

# REPORT ON PROGRESS OF THE APEC ENERGY PEER REVIEW MECHANISM AND THE APEC-WIDE ASPIRATIONAL GOAL FOR ENERGY INTENSITY IMPROVEMENT

## 1. Background

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In their 2007 Sydney Declaration, APEC Leaders agreed to:

1. “work towards achieving an APEC-wide aspirational goal of a reduction in energy intensity of at least 25 percent by 2030 (with 2005 as the base year)” and
2. “facilitate and review progress through the voluntary APEC Energy Peer Review Mechanism with a report back to APEC Leaders in 2010”.

This report is designed to examine APEC’s progress on these two specific initiatives, as well as recommend next steps.

Two programs have been established under the voluntary APEC Energy Peer Review Mechanism.

1. The *Peer Review on Energy Efficiency (PREE)* encompasses two activities.
  - *Peer Reviews of Volunteer Member Economies* (‘Peer Reviews’) are designed to produce policy recommendations for energy efficiency improvement one economy at a time. A Peer Review is conducted by a review team consisting of energy efficiency experts from APEC economies and APERC. The review team visits the economy for up to a week to interview relevant stakeholders.
  - The *Compendium of Energy Efficiency Policies of APEC Member Economies* (‘Compendium’) is a compilation of energy efficiency policies and action plans of the APEC economies presented under a common format. The Compendium is based on information provided by member economies, and is published on the APERC website.
2. *APEC Cooperative Energy Efficiency Design for Sustainability (CEEDS)* provides an in-depth review of energy efficiency policies and measures in a single sector for several economies. The process includes two workshops, which bring together experts on energy efficiency in the selected sector and delegates from participating economies. Between the two workshops, delegates prepare presentations on how their economies’ energy efficiency policies in the selected sector could be improved.

## 2. Peer Reviews of Volunteer Member Economies (‘Peer Reviews’)

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In 2009, Peer Reviews were completed for New Zealand, Chile, Viet Nam and Thailand. The review teams made a number of recommendations covering the institutional context for energy efficiency policy and programs; energy efficiency goals and strategies; energy data collection and monitoring; energy efficiency in the industrial, electricity, transport, residential, and commercial sectors; energy efficiency activities by local government and non-government organisations; and energy efficiency research and development. Reports for these Peer Reviews are available on the APERC website ([www.ieej.or.jp/aperc/](http://www.ieej.or.jp/aperc/)).

The challenges posed by market and institutional barriers to energy efficiency are a theme of all four Peer Review reports. The following barriers were deemed to be particularly significant:

- *Inadequate processes for monitoring and evaluating energy efficiency programs*, making it difficult to assess the effectiveness of energy efficiency programs and identifying areas for improvement.

This barrier is often the result of inadequate end-use energy data, as well as a shortage of appropriately trained experts.

- *Lack of infrastructure and human resources for technical tasks*, such as standards setting and testing of products.
- *Financial barriers* are significant; loans for energy efficiency projects are difficult to arrange as lenders often perceive these projects as risky.

The Peer Review teams were impressed by the significant progress made by all four host economies in improving energy efficiency. The four Peer Review reports also identified a number of areas for future improvement in energy efficiency policies. Three examples are provided. First, a more comprehensive and integrated approach to improving transport energy efficiency, including urban land-use planning, will result in significant energy savings in addition to the savings from specific energy-efficiency policy measures. Second, establishing and maintaining an energy database that can be used for monitoring and evaluation of energy efficiency programs will improve the ability to assess the results of energy efficiency initiatives and ensure their cost-effectiveness. Third, developing an “Eco-Cities” program will promote ways of thinking and behaviour founded on the goal of sustainability.

