

BATF-06-12 ~ 17 - Building Certification

Project number: <i>BATF-06-12 ~ 17</i>		Date: <i>31 August 2006</i>
Title of project: Building Certification		
Leading member & co-leading member: Lead: China; Co-Lead: U.S.		
Participants: Australia, Japan, Korea, India		
Project Overseer: Dr. Liang Junqiang, Director of Building Energy Efficiency and New Material, DOST, Ministry of Construction (MOC)		
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Type of project: <input type="checkbox"/> demonstration/pilot <input type="checkbox"/> national policy, law, regulation <input checked="" type="checkbox"/> appliance testing/labeling <input checked="" type="checkbox"/> seminar/symposium <input type="checkbox"/> training & technical assistance <input type="checkbox"/> public/consumer information <input type="checkbox"/> database/website <input checked="" type="checkbox"/> survey, analysis, research <input type="checkbox"/> others (<i>Please specify</i>)		
Project start date: <i>1 Nov 2006</i>		Project end date: <i>31 Oct 2011</i>
Project summary: Energy labeling is a key mechanism for ensuring effective energy-saving management and has a broader, positive and important effect on economy-wide energy savings. The energy evaluation and labeling of buildings will not only demonstrate their potential to save energy but also improve market transparency which can be a catalyst for greater energy efficiency in buildings. In order to overcome institutional, market and other barriers, the project proposes 15 activities that will foster building energy labeling. These fall into 4 major areas: 1) policy and management systems, 2) technical standards and evaluation methods, 3) plan for building energy labeling, and 4) exchange of information on building energy labeling. The project outputs include a status report on building energy labeling in each Partner country, incentive policies on voluntary energy efficiency certification, research on calculation methods of the building energy consumption, technical guidelines for building energy labeling, and training workshops.		
Signature of Project Overseer: Liang Junqiang Date: 25 August 2006		
Signature of Task Force Chair: Hakdo Kim Date: 31 August 2006		
Remark:		

Background

Analysis of Energy Consumption and CO₂ Emissions

From the 1990s, the energy consumption of Partner countries has been increasing, rising from 36% of world total consumption in 1990 to 52% in 2002.

Rapid growth in construction has led to a large increase in both building floor area and energy consumption, especially in China, the country with the fastest rate of growth in building energy consumption. Accompanying rapid urbanization and construction of new towns, along with improved living standards, building energy consumption in China will eventually increase to about 35% of total energy consumption.

Along with energy use, CO₂ emissions from Partner countries are also increasing—rising from 44% of the world total in 1990 to 50% in 2002.

Analysis of Building Energy Labeling

Energy labeling is a key strategy to encourage energy-efficient design and management of buildings. Energy evaluation and labeling of buildings will not only demonstrate the relative energy efficiency of a building, which can be an incentive to invest in more efficient technologies and operating practices, but also improves the market transparency as a further incentive to energy-efficient purchase and investment decisions by real estate developers, thus speeding the development of a market for low-energy buildings.

The U.S. experience with Energy Star rating of both homes and commercial buildings has led to some useful experience and practical lessons learned in energy labeling. Energy Star ratings are based on the actual measured energy consumption of each building, with comparisons to other similar buildings as a guide to when and where to consider energy-saving measures. Energy efficiency is also an important part of the green building rating system under the U.S. Leadership in Energy and Environmental Design (LEED) program, which has resulted in more than 2,500 buildings certified to date.

Japan has also developed a labeling method to assess the environmental performance of buildings, Comprehensive Assessment System for Building Environmental Efficiency (CASBEE), which has been developed in a cooperative academic, industrial and governmental project. CASBEE is intended for implementation of the environmental assessment based on the new concept of BEE (Building Environmental Efficiency), which enables CASBEE to evaluate both the improvement in living amenity for the building users and the negative aspects of environmental impact.

