

## BATF-06-26 ~ 28 & BATF-07-42 ~ 46 - High-Performance Buildings and Development

<b>Project number:</b> <i>BATF-06-26 ~ 28 &amp; BATF-07-42 ~ 46</i>		<b>Date:</b> <i>31 August 2006</i>
<b>Title of project:</b> High Performance Buildings and Developments		
<b>Leading member &amp; co-leading member:</b> Australia, Japan		
<b>Participants:</b> China, United States, India		
<b>Project Overseer:</b> Dr Michael Green, General Manager, Manufacturing Engineering and Construction Division, Department of Industry, Tourism and Resources		
<b>Postal address (leading member):</b> PO Box 9839 Canberra City 2601		<b>Phone:</b> +61 2 9236 6799 <b>Fax:</b> +61 2 9237 5051 <b>Email:</b> michael.flaherty@industry.gov.au <b>Copy please to:</b> michael.green@industry.gov.au
<b>Financial information</b>	<b>Total cost of proposal:</b> To be determined	
<b>Type of project:</b> <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 type="checkbox"/> training & technical assistance <input type="checkbox"/> public/consumer information <input checked="" type="checkbox"/> database/website <input checked="" type="checkbox"/> survey, analysis, research <input type="checkbox"/> others ( <i>please specify</i> )		
<b>Project start date:</b> <i>August 2006</i>		<b>Project end date:</b> <i>December 2010</i>

**Project summary:**

The project aims to increase the proportion of new buildings and developments that incorporate cost-effective measures that support the clean development and climate objectives of the Partnership. The project also aims to support the integration of efficient buildings and infrastructure into larger abatement projects (e.g. “zero net energy” precincts), identify promising areas for technical and market development to support wider uptake of advanced building design.

A number of recent iconic projects demonstrate advanced building technologies and practices that can significantly improve building performance in areas like energy efficiency. However, high-performance buildings should not be iconic projects alone. Low-cost, sustainable and disaster-resistant building solutions are needed globally.

Market-based strategies aimed at accelerating the take-up of these approaches must be able to draw on a verified base of relevant technical and economic information. The project will collect, and disseminate to member countries, verified technical and economic information in a common framework for use in building projects and policy initiatives. This would allow the development of an agreed methodology to assess the costs and benefits of alternative building designs in common framework. Each member country would then commit to supporting the construction of buildings or larger developments (e.g. precincts, suburbs, towns etc) that exemplify the clean development and climate objectives of the partnership. Consideration could be given to ways to recognize, through a system of awards for example, significant efforts toward the project goal in member countries.

**Signature of Project Overseer:** Michael Green

**Date:** 25 August 2006

**Signature of Task Force Chair:** Hakdo Kim

**Date:** 31 August 2006

**Remark:**

### *Goals and Objectives*

#### *Objective*

Promote the construction of and identify existing high-performance buildings and developments for which information will be kept and maintained on the Partnership web portal. Create proven building designs for mass production and deployment, using existing technologies with proven energy reduction. Investigate building design options and issues for construction in disaster prone areas.

#### *Goals and Outcomes*

- To increase the number of high performance buildings to 25% of all large buildings being constructed.
- The incorporation of advanced building methods and energy-efficient appliances into mass production housing projects is achieved.
- Agreement reached on sharing of information and technologies to assist all member countries to achieve the clean development and climate objectives of the Partnership.

- Development of common methodologies to assess, both economically and against Partnership clean development and climate objectives, the performance of alternative building designs.
- Identify promising areas of building innovation that could cost-effectively deliver against the clean development and climate objectives of the Partnership.
- Improved approaches to building in disaster-prone areas.

#### *Performance Indicators*

- Reduction in energy consumption and associated CO<sub>2</sub> emissions (e.g., per square meter) due to the incorporation of improved building practices, building materials, equipment and ongoing management.
- Establishment of a database of verified technical and economic information about high performance buildings and developments that is valued in Partner countries.
- Agreement on a common evaluation methodology.
- Improved disaster resistance in buildings—e.g., lower mortality and property losses.
- Agreement on ways to recognize, through a system of awards for example, significant efforts toward the project goal in member countries.

Partner countries facilitate the collection and dissemination of a verified base of relevant technical and economic information. The accelerated take-up of identified technologies and practices will provide opportunities for energy savings with exemplar projects providing opportunities to cost and monitor real life application in each Partner. Adoption of technologies and techniques in mass-production developments can reduce ongoing energy costs and improve general living conditions by making affordable, efficient housing more widely available. The development of common methodologies, possibly involving notional carbon prices, to facilitate the building industry assess the long term cost and benefit risks of alternative building technologies.