The feedback APERC received from the volunteer economies that hosted Peer Reviews is that the reviews have provided very useful recommendations for more effective energy efficiency strategies, institutional setup, and policy measures. The fact that another three economies have volunteered for Peer Reviews during 2010, despite the significant commitment of time required by senior officials and experts in each host economy, is evidence of the value the Peer Reviews provide. **APERC recommends that Peer Reviews should be continued to cover more economies.**

Several of the barriers identified by the Peer Reviews reflect insufficient human resources in some areas, especially monitoring and evaluation of energy efficiency programs, end-use data collection, standards setting, and product testing. These barriers could be countered by appropriate APEC cooperative follow-up projects. Therefore, **APERC recommends that APEC initiate a follow-up project focused on capacity building and technical assistance.**

### 3. Compendium of Energy Efficiency Policies of APEC Member Economies (Compendium)

As instructed by the APEC EWG in March 2008, APERC compiled a summary table and detailed information on energy efficiency policies, including goals, strategies, action plans and policy measures for APEC economies. After EWG endorsement, the first *Compendium* was published on the APERC website in March 2010. **APERC recommends that the Compendium be periodically updated under the guidance of the APEC EWG.**

To assess the current status of energy efficiency policies summarised in the *Compendium*, in terms of coverage and implementation, APERC identified 15 High-Performance Energy Efficiency Policies in consultation with APEC expert groups, including the Expert Group on Energy Efficiency and Conservation (EGEEC) and the Expert Group on Energy Data and Analysis (EGEDA). The 15 High-Performance Energy Efficiency Policies are presented in Table 1.

TABLE 1: 15 High-Performance Energy Efficiency Policies

<b>15 High-Performance Energy Efficiency Policies</b>
<b>Cross-sectoral</b>
1. Set energy efficiency <b>goals and action plans</b> for overall economy and various sectors
2. Increase investment, facilitate <b>private sector involvement</b> and encourage financial institutions' participation and effort for energy efficiency improvement
3. <b>Monitor</b> , enforce and evaluate energy efficiency measures for successful implementation
<b>Industry</b>
4. Collect energy efficiency data for industry including <b>end use data</b> for various sub-sectors
5. Assist in developing <b>energy management capability</b> and encourage or require the implementation of these practices by major industrial energy users
6. Develop policies and measures to promote energy efficiency in small and medium-sized enterprises (SMEs).
7. Introduce minimum/high energy performance standards for <b>motors</b>
<b>Transport</b>
8. Establish mandatory <b>fuel efficiency standards and labelling requirements</b> for light-duty and heavy-duty vehicles
9. Encourage fuel-saving <b>Eco-driving</b>
<b>Residential, Commercial and Public</b>
10. Promote energy efficiency in <b>buildings</b> <ol style="list-style-type: none"> <li>a. Establish and regularly update mandatory energy efficiency <b>building codes</b> for <b>new</b> buildings</li> <li>b. Develop policy packages to promote energy efficiency in <b>existing</b> buildings</li> </ol>
11. Encourage the construction of <b>highly energy efficiency buildings</b> such as Passive Energy Houses and Net-Zero Energy Buildings
12. Encourage the introduction and update of <b>building certification</b> systems
<b>Appliances and Equipment</b>
13. Adopt and update <b>mandatory/voluntary high energy performance standards and labelling</b>
14. Adopt <b>international measurement standards and standards harmonisation</b> , where appropriate, to reduce compliance and administrative costs
15. <b>Phase-out incandescent bulbs</b> and introduce higher efficiency lighting systems

In order to evaluate the extent of implementation of the 15 High-Performance Energy Efficiency policies throughout APEC, APERC compared current energy efficiency policies for each economy, as reported in the *Compendium*, with the 15 High-Performance Energy Efficiency Policies listed in Table 1. A three-category classification was used for this comparison:

- I – *Implemented (fully or partly)* shown in **green**
- U – *Underway or in-planning* shown in **yellow**
- N – *Need more information* shown in **red**.

The results are presented in Table 2. A summary of strengths and areas for further improvement in the energy efficiency policies of APEC economies is presented below.

#### A. Strengths

- Nearly-all APEC economies have an energy efficiency strategy and action plan
- Most APEC economies are currently implementing policies to phase out conventional incandescent lamps while introducing more efficient lighting systems.

#### B. Areas for Future Improvement

- Some APEC economies are planning for more effective vehicle fuel efficiency standards
- Some APEC economies have been developing policies and measures to promote energy efficiency in small and medium-sized enterprises (SMEs)
- Some APEC economies are implementing more stringent minimum energy performance standards (MEPS) for appliances.