China has also developed the “Energy Efficiency Labeling Management Method” as the first stage of an energy labeling system covering specific building products and equipment. The building energy labeling system has received increasing attention. In 2003 the “Assessment System for Green Buildings of Beijing Olympics” was carried out, followed in the beginning of 2006 by two other projects, “Evaluation Standard for Green Buildings” and “Technical Standard for Performance Assessment of Residential Buildings.” China has thus made a start on building energy labeling and setting up its own evaluation system and software.

Objectives

Building energy labeling offers a large potential to reduce the building energy consumption in both developed and developing countries. If building energy labeling is successful in helping to strictly implement the new building energy efficiency standard in China and to keep retrofitting existing buildings, there is a potential for China alone to save 4.2×10^{11} kWh of electricity and 2.6×10^8 tons of oil, while reducing greenhouse gas emissions as much as 8.46×10^8 tons of CO₂.

The project objectives are:

- Study experience to date with building labeling and establish technical approaches and incentive policies appropriate to each Partner.
- Based on extensive data collection and analysis, and to the extent necessary and practical, begin development of practical benchmarking tools that can be used to monitor energy use in existing buildings and to establish performance targets for new buildings during the design phase, appropriately linked to building codes.
- Establish continuous monitoring of energy performance as an accepted best practice in the management of large public buildings.
- Set up the energy labeling method and procedure suitable to each country and continue to revise and improve it based on experience. Each Partner should establish its own benchmarking tools, or continue to refine existing tools.
- Demonstrate the power of voluntary market transformation approaches, such as formal recognition programs, in improving energy efficiency in buildings.
- Continue to educate the building sector and the public about building energy labeling, for both new and existing buildings.
- By achieving the objectives mentioned above, encourage continued innovation in energy-efficient building design and construction materials to help significantly decrease building energy consumption.

A target for this effort might be to hold constant total energy use in buildings despite the rapid increase in construction and building floor space, and perhaps eventually achieve significant reductions in building energy use compared with that in 2000.

Analysis of Barriers and Gaps

Differing Policies and Management Systems for Building Energy Labeling

At present, the six Partner countries are pursuing different strategies and programs to save energy in buildings, and approaches to building energy labeling—as well as the amount of program experience with labeling to date—also vary considerably. Future sharing of experience and results will be of benefit to all Partner countries, especially those like China with little previous experience with regulations or policies on building energy efficiency certification.

Existing Standards of Building Design and Construction Quality Also Differ

Due to the different climates and building styles for both residential and non-residential buildings, among Partner countries and even within a Partner, the technical requirements for energy-efficient envelopes, HVAC systems, renewable energy and building controls should not necessarily be the same. Every country also has its own approaches to checking and verifying compliance with energy-efficient requirements, at the design and construction stages.

A Lack of Comparable Methods for Energy Efficiency Labeling

Some Partners have not yet established methods and procedures for building energy labeling, while even those that have adopted such methods are using different approaches and different methods of calculating and comparing performance.

Implementation Programs are not Consistent

Differences in the orientation and emphasis in building energy labels among Partner countries are sometimes a response to differing political systems and economic conditions, leading to unique approaches to marketing the label, incentive policies, and so on.

A Lack of Basic Data on Building Energy Efficiency

There is a need for extensive data on building energy efficiency that can serve as the basis for meaningful benchmarking tools to compare building energy performance.

Activities

In order to address these obstacles and encourage the rapid development or advancement of building energy labeling, the following 15 activities are proposed for work in this area. Successfully implementing these can contribute to substantial improvements in building energy efficiency and reduction in greenhouse gas emissions.

Policy and Management Systems

There are three activities involving policy and management systems

1. Research on Building Energy Labeling Policy and Management

The project will convene a meeting of Partner countries' experts, to summarize and discuss the status of building energy labeling, related incentive policies and management systems in the Partners. The meeting and subsequent work will identify good practices where possible and discuss the applicability of various incentive and management policies that can meet each Partner's situation and market barriers. These results will be provided in reports of the meeting and further analysis.

