

UNDERSTANDING INTERNATIONAL ENERGY INITIATIVES IN THE APEC REGION

SCOPE AND ELEMENTS

ASIA PACIFIC ENERGY RESEARCH CENTRE

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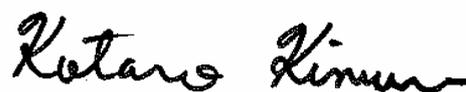
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FOREWORD

With this report entitled “Understanding International Energy Initiatives in the APEC Region: Scope and Elements”, the first report within a two-year project undertaken by the Asia Pacific Energy Research Centre will be presented.

The objective of the study was to provide the scope of energy cooperation policies, elements and structuring of International Energy Initiatives in the APEC region and to draw policy implications.

This report is published by the Asia Pacific Energy Research Centre as an independent study and does not necessarily reflect the views or policies of the APEC Energy Working Group or individual member economies. But we hope that it will serve as a useful basis for discussion and analysis both within and among APEC member economies for the enhancement of energy security, promotion of regional cooperation and sustainable development.



Kotaro Kimura

President

Asia Pacific Energy Research Centre

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EXECUTIVE SUMMARY

There are numerous International Energy Initiatives (IEI) established around the world, with the purpose of enhancing or improving energy security and minimising the negative environmental impacts of energy consumption. In the first phase of this study, analysis is focused on an initiatives elements, including characterisation of the actors and stakeholders, driving forces to bring the participants together, and the interaction of these elements through the whole process from an initiative's inception to its successful (or unsuccessful) finish, and the identification of purposes and modes that are used to achieve the overarching ultimate objective of the initiatives.

ELEMENTS OF IEI

- To identify the coverage of issues being pursued through international cooperation that are discussed in this report, International Energy Initiatives are defined as a coordinated strategy to reach explicit goals within energy-related problems, which is voluntarily undertaken to address the needs or ambitions of diverse partners.
- To achieve the two purposes, that is energy security and energy and the environment, six modes or mechanisms have been identified after the international initiatives given in the database were analysed, namely infrastructure development, financing mechanisms, regulatory framework, research and development, information sharing, and education and capacity building.
- International government-based organisations, such as APEC, ASEAN, OECD, ADB *etc.* are evaluated as the major actors for International Energy Initiatives among the group of government, civil and private participants.
- Issues or areas of interest for international cooperation are affected by the current political and economic development of an economy, and the general concerns of the public.

INFRASTRUCTURE DEVELOPMENT

- Although there are few international initiatives in relation to energy infrastructure projects, driving forces for cooperation are numerous, including: (1) continuously increasing energy demand and net energy imports; (2) insecurity

of motor fuel supply; (3) large environmental footprints and insufficient penetration of NRE technologies; (4) high project costs for a single economy; (5) weak oversight of the nuclear fuel cycle; and (6) synergistic effects of larger gas and power networks.

- The most representative infrastructure initiative in the APEC region is the Greater Mekong Sub-Region Interconnection (GMS), through which member economies have gained benefits by cooperating in the development and complementary use of the sub-region's energy resources.
- ASEAN is one of the most active actors in the APEC region cooperating in infrastructure interconnection projects, such as the ASEAN Power Grid (APG) and the Trans-ASEAN Gas Pipeline (TAGP).
- The Korean Peninsula Energy Development Organisation (KEDO) is one representative example that shows that once the agreed framework of an initiative has broken down – due partly to the political sensitivity of the issue – the responsible entity can cease to function in the way it was supposed to.

FINANCIAL MECHANISMS

- The major responsible entities for financing initiatives in the APEC region include multilateral financial development institutions such as ADB and the WB; the UN family including UNEP, UNDP, UNESCAP, and UNFCCC; regional cooperative entities such as APEC EWG and ASEAN Centre for Energy; and others, which are established by a combination of governments, businesses and NGOs.
- Barriers to participant's cooperating in financial initiatives are mainly due to (1) high transaction costs; (2) insufficient capital (start-up) funding; (3) low and slow rate of return; (4) unstable markets for investment; and (5) lack of proper financial mechanisms.
- Representative examples of financial initiatives to promote finance and investment in the energy and environmental areas (Level 1) type cooperation are the Kitakyushu Initiative for a Clean Environment (KICE) and Methane to Market Partnership (MMP).

