list-style-type: none"> Did the project logical framework and work plans and any changes made to them used as management tools during implementation? <u>The LFA/PPM was well developed, clear, and remained relevant</u> 	•	• PIR, ProDoc, stakeholder	• Document analysis, site visits

	<i>through the life-of-project, and therefore, did not require any change.</i>		interviews	
	<ul style="list-style-type: none"> Utilization of resources (including human and financial) towards producing the outputs and adjustments made to the project strategies and scope. <i>Project resources were used efficiently in providing project outputs and defining the focus on capacity building, upgrading BCNS, training and awareness creation. Many workshops, seminars were organized and TV media was used to create awareness and dissemination of the concept.</i> 	•	<ul style="list-style-type: none"> PIR, ProDoc, stakeholder interviews 	<ul style="list-style-type: none"> Document analysis, site visits
	<ul style="list-style-type: none"> Details of co-funding provided (Ministry of Construction and Urban Development, GoM and Xac Bank) and its impact on the activities <i>Refer Table 3 under section 3. of this report.</i> 	•	•	•
	<ul style="list-style-type: none"> How does the APR/PIR process helped in monitoring and evaluating the project implementation and achievement of results? <i>Project Outcomes were reviewed and updated by PIU and UNDP CO during annual reporting the GEF regional office. The PIRs helped in keeping the project on track, result-oriented.</i> 	•	•	•
<ul style="list-style-type: none"> How efficient are partnership arrangements for the project? 	<ul style="list-style-type: none"> Appropriateness of the institutional arrangement and whether there was adequate commitment to the project? <i>The institutional arrangement was appropriate for the project. Various project partners involved in the project were motivated and fully committed to the cause of improved energy efficiency of buildings.</i> 	•	<ul style="list-style-type: none"> Disucssion with program partners 	•
	<ul style="list-style-type: none"> Was there an effective collaboration between institutions responsible for implementing the project? <i>Yes. The high motivation and commitment levels translated into project meetings all its targets for capacity building and training that were set at the beginning of the project. A number of partners have conveyed their commitment to the cause of building energy efficiency would continue and a few private sector players have included it as business differentiator.</i> 	•	<ul style="list-style-type: none"> Disucssion with program partners 	•
	<ul style="list-style-type: none"> Is technical assistance and support received from project partners and stakeholders appropriate, adequate and timely specifically for project PMU? <i>The project partners such Association of Mongolian Windows and Door Manufacturers' Association, Building Material</i> 	•	<ul style="list-style-type: none"> Meeting with project partners, site visits 	<ul style="list-style-type: none"> Document Analysis, CO2 reduction

	<u>Manufacturers' Association of Mongolia and Mongolian Association of Civil Engineers, Mongolian University of Science and Technology provided valuable contribution and supported project's activities. The collaborative relationship between the PIU and project partners helped BEEP achieve its goals.</u>			calculations
Sustainability: To what extent are there financial, institutional, social-economic, and/or environmental risks to sustaining long-term project results?				
<ul style="list-style-type: none"> Will the project be sustainable on its conclusion and stimulate replications and its potential? <u>Likely. Sufficient capacity has been built during the past 4½ years of BEEP, among the local stakeholders such as private house construction companies, building sector professionals and associations of doors and windows manufacturers and building construction material association. As the BCNS have been updated and its compliance is mandatory, all new construction buildings are expected to be energy efficient. MoCUD will carry on the work with the help of MUST and associations, CDC</u> 	<ul style="list-style-type: none"> How effective is the project in terms of strengthening the BCNS, training and awareness creation in development and demonstration of energy efficient single houses, and replication of these options on their own by other Ger owners once the project is closed. Does there exist a sound database of knowledge, and technical cell on supporting financing by Xac Bank. <u>Very Effective. BEEP contributed to updating of 57 BCNS and trained more than 2000 building sector professional. The project has been effective in providing technical hand-holding support to implement EE concepts and designs in single unit homes that comply with revised BCNS. Several reports and documentaries have been made on the energy saving technology options, which needs to be shared with industries even after the end of this project. Though the project faced some challenges for providing home loan through Xac Bank, it demonstrated adaptive management by engaging MCA and managed to leverage MCA funds to engage Xac Bank, and opened a new sector for the bank to provide financial support. Xac Bank has short to medium term commitment in the building sector.</u> <u>How useful the work was Outcome 3 on Financing support to those interested in energy efficiency in their dwellings? The project made important contribution The project with the support of Millennium Challenge Account made use of home loan from Xac Bank to demonstrate new designs of house that utilized energy efficiently and are more comfortable than ger, and also reduced fossil fuel consumption by 50%.</u> Appropriateness of the institutional arrangement and whether there was adequate commitment to the project. <u>The institutional arrangement was appropriate for the project. Various project partners involved in the project have gained from it as well as made important contribution to the cause of improved energy</u> 	<ul style="list-style-type: none"> Response of government agencies, ministries and select project partners to carry on the work after end of project 	<ul style="list-style-type: none"> PIR, ProDoc, stakeholder interviews 	<ul style="list-style-type: none"> Document analysis, site visits
			<ul style="list-style-type: none"> PIR, ProDoc, stakeholder interviews 	<ul style="list-style-type: none"> Document analysis, site visits

