TENTH REPORT ON IMPLEMENTATION OF THE ENERGY SECURITY INITIATIVE (ESI)

Purpose: Consideration

Submitted by: EWG Secretariat

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The ESI Factsheets are intended to present in a clear and concise form the purpose, progress and achievements of each measure under the ESI. They are updated on a regular basis by the EWG Secretariat in consultation with Expert Groups, Task Forces and project Lead Economies. Members are invited to comment to update and improve the Factsheets at any time. The Factsheets are posted on the EWG website (www.ewg.apec.org).

Factsheets

- Joint Oil Data Initiative (JODI)
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- Methane Hydrate
- Petroleum Infrastructure and Crude & Refined Products
Joint Oil Data Initiative (JODI)

Background

"Noting that a "lack of transparent and reliable oil market data aggravates price volatility", Energy Ministers at EMM8 (Darwin, 2007) reaffirmed their support for JODI as an international initiative that "addresses investor uncertainty, contributes to global harmonisation of energy data, and strengthens producer and consumer dialogue by demonstrating concrete action". They encouraged APEC economies to report "timely, accurate and complete data on oil reserves, supply and demand, stocks and production under the JODI" and directed the EWG to continue to provide training through JODI to enable economies to contribute to the JODI World Database.

APEC Ministers (Sydney, 2007) recognised the role of improved oil data sharing in achieving oil security and welcomed the promotion of broader energy cooperation which can enhance energy data collection.

JODI contributes to the Energy Security Initiative through improved oil data and greater data transparency in the region. Launched in 2001, JODI collects monthly oil data from over 90 participating countries through six international organisations (APEC, EUROSTAT, IEA, OLADE, OPEC and the United Nation Statistics Division), aiming to assess the quantity, quality and timeliness of basic monthly oil data.

JODI addresses data transparency, assisting in the implementation of more efficient investment decisions in the oil market and leading to enhanced energy security. JODI's first priority was to assess oil data collection methods in participating countries to better understand and quantify any gaps. This data collection assessment was followed by the development of a framework and template by which countries could collect monthly oil statistics in a harmonised manner. The primary goal was not just to build a database, but to raise the awareness of all oil market participants of the need for greater transparency in oil markets.

JODI has played an important role in raising awareness of the difficulties encountered in improving data reliability and timeliness. Networks have been established and data collection systems have been improved. Attitudes towards confidentiality and reliability have evolved and contacts between oil companies, countries and organisations have multiplied.

The release of the first JODI World Database (late 2005) was a significant development, with one of the more important outcomes being the facilitation of an oil producers and consumers dialogue. The JODI Manual (released late 2006).has definitions of products and flows are at its heart, but information on the JODI questionnaire and database is available as well. The Manual also includes chapters on data verification methods and examples of practices from participating countries. The Manual is available for download from the JODI website: www.jodidata.org.
Implementation

APEC’s contribution to JODI is managed by the EWG’s Expert Group on Energy Data and Analysis (EGEDA). The Energy Data and Modelling Center (EDMC) in Japan is the Coordinating Agency for EGEDA. Twenty Member Economies submit monthly JODI data to the EDMC, which evaluates the data prior to submission to the JODI World Database hosted by the International Energy Forum Secretariat (IEFS) in Riyadh, Saudi Arabia.

JODI data include seven product categories: 1. crude oil; 2. LPG; 3. gasoline; 4. kerosene; 5. gas/diesel oil; 6. fuel oil; and 7. total oil, which includes categories 2-6 and all other petroleum products (refinery gas, ethane, naphtha, petroleum coke, white spirit & industrial spirit (SBP), paraffin waxes, bitumen, lubricants and others).

Data includes six flows: 1. production of crude oil and refinery output; 2. imports; 3. exports; 4. closing stocks; 5. stock changes; 6. refinery intake of crude oil and demand of oil.

The 6th International JODI Conference (Saudi Arabia, November 2006) introduced a trial revision of the reporting format extending the number of product categories to eleven and the number of flows to twelve to improve the usefulness of the Initiative and the entire database.

The new products that have been added are: NGL and Other Hydrocarbon for primary products as well as Naphtha, Jet Kerosene and Other Products for secondary products. The additional flows for the primary products are: From Other Sources, Products Transferred/Backflows, Direct Use and Statistical Difference. Primary Product Receipts and Inter-product Transfers flows were added for petroleum products.

A 6-month trial data collection using the extended format took place April – September 2007. The results of the trial collection will be used by the JODI Group to determine whether to replace the old format with the extended format in future data collection. The trial collection was extended for another 6 months after the Inter-Secretariat Working Group Meeting held in November 2007 to allow member countries/economies to improve data reporting.

As regards the World JODI Database that is being hosted by the IEFS, two additional flows were opened to the public: Refinery Intake and Output data. In 2005, only the Indigenous Production, Stock Closing, Stock Change and Demand were released among all the collected flows mentioned above.

EGEDA provide APEC member economies with capacity building services to support the collection and reporting of oil data.

Contact

Kenichi MATSUI
matsui@edmc.ieej.or.jp
Energy Data & Modelling Centre, Institute of Energy Economics, Japan
Chair, Expert Group on Energy Data and Analysis
ENERGY SECURITY INITIATIVE
FACTSHEET

Real-Time Emergency Information Sharing System (RTEIS)

Background

Recognising that oil supply disruptions can affect all member economies, Energy Ministers (Darwin, 2007) encouraged all members to participate in the Real-Time Emergency Information Sharing System (RTEIS). They further encouraged all member economies to "develop and communicate emergency mechanisms and contingency plans" through the APEC Taskforce for Emergency Preparedness to include an APEC Rapid Response Points of Contact for the Protection of Critical Energy Infrastructure. This new network would be expected to "help minimise the potential for supply disruptions" and "better protect critical energy infrastructure, including for maritime transportation.

RTEIS was developed by Japan as a secure web-based tool to share information in the event of energy emergencies and disruptions that may have a flow-on effect to other APEC economies. The site only allows access to designated officials from participating economies.

RTEIS enables real-time communication in the form of a chat-room, as well as data sharing and non real-time communication in the form of a bulletin board. It also contains daily crude oil spot price data and provides access to Joint Oil Data Initiative (JODI) data. Member economies provide up-to-date information to the JODI project and have undertaken to alert others to potentially damaging energy emergencies across the region.

Forming part of an Emergency Management Framework, RTEIS is designed to provide APEC member economies with the tools to manage and coordinate their responses to oil supply disruptions. The purpose of the Framework is to provide a common response capability that enables all affected member economies to minimise the impact of energy supply incidents by acting in a coordinated and united manner. The objectives of a coordinated response are to:

- minimise disruptions to energy supplies for all consumers;
- minimise the economic and social impact of supply interruptions;
- provide protection to critical functions and facilities; and
- promote economic development through confidence in energy supply.

Achieving these objectives is dependent on the active participation of all member economies under both normal and extreme circumstances. It relies on each jurisdiction having procedures in place that are well understood, practiced, with a robust legislative foundation and consistent with the principles of this Framework.
Implementation

The Operational Manual for the RTEIS was released in July 2005, providing users with information on how to activate and operate the system. Funding for the Manual was provided by Australia.