#### ***Background***

A number of building and larger developments (e.g., precincts, suburbs, towns etc) have occurred recently where improvements in building techniques have meant that some buildings achieve significantly reduced energy consumption or other clean development and climate objectives. In a number of cases these techniques can be incorporated at no additional cost. The sharing of information and the commitment of Partner countries to the introduction of these measures will significantly reduce energy consumption and the associated emissions.

As buildings and built environments have typical lifetimes of 50 years or more, investors will also benefit from agreed methodologies to assess the long term risks associated with various design options both economically and against Partnership objectives. Such

methodologies could include how sensitive particular design alternatives are to future movements in prices (e.g., for energy, carbon emissions, water and waste, or for new technologies as they become produced in volume).

### ***Methodology***

After agreement is reached with participating Partner countries on providing information, an agreed format and matrix would be developed to try to match existing available data. Partner countries would nominate agencies that would provide data and details of high-performance buildings and developments as well as data on general consumption in an agreed format. This could include, but not be limited to, energy, water, waste, occupancy, operation, design, management or technologies. This will allow comparisons to be made both within Partner countries and across Partner countries. Details of high-performance buildings and advanced production and management practices will be collected and collated. The database of information will be accessible to members through the Partnership web portal. A common framework to integrate and assess alternative building designs in terms of their economic and clean development and climate outcomes will be agreed. Forums and conferences could be held to discuss and expand on the collected information culminating in Partners agreeing to take part in exemplar projects and continue to share information and developed technologies.

Sub-Project	Major Tasks / Deliverables
<p><b>Information Sharing:</b> Share and Disseminate Data and Information on High Performance Buildings &amp; Developments</p>	<ul style="list-style-type: none"> <li>• Partners agree to make available relevant information and data on high performance buildings.</li> <li>• Partners identify refinements or extensions to their current information and data that enhance their value to the project. These may include, but are not limited to, providing real-time data (e.g. on energy consumption), web cam or interactive features.</li> <li>• Agreement reached on protocols for sharing information including IP.</li> <li>• Common methodology to assess alternative building designs in terms of their economic and clean development and climate outcomes would be agreed.</li> <li>• Partners provide and share access to existing data and information on high performance buildings.</li> <li>• A database of high performance buildings including measures incorporated and outcomes achieved created. Options for dissemination considered including web access and web cast.</li> <li>• The verified information is made available to all participating Partner countries and forms the basis of future forums and seminars.</li> </ul> <p>Consideration given to developing Partner countries gaining access to new technologies to be incorporated into major urban expansion programs.</p>
<p><b>Improve Take-Up of Existing Cost-Effective Technologies:</b> Create Proven Building Designs for Mass Production and Deployment Using Existing Technologies</p>	<ul style="list-style-type: none"> <li>• Survey technologies available and identify organizations and support programs. This could include assessment of how different potential prices (e.g., for carbon emissions) might influence technology choices.</li> <li>• Design options and technologies considered against the needs of particular Partner countries.</li> <li>• Partner countries use available information to create and promote designs suitable for their particular requirements.</li> </ul>
<p><b>Low Net Energy Precincts:</b> Support the Integration of Efficient Buildings and Infrastructure into Larger Abatement Projects (e.g., "Zero Net Energy" Precincts)</p>	<ul style="list-style-type: none"> <li>• Identify current developments and technologies in each Partner.</li> <li>• Collect data on developments in policy covering larger abatement projects.</li> <li>• Identification of relevant information on activities such as "embedded generation" and "zero net energy."</li> <li>• Agreement on sharing of information and agreement to work together to research options identified.</li> <li>• Conferences to discuss and workshop options with exemplar projects identified and supported.</li> </ul>
<p><b>New Technologies for Sustainable Buildings:</b> Investigate New and Emerging Designs and Technologies for Energy Efficient Buildings and Other Sustainability Objectives.</p>	<ul style="list-style-type: none"> <li>• Identify and collate current research and outcomes.</li> <li>• Identify relevant information and organizations. This could include, but not be limited to: glazing and window treatments, embedded generation, lighting, roofing, low-energy HVAC, DC lighting and appliances, computer interfaces, training and organizational innovation.</li> <li>• Agree to share information and research options identified.</li> <li>• Workshop findings and identify demonstration options such as exemplar and demonstration projects.</li> </ul>
<p><b>Disaster-Resistant Designs and Technologies:</b> Investigate and Develop Designs and Technologies that Can be Applied to Buildings in Areas Subject to Natural Disasters Such as Hurricanes, Tsunamis, Earthquakes, etc.</p>	<ul style="list-style-type: none"> <li>• Identify current developments and technologies in each Partner.</li> <li>• Collect data on developments in regulations covering construction in disaster prone areas.</li> <li>• Identification of relevant information with agreement reached to share information and technologies.</li> <li>• Agreement on sharing of information and agreement to work together to research options identified.</li> <li>• Conferences to discuss and workshop options with exemplar projects identified and supported.</li> </ul>
<p><b>Exemplar Projects:</b> Construction of exemplar and demonstration projects</p>	<ul style="list-style-type: none"> <li>• Member countries agree to support the building of exemplar projects to highlight cost effective measures that improve the performance of the building.</li> <li>• Exposure of the project at selected international conferences and other relevant forums.</li> <li>• Member countries continue to share information and promote high</li> </ul>