<i>and ECC.</i>	<i>efficiency of buildings. More importantly, the capacity of these institutions have got build to the extent that they can work independently and support MoCUD in its work to ensure new buildings in Mongolia are energy efficient.</i>			
Impact: Are there indications that the project has contributed to, or enabled progress towards maximizing environmental benefits?				
<ul style="list-style-type: none"> What was the project impact under different components 	<p>(a) Updating and Strengthening of Mongolian Energy Efficiency BCNS</p> <ul style="list-style-type: none"> <i>BEEP directly contributed to updating of 57 new BCNS including the development of 3 new norms for energy efficiency in buildings; 12 books on various aspects of improving energy efficiency were produced out of which 7 were contribution by MUST. The PIU also worked with government agencies, academic institutions, construction companies; product suppliers capacity to build capacity and make contribution towards reducing energy intensity in building sector.</i> <p>(b) Training and Awareness</p> <ul style="list-style-type: none"> <i>More than 30 training programmes conducted and trained 2200+ people connected with construction Awareness of 'energy efficiency' potential in building sector; steps required to develop and accelerate market have been raised among key stakeholders including GoM policymakers. Excellent knowledge products, studies regular trainings have increased the awareness of the sector professionals and GoM to take actions to conserve energy and improve air quality.</i> <p>(c) Facilitating Access to Energy Efficiency Financing</p> <ul style="list-style-type: none"> <i>Successful demonstration of individual houses built as per revised BCNS and motivated 'Ger dwellers' to invest and move into such house. UNDP's TA assistance leveraged Xac Bank's loan of US \$1.1m for houses and SME against a combined equity contribution of US\$ 1.03m High Satisfaction on awareness and technical support of BEEP among private construction companies and manufacturers of windows, insulation materials producers.</i> 	<ul style="list-style-type: none"> Number of BCNS updated, training and awareness creation and information dissemination, loan disbursed by Xac Bank 	<ul style="list-style-type: none"> Discussion with project stakeholders PIR 	<ul style="list-style-type: none"> Document Analysis and stakeholder discussions
	<ul style="list-style-type: none"> What was the additional co-financing amount that was leveraged by the project and mobilized investments in Mongolia? The co-financing given by Ministry of Construction and Urban Development, KEMCO and GIZ and the investments made by individual home owners. <i>Co-financing from KEMCO was fully utilized by BEEP while the</i> 	<ul style="list-style-type: none"> Number of individual homes that received financial support from 	<ul style="list-style-type: none"> Discussion with project stakeholders PIR, APR, CDR 	<ul style="list-style-type: none"> Document Analysis and stakeholder discussions

	<u>co-financing provided by Xac bank for the housing sector and to SME involved in the building sector was USD1.1 million, was 56% of the target. The project demonstrated adaptive management to obtain co-financing from the Millennium Challenge Accounts' Energy and Environment project which was provided as a grant for construction of energy efficient homes for 'ger' dwellers and providing them energy efficient cook-stoves. The households which opted to constructed energy efficient home with technical assistance from BEEP and loan from Xas Bank also received an MCA grant in between 5 to 9 million MNT</u>	BEEP		
<ul style="list-style-type: none"> What are the indirect benefits that can be attributed to the project? 	<ul style="list-style-type: none"> What has been the impact of the various training programs, workshops held and training guides produced under the project in building awareness and enhancing capacities? <u>The impact has been satisfactory based on the fact that all workshops were well attended. The feedback surveys of the workshops indicate that majority of the participants were satisfied with the contents of training/workshop, the topics and discussions were relevant and helped in capacity building effort. The outcome of the Project reaching its broad goal and CO2 reduction target indicates that these workshops have had an impact.</u> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> Impacts due to information dissemination under the project 	<ul style="list-style-type: none"> Assess the use of electronic information and communication technologies in the implementation and management of the project. Documentary on the model units and the process documents produced. <u>The project used electronic media –web and TV – for information dissemination about the importance and benefits of using energy efficiently in the single unit house and buildings. The project's activities and deliverables produced have been hosted on the web which will be maintain for 5 year by MACE after the project ends in December 2013.</u> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none">