The Manual acts as both a guide to using the RTEIS and as an emergency management framework. It lists the policies and definitions for emergency notification and escalations. With the development of the RTEIS Operational Manual, a number of enhancements to the system were introduced, including the identification of two levels of users per economy: Emergency Contact and RTEIS Users. Other new features included the individual economy’s energy emergency level and an Emergency Contacts and RTEIS Users contacts list. For a copy of the Manual, refer to the Short Term Measures of the Energy Security Initiative at: www.ewg.apec.org.

Several modifications have been made to the RTEIS. These include improved responsiveness of APEC Economies to indicate their emergency status; Further work and enhancements to the system continue, including the addition of a new emergency level to indicate an economy is in a recovery/reconstruction stage; improvements to oil data and communication facilities; and the introduction of bi-monthly newsletters released by the Institute of Energy Economics, Japan available on the EWG website.

During and after Hurricane Katrina, Australia, Japan and New Zealand shared information through the Bulletin Board System on their responses to its impacts on energy supply.

A ‘trial chat’ was conducted in March 2006, with a subsequent “chat” in August 2006 on the topic of biofuels. Outcomes from the March trial were reported at EWG31 (Singapore, May 2006) and the August “chat” results at EWG32 (Russian Federation, October 2006). In December 2006, Australia, Japan, Canada and the United States shared information on oil stockpiling through the Bulletin Board System.

In November 2007, Australia, Hong Kong China, Japan and New Zealand participated in a chat to discuss the possible linking of the proposed APEC Rapid Response Points of Contact Network put forward by the Russian Federation at EWG33 (Sakhalin, October 2006). Outcomes were reported at EWG35 (Peru, March 2008) but EWG35 requested continuous discussion on this issue and a report on outcomes at EWG36 (Manila, December 2008). In August 2008, a chat was held to discuss the issue although only Japan, Australia and New Zealand participated. The outcomes of the chat will be reported at EWG36.

Contact

Shigeru KIMURA                                      kimura@edmc.ieej.or.jp
Senior Research Fellow, General Manager
Energy Data & Modelling Center, Institute of Energy Economics, Japan
Energy Emergency Responses, including Oil Stocks

Background

Energy Ministers at EMM8 (Darwin, 2007) instructed the EWG to strengthen cooperation with other relevant international fora, such as the IEA, for coordinating efforts at the time of energy supply disruptions. They also encouraged interested economies to continue to report on implementing best practices for the establishment, financing and management of strategic oil stocks.

A key component of emergency responses in many situations is the availability of strategic oil stockpiles. APEC Best Practice Principles for Strategic Oil Stocks cover the areas of control, composition, physical location, use, operational principles and international cooperation.

As an immediate response to the Indian Ocean Tsunami, as well as a collective response to future natural disasters, APEC Senior Officials adopted an APEC Strategy on Response to and Preparedness for Natural Disasters and Emergencies in March 2005. They specifically called for the establishment of a Virtual Task Force for Emergency Preparedness (VTFEP), now known as the Task Force for Emergency Preparedness (TFEP).

The first meeting of the TFEP was held in Bali, Indonesia on 2–3 May, 2005. The TFEP considered a stock-take of emergency and natural disaster management initiatives developed by APEC fora, including the Earthquake Response Cooperation Initiative, Real-Time Emergency Information Sharing System, information sharing on energy emergency preparedness and several EWG projects and workshops on emergency response.

The TFEP acts as a regional network to build links between APEC disaster management experts; share information between APEC fora and other relevant organisations; and facilitate capacity building projects. Information on the TFEP is available at www.apec.org.

General Principles of the TFEP Work Plan

- Adopt a strategic cross-fora approach to determining priorities for cooperation on emergency and natural disaster preparedness and response, taking into account capacity and expertise available among APEC members.
- Complement and not duplicate the work of other relevant international and/or regional organisations.
• Promote regional network development, effective intra-APEC information sharing and effective communication of outcomes to the wider APEC community.

• Promote sharing of best practices, information and resources – including technical expertise – in a manner that takes account of and complements existing “economy-based” strategies.

• Support work by all APEC fora to develop best practice capacity in the region to better prepare economies for future disasters using generic all hazards approaches.

• Support work on community-based disaster response plans (and organisational arrangements to support them) and education through APEC fora in ways in which economic disruption (particularly damage to peoples’ livelihood and health) can be minimised.

Implementation

Economy Energy Response Arrangements

Oil Stockpiling
Oil stockpiling is an important strategy to improve emergency preparedness. APEC oil import dependency will rise from 35 percent in 2002 to 44 percent by 2030 (APEC Energy Supply and Demand Outlook 2006, APERC). Oil supplies are also expected to grow more vulnerable to disruption. Consequently, emergency oil stocks must increase with growing net imports so that consumers can maintain the same degree of preparedness against unexpected oil supply disruptions.

"APEC Best Practice Principles for Establishment and Management Strategic Oil Stocks", approved by Energy Ministers (Philippines, 2004) relates to the control, composition, location, use and operation of strategic oil stocks, as well as international cooperation with respect to such stocks (www.ewg.apec.org).

A workshop on "Oil Stockpiling in the APEC Region: Implementing Best Practices, Facilitating New Commitments" was held in Hawaii, United States, 26–27 July 2005. Participants discussed the magnitude of stocks required; the balance between government and private ownership of stocks; the balance between crude oil and product stocks; and the types of emergencies in which strategic stocks should be released (report available at www.ewg.apec.org). A summary presentation on the workshop was given at an APEC session held at “Petrostocks 2007: New Perspectives” (New Orleans, United States, January 2007), a forum for participants from stockpiling entities worldwide to meet and share ideas on technical, economic and financial issues facing the international oil stockholding community.
Energy Investment

"Energy is an integral part of economic activities and thus, investment in energy infrastructure is essential to support activities and growth of APEC economies. It facilitates the mobility of people and goods, underlies the production of manufacturing and services, and sustains the comfort and convenience in living. All in all, quality of our living standards, performance of industries and business activities invariably depend upon stable and reliable energy supply." (APEC Energy Supply and Demand Outlook 2006, APERC)

Background

Meeting energy demand in the APEC region will require new investment of at least US$ 6 trillion to 2030. The importance of facilitating and attracting energy investment was highlighted at both the 6th (Philippines, 2004) and 7th (Korea, 2005) Energy Ministers’ Meetings. They directed the EWG to continue to engage with financial institutions and the private sector in this regard, noting the Energy Business Network’s ‘Ten Priorities for Financing Energy Infrastructure Projects within the APEC Region’ and its previously endorsed best practice principles for the natural gas sector.