	performance buildings.
<b>Recognition Framework:</b> Recognition of Significant Achievements	<ul style="list-style-type: none"> <li>• Agreement on the recognition framework, including categories to be recognized.</li> <li>• Agreement on assessment process and form of recognition.</li> <li>• Commitment of resources from Partner countries to support the recognition framework and assessment process.</li> <li>• Initial award process.</li> <li>• Ongoing implementation.</li> </ul>

### *Milestones*

There is a presumption that the three sub-projects would be developed in conjunction with each other and that certain stages such as membership nominations would be conducted concurrently.

#### *High-Performance Buildings*

June 2006	Draft work plan forwarded to participating Partner representatives.
August 2006	Nominations for project team membership and supporting / verification organization for each supporting Partner received
October 2006	Agreement reached on data to be supplied by each Partner and the template to be used. Commencement of process to develop common methodologies.
December 2006	Examples of high-performance buildings with associated data provided by each Partner.
March 2007	Data posted to the Partnership website and able to be accessed by all Partners.
August 2007	Review of high-performance buildings and data including forums and conferences to examine particular buildings and the associated high performance measures.
December 2008	Forum to further examine the nominated high-performance buildings. Agreed assessment methodology.
December 2008	Policy adopted for high performance buildings and agreement reached on sharing of information.
December 2010	Each Partner to support the building of an exemplar project to both test and promote high-performance buildings.

#### *Proven Building Designs for Mass Production*

July 2006	Nominations received and agreement reached on membership of sub project.
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- September 2006 Agreement reached on information to be shared and template for sharing information.
- March 2007 Information provided and posted to the Partnership website for consideration by member countries.
- October 2007 Conference / Seminar to discuss technologies and building processes available.
- December 2007 Agreement reached on protocols for sharing information and technologies. Agreement on developing pilot projects and green precincts using available technologies.

*Design of Buildings in Disaster Prone Areas*

- July 2006 Nominations received and agreement reached on membership of sub-project.
- September 2006 Agreement reached on information to be shared and template for sharing information.
- March 2007 Information provided and posted to the Partnership website for consideration by Partner countries.
- October 2007 Conference/seminar to discuss technologies and building processes available.
- December 2007 Agreement reached on protocols for sharing information and technologies. Agreement on developing pilot projects and green precincts using available technologies.

***Dissemination of Project Results***

Data and information would be accessible on the Partnership website; forums and conferences would be held to discuss issues and gain agreement on future protocols. Ongoing collection of data and arranging conferences to continue upskilling of Partner building industry stakeholders.

***Assessment of Project***

Energy savings and associated greenhouse gas reduction can be measured using a variety of methods including Kw per sq m or CO<sub>2</sub> per sq m. As an example, energy efficiency measures may reduce the sq m energy consumption and the associated CO<sub>2</sub> emissions may be further reduced where energy is produced by the building, e.g. solar or thermal.

## ***Participation and Management***

### ***Management***

Australia is the partner in developing the project proposal, with Michael Green of the Australian Department of Industry, Tourism and Resources the primary contact for developing the project proposal. Project leadership and management during project implementation remains to be agreed by the Buildings and Appliances Task Force.

### ***Participation***

All Partner countries will be asked to provide input to the project and will also be asked to nominate the agency that manages building energy efficiency and sustainability issues to act as a principal point of contact for verification and nomination.

### ***Estimated Budget and Funding Sources***

(To be determined.)

<b>Sub-Project/Task</b>	<b>Total Estimated Project Funding</b>	<b>2007 Funding</b>	<b>2008 Funding</b>	<b>2009 Funding</b>	<b>2010 Funding</b>
1. Information sharing	<b>US\$600K</b>				
2. Improved take-up of existing cost-effective technologies	<b>US\$400K</b>				
3. Low Net Energy Precincts	<b>US\$400K</b>				
4. New Technologies for Sustainable Buildings	<b>US\$500K</b>				
5. Disaster Resistant Designs and Technologies	<b>US\$200K</b>				
6. Exemplar Projects	<b>US\$500K</b>				
7. Recognition Framework	<b>US\$750K</b>				
<b>Project TOTAL</b>	<b>US\$3 350K</b>				