

BATF-06-18 ~ 23, BATF-07-38 ~ 41 & BATF-08-48 — **Improvements to Existing Buildings**

Project number: <i>BATF-06-18 ~ 23, BATF-07-38 ~ 41 & BATF-08-48</i>		Date: <i>31 August 2006</i>
Title of project: Existing Buildings		
Leading member & co-leading member: U.S.		
Participants: Australia, China, Japan, India		
Project Overseer: Mr. Gary McNeil		
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Financial information	Total cost of proposal (US\$, by year): [to be determined based on continuing discussion among BATF participants]	
Type of project: <input checked="" type="checkbox"/> demonstration/pilot <input checked="" type="checkbox"/> national policy, law, regulation <input type="checkbox"/> appliance testing/labeling <input checked="" type="checkbox"/> seminar/symposium <input checked="" 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: 1 Nov 2006		Project end date: 2009
Project summary: <p>The project would employ market transformation strategies to improve energy efficiency in commercial and residential buildings, based on the rationale that abundant opportunities exist to cost-effectively make such improvements by sharing experiences among Partner countries and implementing proven program approaches. There are three subprogram elements:</p> <p>Operations and Maintenance, with the goal of reducing energy use in participating commercial buildings by 10 to 15%, through no-cost/low-cost measures and cost-effective retrofits.</p> <p>Residential Buildings, with the goal of improving energy-efficiency through improved installation of HVAC equipment and through addressing other barriers to improved energy efficiency.</p> <p>Program Design, with the goal of incorporating building performance monitoring and recognition activities into government and business policies, programs, and building portfolio management practices.</p>		
Signature of Project Overseer: Mr. Gary McNeil Date: 25 August 2006		
Signature of Task Force Chair: Hakdo Kim Date: 31 August 2006		

Remark:

Goals and Objectives

Establish continuous monitoring of energy performance as an accepted best practice in the management of large commercial buildings (also sometimes referred to as “public” buildings).

Increase awareness of the value of low-cost/no-cost measures as cost-effective means to improving energy performance in commercial buildings. Demonstrate the power of voluntary market transformation approaches, such as formal recognition and education/outreach programs, in improving energy efficiency in commercial buildings.

Demonstrate the value of portfolio management strategies to improve building energy efficiency in commercial buildings in both the public and private sectors.

Accelerate the practice of cost-effective energy-efficiency retrofits based on life-cycle cost analysis using a whole-building energy performance approach.

Improve the energy efficiency of residential buildings through improved installation of HVAC equipment and through addressing other barriers.

Promote well-designed programs and activities that incorporate elements such as building energy performance monitoring to improve efficiency of commercial and residential buildings.

Performance Indicators

To be determined.

This project responds to the priorities of the PIC by embodying the following section from the Partnership Vision Statement:

“The partnership will collaborate to promote and create an enabling environment for the development, diffusion, deployment and transfer of existing and emerging cost-effective, cleaner technologies *and practices*, through concrete and substantial cooperation so as to achieve practical results (italics added).”

This project responds to the Action Plan Guidelines:

“Each Task Force is expected to build on the wide range of actions already in place in Partner countries through national programs and other international cooperative arrangements and, where appropriate, seek to leverage existing initiatives to ensure maximum return on resources.”

“The Action Plans should identify, and promote ways and means to deploy, the best of current commercially viable technologies and practices, as well as the uptake of emerging cleaner and more efficient technologies.”

The project responds to the following objectives from the Work Plan:

“Promote best practice and demonstrate technologies and building design principles to increase energy efficiency in building materials and in new and existing buildings.”

“Support the integration of appropriate mechanisms to increase the uptake of energy-efficient buildings and appliances into broader national efforts that support sustainable development, increase energy security and reduce environmental impacts.”

“Systematically identify and respond to the range of barriers that limit the implementation of end-use energy efficiency practices and technologies.”

Background

Based on the U.S. experience, and limited field research conducted by EPA in China and India:

- Substantial opportunities exist to improve the energy performance of buildings through improvements in building operation and maintenance (O & M). There are also untapped opportunities for cost-effective retrofits to improve energy performance.
- In general, even many of the best-managed buildings do not collect and analyze energy use data and therefore are not prepared to effectively manage building energy performance. More effective management is the key to both improved O & M and implementation of retrofits when appropriate.
- There is a very high interest in training in building energy management.
- Many buildings are relatively new, and their owners and managers are typically reluctant to implement retrofits, because they are unwilling to replace functioning equipment. Consequently, in these buildings there is a high level of interest in low-cost and no-cost measures to improve energy performance.
- Building control systems are often not fully operational because of equipment and training problems. Improvements in control system operations can often improve efficiency quickly at low cost.
- A building energy services (ESCO) sector is not well established in China and India, which means that buildings typically must rely on in-house staff to improve energy performance. This creates an opportunity for training programs, and to strengthen the role of established energy service providers such as engineering firms and suppliers of control systems and HVAC equipment.
- Building owners and managers are eager to be formally recognized for achievements in energy efficiency.

- There is a general lack of experience with voluntary market transformation programs and portfolio-wide approaches to building energy management, which have been effective in the United States.
- The green buildings movement is increasingly influencing the design of new buildings in China and India, and offers an opportunity to promote energy efficiency. Energy efficiency is not always understood as an essential element of green building performance that delivers continuous cost savings and prevents pollution over the lifetime of the building. It is also not recognized that achieving these important benefits requires sustained long-term attention to building maintenance and operations.
- Installation practices are critical to achieving the potential savings from high-efficiency residential HVAC equipment. In some Partner countries, there are not clear guidelines for high-quality installation and technician training, and consequently these savings are not realized.
- Well-designed and well-managed government-sponsored voluntary programs can be powerful tools for promoting energy efficiency, environmental improvement and economic growth.