Energy Ministers at their 8th Meeting (Darwin, 2007) considered collaborative measures to attract energy investment and facilitate cross-border trade and to facilitate investment and trade in downstream and upstream oil markets. They directed the EWG to review the uptake and currency of the above-mentioned best practice principles and noted that significant economic benefits can be gained by removing barriers to new investment and encouraged "continued efforts by the Energy Efficiency & Renewable Energy Financing Task Force to help governments, businesses and financial institutions incorporate the value of energy savings in large-scale investment decisions" and directed the EWG to "contribute to the proposed APEC Energy Trade & Investment Study and Roundtable".

APEC Leaders in their 15th Leaders' Declaration (Sydney, 2007) "affirmed that rising energy demand in the Asia Pacific can best be met by expanded trade and investment to boost supply and greater efficiency in use" and "agreed that energy security is best met through efficient energy markets, characterized by free and open trade, secure and transparent frameworks for investment, clear price signals, market transparency, effective governance and competition". In their accompanying Declaration on Climate Change, Energy Security and Clean Development, Leaders stated that "the pursuit of climate change and energy security policies must avoid introducing barriers to trade and investment" and that "open trade, investment and environmental policies are crucial to disseminating low emissions products, technologies and best practices."
Implementation

A series of three workshops on facilitating financing of energy infrastructure, energy efficiency and renewable energy projects was held in 2004, with participation from financial institutions, the private sector, NGOs and government agencies from across the APEC region. Their recommendations reflect three guiding principles:

- Public/private partnerships are needed to design and implement market-based remedies to financing barriers, with funding and support mechanisms locally managed and operated.
- The public sector’s role should focus on providing effective incentives for private sector investments in clean and more efficient energy projects.
- Host country initiatives should take a holistic approach, combining policy drivers, economic incentives and financial intermediation.

The Energy Efficiency and Renewable Energy Financing Task Force was set up in response and completed several projects before disbanding in March 2008. Several projects have also been undertaken by the Expert Group on New and Renewable Energy Technologies (EGNRET). Projects completed or underway include:

Developing Market Capacity to Commercialise Financing of Clean and More Efficient Energy Projects
Information Sharing on Financing Public Sector Energy Efficiency & Renewable Energy Projects: development of a web-based information system
Local Banks Training Program for Financing EE & RE Projects
Successful Business Models for New and Renewable Energy in the APEC Region.

Ten Priorities for Financing Energy Infrastructure Projects
Review and update will be discussed at EWG36 (Manila, 2008).

Asia Clean Energy Forum (Manilla, 26–28 June 2007)
The Forum, co-sponsored by the Asian Development Bank, the US Agency for International Development, the US Department of State and APEC, gathered more than 400 experts from 36 countries, the majority representing APEC and ASEAN economies. Focus was on policy and financing solutions for increasing access to clean, reliable and affordable energy in the region, with presentations on energy efficiency, renewable energy and climate change.

APEC Energy Trade & Investment Study and Roundtable
The Australian-funded APEC Energy Trade & Investment Study was released prior to the Roundtable (Cairns, 30 September–2 October 2008). Roundtable participants met to develop a plan of action, tailored to the needs of individual economies, towards removing barriers to energy investment and facilitating cross-border trade and contributing to greater regional economic integration. The Draft Action Plan will be presented to EWG members at EWG36 (Manila, December 2008).

Contacts
Jeff SKEER jeff.skeer@hq.doe.gov
Former Chair, Energy Efficiency & Renewable Energy Financing Task Force (dissolved)
Cary BLOYD bloyd@anl.gov
Chair, Expert Group on New & Renewable Energy Technologies
ENERGY SECURITY INITIATIVE
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Natural Gas Trade

Background

Natural gas is a regularly supplied, globally traded and relatively clean, low-carbon, low-polluting fossil fuel. Expanding the use of natural gas, including Liquefied Natural Gas (LNG), is recognised as a strategy for addressing the requirements embodied in the Kyoto Protocol for many APEC member economies, as well as broadening the fuel mix and enhancing energy security across the region.

APEC Energy Security Initiative recommendations, endorsed by the 5th Meeting of Energy Ministers (Mexico, 2002) acknowledged natural gas as an important non-petroleum means to fill energy needs from the supply side and recommended that cross-border trade barriers be lowered.

Similarly, at the 6th Meeting of APEC Energy Ministers (Philippines, 2004) Energy Ministers declared that energy diversification broadens our choice of energy sources and technologies, strengthening energy security and sustainable development within the APEC region. The region’s move towards a more diverse energy mix includes a growing demand for natural gas, through cross-border pipelines and Liquefied Natural Gas (LNG).

Supporting the creation of a competitive and transparent marketplace for gas trade, APEC Energy Ministers at EMM7 (Korea, 2005) encouraged member economies to move towards implementing best practice as identified in ‘Facilitating the Development of LNG Trade in the APEC Region’ and supported the establishment of the APEC Gas Forum (APGAS).

Energy Ministers at EMM8 (Darwin, 2007) directed the EWG to review the uptake and currency of Best Practice Principles on "Accelerating Investment in Natural Gas Supplies, Infrastructure and Trading Networks in the APEC Region" and "Facilitating the Development of LNG Trade". They also directed the EWG to continue implementation of the LNG Public Education and Communication Information Sharing Initiative, to improve natural gas data collection and to address the recommendations of the APEC Gas Forum.

APEC Leaders (Sydney, 2007) stated that "Fossil fuels will continue to play a major role in our regional and global energy needs. Co-operation, including joint research, development, deployment and transfer of low and zero emission technologies for their cleaner use, particularly coal, will be essential."
Implementation

APEC Gas Forum
The APEC Gas Forum (APGAS) was established with the aim of creating a competitive, open and transparent marketplace for natural gas, particularly LNG, in the region. The three APGAS forums to date (Perth 2005 and 2006, San Diego 2007) have provided a platform for high-level discourse between suppliers, consumers and transporters in both government and industry to discuss and debate issues that facilitate a vibrant regional trade in natural gas and LNG. The APGAS forums led to industry participants from across the region developing a set of recommendations which were considered at the 8th Meeting of APEC Energy Ministers (Darwin, May 2007) www.apgasforum.com

LNG Public Education and Communication Information Sharing Initiative
In the context of sharing LNG best practices, Energy Ministers endorsed at EMM7 (Korea, 2005) the Chinese Taipei proposal for an LNG Public Education and Information Sharing Initiative to provide a mechanism for APEC member economies to disseminate information to the public on the benefits of LNG as a safe, reliable and cleaner fuel source. The initiative allows economies to share information on insights gained into successful communication with the public on LNG projects through a website, with information from a LNG questionnaire circulated to EWG members. It is hoped that a greater awareness of the benefits of LNG will improve its uptake and lead to a reduction in barriers to investment. With the 3-years’ implementation coming to an end, the plan is to continue the information collection and website maintenance.

The Expert Group on Clean Fossil Energy (EGCFE) held a Workshop on LNG Public Education in November 2007 in Guangzhou, PRC, and visited China's first LNG receiving terminal. Private sector and government officials involved with educating the general public and other government officials prior to the development and during the life of an LNG facility (either a liquefaction shipping or regasification receiving terminal) shared their experiences. Outcomes from this workshop, as well as the APEC Natural Gas Utilisation Workshop (August, 2007), were reported to EWG35 (Peru, 2008). In 2009 the EGCFE will begin an APEC-funded project, “Case Studies of Public Education and Information Campaigns in APEC Economies, and Development of Best Practice Guidelines”.