- In addition to promoting investment, financial initiatives to provide financing services, develop financing mechanisms or products and provide both technical and financial assistance are categorised as (Level 2) type cooperation. Representative examples include ADB Renewable Energy, Energy Efficiency, and Climate Change (REACH) programme, Global Gas Flaring Reduction (GGFR) and APEC Energy Efficiency and Renewable Energy Financing (EERE Financing).
- Financial initiatives under (Level 3) type cooperation are a culmination of all the subsequent levels with the addition of established investment funds and/or provision for project co-financing facilities to project developers or initiatives' participating members. Representative examples include the Global Environment Facility (Climate Change) (GEF-CC), the Patient Capital Initiative (PCI), and the Rural Energy Enterprise Development (REED).
- Although more than half of the financial initiatives are designed to develop the carbon market, it is unknown whether or not these initiatives have had a positive impact on the number of CDM or JI projects within the APEC region or have contributed to the carbon market working more efficiently.
- Driving forces for Type II regulatory initiatives include the abuse or neglect of common international resources in the *lassaiz-faire status quo*, the lack of international accountability, and the limited reach of any one member economy's government's own policy agenda on the international stage. Representative initiatives include the Kyoto Protocol to the United Nations Framework Convention on Climate Change and the Energy Charter Treaty (ECT).
- The driving forces for creation of regulatory frameworks for Type III initiatives are diverse and vary depending on the precise relationship structure. Regulatory framework initiatives in this category can be thought of as microcosms of the same sort of initiatives formed at the national level – functioning at a different scale, but preserving the basic nature of interaction. Representative initiatives include the Global Gas Flaring Reduction initiative (GGFR), Gold Standard (GS), and the APEC EWG's Energy Business Network (EBN).
- The challenges faced by regulatory framework initiatives also vary by structure type. Type I initiatives, where lead-actor accountability is limited, are generally subject to inactivity in achieving initiative goals and short time horizons because of political cycles.

REGULATORY FRAMEWORK

- Based on characterisations of the actors involved and the nature of their interaction, regulatory framework initiatives can be described in three categories: (I) government interact directly to negotiate and agree to joint regulations and laws; (II) governments interact through a specially-created international forum to negotiate and create a supra-national regime with its own set of laws and regulations; and, (III) cooperation between business and civil actors in addition to the public entities in categories Type I and II.
- Driving forces of Type I regulatory initiatives include the desire to improve international relations and create “peace dividends” between neighbours; and the prospect for rapid development encouraged by creating macro-level synergies in cross-border trade and exchange. Representative initiatives include the Greater Mekong Sub-region Economic Cooperation Programme, and the APEC Energy Standards and Labelling Cooperation Initiative.
- Type II initiatives, with their supra-national regime structure, face delicate tradeoffs between enforcing accountability to achieving initiative targets and lowering the barriers to membership. They are also sensitive to varying incentives faced between the level of the negotiating lead-actor and the level of domestic initiative implementers.
- Type III initiatives encounter challenges similar to those of Types I and II, but difficulties are often smaller because of the self-selecting voluntary nature of membership among civil society or business partners.
- For all regulatory framework initiatives, political mobilisation bias is an important challenge that must be acknowledged and accounted for in order to achieve fairness in International Energy Initiative design.

RESEARCH AND DEVELOPMENT

- International Energy Initiatives in relation to research and development (R&D) are either conceptual R&D focusing primarily on “*adding value to the status quo*” within a particular field in

the energy sector, or technological R&D such as the development of new technologies, the improvement of existing technologies, and improving the commercial attractiveness of existing technologies.

- Regardless of the actors or participants of the initiatives coming from the government, civil or private sectors, the key drivers to promote R&D within the energy sector include (1) energy import dependency; (2) improving energy efficiency; and (3) global consensus on an international issue that requires the integration of the international scientific community to solve.
- In terms of supply side R&D initiatives with the purpose of the enhancing energy security, the IEA Enhanced Oil Recovery programme is a representative case.
- To minimise environmental footprints, there are a few international initiatives operating at the APEC level, such as Asia Pacific Partnership on Clean Development and Climate (APP/AP6), and the Carbon Sequestration Leadership Forum (CSFL).
- With renewed interest in nuclear energy from a security perspective and reducing an economies reliance on energy imports, many governments in coordination with the private sector have instigated R&D activities to strengthen the applicability and safety compliance of utilised nuclear technologies. Representative initiatives include International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO), Generation IV International Forum (GIF), International Thermonuclear Experiment Reactor (ITER), and IEA Environmental and Economic Aspects of Fusion Power.
- The biggest challenges, which can have a large impact on the quantity and extent of R&D activities, are issues of technology transfer, intellectual property rights, and the degree of a government's intervention in R&D activity.