APPENDIX G – LOGICAL FRAMEWORK MATRIX

	Indicator	Baseline	Targets End of Project	Source of verification	Risks and Assumptions
Project Objective7 Reduction in the annual growth rate of GHG emissions from the buildings sector in Mongolia, by improving the energy utilization efficiency in new construction in the residential and commercial buildings sector	<ul style="list-style-type: none"> Specific energy consumption, kWh/m2/yr: Baseline existing construction sector buildings New construction sector buildings that do not fully comply with BCNS EE requirements New buildings that fully comply with existing BCNS EE requirements Private houses 	250 200 150 550	<ul style="list-style-type: none"> 250 by project end 169 by project end 135 by project end 100 (through voluntary agreements) by project end 500 by project end 	Evaluation of building construction rates, energy intensities, and GHG emission factors	Energy consumption evaluation and analysis activities under the project are fully supported. by stakeholders

Outcome 1 Energy efficiency provisions of the Mongolian Building Code, Norms and related Standards (BCNS) updated and strengthened	Increased stringency of EE provisions of BCNS system ▫Increased compliance with BCNS EE levels ▫ BCNS EE coverage extended to higher proportion of new buildings	New Construction Sector buildings meet 25% of overall average current BCNS EE requirements ▫Key BCNS EE elements are not fully enforced ▫BCNS system only enforced for construction sector buildings	New energy efficiency standards developed, covering: 1. Building energy efficiency performance modeling 2. Methods for determining the total thermal resistance of parts of buildings 3. Thermo-technics of construction materials 4. Methods for determining the thermal resistance of insulation materials 5. Space heating system energy efficiency 6. Domestic hot water system energy efficiency 7. Thermal resistance of external walls 8. Thermal resistance of ground floors, basements, and foundations 9. Thermal resistance of roofs and insulated ceilings 10. Thermal resistance of windows 11. Air tightness, leakage and ventilation 12. Energy efficient lighting systems ▫Government officials trained in the operation and enforcement of the new BCNS energy efficiency provisions ▫85% of newly constructed buildings meet the updated BCNS EE requirements by 2015 ▫Building energy monitoring and reporting system developed and implemented.	Review of new BCNS EE control system and stringency levels ▫ Review of actual EE levels achieved in practice in sectors covered by BCNS requirements	Updated BCNS EE system development is fully supported ▫New BCNS EE system and requirements are more strictly enforced
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Outcome 2 Training and Awareness Program	<input type="checkbox"/> New and improved EE related building technologies developed, tested, refined, demonstrated and documented, <input type="checkbox"/> New building EE technologies supported and necessary training provided <input type="checkbox"/> Number of training courses <input type="checkbox"/> Number of trainees employing building EE technologies <input type="checkbox"/> Number of trainees engaged in building EE service provision	<input type="checkbox"/> Key new building EE technologies are not developed and supported <input type="checkbox"/> Key building EE issues will remain poorly known and understood <input type="checkbox"/> No building EE training courses and publicity campaigns will be run <input type="checkbox"/> Minimal numbers of new urban area buildings will fully meet EE requirements	<input type="checkbox"/> 4 new building EE technologies supported <input type="checkbox"/> 4 existing Energy Conservation Centers in UB, Darkhan and Erdenet supported <input type="checkbox"/> 3 new regional centre EE advisory services in Dalanzadgad, Dornod and Khovd introduced and operating effectively <input type="checkbox"/> 12 training courses completed by end of project <input type="checkbox"/> 500 trainees trained in building EE technologies by end of project <input type="checkbox"/> 200 trainees providing building EE services by end of project <input type="checkbox"/> 6 publicity campaigns completed by end of project <input type="checkbox"/> 9,000 buildings applying EE by 2012	<input type="checkbox"/> Evaluation of the suitability of new building EE technologies for Mongolian conditions <input type="checkbox"/> Evaluation of training and technical support provision and effectiveness <input type="checkbox"/> Initial and final project surveys of awareness of the government, public and the building sector on the new BCNS and EE building technology applications <input type="checkbox"/> Monitoring of building EE loans	Technical support partners provide necessary support Building sector is interested in and supports new building EE technologies Building industry, financial sector and public are interested in building EE issues
Outcome 3 <i>Access to energy efficiency financing facilitated</i>	<input type="checkbox"/> Number of building EE training courses provided for banks/FIs staff <input type="checkbox"/> Number of financing schemes lending to building EE projects <input type="checkbox"/> Volume of investments in building EE projects funded by banks/FIs.	<input type="checkbox"/> Only minimal bank loans are available and utilized for building EE <input type="checkbox"/> No training courses provided to banks/FIs staff in building EE loan appraisal <input type="checkbox"/> No financing schemes for building EE in place	<input type="checkbox"/> At least 4 training events and workshops conducted for XacBank and other FI's loan officers on how to assess and conduct due diligence of energy efficiency investments <input type="checkbox"/> At least 100 loans provided to BEE projects by end of PY4 <input type="checkbox"/> \$2M invested by banks/FIs in building EE and reinvested in building EE as loans repaid by 2013 <input type="checkbox"/> Workshops conducted to raise awareness and build the capacity of commercial, government and residential property owners to access financing for energy efficiency improvements	<input type="checkbox"/> Monitoring of banks/FIs provision of building EE loans <input type="checkbox"/> Initial and final survey of building EE levels	<input type="checkbox"/> Building owners and tenants will borrow additional funds for building EE at commercial terms