Collection of Natural Gas Data
The Coordinating Agency of the APEC Energy Database, located at the Energy Data and Modeling Centre of the Institute of Energy Economics Japan, undertook a three-month trial collection (September–November 2006) of monthly natural gas production, trade and stocks statistics from non-OECD members. (OECD member economies already submit monthly gas statistics to the International Energy Agency.) The Expert Group on Energy Data and Analysis (EGEDA) extended this trial collection for another three-month period (December 2006–February 2007) and reported at EWG35 that gas data collection will be ongoing.

Best Practice Principles on "Accelerating Investment in Natural Gas Supplies, Infrastructure and Trading Networks in the APEC Region" and "Facilitating the Development of LNG Trade"
Review and update will be discussed at EWG36 (Manila, December 2008)

Contacts
Jyuung-Shiauu CHERN  
Bureau of Energy, Ministry of Economic Affairs, Chinese Taipei  
jschern@moeaboe.gov.tw

Scott SMOUSE  
Chair, Expert Group on Clean Fossil Energy  
scott.smouse@netl.doe.gov

www.ewg.apec.org  
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Energy Efficiency

Background

Stating that "improving energy efficiency is a cost-effective way to enhance energy security and mitigate greenhouse gas emissions" and that there is great potential for energy efficiency improvements in the power generation, industrial, transportation, public, residential and commercial sectors": Energy Ministers (Darwin, 2007)

- encouraged APEC economies to individually set goals and formulate action plans for improving energy efficiency on an overall and/or sector basis;
- directed the EWG to collaborate with the IEA to develop energy efficiency indicators and compile best practices that can be used to help formulate and track progress towards such voluntary goals and action plans;
- directed the EWG to strengthen efforts to share information on energy efficiency policies and measures, identify effective energy efficiency approaches and review progress towards efficiency goals; and
- encouraged APEC economies to contribute to and utilise the APEC Energy Standards Information System (ESIS).

In their Action Agenda, APEC Leaders (Sydney, 2007) recognised that improving energy efficiency is a "cost-effective way to enhance energy security and address greenhouse gas emissions while promoting economic growth and development" and "without prejudice to commitments in other fora":

- agreed to work towards achieving an APEC-wide regional aspirational goal of a reduction in energy intensity of at least 25 percent by 2030 (with 2005 as the base year);
- encouraged all APEC economies to set individual goals and action plans for improving energy efficiency, taking into account this aspirational goal, and reflecting the individual circumstances of different economies;
- agreed to facilitate and review progress through the voluntary APEC Energy Peer Review Mechanism, with a report back to APEC Leaders in 2010.

Implementation

APEC Energy Peer Review Mechanism (APEC/PREE)

EWG members at EWG35 (Peru, March 2008) endorsed Japan's proposal for the PREE, incorporating the following objectives:

- sharing information on energy efficiency performances as well as on policies and measures for improving energy efficiency;
- providing opportunities for learning from other APEC economies’ experiences and for broadening the network among energy efficiency policy experts;
- exploring how energy efficiency goals on an overall and/or sectoral basis and action plans could be effectively formulated in the APEC economies under review, taking into account the diversity of possible strategies that could be used, according to the circumstances of individual member economies;
monitoring progress toward attaining the energy efficiency goals on an overall and/or sectoral basis and action plans, if such goals and action plans have already been formulated at the time of the review; and

providing recommendations (for voluntary implementation) on how the implementation of the above action plans could be improved with a view to achieving energy efficiency goals.

Two activities will be undertaken a) a compilation/compendium of APEC member economy energy efficiency policies; and b) peer reviews, with interested member economies invited to volunteer for APEC/PREE. Three Peer Reviews will be held in 2009 in New Zealand, Chile and Viet Nam.

Pledge and Review Program
Under the voluntary Pledge and Review Program member economies share information on domestic energy efficiency projects and initiatives. Members submit economy-specific reports at the first EWG meeting of the year and also submit reports on an agreed energy efficiency topic at the EWG's second annual meeting.

APEC Energy Standards Information System (APEC ESIS)
APEC ESIS facilitates the exchange of information, knowledge and experience through the comprehensive APEC ESIS website, providing government and industry stakeholders with information on testing standards, minimum energy performance standards and labelling requirements for a range of equipment traded in the APEC region and provides links to other international data. (www.apec-esis.org.)

EWG Expert Group on Energy Efficiency and Conservation (EGEEC)
The EGEEC strives to advance economic and social well-being and to realise environmental benefits in the Asia-Pacific region through energy conservation and the application of energy-efficiency practices and technologies. (www.egeec.apec.org)

Recently completed and ongoing EGEEC projects
Government-Sector Energy Management: Best Practices Inventory and Comparative Analysis and Energy Management in the Public Sector
Application of Energy Indicators in APEC Economies
Development of an International Energy Efficiency Financing Protocol
Information Sharing on Financing Public Sector Energy Efficiency and Renewable Energy Projects
Survey of Transport Efficiency Policies in APEC Economies
Survey of Policies and Programs to Measure and Promote Energy Efficiency in Industry in APEC Economies
Workshop on Policies to Promote Energy Efficiency in Transport in APEC Economies
Comparison of Building Energy Codes in APEC Economies
Facilitation of International Harmonization of Standards for Energy Management in the APEC Region (2009)
Reducing Barriers to Trade through Development of a Common Protocol for Measuring the Seasonal Energy Efficiency (SEER) of Air Conditioners (2009)
Alignment of National Standby Power Structures (2009)

Contact
Terry COLLINS    Terry.Collins@eeca.govt.nz
Chair, Expert Group on Energy Efficiency & Conservation
Renewable Energy

“Over the next twenty years economically recoverable renewable resources will increase as a result of cost reductions from technological improvement and expanding markets, and new market valuations (e.g., of carbon emissions). Environmental concerns have increased the attractions of these sources to policy-makers and growth in demand in industrialised countries is leading to economies of scale. Such growth enables increased access by the developing world.”  

Background

The high reliance on the use of fossil fuels contributes directly to polluting of the environment and increasing levels of greenhouse gases in the atmosphere, contributing to global warming. Although fossil fuels will continue to be used to supply energy in the future, it is essential to introduce alternative renewable sources of energy now as part of an economy's energy supply portfolio. The renewable energy sector has been growing due to increasing public awareness about greenhouse gas emissions, other environmental impacts and the costs of fossil fuels in remote areas. The most promising are wind energy, small hydro, biomass energy, solar thermal systems and solar energy from photovoltaic cells.

At EMM8 (Darwin, 2007) APEC Energy Ministers reiterated that urgent and significant investment is essential if APEC Economies are to increase supply and improve demand-side efficiency to meet the estimate of at least $US six trillion in energy infrastructure investment required to 2030. They recognised the importance of progress in the uptake of new and renewable energy through the APEC 21st Century Renewable Energy Initiative and encouraged collaboration with the Renewable Energy and Energy Efficiency Partnership on financing, policy and regulations.