**TABLE 2: Comparison Table – Current Status of 15 High-Performance Energy Efficiency Policies in APEC Economies**

15 High Performance EE Practices	AUS	BD	CDA	CHL	PRC	HKC	INA	JPN	ROK	MAS	MEX	NZ	PNG	PE	RP	RUS	SIN	CT	THA	US	VN	
<i>implemented (fully/partly) - I, underway /plan - U, need more information - N</i>																						
<b>Cross-sectoral</b>																						
1. Setting Goal and/or Action Plan	I	I	I	I	I	I	I	I	I	I	I	I	N	I	I	I	I	I	I	I	I	I
2. Private sector participation for EE Investment	I	I	I	I	I	I	I	I	I	I	I	I	N	I	I	U	I	I	I	I	I	I
3. Monitoring mechanism	I	U	I	I	I	I	I	I	I	I	I	I	N	I	I	I	I	I	I	I	I	I
<b>Industry</b>																						
4. End Use Data collection	I	I	I	I	I	I	I	I	I	I	I	I	N	I	I	U	I	I	I	I	I	I
5. Energy management by major industries	I	I	I	I	I	I	I	I	I	I	I	I	N	I	I	N	I	I	I	I	I	I
6. Promotion of energy efficiency in SMEs	I	I	I	I	U	I	I	I	I	I	I	I	N	I	N	N	I	I	U	I	I	I
7. Minimum/high energy performance standards for motors	I	N	I	U	I	I	U	I	I	I	I	I	N	I	I	N	U	I	I	I	I	I
<b>Transport</b>																						
8. Fuel efficiency standards / labelling	I	U	I	U	I	U	U	I	I	N	U	I	N	N	U	N	I	I	U	I	I	U
9. Eco-driving	I	U	I	I	I	I	I	I	I	U	I	I	N	U	N	U	I	I	I	I	I	N
<b>Residential, commercial and public</b>																						
10. Mandatory building codes for new buildings/EE Policy in existing buildings	I	U	I	I	I	I	I	I	I	I	I	I	N	U	I	I	I	I	I	I	I	I
11. Encourage construction of highly energy efficient buildings including passive energy houses and net-zero energy buildings	I	I	I	I	I	I	I	I	I	I	I	I	N	I	I	N	I	I	I	I	I	I
12. Building certification systems	I	N	I	U	I	I	U	I	I	I	I	I	N	U	I	I	I	I	I	I	I	U
<b>Appliances and Equipment</b>																						
13. MEPS / HEPS and labelling	I	U	I	U	I	I	I	I	I	I	I	I	N	U	I	I	I	I	I	I	I	U
14. International measurement standard for comparison of traded products	I	I	I	I	I	I	I	N	I	I	I	I	N	I	I	I	I	I	I	I	I	U
15. Phase out of incandescent bulbs and introduction of more efficient lighting systems	I	U	I	I	I	I	I	I	I	I	I	I	N	I	I	I	I	I	I	I	I	I

Despite widespread adoption of many of the high performance energy efficiency policies, the Peer Review Mechanism has revealed that there is often a gap between the expectations and actual effect of a policy measure. Closing this gap will require further concerted effort by APEC economies.

To further encourage the full implementation of high-performance energy efficiency policies in as many economies as possible, **APEREC recommends updating and deepening the comparison of current energy efficiency policies as reported in the *Compendium* with the 15 High Performance Energy Efficiency Policies.**

