

# APEC Project Proposal

**Please submit through relevant APEC Secretariat Program Director.  
Proposals must be no longer than 12 pages, including budget.**

<b>Project title and number:</b>	Energy Saving Window Thermal Performance Simulation Training
<b>Source of funds</b> (Select one):	<input type="checkbox"/> Operational Account <input type="checkbox"/> TILF Special Account <input checked="" type="checkbox"/> APEC Support Fund
<b>Committee / WG / Sub-fora / Task-force:</b>	Energy Working Group/Expert Group on Energy Efficiency and Conservation
<b>Proposing APEC economy:</b>	Thailand
<b>Co-sponsoring economies:</b>	United States, New Zealand, Singapore
<b>Expected start date:</b>	March, 2012
<b>Expected completion date:</b>	July 25 <sup>th</sup> , 2012
<b>Project summary:</b>  <b>Describe the project in under 150 words. Your summary should include the project topic, planned activities, timing and location:</b>  <i>(Summary must be no longer than the box provided. Cover sheet must fit on one page)</i>	<p>Thailand will host a workshop for APEC economies and provide expert training for policy implementation and building envelope component testing and simulation in support of our effort to establish a regional APEC Test and Simulation Facility along with effective policy implementation strategies. This effort will enable improved building energy efficiency policies and programs, reduce trade barriers, and directly support the Energy Smart Communities Initiative (ESCI), Smart Buildings-Materials Testing and Rating Centre activity (SB-2).</p> <p>The workshop will bring together the range of public, private and academic sector stakeholders who are involved in developing an advanced building material infrastructure in the APEC region. Key APEC economy decision makers and experts will be invited to participate and provide their policy and implementation recommendations. The workshop will include sessions on policy, technology, component rating, Infrastructure needs and building energy code implementation with a building material rating and labelling focus.</p> <p>This project directly supports the ESCI which was jointly announced by Japan and the United States at the APEC Leaders meeting in November 2010. Specifically, this project is a major activity of the Smart Buildings-Materials Testing and Rating Centers (SB-2) activity. This project also builds upon the recently completed APEC Cooperative Energy Efficiency Design for Sustainability (CEEEDS) –Phase 2 “Building Energy Codes and Labelling” project.</p> <p>Timing and Location: This workshop and training will take place over 5 days in Bangkok, Thailand.</p>

<b>Total cost of proposal:</b> (APEC funding + self-funding) <b>USD \$102,175</b>	<b>Total amount being sought from APEC (USD): 70,875</b> <b>By category:</b> Travel: \$50,875      Labour costs: \$15,000 Hosting: \$5,000      Publication & distribution: Other:
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***Project Proponent Information and Declaration:***

**Name:** Dr.Prasert Sinsukprasert, Ministry of Energy

**Title:** Director of Planning Division

**Organization:** DEDE

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I declare that this proposal has been prepared in line with the **Guidebook on APEC Projects**. If approved, I agree to develop the project in line with APEC project requirements.

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*Name of Project Proponent*

**Date:** February 27<sup>th</sup>, 2012

## Project Synopsis

1. **Relevance:** Why should APEC undertake this project? What problem or opportunity will the project address and why is it important?

Commercial and residential building's are responsible for approximately 50 per cent of the electricity consumption in most APEC economies. Space conditioning loads that are directly affected by the building envelope (window, walls, roof and foundation) characteristics are responsible for approximately 30 to 50 per cent of the building consumption. Thus, to reduce the growth of increased demand for electricity and to reduce greenhouse gas production investment in high performance, energy efficient building envelopes is essential. This project will enable APEC building experts, researchers and policy makers to better address energy consumption through improved energy policy and implementation.

This project directly supports APEC ESCI SB2 goal to develop a pilot regional testing center to support and implement a building energy code and labelling program for use among APEC economies. This effort will educate other APEC economies on how to perform widely accepted energy efficiency practices to ensure implementation and enforcement of building energy codes and labeling.

The APEC *Energy Saving Window Study*, completed for APEC by the National Fenestration Rating Council in 2011, revealed a lack of congruent building envelope energy efficient practices among APEC economies including very limited window energy rating procedures. Recently, the completed APEC report "*Cool Roofs in APEC Economies: Review of Experiences, Best Practices, and Potential Benefits*" completed by Building Systems and Diagnostics (BSD) also articulated the need for product infrastructure and rating development. This project proposes to follow up on the recommendation of these study's to educate APEC economies on state-of-the-art energy efficient window and cool roof rating procedures that comply with internationally recognized standards. Currently, most building energy codes make a general reference to window energy performance leading to widely divergent results reducing building energy savings. Fundamental investments for insulation applications, cool roof technologies, and other technological opportunities need to be pursued by all APEC economies and are included in the scope of this project.

2. **Objectives:** Describe the 2-3 key objectives of the project. (e.g. to... create a framework...; ensure participants will be able to...; share experiences...; enhance understanding...; develop recommendations...; build interest...; revise strategies... etc.)

- Develop and implement an APEC economy pilot, regional simulation and test centre that can be replicated throughout APEC economies where building envelope energy saving opportunities will be taught and implemented
- Train APEC participants to perform energy saving window rating thermal simulations
- Enhance energy efficient building practices understanding by developing building envelope component ratings

3. **Alignment:** Describe how the project will help achieve APEC's key priorities and meet your forum's work-plan or medium-term plan.

This project directly supports the 2010 APEC Leaders decision to implement the Energy Smart Communities Initiative (ESCI) for the APEC Building Material Testing and Rating Center (SB2). This project is directly focused on test standard development and harmonization to foster economic growth of energy efficient technologies and to reduce trade barriers.