Energy Ministers urged governments, the private sector and financial institutions to work together to create conditions to facilitate investment in the full range of energy projects, including renewable energy. They also directed the EWG to increase its cooperative activities to support the development and uptake of technologies for new and renewable energy and to accelerate energy technology development.

APEC Leaders (Sydney, 2007) in their Declaration on Climate Change, Energy Security and Clean Development emphasised the important role for low and zero emissions energy sources and technologies and of enhancing diversity of energy sources and supplies, including renewable energy. Their Action Agenda initiatives include strengthening collaboration on energy research in the APEC region, particularly in areas such as clean fossil energy and renewable energy sources. Leaders welcomed “work underway in international partnerships involving a wide range of economies, including on methane, hydrogen, renewable energies...”
Implementation

Expert Group on New and Renewable Energy Technologies (EGNRET)
EGNRET was formed by the EWG to facilitate the increased use of new and renewable energy technologies in the APEC region. EGNRET's role includes developing policy recommendations, renewable resources assessments, information exchange, promoting commercialisation of renewable energy technologies, identifying and mobilising finance sources, and promoting technology cooperation.

EGNRET projects are implemented through the APEC 21st Century Renewable Energy Development Initiative (REDI), a series of collaborative efforts to foster a common understanding of regional renewable energy issues; facilitate trade and investment in renewable energy technologies and services and reduce the environmental impact of the energy sector through the applications of renewable energy technologies. EGNRET has completed over 40 APEC-wide projects. (www.egnret.ewg.apec.org)

Recently Completed and Ongoing Projects

Sourcebook of Hydrogen Codes & Standards for APEC Member Economies
Phase II of the Adoption of Renewable Energy Standards
A Local Banks Training Program for Financing Energy Efficiency and Renewable Energy
An Evaluation of the Role of Village Power Applications in Response to the Tsunami Recovery Effort
Information Sharing Project on Financing Public Sector Energy Efficiency and Renewable Energy
Development of a Renewable Energy Products Database to Pave the Way for the Deployment of Renewable Energy
Establishment of Guidelines for the Development of Biodiesel Standards in the APEC Region
The Future of Liquid Biofuels for APEC Economies
Workshop on Recent Advances in Utility-Based Financial Mechanisms that Support Renewable Energy and Energy Efficiency
Alternative Transport Fuels Policy Options for APEC Economies
Successful Business Models for New and Renewable Energy Technology Implementation in the APEC Region
Best Practices in New and Renewable Energy Technologies in Urban Areas in the APEC Region
Workshop and Report on Implications of Bio-refineries for Energy and Trade in the APEC Region
Addressing Grid Interconnection Issues in Order to Maximize the Utilization of New and Renewable Energy Sources (2009)

Contact

Cary BLOYD                                      bloyd@anl.gov
Chair, Expert Group on New & Renewable Energy Technologies
Clean Fossil Energy

In the reference scenario of the International Energy Agency's World Energy Outlook 2008, fossil fuels still account for 80% of the world's primary energy mix in 2030. Oil remains the dominant fuel, though demand for coal rises more than demand for any other fuel in absolute terms. Most of the increase in coal demand comes from the power generation sector, where coal is projected to account for about half of the sector's fuel needs. China and India together are projected to contribute 85% to the increase in world coal demand over the period. Rising global fossil fuel use is projected to increase energy-related CO₂ emissions by 45% during the period 2006-2030 in the business-as-usual scenario.

Clearly, fossil energy will remain a vital component of global energy supply and demand over the next few decades, but it must overcome its environmental and sustainability concerns, and actions to deal with these concerns will be an important part of any solution to the global climate issue.

Background

Clean fossil fuel systems and technologies can significantly reduce pollution and play a role in ensuring sustainable growth. At their 6th Meeting (Philippines, 2004) Energy Ministers acknowledged the importance of 'cleaner' fossil fuels and encouraged member economies to 'Capitalise on Technological Innovation', asserting that:

"Innovative technologies enable us to discover, produce, transport and use energy in new and more efficient ways, increasing our access to more adequate, reliable and affordable energy. They also strengthen energy security and sustainable development through energy diversification, lower energy costs and the provision of cost-effective solutions to reduce environmental impacts."

Building on the work from EMM6 and EMM7, and to accelerate energy technology development, Energy Ministers at EMM8 (Darwin, 2007) directed the EWG to progress the development of clean fossil energy technologies, including carbon capture and storage, an initiative welcomed by APEC Ministers (Sydney, 2007).

APEC Leaders’ Declaration on Climate Change, Energy Security and Clean Development (Sydney, 2007) stated that “enhanced uptake of low carbon energy uses will require coherent policy and regulatory settings. In their Action Agenda, Leaders agreed to “promote policies that advance the deployment of low and zero emission energy uses, in particular in the field of clean coal use and carbon storage, through co-operative work in the APEC Energy Working Group” and welcomed “work underway in international partnerships involving a wide range of economies, including…carbon sequestration..."
Implementation

**Expert Group on Clean Fossil Energy (EGCFE)**
The EGCFE undertakes research and shares timely information regarding technical, economic, and policy aspects of fossil energy production and the promotion of clean fossil energy options by facilitating, coordinating and implementing a variety of studies, workshops, conferences and other meetings related to clean and efficient production and use of fossil fuels. ([www.egcfe.ewg.apec.org](http://www.egcfe.ewg.apec.org))

**Recently Completed and Ongoing Projects**

**Potential for Growth of Gas as Clean Energy Source in APEC Developing Economies**

**Carbon Dioxide Capture and Geological Sequestration – Phase III (refining Phase II training materials on the potential to capture and store CO₂ from large fossil fuel-based energy facilities to deliver the training materials in two additional APEC economies)**

**APEC Information Exchange Workshop on LNG Public Education Campaigns in the APEC Region: Workshop on LNG Public Education (China, 5–7 November 2007)**

**How Can Environmental Regulations Promote Clean Coal Technology Adoption in APEC Developing Economies?**

**Lessons Learned in Upgrading and Refurbishing Older Coal-Fired Power Plants - A Best Practice Guide for Developing APEC Economies**

**Technology Status and Project Development Risks of Advanced Coal Power Generation Technologies in APEC Developing APEC Economies**

**Environmental Monitoring for Coal-Fired Power Plants in Developing Asian APEC Economies**

**Reducing the Trade, Regulatory and Financing Barriers to Accelerate the Uptake of Clean Coal Technologies by Developing Economies in the Asia Pacific Region**

**Increasing the Knowledge and Awareness of Carbon Capture and Storage Capacity Building in the APEC Region (Phase IV)**

**Planning and Cost Assessment Guidelines for Making New Coal-Fired Power**

**Assessment of the Capture and Storage Potential of CO₂ Co-Produced with Natural Gas in South-East Asia**


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**Contact**

Scott SMOUSE  
Chair, Expert Group on Clean Fossil Energy  
scott.smouse@netl.doe.gov
Alternative Transportation Fuels

“Biomass is the largest renewable energy source in use today. For the future, Bioenergy offers cost-effective and sustainable opportunities with the potential to meet up to 50% of world energy demands during the next century, while meeting the requirements of reducing carbon emissions from fossil fuels.” (IEA Bioenergy: www.ieabioenergy.com)

Background

Increased use of biofuels could enhance growth and energy security in the APEC region by diversifying fuel sources in oil-importing economies, enhancing farm production and exports in agricultural economies, and easing investment pressures in oil-producing economies.