Results

- The report on the status of building energy labeling in each Partner country.
- The report on successful incentive policies for building energy labeling.

- Documentation of good practices and recommendations on management systems for building energy labeling.

2. Good Practices for Government Promotion of Building Energy Labeling Under a Market Economy.

The project will carry out consultation among the project participants and key stakeholders in their countries, including building energy labeling management organization, technical labeling units and end-users, to identify successful practices and roles for government organizations to promote building energy labeling within a market economy.

Based on preliminary and extensive analysis and discussion, the project will document programs that governments have implemented to promote building energy savings, such as ENERGY STAR and CASBEE. The evaluation will highlight the difference between Partner countries' actual situations and programs to promote the building energy labeling. A report will summarize the successful experiences, and make recommendations for programs and policies to promote the building energy labeling under market economy.

Results:

- The report on the experiences that developed countries promote the building energy labeling in their market situations.
- Recommendations on promoting building energy labeling rapidly and efficiently in market economies.

3. Incentive Policies for Voluntary Energy Efficiency Certification

Voluntary energy efficiency certification programs have had notable successes, in the U.S. and other Partner countries. After reviewing the experiences of successful programs in a number of Partner countries, the project will study and recommend incentive policies on voluntary energy efficiency certification. Each participating Partner will determine the policies that are suitable to its specific situation. Where appropriate individual Partner countries will take steps to adopt or modify incentives to accelerate voluntary energy efficiency certification.

Result:

- Incentive policies for voluntary energy efficiency certification.

Technical Standards and Methods

There are six activities on the area, to establish the technical basis for building energy certification:

- Collection and analysis of extensive building energy performance data.
- Technical guidelines for building energy labeling.
- Research on indices used for the building energy evaluation.
- Methods for calculating building energy consumption.
- Methods for measurement of building energy consumption.
- Develop software to evaluate the building energy efficiency.

Each Partner should start the collection and analysis of extensive building energy performance data to serve as the basis for development of energy efficiency certification methods and the development of energy labeling. This will include establishment of standard measurement and evaluation methods for building energy efficiency, mandatory or voluntary labeling options for both residential buildings and public buildings. The project will draw on study of the experiences of the developed countries and will identify approaches to integrate building energy efficiency into design and inspection systems. The project will develop software to be used for the calculation of building energy consumption. It will develop the technical materials to support energy labeling and regulation energy labeling in the market.

Results:

- Analysis of extensive building energy performance data of residential building.
- Analysis of extensive building energy performance data of public building.
- Technical guidelines for building energy labeling for residential building.
- Research on indices used for the evaluation of energy consumption in residential buildings.
- Research on calculation methods of the building energy consumption and related software for residential buildings.
- Research on measurement methods for energy consumption in residential building.
- Research and explore the software to evaluate the building energy consumption for residential buildings.
- Technical guidelines for building energy labeling for public building.
- Research the indices used for the evaluation energy consumption of public buildings.
- Research on calculation methods for energy consumption public buildings and related software.
- Research on measurement methods for energy consumption in public building.
- Research and explore the software to evaluate the building energy consumption in public building.

Implementation Plan for Building Energy Labeling

There are four activities on implementation planning for building energy labeling.

1. Establish continuous monitoring of energy performance in the management of large public buildings. Establish continuous monitoring of energy performance as an accepted best practice in the management of large public buildings.

Result:

Measurement and analysis report on the energy efficiency in buildings for public building.

2. Pilot project on mandatory building energy labeling. Start a pilot project on building energy labeling based on the label design, procedures and roles of government organizations and the market developed in previous activities.

Result:

Mandatory building energy labeling results on the pilot project.

3. Pilot project on voluntary energy efficiency certification programs. Implement a pilot project to test voluntary marking authentication procedure, with separate certification marks for public building and the residential buildings, and to develop experience to support broader implementation.