INFORMATION SHARING

- The main driving forces for participants cooperating on information sharing initiatives are saving time and money on literature studies, data collection and standardisation. International initiatives could help to overcome burdens including: (1) inaccurate data and information on both the domestic and international levels; (2) inconsistent energy

units and categorisation; (3) language barriers; and (4) lack of transparency in market signals.

- Web-based databases are the most popular and easy way to share information, as participants can access up-to-date and usually first-hand information from a website at anytime and from anywhere.
- Information sharing in initiatives exists both as a means with the exclusive purpose of sharing information, and also as a tool to facilitate other initiatives activities.
- As a means, energy statistics are shared among the participants at both the global and regional level. Representative initiatives include JODI and the APEC Energy Database. Besides energy data, information sharing also covers the areas of nuclear, new and renewable energy, energy efficiency and technology, emergency response – such as a nuclear event or earthquake, and energy & the environment. Representative initiatives include the International Nuclear Information System (INIS), APEC 21st Century Renewable Energy Development Initiative (APEC 21st Century REDI), Energy Technology Data Exchange (ETDE), Earthquake Response Cooperation Initiative (ERCI), and the Clean Air Initiative (CAI).
- Financial support is a key factor to sustain the operation of an initiative as the programme running under the initiative could be stopped or suspended because of a lack of financial support.
- Direct transfer of information between organisations or participants is not always easy due to ownership rights and data confidentiality issues, differences in definitions, units, coverage, timeliness, and data quality.

EDUCATION AND CAPACITY BUILDING

- Capacity building in relation to International Energy Initiatives is targeted on three types of actors – statesmen/government officials, policymakers, and professionals. Through the initiatives a venue is provided for discussion through common understanding of issues, and building professional knowledge.
- Initiatives for educative purposes are offered to the general public, in particular at the domestic level, and are aimed to improve their energy and environmental literacy as well as

acquiring their support in the design of government policies that benefit all parties.

- Developing initiatives on capacity building and education are mainly due to: (1) insufficient communication with the general public concerning energy and environmental issues; (2) shortage of qualified human resources in policy making and the workforce; and (3) the need for continued awareness of new ideas on upcoming issues on the international stage.
- Communiqué from heads of government are the highest form of capacity building, through which the heads of state point out the areas for capacity building and international cooperation to be undertaken. Representative initiatives include the Cebu Declaration on East Asian Energy Security, and the St. Petersburg Plan of Action – Global Energy Security.
- To enhance understanding of the nature of a new issue and its implications, capacity building initiatives are provided with venues for discussion among the participants from the public, civil and private sectors. Representative initiatives include the Clean Air Initiative – Asia (CAI-Asia), the ASEAN Business Forum, and the Asia Pacific Gas Forum (APGAS).
- Regarding initiatives with education purposes, the aim is to raise the awareness of the general public to a specific issue. Representative initiatives include the Alliance of Communicators for Sustainable Development (COM+) and the LNG Public Education and Communication Information Sharing Initiative.
- The challenge of confidentiality on circulating sensitive information among the initiative participants can be a barrier to the free-flow of discussion and the introduction of ideas that are innovative.

IMPLICATIONS

- The importance of such issues as public acceptance of International Energy Initiatives, human resource (capacity building, and information sharing) development, uneven level of economic development, degree of business involvement, and rapid political changes are discussed, which is based on the analysis of IIE's major elements and scope of recent and current activity in the APEC region.

- And finally, the issues for the second phase of the study are listed in accordance with the mission for this project – to ascertain the effectiveness of initiatives, and identify possible overlapping or missing areas for cooperation.

AFTERWORD

Through the second phase outlined above, the aim is to provide implications for policymakers within the APEC community to strengthen cooperation in their joint effort to solve issues of securing energy supply and minimise the environmental impact of energy consumption to keep on the road towards sustainable energy development in the APEC region.