APEC Energy Ministers (Darwin, 2007) considered collaborative measures to promote energy efficient transport and alternative transport fuels and to intensify efforts to develop and deploy cost-effective techniques for expanded biofuels production. They welcomed the report of the APEC Biofuels Task Force which finds that biofuels from a wide variety of crops are cost-competitive at current oil prices, that biofuels can reduce greenhouse gas emissions, and that biofuels can displace a substantial share of petroleum use over time. These findings were also welcomed by APEC Ministers (Sydney, 2007).

APEC Leaders in their Declaration on Climate Change, Energy Security and Clean Development (Sydney, 2007) stated that “enhanced uptake of low carbon energy uses will require coherent transport and regulatory settings” and emphasised the importance of diversity of energy sources and supplies. Their Action Plan supported “the development of criteria for performance-based biodiesel standards for the region through the work of the APEC Biofuels Task Force”.

Implementation

To counter high oil prices and reduce oil dependency in the APEC region, Energy Ministers at EMM7 (Korea, 2005) directed the EWG to enhance cooperation supporting the development of alternative transport fuels, including the establishment of a Biofuels Task Force. In response, the APEC Biofuels Task Force was established at EWG31 (Singapore, 2006) with a remit to report consensus findings to APEC Energy Ministers at EMM8 (Darwin, 2007).
The APEC Biofuels Task Force Report to the Eighth Energy Ministers' Meeting (www.ewg.apec.org under Taskforces) concluded that:

The increased use of liquid biofuels can help the region to become less reliant on oil for transport over time, while contributing to the region’s economic and social well being. Expanding economies will mean continued growth in demand for transportation, yet the cost of oil on which transportation systems are largely dependent has risen sharply. Biofuels from a wide variety of crops, as well as crop and forest residues, can help to meet transport demand while diversifying fuel sources, contributing to rural incomes, and improving the balance of trade in economies with substantial agricultural resources.

Following the favourable response by Energy Ministers and subsequently by APEC Ministers and Leaders, the Task Force is continuing to focus on the following key factors that affect the potential for biofuels to substitute for oil in transport:

**Economics** – the costs of producing transport fuels from different forms of biomass, in comparison to the projected costs of automotive fuels produced from oil.

**Infrastructure** – requirements for adapting refueling stations to biofuels, the cost of meeting such requirements, and how fast adaptations should be made.

**Vehicles** – practical measures for promoting fuel-flexible vehicles that are biofuel-capable, and how fast such vehicles can be expected to penetrate the market.

**Resources** – the likely extent of biofuel resources, in terms of available land, biomass yields from the land, and crop and forest residues that could practically be harvested.

**Trade** – the potential benefits of trade in biofuels, in view of the fact that biofuels can be produced from a variety of crops at different costs across the APEC region.

**Recently Completed and Ongoing Projects**

**APEC Biofuels Task Force**

Survey of Biomass Resource Assessments and Assessment Capabilities in APEC Economies

Assessment of Biomass Resources from Marginal Lands in APEC Economies

Study of Employment Opportunities from Biofuel Production in APEC Economies

Assessment of Biomass Resource Elasticity in APEC Economies

Study of Biofuel Feedstock Costs, Technology and Economics (to begin in 2009)

**Expert Group on New and Renewable Energy Technologies**

The Future of Liquid Biofuels for APEC Economies

Establishment of Guidelines for the Development of Biodiesel Standards in the APEC Region

Alternative Transport Fuels Policy Options for APEC Economies

Implications of Biorefineries for Energy and Trade in the APEC Region

**Contacts**

Jeff SKEER  
Chair, APEC Task Force on Biofuels  
jeff.skeer@hq.doe.gov

Cary Bloyd  
Chair, Expert Group on New and Renewable Energy Technologies  
bloyd@anl.gov
Nuclear Energy

Background

To cope with growing energy demand, many world economies recognise the need to make better use of all available energy sources. Nuclear energy has been an important component of the electricity systems of some Member economies since the 1950s, and today it generates 16 percent of all the electricity in the APEC region. The electricity generated by nuclear power in APEC is roughly similar to that generated by natural gas plants or hydropower. However, there is debate concerning its viability due to concerns surrounding cost, safety, waste disposal and proliferation.

Public concern has increased about nuclear safety. The industry is addressing concerns about accidents and radiation, including in light of post-9/11 concerns regarding plant security and nuclear proliferation. Investment risks are high for nuclear plants, as it is perceived that the cost of a new plant is still not competitive with base load alternatives such as coal, and many investors are wary of capital investments exceeding three to four years. Waste disposal may remain controversial until the first geological repositories become operational and the disposal technologies are fully demonstrated.

The 2004 APERC report – *Nuclear Power Generation in the APEC Region* – argued that:

“...there is no urgent need at present for final disposal of high level radioactive waste, given that most is undergoing the required 40-50 year initial cooling down period. When sufficient volumes of spent fuel assemblies or of high-level waste are ready to be definitively disposed of, the technology for deep underground repositories will have been demonstrated and available. The technology is well advanced today and there is already one repository for military use in operation in the United States. The construction of the first civilian repository is expected sometime after 2010.”

The APERC report also considers that the competitiveness of new nuclear plants has a good chance of improving due to lower prices announced by vendors for new models, revised licensing procedures, shorter lead-times for construction, and aid from local governments in the form of tax breaks or with risk sharing.

At EMM6 (Philippines, 2004) Ministers recognised that while some Member Economies consider nuclear power as an option for their energy mix, others do not, and so encouraged interested economies to cooperate on the nuclear framework as endorsed by the EWG. They emphasised that security, seismic and health concerns, including trans-border effects, should be adequately addressed.
To build on EWG efforts since EMM6 and EMM7, Energy Ministers at EMM8 (Darwin, 2007) encouraged interested APEC economies to join the Ad Hoc Group on Nuclear Energy and to progress activities identified in the Nuclear Framework which was endorsed at EWG27 (China, 2004) to support nuclear power by ensuring optimal safety, security, seismic, health and waste handling, including trans-border effects.

APEC Leaders (Sydney, 2007) emphasised the "important role for low and zero emissions energy sources and technologies" noting that "for those economies which choose to do so, the use of nuclear energy, in a manner ensuring nuclear safety, security and non-proliferation in particular its safeguards, can also contribute".

Implementation

Nuclear Power remains a viable energy option for some – but not all – APEC Member Economies. In accordance with this understanding, the EWG developed a Framework Document on "The Role of Nuclear Power in the Energy Development of the APEC Region", reported to Energy Ministers at EMM6. The Framework identified a range of activities that complement the work undertaken in existing international nuclear organisations.