This workshop and training session will be a major effort to get greater support from the APEC region. In 2011, under a self-funded US led project, a first successful workshop was held and six economies participated. Significant momentum has been created, however this next workshop will be held at a critical time when the test center will be moving towards phase II. Getting greater support from multiple APEC economies for participation and recognition, will help secure funding from the private sector since many companies serve numerous APEC markets. Funding requirements for phase II will be much greater and a consolidated APEC effort as proposed for this project can make a big difference in securing the private sector investment.

4. **For TILF Special Account applications: Briefly describe how the project will contribute to APEC trade and investment liberalization and facilitation with reference to specific parts of the Osaka Action Agenda (Part 1, Section C and, where appropriate, Part 2).**

Accurate certification and labelling program helps in implementing of code and provide verifiable compliance. This workshop will support the establishment of a buildings materials testing and rating center to provide such data so that consumers and businesses will feel confident in buying energy-efficient building components from any APEC economy thus removing trade barriers. A major economic benefit will be that the center will help spur global investment in local manufacturing plants. Host economies will create local manufacturing jobs, and investing economies will have raw material, supplies and equipment order demand creating jobs in their home economy. The overall net effect will be clean energy development that otherwise would not have occurred. This fundamental infrastructure and related capacity building activity, is a prerequisite to effective voluntary and mandatory building policy adoption. Successful establishment of one Regional Energy Center will serve as a template to be replicate in other APEC economies.

**For APEC Support Fund applications: Briefly describe how the project will support the capacity building needs of APEC developing economies, and how they will be engaged. [¼ page]**

The workshop will bring together the range of public, private and academic sector stakeholders who are involved in developing advanced building material infrastructure in the APEC region. Key APEC economy decision makers and experts will be invited to participate and provide their policy and implementation recommendations. The workshop will include sessions on policy, technology, component rating, Infrastructure needs, and building energy code implementation with a building envelope rating and labelling focus. The result of the workshop will assist APEC economy policy makers to follow a unified path to implement certification and labelling program.

The simulation workshop will train participating APEC economies experts for the use of simulation programs which can be used to determine windows energy performance, U-factor, Solar heat gain and Visible transmittance in a cost effective manner. These values then can be used for confirming building code implementation and thus providing a level playing field for manufacturers to sell energy efficient products in the marketplace. Penetration of advance energy efficient products in the market place will help achieve the goal of saving energy.

This project is specifically targeted to APEC developing member economies and will be of special benefit to them because the techniques being taught will help them to increase the energy efficiency of buildings in their economies. As developing member economies expand their buildings infrastructure, it is important that they take advantage of new materials and construction techniques. A major portion of the funding request is to allow for travel expenses for developing economies to participate in the workshop.

## **SECTION B: Project Effectiveness**

5. **Work plan: Provide a timeline of actions you will take to reach your objectives. For each, include:**
- a. **How it will be carried out and how member economies, beneficiaries and others will be involved**

The scope of the workshop consists of two parts, 1) policy implementation training - intended to provide specific programmatic information to the entire building energy sector enabling them to meet evolving policy implementation needs. 2) Addresses institutional and infrastructure needs to meet the challenges of implementation of the building energy codes by establishment of a regional building energy center. Center establishment will be an evolving process and as a first step, building envelope energy simulation training will be provided to participants from APEC economies.

These trained participants will then train candidates in their respective APEC economies to implement building energy codes and labelling. Trained APEC participants may be able to establish functional building energy code and labeling programs by replicating what will be accomplished in this Thailand based effort. Many APEC economies have made limited building energy code and labeling harmonization efforts as identified in the recent APEC Energy Saving Window report. The training received during this event will enable APEC participants to expand on any existing building energy code and labeling activity and further harmonize building energy efforts among APEC economies. Several APEC economies including Australia, Singapore, Vietnam, China, Philippines, South Korea, Canada, Russia, Mexico, and the United States have already used the simulation tools that will be demonstrated taught in this effort.

**Timeline:** Project timelines and dates for key activities and deliverables:

Dates	Activity	How it will be carried out	Beneficiary Involvement
March to April	Identify workshop participants; extend invitation for 1) policy 2) Training seminar	KMUTT and APEC secretariat will prepare invitee list and notification	APEC invitees, policy developers, researchers, technical experts
April to May 2012	Develop list of requirements for setting up of a regional energy centre for testing building envelop components	KMUTT and NFRC will develop	None
May 2012	Host workshop – Day 1 – Policy, Day 2-4 Simulation training, Day 5 – Regional centre establishment training	KMUTT, with NFRC's assistance, will conduct policy and simulation training workshop	APEC invitees, policy developers, researchers, technical experts
June 2012	Summary of workshop completion with action items,	KMUTT, with NFRC assistance, will develop this	None

	next steps, and revised implementation plan	summary	
July 2012	Posting of all materials and final report from the workshop on the internet for easy access by all APEC economies	KMUTT and APEC Secretariat	none

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**b. Related outputs for that particular step (e.g. contract, agenda, participant list, workshop, report)**

*[1-2 pages. Answers may be taken or adapted from the Concept Note]*

**Stakeholders: Beneficiaries and stakeholders (APEC & non-APEC) and how they will be engaged**

- Policy developers from Australia, China and USA will share the step to implementation of rating and labelling program with participating APEC country participants.
- APEC economy building material manufacturers, industry experts, academics, governmental officials (energy code officials), and product suppliers will participate in round table format to discuss the policy and implementation of certification program. Issues will be identified and solutions to resolve issues will be discussed.
- Non APEC fenestration manufacturers and suppliers providing products to APEC economies may participate
- Participating APEC economies will learn the requirements for establishment of regional centre for testing and simulation. They will also acquire skill to simulate fenestration energy performance, i.e. U-Value, Solar Heat Gain and Visible transmittance.
- Residential and commercial building owners/tenants will learn about new opportunities to reduce energy consumption, and gain increased comfort for unconditioned buildings thus avoid increased space conditioning loads that come with increased income
- APEC policy developers will learn how product ratings can help in establishing a range of energy efficiency policies; participation will be pursued so that “buy-In” can be achieved leading to program requirements that specify the need for rated performance of complying products.