#### 4. Cooperative Energy Efficiency Design for Sustainability (CEEDS)

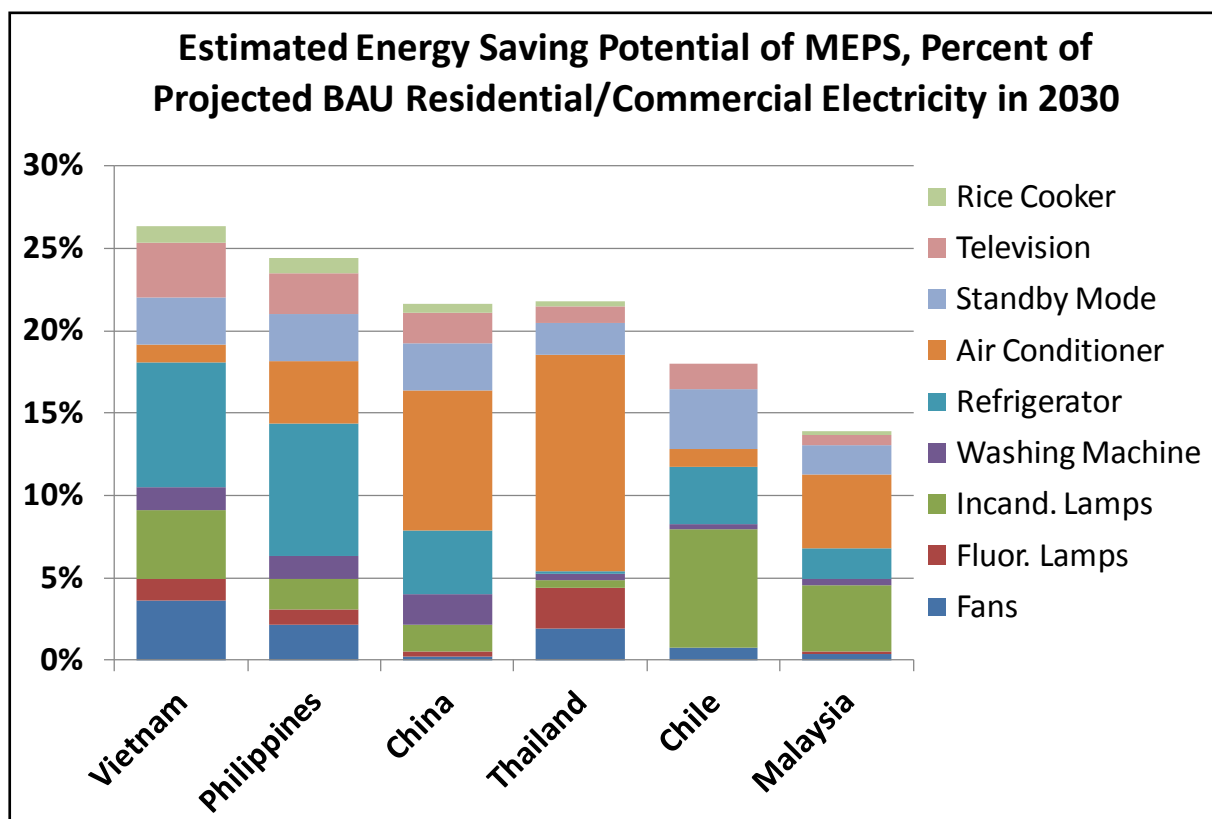
The first phase of CEEDS, which focused on Appliance Efficiency Standards and Labelling (AEES&L), was hosted by Chinese Taipei and Japan. Discussions at the two workshops were wide-ranging and detailed. Some of the topics discussed included:

- How to set up the legal framework for an AEES&L program
- How to select appliance categories for program inclusion
- How to develop criteria for setting standards
- How to design labels, including whether labels should endorse the product or provide consumers with a basis for comparison
- How to set-up a testing and product certification system
- How to monitor and enforce standards and labelling requirements
- How to involve stakeholders in program design.

The findings of most interest relate to a) the energy saving potential of AEES&L, and b) priority areas for future regional cooperation on AEES&L.

To aid economies in the design of effective standards and labelling policies, a team of researchers from APERC and the Lawrence Berkeley National Laboratory (LBNL) estimated the energy saving potential of implementing minimum energy performance standards (MEPS) for eight household appliances in the six participating economies. Results are presented in Figure 1. The potential energy savings from appliance standards ranged from 14% to 26% of projected residential and commercial electricity demand in 2030.

FIGURE 1: Estimated energy saving potential of MEP, percent of projected BAU residential/commercial electricity in 2030.



Discussions at the CEEDS workshops pointed to the need for increased regional cooperation on AEES&L. Cooperative action can reduce costs and accelerate implementation, while facilitating trade in appliances. CEEDS workshop participants identified the following priority areas of opportunity for future APEC regional cooperation for AEES&L:

- Capacity building, including training for
  - Test lab personnel
  - Criteria and methods for setting standards
  - Program impact evaluation.
- Test laboratory coordination, including accreditation of test labs and mutual recognition of lab test results.