APPENDIX H– EVALUATION CONSULTANT AGREEMENT FORM

Evaluators:

1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and respect people's right not to engage. Evaluators must respect people's right to provide information in confidence, and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals, and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.
6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/or oral presentation of study imitations, findings and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

Evaluation Consultant Agreement Form⁶

Agreement to abide by the Code of Conduct for Evaluation in the UN System

Name of Consultant: Mr. Sandeep Tandon, TE International Consultant

Name of Consultancy Organization (where relevant): Not Applicable


I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at place on date: October 15, 2013, NOIDA, U.P., India

Signature: 

Evaluation Consultant Agreement Form⁶ Agreement to**abide by the Code of Conduct for Evaluation in the UN System****Name of Consultant: _Ms. Batimaa P. , TE National Consultant****Name of Consultancy Organization (where relevant): Not Applicable****I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.**

Signed at place on date: 2013-10-15

Signature: _____ 

⁶ www.unevaluation.org/unegcodeofconduct

APPENDIX I – ASSESSMENT REPORT ON BUILDINGS UNDER CONSTRUCTION IN ULAANBAATAR



Барилга, Хот Байгуулалтын Яам



Барилгын Хөгжлийн Төв ТӨҮГ

**УЛААНБААТАР ХОТЫН ХЭМЖЭЭНД
БАРИГДАЖ БУЙ ОРОН СУУЦНЫ
СУДАЛГААНЫ ТАЙЛАН**



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НЭГ. СУДАЛГААНЫ ҮНДЭСЛЭЛ

Монгол Улсын Засгийн газар, Барилга, хот байгуулалтын яамнаас салбарын бодлогын хэрэгжилт, цаашдын чиг хандлагын талаар Улаанбаатар хотод үйл ажиллагаа явуулж буй барилгын салбарын хөрөнгө оруулагч, захиалагч, үйлдвэрлэгч, бүтээн байгуулагч, гүйцэтгэгч аж ахуй нэгжүүдтэй хамтран ажиллах, төр, хувийн хэвшлийн түншлэлээр орон сууцны нийлүүлэлтийг дэмжих зорилгоор Барилгын хөгжлийн төв болон Орон сууцны санхүүжилтийн корпорацийн 317/А-155 дугаар тушаалыг үндэслэн Улаанбаатар хотын 9 дүүрэгт нийт 15 хүнээс бүрдэх хамтарсан ажлын хэсэг томилогдон баригдаж буй орон сууцны барилга тус бүр дээр очиж авсан судалгааны мэдээлэл дээр үндэслэн дараах судалгааны тайланг гаргав.

ХОЁР. СУДАЛДААНЫ ЗОРИЛГО

Энэхүү судалгааны зорилго нь Улаанбаатар хотод 2013, 2014 болон 2015 онуудад ашиглалтад орох орон сууцны талаар тойм мэдээлэл гаргахад оршино.