**Agenda:** The agenda for the policy workshop will be developed in collaboration with experts from several APEC economies, as well as with leading global material supplier who are expected to fund a major portion of the test centre. A draft Simulation Training Workshop THERM 6 / WINDOW 6 / OPTICS Agenda is included as Appendix A.

- **Previous projects/activities: If and how this proposal builds on the findings or lessons learned from previous projects/activities, while avoiding duplication**

- This project will build upon NFRC's recent APEC supported research titled: Energy Saving Windows- Survey of Policies and Programs to Promote Advanced Window and Glazing Technologies in APEC Economies. This research highlighted the tremendous need for improved building energy policies and programs where energy saving windows may be further implemented by providing an energy rating method such as that proposed here.
  - Click here to access the paper: [http://publications.apec.org/publication-detail.php?pub\\_id=1172](http://publications.apec.org/publication-detail.php?pub_id=1172)
  - This project directly address the key next step that was suggested in the recent APEC Study by BSD, "Cool Roofs in APEC Economies: Review of Experiences, Best Practices, and Potential Benefits".
  - This project also builds upon the outcome of the Cooperative Energy Efficiency Design for Sustainability (CEEDS) Phase II effort on Building Energy Codes lead by the Asia Pacific Energy Research Centre.
- Communication: How you plan to communicate the results or benefits of this project to others**
  - The results of the workshop will be made available in the public domain. Policy developers from organizing economies including Thailand, USA and Japan will promote the effort to other economies and within entities within their own economies. Every workshop participant will be requested to share the information back to their home economies. Global material suppliers will promote the effort to developing markets in other APEC economies. The entire effort will become a major case study to be replicated in other economies.

6. **Risks: What risks may be involved in implementing the project and how will they be managed?**

*[1/8 to 1 page, depending on project nature/complexity]*

The risk to conduct a successful workshop is very low. An initial workshop was held last year that has created enormous interest in this activity.. Risk involved is to get participation from APEC economies for simulation training workshop. To address the risk following key steps will be taken

- Plan and organize the workshop. Arrange for the workshop through the following activities:*

*Select Host:* Thailand has agreed to host the workshop and has previous experience in hosting of these kinds of workshop.

*Reach out to APEC Economies:* Communication with key personals in APEC economies will be made well in advance and confirmation for their attendance will be obtained.

*Travel and Stay cost:* Request to cover travel and stay cost will be requested from APEC to encourage participation of experts and personals from qualified APEC economies.

*Develop Workshop Agenda and study material:* Developed draft agenda, see appendix A, will be circulated well in advance to the participating APEC economies. Educational material for the simulation workshop will circulated well in advance, so as the attendees can come better prepared for the workshop and benefit more from the in-class interaction.

*Identify Appropriate Speakers.* Chairs and expert speakers on policies for promoting window energy ratings will be chosen from both the public and private sector. These experts will be paid for their travel and stay to encourage them to attend the workshop. Industrial speakers will participate at their own expense since they are interested in promoting innovative materials.

*Follow up to the workshop:* The conference organizer will (i) compile and publish relevant papers and overheads as workshop Proceedings; and (ii) Questions related to Simulation training will be addressed if raised after the workshop to encourage attendees to grasp fully the methodology.

7. **Monitoring and Evaluation: What indicators will you use to know if the project is on track (monitoring) and successful in meeting its objectives (evaluation)? What information will you collect (e.g. stakeholder feedback, website hits, participant stats etc.) and how will you collect it (e.g. meetings, surveys, interviews, peer review, records review)?** [ $\frac{1}{2}$  page]

KMUTT anticipates two participants from each APEC economy which will be a significant indicator of potential success of the training. KMUTT will work closely with the APEC secretariat to ensure good participation. Upon completion of the training, KMUTT will provide building energy component modeling exercises to simulation training participants and their results will be objectively evaluated. KMUTT anticipates an 80% successful building energy simulation result indicating a successful effort. In addition, a general survey about their satisfaction in the training program will also be conducted and results will be reported in the final project report. Successful use by KMUTT of the building energy component simulation tools to implement building energy codes and pursue component labeling will also be a key indicator of success. Notes and conclusion from the policy round table will be documented and published as part of the final report. The action items identified for steps to better implement the building energy codes and labeling program will also be documented and published.

8. **Linkages: Describe the involvement of other APEC fora, and relevant other organisations. Include:**

- **Engagement: How are you engaging other relevant fora, within and outside of APEC?**

The project sponsors have previously engaged the IEA about this activity and they participated in several CEEDS activities that were a precursor to this activity. The IEA will be invited to participate in this workshop. The APEC Expert Group on Energy Efficiency and Conservation has been fully engaged in this activity and all participants have been encouraged to share the development with their extended organizations. The project sponsors will coordinate as appropriate with the activities of any relevant or suggested Working Group. The sponsors would be pleased to have suggestions from ECOTECH on other APEC fora that might find the project of interest.