Activities under the Framework

Nuclear Power Generation in the APEC Region, Asia-Pacific Energy Research Centre (APERC), 2004.

Establishment of an Ad-hoc Group of interested economies
The purpose of this ad hoc group is to identify potential perspectives of nuclear power in the APEC region in the long term and identify ways of cooperation in the area of nuclear power.

Capacity building through an annual Nuclear Power Technology Training,
Korea hosts this activity, which aims to provide participants with Korea Hydro & Nuclear Power Company's (KHNP) accumulated knowledge and experience of nuclear energy and to contribute to the development of the nuclear power industry in the participants' economies.

Consideration of establishing a Regional Association of Safeguards Authorities
Australia hosted an informal meeting of senior officials (Sydney, 2007) to bring together the various organisations with safeguards responsibilities within the region to enable regional economies to become aware of each other’s strengths and capacities and benefit from each other's experiences with a view to considering the establishment of a Regional Association of Safeguards Authorities. Overall, participants were supportive of the concept of an association and of exploring the concept further through consultation and another meeting. However, participants agreed that any nuclear safeguards association should be established outside of the APEC framework, considering the nature of APEC as an economic forum. Outcomes from discussions will be presented to Energy Ministers at EMM9 (2009).
Hydrogen and Fuel Cells

“The hydrogen economy would facilitate the transition from limited non-renewable stocks of fossil fuels to unlimited flows of renewable sources. And the successful development of the technologies and infrastructure to produce, store, and distribute hydrogen offers the promise of efficient, pollution-free vehicles as well as residential and business electricity generation.” APEC Interim Document on Hydrogen and Fuel Cells, 2004 (www.ewg.apec.org under Publications)

Background

A range of conditions create significant potential for hydrogen as one option within the fuel mix of APEC member economies. The Asia Pacific Energy Research Centre (APERC) forecast that energy demand in the region will increase by almost 60 percent by 2020, an annual growth rate of 2.2 percent. Member economies recognise the importance of the long-term sustainability of energy production and use and strongly support alternative energy technologies which are clean and efficient.

The diversity of economies in APEC also presents an opportunity for hydrogen in the region. Both developed and developing APEC economies include populations with restricted access to energy infrastructure. There is a large potential market for hydrogen and fuel cell technologies in remote locations and distributed generation systems. This also creates the opportunity for leapfrogging of status-quo technologies in these areas, with implications for environmental sustainability.

Significant technical and economic challenges remain to be met before hydrogen and fuel cells are likely to make major inroads in the transportation and power sectors:

- Hydrogen-powered vehicles need to be competitive with conventional vehicles.
- The price and availability of hydrogen need to be competitive with conventional fuels.
- Hydrogen fuel needs to be conveniently available to hydrogen vehicle drivers, based on improved fuelling and storage infrastructure.
- Hydrogen energy storage technologies should allow personal transportation systems to operate at the same levels of safety, performance and range as conventional vehicles.
- An internationally consistent system of safety codes and standards related to hydrogen utilisation should be developed and adopted.
- Distributed power generation using hydrogen fuel needs to become cost competitive with traditional stationary power systems.
APEC Energy Ministers at EMM6 (Philippines, 2004) directed the EWG to implement the recommendations in the Interim Framework Document on Hydrogen and Fuel Cells, which identifies activities currently being undertaken in the APEC region, highlights obstacles and areas of opportunity and considers the potential for cooperation in areas such as capacity building and codes and standards.

At EMM8 (Darwin, 2007), Energy Ministers stated that new energy technologies can address energy security and provide environmental benefits by reducing greenhouse gases and other atmospheric pollutants and encouraged the development of cleaner and more efficient power generation technologies.

APEC Leaders and Ministers (Sydney, 2007) recognised the importance of a diversified mix of energy sources and supplies to meet long-term development goals in the region and encouraged efforts toward this goal. Leaders noted that "enhanced uptake of low carbon energy uses will require coherent policy and regulatory settings" and welcomed "work underway in international partnerships involving a wide range of economies, including on methane, hydrogen, renewable energies and carbon sequestration".

**Implementation**

A number of APEC economies, including Australia, Canada, People's Republic of China, Japan, Republic of Korea, Malaysia, New Zealand, Chinese Taipei, Thailand and the United States, have programs or projects focused on developing and demonstrating hydrogen and/or fuel cell technologies.

Canada will serve as Steering Committee Chair and Secretariat of the International Partnership for the Hydrogen Economy (IPHE) from November 2007. The IPHE's goal is to "efficiently organize and coordinate multinational research, development and deployment programs that advance the transition to a global hydrogen economy. APEC economy members of the IPHE are Australia, Canada, China, Japan, Republic of Korea, New Zealand, Russian Federation and the United States.

**Sourcebook of Hydrogen Codes and Standards for APEC Member Economies**

This project was implemented for APEC by the Partnership for Advancing the Transition to Hydrogen (PATH). The final report was completed in December 2005 ([www.ewg.apec.org](http://www.ewg.apec.org), under Publications). The report and associated computer database provides a one-stop, user-friendly program for code officials, government agencies, and research organisations to use as a reference for implementation of Hydrogen projects within their own economies.

**APEC Foresighting Future Fuels Technologies Project**

The APEC-wide Foresighting Future Fuels Technology Project examined the rapidly emerging technologies for future fuels: hydrogen; conventional hydrocarbons; and biofuels. The project assessed the medium and long-term scenarios of future fuel technology development and developed technology roadmaps for those scenarios. The final report from the *APEC Foresighting Future Fuels Technology* Project can be found at [www.ewg.apec.org](http://www.ewg.apec.org) and on the Foresighting Future Fuels website [www.apecforesight.org/apec_wide/future_fuel_main.cfm](http://www.apecforesight.org/apec_wide/future_fuel_main.cfm)

**Contact**

Cary BLOYD  
Chair, Expert Group on New & Renewable Energy Technologies  
blloyd@anl.gov
Methane Hydrate

Background

Methane Hydrate – molecules of natural gas trapped in ice crystals – represents a potentially vast resource that may have as much energy as all the world's other fossil fuels combined. Given the growing demand for natural gas, the development of new, cost-effective supplies can play a major role in moderating price increases and ensuring adequate supplies of natural gas for future generation. Large hydrate resources in areas outside the Middle East, if produced, could change the energy balance of the world.

Gas hydrates occur abundantly in nature, both in Arctic regions and in marine sediments along continental margins. Gas hydrate is a crystalline solid consisting of gas molecules, usually methane, each surrounded by a cage of water molecules. It looks very much like water ice. Methane hydrate is stable below arctic permafrost and in ocean floor sediments at water depths greater than 500 meters. The zone of hydrate occurrence may be several hundred meters thick.