ГУРАВ. ХЭРЭГЖҮҮЛСЭН АРГА ХЭЛБЭР

Судалгааны анкетыг боловсруулах, орон сууцны барилга угсралтын ажил явагдаж буй газар тус бүр дээр очиж мэдээллийг биеэр авах, бусад тохиолдолд цахим шуудан болон холбогдох утсаар мэдээллийг авах.

ДӨРӨВ. СУДАЛГААНЫ ХАМРАХ ХҮРЭЭ

Улаанбаатар хотын нийт 9 дүүрэгт орон сууц барилга угсралтын ажил явуулж буй хөрөнгө оруулагч, захиалагч, болон гүйцэтгэгчид.

ТАВ. СУДАЛГААНЫ ҮР ДҮН

Барилгын хөгжлийн төв болон Орон сууцны санхүүжилтийн корпорацийн 317/А-155 дугаар тушаалыг үндэслэн Улаанбаатар хотын 9 дүүрэгт хамтарсан ажлын хэсэг томилогдон баригдаж буй орон сууцны барилга тус бүр дээр очиж авсан нийт 116 орон сууцны барилгын судалгааны материалыг боловсруулан тайлан гаргав. Улаанбаатар хотын хэмжээнд нийт 6383 айлын орон сууц 2013 онд, 8965 айлын орон сууц 2014 онд ашиглалтад орохоор бүртгэгджээ. Үүнээс нийт Баянзүрх дүүрэгт 4170, Сүхбаатар дүүрэгт 854, Чингэлтэй дүүрэгт 499, Баянгол дүүрэгт 2264, Хан-Уул дүүрэгт 2336, Налайх дүүрэгт 403, болон Багануур дүүрэгт 34 айлын орон сууц тус бүр

Судалгааны тайлан

ашиглалтад орохоор бүртгэгдсэн байгаагаас үзэхэд Баянзүрх, Баянгол, Сонгинохайрхан, Хан-Уул дүүргүүдэд орон сууцны барилгажилт эрчимтэй явагдаж байна гэж товчоор дүгнэж байна.