- **Previous work: How does this project build on, yet avoid duplication of, previous or ongoing APEC initiatives, or those of other organisations?**

This workshop is the kick-off of phase II for the action items identified during the workshop titled 'APEC Efficient Building Envelope Stakeholders Meeting and Workshop' hosted in June 3-5, 2011.

This project directly supports the 2010 APEC Leaders decision to implement the Energy Smart Communities Initiative (ESCI) for the APEC Building Material Testing and Rating Center (SB2). Project results will be reported to the ESCI Knowledge Sharing Platform to that they are widely shared among both the APEC and non-APEC communities. In addition, the U.S. as a project cosponsor and as the lead in the ESCI Cool Roof Demonstrations (SB-3) and Low Energy Windows Demonstrations (SB-4) will incorporate the workshop results in ESCI SB-3 and SB-4 activities. This project is also directly focused on test standard development and harmonization to foster economic growth of energy efficient technologies and to reduce trade barriers.

- **APEC's comparative advantage: Why is APEC the best sources of funds for this project?**

[ $\frac{1}{4}$  to 1 page. Answers may be taken or adapted from the Concept Note]



This project is directly related to a major region of APEC that is in significant need of investment in building envelope infrastructure. Prior significant funding from the US is not available to kick-off this major second phase to develop a regional building material rating and certification centre. However, it is expected that significant investment will be provided from the private sector. Furthermore, major cost share is expected with resources to be spent by participating companies. The value of the software tools that will be provided to training participants to use free of charge cost over \$15M USD to develop. The relatively modest funding for these workshops will be significantly exceeded by the private sector investment. The majority of these funds are needed to pay for travel expenses of authorized developing economies which are not something the private sector would pay for.

## SECTION C: Project Efficiency

9. **Budget:** Complete the budget and budget notes for the project in the template in SECTION F of this form. The budget should include calculation assumptions (e.g., unit costs) and self-funding contributions. Please consult the *Guidebook on APEC Projects* for eligible expenses.

This project proposal is requesting US \$70,875 in APEC funding as described in the detailed project budget which is attached as Annex B.

- Consulting and organizational cost is estimated at \$ 20,000
- Travel, Hotel and Per Diem support for experts and Qualified APEC economy participants is \$ 50,875.

10. **Cost Efficiency:** Highlight how the project offers APEC maximum value for money. In what ways will the project maximize the cost-efficient use of resources? [ $\frac{1}{4}$  to  $\frac{1}{2}$  page]

- Project host will select cost effective venue for hosting the workshop by surveying at least three venues and choose the most cost effective venue.
- Host will also use university students and staff assistance to reduce the cost of organization.
- Furthermore, the workshop will be held in Thailand, therefore the travelling expense of delegates of APEC economies can also be minimized.
- Host will look for local sponsors for event to reduce the cost of hosting the workshop and training.
- The travel estimate for expert speakers and authorized participants will be allocated by the APEC Secretariat and may be less than 70K. The organizers will attempt to get as many self-funded participants as possible to reduce the overall cost to APEC.

## SECTION D: Project Impact

11. **Beneficiaries:** Explain who the direct project beneficiaries are and what the intended benefits will be. Include an explanation of how the project outputs (e.g. workshop, symposium, research paper, best practices etc.) will assist the project beneficiaries. [less than  $\frac{1}{2}$  page]

APEC participants are expected to gain knowledge that will help them back in their home economies to setting up of buildings materials testing and certification center and policy strategies for successful implementation of energy efficient policies.

This building component energy simulation training is one of the initial steps towards the establishment of a regional buildings materials testing and certification center (BM-TCC) which is an essential activity declared in the **Energy Smart Communities Initiative (ESCI)**. **Most building components can be simulated to determine their energy performance characteristics, U-Value, g-value, visible transmittance and can then can be used to satisfy building energy codes.**

Successful establishment of one regional BM-TCC will serve as a template to be replicated in other APEC economies. **Interested APEC economies can be engaged during the establishment period which will help them learn about the energy testing equipment selection procedure, measurement calibrations, and equipment operation resulting in capacity building and expedient development of such centers in other APEC economies.**

**Participants from KMUTT attending this workshop will use their newly gained knowledge to establish the regional Building Material Testing and Certification Center. The BM-TCC establishment will ensure accurate and reliable energy performance data for consumers and businesses among APEC economies and reducing trade barriers. It would also promote trade in energy-efficient building materials – such as insulation , roofs, and windows. A major economic benefit will be that the center will help spur global investment in local building component manufacturing plants. Host APEC economies will create local manufacturing jobs and investing economies will have increased raw material, supplies and equipment order demand creating jobs in their home economy. In addition, an accurate testing and certification program would then help policy makers and regulators implement a building energy code which is one of the key mechanisms in driving clean energy development. This workshop is a key activity to increase the interest and demand in establishing the centre which will allow for greater private sector investment. Global suppliers have stated they are interested in a regional test center and this workshop will demonstrate that possibility to these potential investors.**

12. **Gender: What steps will the project take to ensure the participation and engagement of both men and women throughout the project? How do project objectives benefit women?** *[less than ½ page]*

It welcomes the participation of women in all aspects of this project. Several Women participated in the first APEC's Energy Efficiency Centre, sponsored by the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy (EERE) and Thailand's Ministry of Energy Department of Alternative Energy Development (DEDE) and the basic simulation training workshop. Project organiser will continue to make efforts to ensure that women are well represented among the speakers of the workshop, will encourage the participation of women as delegates in our invitations, encourage participation in the simulation training.