**APEREC recommends that APEC initiate cooperative activities in the areas of opportunity identified in the CEEDS workshops as part of the Peer Review follow-up project focused on capacity building and technical assistance discussed in Section 2.**

Following the success of CEEDS Phase 1 on Appliance Energy Efficiency Standards and Labelling (AEES&L), Thailand and Hong Kong, China announced that they will host the CEEDS Phase 2 workshops on Building Energy Codes and Labelling. Results from the *Compendium* indicate that energy efficiency requirements for buildings are a key feature of all APEC economies' energy efficiency policies in the residential and commercial sector. Most economies have been developing energy efficiency requirements for buildings, such as mandatory building codes for new buildings and effective building certification systems for existing buildings. Therefore, CEEDS Phase 2 will be addressing a topic of great interest to the APEC economies.

There are many other topics where future phases of CEEDS can make a valuable contribution. Future phases of CEEDS should address energy efficiency measures in other sectors including *industry* (such as effective energy management), *transport* (such as mandatory fuel efficiency standards or promoting public transport), as well as further efforts in the *residential and commercial* sector (such as promoting home insulation retrofits and solar water heating). Feedback on CEEDS Phase 1 from participating economies has been very positive, therefore **APEREC recommends that the CEEDS program be continued in order to promote further implementation of energy efficiency measures in all sectors.**

## 5. Recommended Next Step – APEC Peer Review of Low-Carbon Energy

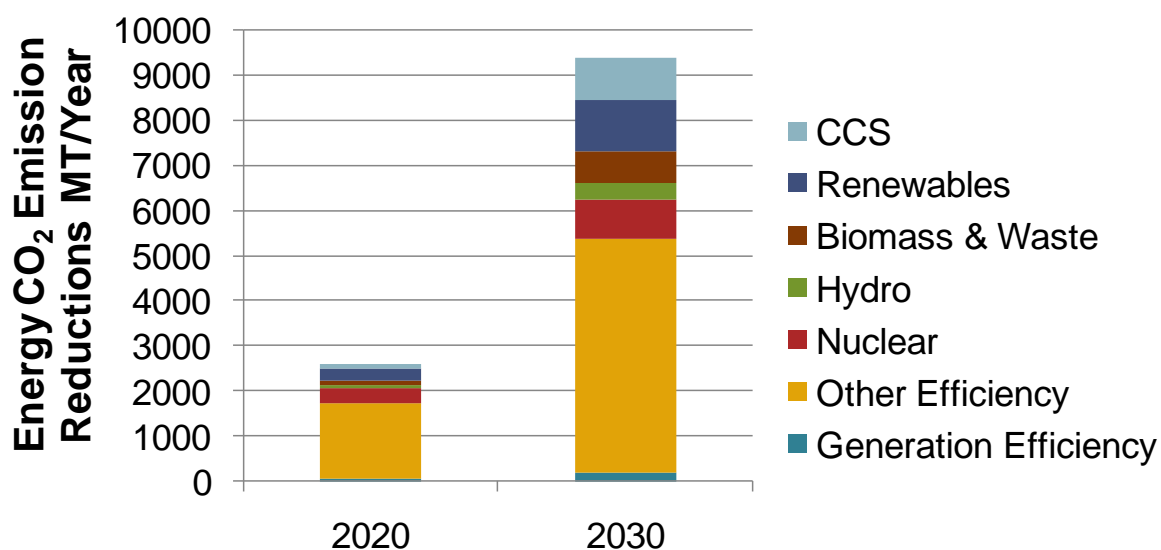
When APEC energy ministers directed the EWG to develop a voluntary energy peer review mechanism in their 2007 Darwin Declaration, they called for an 'initial focus on progress towards attaining energy efficiency goals'. As a result, the focus of all the voluntary energy peer review activities implemented by APEC to date – PREE and CEEDS – has been on energy efficiency. However, this directive appeared as one of several under a broader heading titled "Promoting Clean and Efficient Energy Production and Use". It is clear from this context that the word 'initial' implied that the ministers intended that the peer review mechanism should be expanded in the future to encompass other aspects of clean and efficient energy production and use.