Methodology

- Share best practices such as recognition and technical assistance programs, and education and outreach.
- Demonstrate the value of data collection, data analysis, and monitoring energy performance in promoting no-cost/low-cost improvements and cost-effective retrofits in buildings. Work with stakeholders such as building owners, property management firms, architecture and engineering firms, equipment manufacturers, energy services providers, utilities, associations, and local/regional/national governments. Elements to include:
 - Training.
 - Tools.
 - Technical assistance.
 - Case studies to profile energy efficiency practices and technologies.
- Train building managers in data collection and monitoring, to ensure that energy-efficient designs translate into energy-efficient performance.
- Work with high-profile green buildings to document energy savings and demonstrate the environmental and financial benefits of monitoring and improving energy performance during the operating life of the buildings.

Operations and Maintenance

A building's energy use is significantly determined by O & M practices. No-cost and low-cost measures can quickly reduce building energy use by 10–15%, and reduce operating costs and greenhouse gas emissions without compromising tenant comfort or services.

With the goal of increasing awareness of the value of no-cost/low-cost measures as cost-effective means to improve energy performance, the following activities are proposed:

- Train owners and managers of 500 buildings.
- Train 200 government officials.
- Prepare 20 case studies of no-cost/low-cost EE measures.
- Best practices workshop for national, regional and local government officials to promote whole-building energy performance.
- Workshops in 15 major cities in China and India.

Based on assessment of global best practices, and research in participating countries, develop outreach and technical assistance programs based on the barriers to cost-effective retrofits identified in each country.

Residential Buildings

- Identify barriers to increased energy efficiency in residential buildings (both single- and multi-family) and implement strategies to overcome those barriers.
- The Consortium for Energy Efficiency in the United States estimates that a high-quality installation of residential HVAC equipment can reduce energy consumption by as much as 35% and peak demand by as much as 25%. The United States is developing a set of consistent guidelines to define a standard set of practices for HVAC contractors. Establishment of an installation specification would enable training and certification of contractors, better-quality installations, and significant energy savings.
- Depending on climate, adding insulation to roofs and attics of small residential buildings and sealing cracks to reduce air leakage may be a more cost-effective way to improve energy efficiency in residential buildings. Replacing single-pane windows with insulated glass with low-E coatings may also be a cost-effective measure.
- Evaluate and share current practices in HVAC installation across Partner countries at initial workshop. Time and location to be determined.
- Review standards and certification that may exist across different Partner countries.

- Determine extent of need to develop installation specifications, and how they could be the same or different in the participating Partner countries.
- Develop training programs.
- Develop specifications.

Program Design.

The United States has successfully implemented a range of programs to promote higher energy efficiency in existing buildings. A combination of policies is needed for market transformation:

- Technology development.
- Regulatory programs.
- Voluntary programs.

Effective coordination across levels of government can strengthen implementation.

Simple messages, education, outreach and training are very important.

The sub-project would work with governments, businesses, and other organizations to incorporate building performance monitoring, improvement and recognition activities into policies, programs, and building portfolio management practices. For example, this might be accomplished through a “building tune-up” approach that would assess the potential for upgrades, and support and assist building owners who wish to undertake upgrades.

This sub-project could begin by convening a workshop in 2007 to share best practices and determine country interests and needs.

Retrofit of Existing Building Chillers

- Work with industry experts to document and demonstrate the energy, environmental, and cost advantages to new technologies for buildings, specifically the advances made in building chillers.
- New model chillers offer potential for significant energy savings by operating 35% more efficiently than older models, providing increased reliability, requiring less maintenance, having lower probability of system failures, and reduced refrigerant leakages. Co-benefits of increased efficiency include reduced air pollution from thermal energy generation, mainly coal, oil, and gas based.
- The opportunity to replace chiller equipment in existing buildings supports other subprojects addressing whole building energy efficient design, operation, and maintenance.

- Support market transition to more energy-efficient chillers through continued efforts to identify and address country- and sector-specific barriers to the transition (i.e., environmental and energy policy and regulations, building codes and standards, power supply infrastructure, competing investment options).
- Identify and build on related actions that may be in place through national programs and other international cooperative arrangements and, where appropriate, seek to leverage existing initiatives to support project objectives through demonstration projects, data collection and reporting.
- Develop case studies documenting energy, environmental, and cost advantages to building chiller replacements.
- Based on research in participating countries, develop outreach and technical assistance programs based on the barriers to the uptake of more efficient chiller replacement equipment for existing buildings in each country.

Milestones

2006–2007: Begin initial activities under sub-projects including stock-taking and data-collection activities.

2007–2008: Implementation of sub-projects including tool development, workshops, technical assistance, and training.

2009: Evaluation of project results.

Dissemination of Project Results

To be determined.

Assessment of Project

- Participating buildings are achieving measurable results.
- Governments have initiated policies and programs to advance energy efficiency improvements in the areas of project focus.
- More specific expected results to be identified during project development.

Participation and Management

Management

Leader: Mr. Gary McNeil, U.S. Environmental Protection Agency

Participation

To be determined based on participating Partner interest.

Estimated Budget and Funding Sources

To be determined

Sub-Project/Task	2006 Funding	2007 Funding	2008 Funding	2009 Funding	2010 Funding
1. [Sub-project]	Country 1: US\$__K (cash, in-kind) Country 2: US\$__K (cash, in-kind) etc.				
2. [Sub-project]	etc.				
3. [Sub-project]					
4. [Sub-project]					
5. [Sub-project]					
etc.					
Project total	Country 1: US\$__K (cash, in-kind) Country 2: US\$__K (cash, in-kind) etc.				