ӨНӨӨДРИЙН БАЙДЛААР ХЭРЭГЖҮҮЛЖ БУЙ ОРОН СУУЦНЫ ТӨСЛИЙН МЭДЭЭЛЭЛ

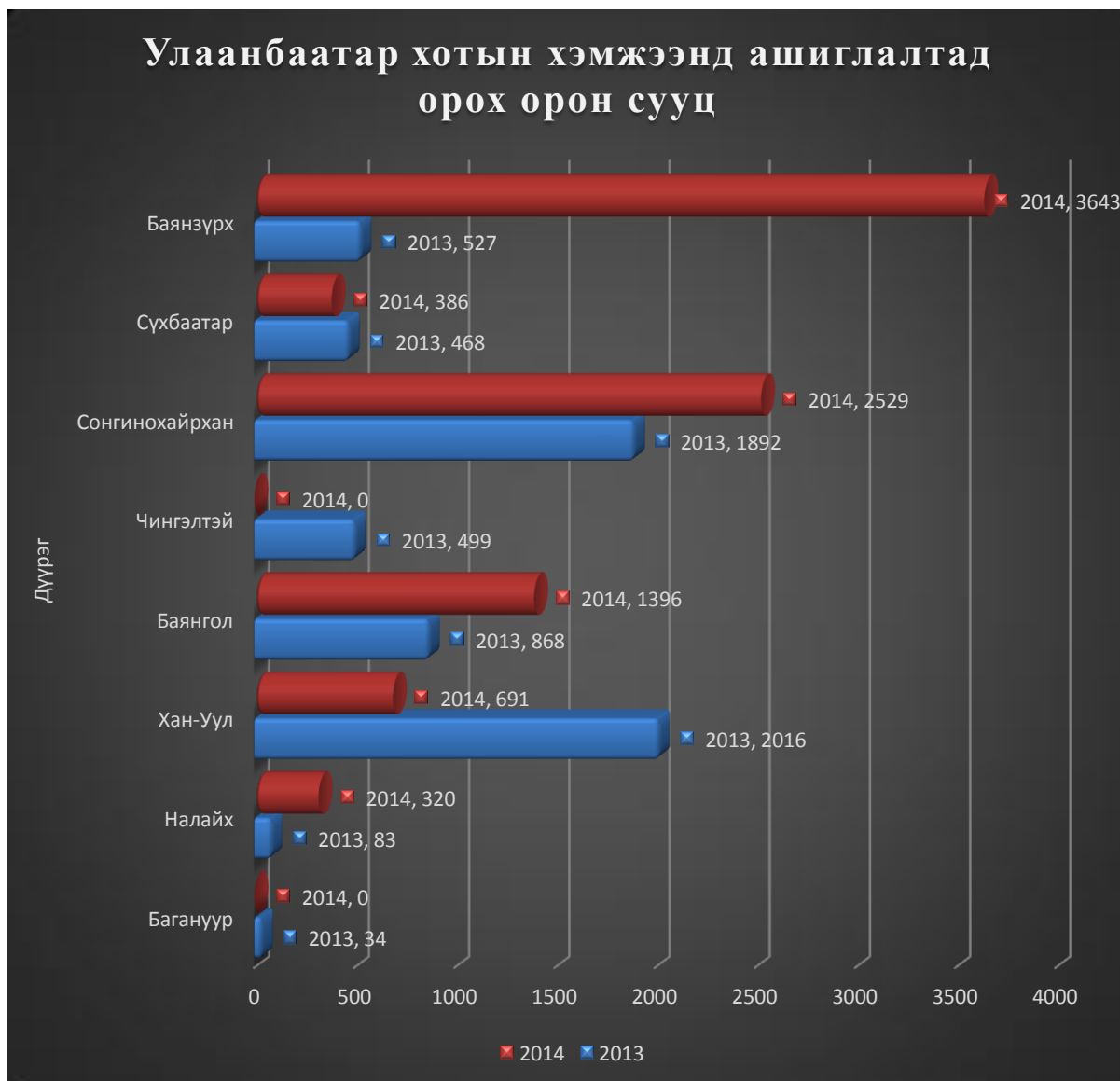
Судалгаанд хамрагдсан нийт аж, ахуй нэгжүүдэд ойролцоогоор 8447 ажилчин ажиллаж байгаагаас 7,003 буюу 83,0% Монгол, 1,444 буюу 17% нь гадаад ажилчид байгаа нь 2013 оны 1-р улиралд хийгдсэн судалгааны мэдээлэлтэй ажилчдын харьцааны хувьдүйцэж байгааг харуулж байна

Зураглал 5.1



(Гадаад ажилчдын дийлэнхийг БНХАУ болон БНАСАУ-ын ажилчид эзэллэж байна)

Судалгаанд хамрагдсан нийт аж, ахуй нэгжүүдийн хэрэгжүүлж буй төслийн хүрээнд 2013-2014 оны хооронд нийт 246 орон сууцны барилга, үйлчилгээний төв, хотхон баригдахаар төлөвлөгдөн барилга угсралтын ажил явагдаж байна. Үүнд нийт 15,348 айлын орон сууц төлөвлөгджээ.



(2013 болон 2014 онд ашиглалтад орох орон сууцны тоо хэмжээг дүүрэг тус бүрээр зураглал 5.2-д харуулав) **Number of new buildings (year, number of apartments) which will be completed in 2013-2016) in Ulaanbaatar**

Дээрх зураглалаас Улаанбаатар хотын хэмжээнд нийт 6383 айлын орон сууц 2013 онд, 8965 айлын орон сууц 2014 онд ашиглалтад орохоор бүртгэгджээ. Үүнээс нийт Баянзүрх дүүрэгт 4170, Сүхбаатар дүүрэгт 854, Чингэлтэй дүүрэгт 499, Баянгол дүүрэгт 2264, Хан-Уул дүүрэгт 2336, Налайх дүүрэгт 403, болон Багануур дүүрэгт 34 айлын орон сууц тус бүр ашиглалтад орохоор бүртгэгдсэн байгаагаас үзэхэд Баянзүрх, Баянгол, Сонгинохайрхан, Хан-Уул дүүргүүдэд орон сууцны барилгажилт эрчимтэй явагдаж байна.

Харин нийслэлийн захын дүүргүүд болох Багануур, Багахангай, Налайх болон төвийн бүсийн Сүхбаатар, Чингэлтэй дүүргүүдэд орон сууцны барилгажилт бага байгааг харж болохоор байна.

БАРИЛГЫН АЖЛЫН ГҮЙЦЭТГЭЛИЙН ЯВЦ

Судалгаанд хамрагдсан нийт аж, ахуй нэгжүүдийн хэрэгжүүлж буй төслийн хүрээнд баригдаж байгаа барилгын ажил дараах гүйцэтгэлийн явцтай байна.