Figure 2 illustrates the composition of emission reductions in the APEC region under a sustainable scenario analysed by APERC in cooperation with the International Energy Agency (IEA). Clearly, energy efficiency represents the biggest opportunity for emission reductions. There is also a significant role for low-carbon energy, including renewables, nuclear, and carbon capture and storage (CCS).

Given the experience APEC has accumulated through voluntary energy peer review efforts, and the associated positive outcomes, as detailed in Sections 2, 3, and 4, it is appropriate for APEC to consider expanding these efforts. Low-carbon energy is widely recognised as the supply-side counterpart to

improved energy efficiency for achieving energy sustainability, and would be a logical focus for these efforts. Low-carbon energy includes renewables, nuclear, and fossil fuels with CCS.

FIGURE 2: Contributions to Greenhouse Gas Mitigation<sup>1</sup>



Building on the success of PREE and CEEDS in the area of energy efficiency improvement, **APERC recommends that APEC establish a Peer Review of Low-Carbon Energy (PRLCE)**. The main purpose of the PRLCE should be to explore how government policies can accelerate the development and deployment of low-carbon energy.

The goals of PRLCE should include:

- identifying effective policies and best practices for low-carbon energy promotion and
- exploring ways that cooperative efforts through APEC could assist APEC economies in promoting low-carbon energy.

Renewable energy is an appropriate initial focus for PRLCE as it is a topic of broad policy concern to APEC economies and one where APEC has already made significant contributions through the technology-focused activities of the APEC Expert Group on New and Renewable Energy Technologies (EGNRET) and the Biofuels Task Force (BTF).

The PRLCE should focus on policy, including goal-setting, strategy design, and action plans, building on the more technology-focused activities of EGNRET and the BTF. The development of renewable energy can benefit from improved government policy as much as through technical improvements. APEC's peer review mechanism is an ideal vehicle to help APEC member economies identify and implement these policy improvements.

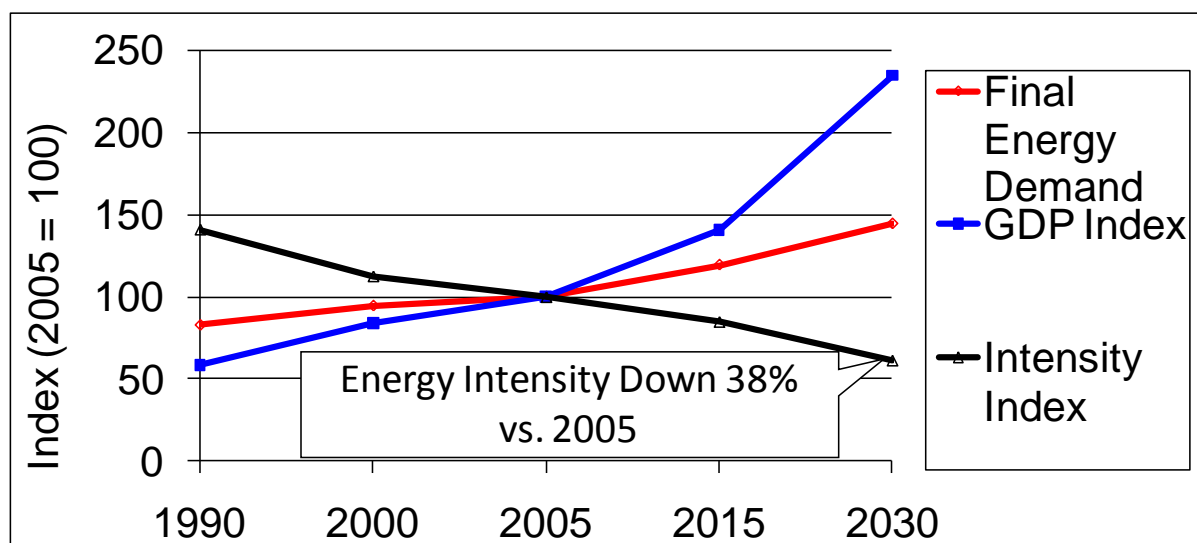
<sup>1</sup> Source: Asia-Pacific Energy Research Centre, *Pathways to Energy Sustainability: Measuring APEC Progress in Promoting Economic Growth, Energy Security, and Environmental Protection*, 2010, to be published on the APERC website. Raw data © OECD/IEA 2009, calculations by APERC.