Successfully improving energy efficiency relies in part on changing energy use behaviour in our society. Women play a key role in the selection of the home features and energy savings. They are important contributors to the realisation of energy efficiency improvement through education and communication both inside the household and in the broader public sphere. Successful comprehensive energy efficiency policy needs broad public involvement and women will be critical to the achievement of an APEC-wide regional inspirational goal of a reduction in energy intensity.

13. **Dissemination: Describe plans to disseminate results and/or outputs of the project, including:**

- **The number, form and content of any publications (Note: APEC will not fund website maintenance or publications that are collections of PowerPoint slides. APEC encourages electronic publication.)**

Host will prepare a training material for simulation workshop which will be distributed to all attendees electronically on a CD. The full workshop material will be posted on web pages and linked to many blogs. The new ESCI web pages that are currently in development will be a new way to reach out to interested parties.

Printed material used for simulation workshop will also be distributed to all attendees.

- **The target audience**

The workshop will target to bring together the range of public, private and academic sector stakeholders who are involved in developing an advanced building material infrastructure in the APEC region. Key APEC economy decision makers and experts will be invited to participate and provide their policy and implementation recommendations and solutions. The workshop will include sessions on policy, technology, component rating, Infrastructure needs and building energy code implementation with a fenestration rating and labelling focus.

For simulation training APEC economy fenestration experts will be targeted to obtain the necessary skills to perform energy rating simulations is their first step toward the establishment of a regional test and simulation center. Key academics and industry leaders will be invited for this workshop.

- **Any intention to sell outputs arising from this project.** *[less than ½ page]*

No

## **SECTION E: Project Sustainability**

14. **Sustainability: Describe how the project will continue to have impact after the APEC funding is finished.**

**a. How will stakeholders and beneficiaries be supported to carry forward the results and lessons from the project?**

KMUTT with support from the United States and other APEC economies will ensure the BMTCC establishment by continued coordination, education, and knowledge sharing among all APEC economies. Numerous manufacturers from larger APEC economies are interested in increased trade with developing APEC economies. Larger APEC economy participants are already testing and labelling building envelope components in their respective economies. The BMTCC will enable larger APEC economies to submit their building components for testing closer to developing APEC economy markets. This powerful market force is hoped to ensure the development and sustainability of the BMTCC.

The United States will continue to work with the BMTCC supplying the necessary knowledge to update and maintain the BMTCC including periodic training, test document modification updates, and testing equipment maintenance guidance.

The United States will continue to provide significant in-kind support such as detailed building component energy simulation programs and training curriculum, building component energy simulation training workshops, and testing equipment design recommendations to enhance APEC participant technical sustainability.

**b. After project completion, what are the possible next steps to build on its outputs and outcomes? How will you try to ensure these future actions will take place?**  
**[less than 1 page]**

Full implementation of the BM-TCC and other APEC economy test centres replication is the ultimate APEC ESCI SB2 goal.. This effort will include dedicated APEC policy experts, as well as large private sector global suppliers that have demonstrated a long term commitment to ensure successful BMTCC establishment.

In the last eight months, APEC participants have made significant progress to begin the BMTCC establishment. A detailed business plan has been developed with public and private participants detailing a long term integrated strategy and is available from

KMUTT. Several key steps have been completed and KMUTT has already developed several key capabilities as a result of prior domestic and APEC investment. KMUTT anticipates this trend will continue and this workshop will be an important step towards continued success. In addition to APEC, other sources of funding are available as previously mentioned and KMUTT may also pursue various investment banks if additional resources are needed.

While KMUTT envision large resources being acquired for this effort mostly related to the procurement, installation, and operation of expensive specialized testing equipment, they also see a possible future role that APEC may want to play to help educate participants from developing APEC economies. For example, it might be possible to host visiting APEC researchers to learn how to operate specialized testing equipment in the future.

15. **Project Overseers: Who will oversee the project—including any hiring of contractors—and drive it to success? Please include the names and brief biographies of the PO and any other main point(s) of contact responsible for this project. [less than ½ page]**

***Dr. Prasert Sinsukprasert***: Ministry of Energy, Department of Alternative Energy Development and Efficiency (DEDE)

~~***Dr. Pattana Rakkwamsuk***: Dean, School of Energy, Environment and Materials, KMUTT.~~

~~***Dr. Paritud Bhandhubanyong***: Executive Director and Director General at the Technology Promotion Association (Thailand-Japan) (TPA).~~

~~***Dr. Kuskana Kubaha***: Vice Dean for Academic, School of Energy, Environment and Materials, KMUTT.~~

(See a brief CV of each overseer in Appendix B)

## SECTION F: APEC Project Itemized Budget

Please consult the descriptions of eligible expenses in the *Guidebook on APEC Projects*

Budget:					
Category	Units	Unit Rate	APEC Funding	Self Funding	notes
<b>Direct Labor</b>					
KMUTT Support Staff	30 days	\$100	\$3,000		6 day, 5 persons
KMUTT Support Staff	75 days	\$100		\$7,500	15 day, 5 persons
Principal Investigator	8 days	\$250	\$2,000		4 days, 2 persons
Principal Investigator	20 days	\$250		\$5,000	10 days, 2 persons
Simulation training expert Consulting fee	5 days	\$1,000	\$10,000		5 days, 2 person
Simulation training expert Consulting fee	5 days	\$1,000		\$10,000	5 days, 2 person
		<b>Total</b>	<b>\$ 15,000</b>	<b>\$ 22,500</b>	
<b>Other Items</b>					
Conference room	2 day	\$500	\$1,000	\$0	1 day, 50 persons
Simulation training conference room	3 days	\$500	\$1,500	\$0	3 day, 30 persons
Refreshment	220 person	\$40		\$8,800	50 conference days 2, 30 persons for 4 days simulation workshop
Equipments -LCD, Screen, microphones	equip for 4 days	\$500	\$2,000	\$0	one set of equip. 4 days
Miscellaneous Banners, displays signs etc		\$500	\$500	\$0	
		<b>Sub -Total</b>	<b>\$5,000</b>	<b>\$8,800</b>	