Зураглал 5.3



(Улаанбаатар хотын хэмжээнд баригдаж байгаа орон сууцны БУА-ын гүйцэтгэлийн явцыг 0-10%, 11-30%, 31-50%, 51-70%, 71-90%, 91-100% тус бүрээр ангилан зураглал 5.3-д харуулав)

Дээрх зураглалаас нийт баригдаж буй орон сууцны барилгын дийлэнх буюу 5% нь 91-100% болон 57% нь 71-90%-ийн гүйцэтгэлтэй буюу зураглал 5.2 “Улаанбаатар хотын хэмжээнд ашиглалтад орох орон сууц”-ны зураглалтай харьцуулж үзвэл нийт

баригдаж буй орон сууцны 41,5% нь 2013 оны 4-р улиралд ашиглалтанд орохоор байна.

ОРОН СУУЦНЫ ТАЛБАЙН ХУВИАРЛАЛТ

Нийт баригдаж буй орон сууцны талбайн хувиарлалтыг зураглал 5.4-д үзүүлэв. Үүнээс баригдаж байгаа орон сууцны дийлэнх нь 36-60 м.кв талбайн хэмжээтэй сууцнууд баригдаж байна.

Зураглал

5.4



(Зураглал 5.4-д харуулсанаар Улаанбаатар хотын хэмжээнд баригдаж буй орон сууцыг 36-60 м.кв, 61-80 м.кв, 80 м.кв-с дээш гэж гуравангилан үзвэл 36-60 м.кв талбайн хэмжээтэй нийт 6301 сууц, 61-80 м.кв талбайтай 1211 сууц, 80 м.кв-с дээш талбайтай 671

орон сууц баригдаж байна.) The graph shows different size of apartments in various districts of Ulaanbaatar: Baganuur, Nalaikh, Khan-Uul, Bayangol, Chingeltei, Songinokhairkhan, Sukhbaatar, Bayanzurkh

БОРЛУУЛАГДСАН ОРОН СУУЦ

Нийт 15,348¹ айлын орон сууц Улаанбаатар хотын хэмжээнд баригдаж байгаагаас 9,822² айлын орон сууц буюу 64% нь борлуулагдаад байна.

Зураглал 5.5



(Баригдаж буй орон сууцны борлуултын хэмжээг Улаанбаатар хотын хэмжээнд зураглал 5.5-д үзүүлэв)

Зураглал 5.6



(Баригдаж буй орон сууцны борлуулалтын явцыг дүүрэг тус бүрээр зураглал 5.6-д үзүүлэв) –

Percentage of apartments sold-out in different districts of Ulaanbaatar

¹ Number of total apartments under construction

² Number of apartments sold out in 2013

Баригдаж буй орон сууцны борлуулалтыг дүүрэг тус бүрээр авч үзвэл Багануур дүүрэгт 100%, Налайх дүүрэгт 10%, Чингэлтэй дүүрэгт 85%, Баянгол дүүрэгт 51%, Сонгинохайрхан дүүрэгт 78%, Сүхбаатар дүүрэгт 57%, Баянзүрх дүүрэгт 70%-ийн борлуулалт тус тус хийгджээ.

ОРОН СУУЦНЫ 1 М.КВ-ИЙН ҮНЭ

Судалгаанд оролцсон нийт аж, ахуй нэгжүүдийн хэрэгжүүлж буй төслийн орон сууцны 1 м.кв-ийн үнийн харьцуулалт.

Зураглал 5.7



(Баригдаж буй орон сууцны үнийн дунджийг дүүрэг тус бүрээр зураглал 5.7-д харуулав)

Баригдаж байгаа орон сууцны м.кв-ийн үнийг дүүрэг тус бүрээр авч үзвэл Багануур дүүрэгт хамгийн хямд буюу 650,000₮, Налайх дүүрэгт 1,287,000₮, Хан-Уул дүүрэгт 1,937,000₮, Баянгол дүүрэгт 1,894,000₮, Сонгинохайрхан дүүрэгт 1,600,000₮, Сүхбаатар дүүрэгт, 2,152,000₮, Баянзүрх дүүрэгт 1,728,000₮, Чингэлтэй дүүрэгт хамгийн өндөр үнэтэй буюу 2,750,000₮ байна.