## 6. APEC's Progress in Improving Energy Intensity

APEREC's *APEC Energy Demand and Supply Outlook 4th Edition* projected that the APEC Leaders' APEC-wide aspirational goal to reduce energy intensity by at least 25% by 2030 (with 2005 as the base year) would be exceeded under business-as-usual, with a primary energy intensity improvement of about 38% (see Figure 3 below). While there are always many uncertainties about the future, additional analysis shows that APEREC's projected 38% improvement in APEC energy intensity between 2005 and 2030 is broadly consistent with both historical and recent trends in the APEC region, as well as with the modelling work of the US Energy Information Administration (EIA) and IEA.

FIGURE 3: Projected APEC Energy Intensity Reduction to 2030<sup>2</sup>



It may be argued that APEREC's business-as-usual energy intensity projection is actually conservative, as there are two other trends driving energy intensity reductions that may not be fully reflected in business-as-usual. The first is that many government policy initiatives for improved energy efficiency throughout the APEC region are not reflected in "business-as-usual". Second, it was assumed that historic rates of technical progress would be maintained under business-as-usual. However, anticipated high energy prices and government policies are driving a push for accelerated technological improvement. Government spending on energy research, development, and demonstration efforts has begun to rise again in recent years after a long and relentless decline in the 1980s and 1990s. In the private sector, anticipated higher energy prices and competitive pressures to respond to government policies, such as appliance energy efficiency standards, are also likely to accelerate energy-saving technical innovations.

**Given that the APEC-wide aspirational goal to reduce energy intensity by at least 25% by 2030 is likely to be exceeded, it is valuable for the APEC EWG to intensify analysis of the potential for further energy intensity improvement with a view to recommending an enhanced goal for a more secure and sustainable energy future. APEREC is ready to assist EWG in these efforts.**

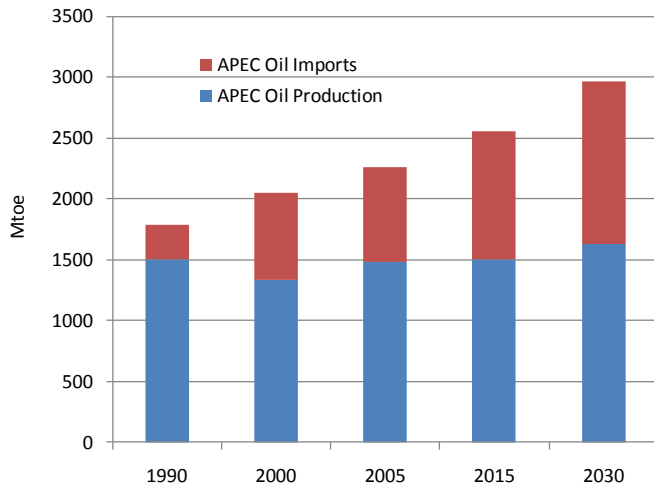
## 7. More Action is Needed for a More Secure and Sustainable Energy Future

Despite APEC-wide progress in reducing energy intensity, business-as-usual will still not result in an energy sector that can support economic growth, energy security, and environmental protection. **More action will be needed. The *APEC Energy Demand and Supply Outlook 4th Edition* identified two major energy-related threats to the future of the APEC region: growing oil imports and**

<sup>2</sup> Source: Asia-Pacific Energy Research Centre, *APEC Energy Demand and Supply Outlook 4th Edition*, 2009, Figure 1.5.

**growing greenhouse gas emissions.** Figure 4 shows the business-as-usual projection for APEC oil imports while Figure 5 shows the business-as-usual projection for APEC greenhouse gas emissions.

**FIGURE 4: APEC Oil Production and Imports**



**FIGURE 5: APEC Greenhouse Gas Emissions**