Result:

Voluntary energy efficiency certification results on the pilot project.

4. Publicize the building energy labeling programs. To establish a 'Building Energy Efficiency Evaluation Committee' for each Partner, drawing on experts, and compile material to be used for the popularization and training for the relevant technical personnel and labeling unit.

Results:

Popularization material.

Training workshops

Building energy efficiency evaluation committee.

The Exchange of Information of Building Energy Labeling

There are two activities on exchange of information of building energy labeling.

1. Information exchange on building energy labeling. In order to promote the work of energy labeling, set up a network to share experiences, organize technical communication on a scheduled basis, organize experts from developed Partner countries who can give training to developing Partner countries, build up a Partnership "Building Energy Efficiency Evaluation Experts Committee." With the authorization of the PIC, a website for exchanging the information will be created.

Result:

Partnership Building Energy Efficiency Evaluation Experts Committee.

Building energy labeling network for the Partnership.

2. Communication of experiences and improvement of tools for building energy labeling. The project will summarize the results on the pilot projects of the participant Partner countries, and improve individual tools based on experience shared under this project.

Result

Comparison and improvement of methods for the implementation, measurement and evaluation of building labeling programs for Partner countries.

Organizations

To oversee the implementation of the “Action Plan for Building Certification (Energy Rating/Labels)” and further activities, an organization is to be created, led by the relevant organizations for building energy efficiency certification of each Partner.

This organization will include three separate parts: first, the leader group will take charge of the schedule and implementation of the activities in each country; second, the experts consultant system can give advice and suggestions to the activities and reports; third, the project office, take charge of the detailed work of the plan, contact and communicate with other organizations.

The functions are as follows:

1. The leader group: composed of the director of the relevant organizations for building energy efficiency certification in each country, will take charge of the overall management of the project, correspond with the PIC office and Partnership project office.
2. The experts consultant system: composed of the experts from each Partner familiar with the policy, technical, finance, society, and environmental situations and with experience in measurement of building energy consumption, and a wide range of the related knowledge, will present advice based on the highest level of each Partner's building energy-saving and experiences in the implementation of the international project.
3. The project office: composed of the research and measure organization or institute affiliated to the Ministry of construction will coordinate day-to-day implementation, establishment of standards and measurement of buildings.

Budget and Schedule

Budget

	Activity	Budget (US\$'000)
1	4.1.1 Research on building energy labeling policy and management.	46
2	4.1.2 Good practices for government promotion of building energy labeling in a market economy	35
3	4.1.3 Incentive policies for voluntary energy efficiency certification	40
4	4.2.1 Collection and analysis of extensive building energy performance data	80
5	4.2.2 Technical guidelines for building energy labeling	42
6	4.2.3 Research on indices used for the building energy evaluation	36
7	4.2.4 Methods for calculating building energy consumption	40
8	4.2.5 Methods for measurement of building energy consumption	50
9	4.2.6 Develop software to evaluate the building energy efficiency	80
10	4.3.1 Establish continuous monitoring of energy performance in the management of large public buildings.	125
11	4.3.2 Pilot project on mandatory building energy labeling	56
12	4.3.3 Pilot project on voluntary energy efficiency certification programs	56
13	4.3.4 Publicize the building energy labeling	60
14	4.4.1 Information exchange on building energy labeling	60
15	4.4.2 Communication of experiences and improvement of tools for building energy labeling	100
	Total	906

Schedule

June 2006 –
September 2006

Collect information and develop project plan

September 2006 – December 2006	Plan detailed activities and develop implementation the plan for each country
January 2007 – June 2007	Evaluate policy and management systems, carry out technical system research and stage achievement report
July 2007 – December 2007	Finish the policy and the management system, the technical system research; Design the pilot projects
January 2008 – June 2008	Pilot projects on building energy labeling
July 2008 – December 2008	Summarization and popularization
January 2009 – June 2009	Establish the information exchange network and continue improving the tools for energy labeling