Travel Accommodations (Experts, researchers)					
Air fare	5 RTs	\$2,000	\$10,000		5 Round Trips (RTs) Economy class, 2-USA, 1-China, 1- Australia, 1- Japan
Hotel and per diem (incl. accommodation and "75% additional payment")	25 days	\$175	\$4,375		5 days, 5 persons, fixed rate; unit rate at \$175 per day is possible and appropriate due to reduced room rate and cost share for some meal
<b>Travel Accommodation (APEC eligible participants only, 2 people per 10 economies)</b>					
Policy Workshop participants airfare (restricted economy class)	10 RTs	\$1,000	\$10,000	\$ -	10 Round Trips (RTs)
Policy Workshop Participants hotel and	40 days	\$175	\$6,000	\$ -	4 days, 10 persons Bangkok, Thailand

per diem (incl. accommodation and "75% additional payment")					
Simulation Workshop Participants airfare	10 RTs	\$1,000	\$10,000	\$ -	10 Round Trips (RTs)
Simulation Workshop Participants hotel and per diem (Incl. accommodation and "75% additional payment")	60 days	\$175	\$10,500	\$ -	6 days, 10 persons Bangkok, Thailand
		<b>Sub -Total</b>	<b>\$50,875</b>	<b>\$ -</b>	
		<b>Total</b>	<b>\$70,875</b>	<b>\$31,300</b>	

**Budget Note 1: Drawdown timetable: Provide a timetable for the drawdown of APEC funding requested.**

Drawdown of APEC funding for 'Direct Labour' and 'Other items' is requested in two payments as shown in the following table.

Description	Amount	Date
First payment (30% of \$15,000-Direct Labour)	\$4,500	May 1 <sup>st</sup> , 2012
Second payment (70% of \$15,000-Direct Labour and \$5000-Other items )	\$15,500	May 20 <sup>th</sup> , 2012
Total	\$20,000	

**Budget Note 2: Direct labour: Provide information for APEC-funded positions including general duties, total hours and who will be contracted, if known. (It is not acceptable to contract staff from your own organisation or government employees.)**

KMUTT will be engaged by Department of Alternative Energy Development and Efficiency (DEDE) to run this workshop. Budget of direct labour amounted to \$15,000 will be given to KMUTT to run the tasks, for example workshop secretariat, venue search and selection, provision of necessary workshop facilities, hotel reservation, logistic, provision of good quality meal and refreshment, final report, etc.

In addition, KMUTT, with valuable consultation received from APEC secretariat, DOE and DEDE, will be responsible for identifying experts and 2 representatives per economy to participate in the workshop.

**Budget Note 3: Waivers: Provide details of any requests for waivers from the normal APEC financial rules, with justifications (e.g. from tendering requirements, for advance payment, simultaneous interpretation payment) in the notes column of the budget table, or below if the waiver requires a detailed explanation.**

A waiver from APEC project funding arrangements is requested, which allows building energy efficiency expert speakers who are government employees to receive airfare/accommodation/per Diem expenses for their participation in the workshops.

## **Appendix A: (Example of Agenda)**

### **Policy workshop**

**May 21th:**      **DAY 1: (8:30 am – 5 pm)**

**(8:30 am - 10:00 am) Registration and Opening ceremony**

**(10:00 am – 3:30 pm) Plenary session (representatives from economies will be invited as speakers in this session)**

- Update status of the establishment of Building Materials Testing and Certification Center in Thailand
- Status of energy efficiency program in APEC
- Shared experiences among economies in building materials testing and the implementation of rating and labeling programs

**(3:30 pm – 5:00 pm) Round table session**

Representatives from policy makers, academia and building material and fenestration industry share their viewpoints about a APEC Building Materials and Component Testing and Rating Centre's role in accelerating market acceptance and increasing the demand for knowledgeable construction trades people, plus other factors that spur on the economic and energy saving benefits.

### **Training workshop**

**May 22nd:**      **DAY 2-4: (8:30 am – 5 pm)**

#### **Introduction to Simulation Program**

- Heat Transfer Basics
- Important Factors to Consider in Fenestration Designing
- code and its requirements

#### **Simulation Requirements: (rules for modeling)**

NFRC 100:2010, *U-factor*

- Requirements, a walk through
- Defining Product Line
- Defining Individual products with a product line
- Simplification rules (Grouping)
- Validation of simulation matrix by physical testing

NFRC 200:2010, *Solar Heat Gain Coefficient and Visible Transmittance, SHGC and VT*

- Requirements, a walk through
- Procedure for rating SHGC and VT (section 6)
- Test only option

NFRC 300:2010, *Spectral data files*

- Spectral data files
- Procedure for approval of spectral data files for IGDB, CEPT capabilities.
- NFRC certified spectral data (# sign) and requirements
- Brief introduction to OPTICS program for Laminates and Applied films.

NFRC 500:2010, *Condensation Resistance, CR (Brief - Time permitting)*

- Requirements a walk through
- Procedure for rating CR, Height requirement

NFRC THERM5/WINDOW5 Simulation Manual

Software requirements

- WINDOW 6
- THERM 6
- Spectral Data files

- Upload Spread sheet

### ***Install All Programs***

CD to be provided.