![World Gas Hydrate Map](source)

The World Gas Hydrate Map depicts recovered, inferred and potential world gas hydrate sources (Source: APEC Center for Technology Foresight, December 2004)

Hydrate science has advanced significantly over the past five years. Laboratory studies and computer modelling have defined the conditions in which methane hydrate forms and dissociates, and these studies suggest that production would be economic using pressure reduction and heating. Production is expected to use conventional oil and gas production technologies –vertical or horizontal wells, probably with thermal stimulation.
Hydrate deposits have been inferred from seismic around the globe and sampled in areas including offshore Korea, New Zealand, Chile, Atlantic and Pacific coasts of the United States, Canada, India and Japan. As part of major national programs, detailed seismic, well logging and core sampling of methane hydrate has occurred offshore Japan, offshore India, the US Gulf of Mexico and the Arctic of Alaska and Canada. These sites confirm the existence of concentrated, potentially producible accumulations. Small-scale production experiments in the United States and Canadian Arctic have confirmed the producibility of methane from Arctic reservoirs.

At EMM6 (Philippines, 2004) Energy Ministers noted that in order to expand energy choices in the APEC region, member economies needed to move towards a more diverse energy mix, including methane hydrates. Energy Ministers at EMM8 (Darwin, 2007) stated that new energy technologies encouraged the development of cleaner and more efficient power generation technologies.

APEC Leaders and Ministers (Sydney, 2007) recognised the importance of a diversified mix of energy sources and supplies to meet long-term development goals in the region and encouraged efforts toward this goal. Leaders noted that "enhanced uptake of low carbon energy uses will require coherent policy and regulatory settings" and welcomed "work underway in international partnerships involving a wide range of economies, including on methane, hydrogen, renewable energies and carbon sequestration".

**Implementation**

Currently, several APEC economies are actively developing techniques to detect and produce methane from hydrate. Noteworthy among these are the following.

- In 2006 China announced plans for a $100 million program over the next decade.
- Several APEC economies have more basic methane hydrate research programs; for example, Chile, New Zealand, and Korea.
- Japan and Canada conducted preparatory work in January–April 2007 leading to a planned long-term production test in the Canadian Arctic in the winter of 2007–2008.
- In February 2007 the United States Department of Energy, working with industry and academia, drilled and cored a well in the Alaska North Slope in Milne Point oilfield, where methane hydrates overlie conventional hydrocarbons. Results confirmed technology for seismic predictions of the location and volumes of hydrates; showed that methane can be produced by pressure reduction and provided data for larger-scale tests in the future. In November of 2008, the US Geological Survey announced its first survey of technically recoverable natural gas hydrates which estimated that 85.4 TCF is technically available from Alaska North Slope resources. (http://energy.usgs.gov/)

Significant research and development is still needed. No one in the world has successfully produced commercial-scale volumes of methane from hydrate. Methods to locate and define potential methane hydrate volumes before drilling are needed. And environmental concerns about natural and production related methane release to the atmosphere must be defined and mitigated.

**Contact**

Cary BLOYD  
bloyd@anl.gov  
Chair, Expert Group on New & Renewable Energy Technologies
Petroleum Infrastructure and Crude & Refined Products

"Oil imports will increase from 36 percent of total oil demand in 2002 to 52 percent in 2030... To meet the demand for transportation fuels approximately 40 percent in additional refining capacity will need to be constructed, with considerable increase in upgrading capacity cracking to produce the required volumes of gasoline and middle distillates." APERC Energy Supply and Demand Outlook 2006

Background

The rapid growth in demand for petroleum products (particularly lighter products; e.g. gasoline, kerosene and diesel), tighter and more stringent product specifications, and low surplus refining capacity have contributed to the upward pressure on oil prices. There has also been increasing concern with petroleum infrastructure and structural bottlenecks in the downstream sector. APEC economies have highlighted the growing need to address problems/barriers to market integration for APEC economies in order to streamline trade and reduce market volatility. These problems include regulation of oil product import/export, differentiated oil product specifications among economies as well as in the domestic markets.

There is some potential for refinery expansion and/or refinery reactivation based on current and future oil demand growth. In particular, refinery construction/expansion is actively planned and being implemented in developing economies of the APEC region. However, there is uncertainty that the planned refinery investment will be realised or that the planned refinery expansion/upgrading is sufficient to meet the growing oil demand and changing product patterns.

Furthermore, although this may differ in existence and degree by economy, there are investor barriers and constraints for new refinery investments, including the following:

- low return on investments (low refining margin, substantial upfront investment costs, high risk due to instability and uncertainty of market situation);
- siting and permitting problems for refinery construction;
- stringent environmental standards and changing fuel specifications; and
- country and political risk.

At EMM8 (Darwin, 2007) Energy Ministers directed member economies to facilitate investment and trade in downstream and upstream oil markets. To ensure sufficient investment in refining capacity to meet growing demand, including for cleaner fuels, they encouraged APEC economies to provide a transparent and streamlined regulatory framework for such investment; facilitate freer trade of oil products; and create a positive environment for technology development to help refiners to produce cleaner oil products more efficiently.
Recognising that transparent, credible, equitable and effective legal and regulatory frameworks are essential to generate sufficient and sustainable international upstream investment, Energy Ministers supported "ongoing dialogue between consumers and producers to facilitate an enabling investment climate in oil and natural gas resources and reserves. They further encouraged the EWG to study the trade and investment practices of oil and gas companies in APEC economies and to examine how partnerships and cooperation can improve the value chain.

APEC Ministers (Sydney, 2007) welcomed the Australian proposal to "establish an APEC Energy Trade & Investment Study and Roundtable to identify barriers to trade and investment and to develop a plan of action to help address these barriers".

APEC Leaders (Sydney, 2007) "...recognised the ongoing economic risks associated with high and volatile energy prices and affirmed that rising energy demand in the Asia-Pacific can best be met by expanded trade and investment to boost supply and greater efficiency in use". They underlined "the importance to the region of affordable and secure supplies of energy which are central to economic growth and sustainable development", and they "are committed to continuing efforts within APEC to address long-term energy needs in the region".

**Implementation**

In 2005 The Institute of Energy Economics, Japan (IEEJ) and the Asia Pacific Energy Research Centre (APERC) released the *APEC Downstream Oil Market Study*, which provides an analysis of refinery bottlenecks. The key findings from the study illustrate a clear link between recent high oil prices and problems in the downstream industry resulting from a rapid growth in demand, an increased share of light products, tighter and more stringent petroleum product specifications, lower inventories, a lack of refining capacity and tight transport and storage facilities. These problems are emerging or imminent in some APEC economies.

There is a growing need to address problems/barriers to market integration for APEC economies. To overcome these issues, the study recommends that existing refining capacity and infrastructure be more optimally utilised, barriers to freer product trade removed and investment in the refining sector and other downstream infrastructure facilitated. The ‘APEC Downstream Oil Market Study’ may be found at: [www.ieej.or.jp/aperc](http://www.ieej.or.jp/aperc).

**APEC Energy Trade & Investment Study and Roundtable**

EWG members agreed at EWG34 (Hong Kong China, 2007) that the Australian proposal to conduct the Study and Roundtable provided an opportunity to respond to the Energy Ministers' instructions (Darwin, 2007) to facilitate investment and trade in downstream and upstream oil markets.