### **WINDOW 6:**

- Program Structure / Libraries
- Database Structure – Import and Export between databases
- Glass Library – Optics connection, Optics User Database
- Gas Library – make new records for gas mixtures
- Environmental Conditions Library – use NFRC 100-2001 and example on other BC
- Glazing System Library – U-factor based on 1 meter cavity, CR requirements.
- Frame and Divider Library – Importing files from THERM, CR details, Absorptance
- Window Library – new navigation shortcuts, SHGC/VT 0/1, CR
- Assemble a whole fixed window
- Review Results. NFRC vs other BC

Window Glazing Exercise:

- Understanding Grouping rules for Glazing



**May 23rd2th: DAY 32: (8:30 am – 5 pm)**

**THERM 6:**

- Walk through - Menu / Toolbar / Status Bar
- File Properties
- Results and Reports
- Modeling Aluminum Fix window (NFRC and ECBC conditions)
- Glazing System Import
- Frame Cavities – gravity vectors, emissivity, temperatures
- Boundary Conditions
- U-factor tags
- Radiation Enclosures
- SHGC tag for SHGC and VT
- CR requirements
- Obtain all indices value, U-factor, SHGC, VT for Aluminum fix
- Reviewing model results and understanding from design concepts.

Special cases

- Dividers
- Meeting rail and External/Internal exposed air cavity rules

THERM Modeling Special Cases:

- Curtain wall, strip windows modeling
- Sloped glazing
- Applied Films and Laminates

**May 24th3rd: DAY 43: (8:00 am – 5 pm)**

THERM Modeling Special Cases Continued:

- Bolts, Skip and debridge
- Doors

**Reports:**

Discuss Report requirements which can then be uploaded to public database.

**Introduction to CMAST computer program for Post fabricated products.  
Introduction to Complex Glazing modeling. (Attachments, Frit glass, etc)**

**Discussion,**

Question and answer

**Exercises: Time permitting**

THERM Modeling Exercise. Frame modeling, Divider modeling

Whole Product Exercise: Understanding the critical design consideration.

**Appendix B:**

**CVs of Project overseers:**

**Dr. Prasert Sinsukprasert:**

Dr. Prasert Sinsukprasert is currently Director of Planning Division, Department of Alternative Energy Development and Efficiency (DEDE) at the Ministry of Energy. He is responsible for planning, budget allocation, monitoring and evaluation of all departmental activities and overall performance of Energy Efficiency and Alternative Energy. Over 13 years with the Ministry of Energy, he has gained extensive experience and a variety of knowledge in energy development and management, both internationally and domestically. He managed and developed several projects under the ESCO Fund & Venture Capital program, providing investment for energy efficiency and renewable energy projects, equity financing, equipment leasing, carbon credit trading, credit guarantee facilities, and technical assistance. He was also involved with the Energy Conservation Promotion Fund and initiated the Revolving Fund for Energy Conservation, a financing program providing low-interest loans for energy efficiency and conservation investments which has leveraged over 500 million USD of EE and RE investment in Thailand. In the international front, he was actively involved in APEC EWG AND ASEAN Energy Cooperation under the Energy Efficiency and Conservation Sub-sector Network (EE&CSSN), including ASEAN Energy Labelling, ASEAN Energy Awards, Energy Audit Training, Energy Efficiency Forums and Seminars, etc. Additionally, he is a Vice-Chairman in the Bureau of Global Energy Efficiency 21 Expert Group and a Programme Committee member in World Energy Council.

Prior to joining the Ministry of Energy, Dr. Prasert worked as Energy Researcher in the Asia Technical Department at the World Bank, Washington DC, USA and co-produced two publications on Energy Pricing Policies and Energy Profiles in Asian countries.

Dr. Prasert holds a Bachelor Degree in Electrical Engineering from Chulalongkorn University, Master Degree in Power and Energy Conversion from George Washington University in Washington DC, and both Master and Doctoral Degrees in Energy Management and Policy from the University of Pennsylvania in Philadelphia, USA. He is also a guest lecturer and speaker at leading universities, academic institution, seminars and events, at both domestic and international levels.

**Advisors:****Dr. Pattana Rakkwamsuk:**

Dr. Pattana Rakkwamsuk is currently Dean for School of Energy, Environment and Materials, King Mongkut's University of Technology Thonburi (KMUTT). He has been actively conducting researches in the field of building energy sciences and energy efficiency. In recent years, he has involved and taken the lead in the establishment of the new Thailand Building Energy Code and some higher energy performance standards (HEPS) for building envelope materials such as window glazing, wall and roof insulation and roof tile. Having earned experiences and findings from his serious researches, he has opportunities to work with and provide technical services to building materials industries. He is now playing a big role in the establishment of the Building Materials Testing and Certification Center (BM-TCC) in Thailand.

Dr. Pattana Rakkwamsuk, received the Degree of Doctoral of Science in Electrical Engineering from the George Washington University (GWU) in Electrophysics in 1999, two Master's Degrees in Electrophysics from the GWU and in Energy Technology from KMUTT and Bachelor's Degree in Physics from Sri Nakharinwirot Bangsaen University, Thailand.

**~~Dr.~~Dr. Paritud Bhandhubanyong:**

Dr.Paritud Bhandhubanyong graduated with Bachelor and Master Degree in Industrial Engineering from Chulalongkorn University, and Master in Business Administration from Thammasart University, Thailand. He got the Doctoral Degree of Metallurgical Engineering from the University of Tokyo under the Japanese Government Scholarships and Honorary Doctor of Engineering from Nagaoka University of Technology. During his study for doctoral degree he got two Kobayashi Awards from the Japan Foundrymen's Society for excellent research works and one scholarship from Iwatani Foundation. His career started as Junior Assistant Engineer in the State Railways of Thailand before working as a lecturer in the Faculty of Engineering, Chulalongkorn University (CU) before promoted to Head of Department of Metallurgical Engineering, Vice Dean for Planning and Development, and Project Director for the Thai-Japan Technology Transfer Project. While working at Chulalongkorn University, he has been well-known in the industry as instructor, expert, and consultant on productivity improvement, cost reduction, Total Quality Management, and Total Productive Maintenance. He was awarded as Young Excellent Engineer by the CU Engineering Alumni Association. Then he moved to be the Executive Director of the National Metal and Materials Technology Center (MTEC), National Science and Technology Development Agency (NSTDA), Ministry of Science and Technology with the final post as Advisor to the President of NSTDA. He is now working as Executive Director and Director General at the Technology Promotion Association (Thailand-Japan) or TPA. He sits on Board of Director of various public and private sectors in Thailand including Thailand Green House Gas Management Organization, Thai-German Institute, Premier Technology, Co., Ltd., United Adsorbent Co., Ltd, etc. His research and work interest are fatigue and fracture toughness of cast iron, heat and surface treatment of iron and steel products, new and renewable energy, energy efficiency, greenhouse gas management, industrial management, engineering education for high quality human resources development. He published about 20 research papers, 13 books translated from Japanese and English, and is current contributor for engineering education column in the CU alumni journal and Japanese Management Technique column in TPA Newsletter. He is an active member of many professional societies in Thailand.

**Dr.Kuskana Kubaha:**

Dr. Kuskana Kubaha is an assistant professor at the School of Energy, Environment and Materials (SEEM), King Mongkut's University of Technology Thonburi (KMUTT). He is also a chairman of the Division of Energy Management Technology and an associate dean for academic affairs at the school. Following a degree in Physics at Silpakorn University, he took an M.Sc. in Energy Technology at the KMUTT, an M.Sc. in Built Environment at the Bartlett School of the University College London (UCL) and conducted the Asymmetric Radiant Fields and Human Thermal Comfort at the Institute of Energy and Sustainable Development, De Montfort University (DMU), UK while working towards his Ph.D.

He has been working as Energy Expert for energy consultancy firms, more than 100 companies including industries and buildings. I was a project manager of energy management projects, i.e., Total Energy Management (TEM) supported by the Department of Industrial Promotion, Energy management and Process Improvement in Frozen Food Industries supported by Thai Frozen Foods. He was also a project manager of the study on roof tiles to draft a ministerial regulation in term of energy efficiency under the Energy Conservation Promotion Act 2007 supported by the Department of Alternative Energy Development and Efficiency (DEDE).

His research interests include energy management and waste heat recovery in order to increase energy efficiency in frozen foods industries, low energy use buildings, external cost of electricity generation, radiant cooling for households and human thermal comfort (discomfort) in residential and public buildings.

**Mr. Marc Lafrance:**

Mr. LaFrance currently is the manager for Building Envelope and Windows R&D programs at the Department of Energy in the Office of Building Technology. The program portfolio has been funded approximately \$8 million annually and is attempting to develop the next generation of technologies that will contribute to buildings that use zero net energy. Key activities include advanced roof, wall, and window systems. In 2004, the windows program received two 100 R&D Awards for electrochromic glazings. Prior to his current assignment, he worked at the Asia Pacific Energy Research Centre in Tokyo working on macro energy and economic analyses for the APEC region from 2000 through July 2002.

His initial positions at the Department of Energy began in 1993 where he worked on the Codes and Standards program and the ENERGY STAR program. He also managed the Emerging Technology program that was responsible for commercializing the least cost, smallest, compact fluorescent light bulbs. Other achievements included the formulation of a team that won a 100 R&D Award for a low cost heat pump water heater. He began his career with the Defense Department working on weapon systems and facility infrastructure at an R&D center in Newport, RI.

Mr. LaFrance received his BS Degree in Mechanical Engineering in 1985 from the University of Massachusetts and a MS Degree in Urban Systems Engineering in 1998 from George Mason University. He also is recognized as a Certified Energy Manager by the Association of Energy Engineers.

### **Bipin Shah**

**Bipin Shah** has Masters Degree in mechanical engineering from California State University and has 19 years of experience in development and implementation of building envelope component products certification & rating programs nationally and internationally. He brings significant experience in promoting energy efficient products internationally and providing technical assistance for development of standards, setting up of infrastructure, quality control and certification program like National Fenestration Rating Council (NFRC) and Cool Roof Rating Council (CRRC) in the USA. He has been an active member of the American Society for Testing and Materials (ASTM, C16 and E06), American National Standards Institute (ANSI), International Standards Organization (ISO) TC160, and TC163 standing committees and American Society for Heating, Refrigerating, and Air Conditioning Engineers TC4.5 – Fenestration, (ASHRAE) 90.1 and 90.2 standards committee.

As the NFRC International programs coordinator, he has assisted United Kingdom and Australia to establish Fenestration Rating Councils and is actively working with, China, India, South Africa, Jordan, Russia and Kuwait for the development and implementation of a labeling and certification program for building envelope products.

Currently as a consultant to the US-Department of Energy for Asia Pacific Partnership program for Building Envelope component Rating and Labeling Project, and as an International Programs Coordinator for the National Fenestration Rating Council (NFRC), he is responsible to assisting partner countries to develop and establish a building envelope component rating and certification program, required infrastructure and human resources.