INTRODUCTION

PURPOSE OF STUDY

International Energy Initiatives (IEI) are one of the important facets of the APEC economy's cooperation process, where different types of activities are involved, such as, Political Leaders and Senior Officials meetings, workshops on energy and energy-related environmental themes, joint international technological research and cross-boundary infrastructure development projects, creation of new international regimes and the subsequent synchronisation with domestic regulation, *etc.* There are numerous International Energy Initiatives that have been established around the world, all with good intentions and objectives, in which all or some APEC economies are involved. However, the amount of information available within the public domain is both vast and very technical, and efforts should be made to assess the scope, progress and performance of these initiatives in a comprehensive way. The problem that arises is to identify International Energy Initiatives and understand the factors affecting them. This is often exaggerated by the dynamic nature of the initiatives themselves, their ability to accommodate and transform over time as the participants needs change, and also by their inherent sensitivity to policy issues. International Energy Initiatives are important and complex phenomena that deserve a special investigation in order to understand their nature and scope; and to provide policymakers, business and experts within the research community with implications to facilitate best practices, as well as outlining an initiative's major misunderstandings and errors.

Throughout its existence, APERC has sought to facilitate the flow of important new insights about international energy cooperation and experience among the industrial, research, and policy-making expert communities. In APERC's terms of reference it is stated that "*the objective of APERC is to foster understanding amongst APEC economies of ... [energy] policy issues in view of regional prosperity*". This report is to help the target audience to understand the current picture of energy-related multilateral international cooperation in the APEC region, identify possible redundancies and major obstacles, and finally make suggestions on possible missing points where energy cooperation could be undertaken. However, in order to achieve this, first, an

insight/analysis of the nature of International Energy Initiatives should be provided, explaining the initiative's elements and their interrelations; and secondly, taxonomy for such activities should be provided.

THE PURPOSE OF THE WHOLE STUDY IS THREE-FOLD:

Understand what an initiative is and how to measure their effectiveness – by learning from the former and current practices of international cooperation on energy-related issues, as well as from insights into the nature of international cooperation. What are the main missions and objectives for such International Energy Initiatives; by which means, mechanisms and resources are the respective objectives supposed to be reached; who are the actors involved; what are the reasons and driving forces for parties to participate in an initiative's inception and in subsequent development of the initiative. This is a non-exclusive list of questions that should be addressed in this study.

- Help to avoid/reduce redundancy – in a comprehensive way, to provide information on similar activities currently ongoing in different parts of the world, under different organisations; some common problems arising from these activities could be avoided in the APEC region through the implementation of best practices. Similar, yet unrecognised tasks can be put on the discussion table looking at other [world regions] approaches to deal with energy-related issues. Moreover, identifying overlapping tasks/issues under different initiatives might help to reduce costs and improve the efficiency of international cooperation. The above mentioned tasks should aim to
 - answer the question “*Who is doing what and how?*”,
 - help in saving resources (which are time, finance, qualified and responsible staff) by avoiding redundancy,
 - identify “best practices”.
- Eliminate the misunderstanding surrounding initiatives within the public domain. For example, if the Kyoto Protocol under the UNFCCC fails is there any necessity to pursue CDM?

- The ultimate goal of this study is to provide options for the improvement and facilitation of international cooperation in the APEC region. Ambiguous questions must be addressed in doing so, such as:
 - Is the current set of International Energy Initiatives within the APEC community perfectly suited for their purposes, or should they be amended?
 - If yes, why does this happen and what are the key factors that impact an actor's behaviour and the progress of an initiatives development and governance?
 - What is the best method to make International Energy Initiatives more productive in the service of fostering collaboration among APEC economies?

Identification of overlapping issues or missing gaps, the evaluation and assessment of the initiative's progress and identification of the key factors that lead to the success of an initiative is the most challenging task for **the whole study**. However, such in-depth analysis is impossible without a preliminary identification of initiatives' elements like actors and their driving forces, the dynamics of an initiative's evolution, relationships among actors and management practices, the role of international organisations, *etc.* Thus, for **the first phase** of the project, description of ongoing International Energy Initiatives in the APEC region has to be done, followed by analysis of an initiatives elements, characterisation of the initiatives actors and their driving forces, along with identification of the overarching purposes and modes used to achieve these purposes. This analysis will be backed up by examples of representative initiatives.

The second phase of the International Energy Initiatives project will provide an extended analysis of the initiative database, which was created during the first phase of the project. The objectives of the second phase are to identify redundancies and major obstacles for cooperation, to analyse factors affecting an initiatives progress, to identify "best practices", determine possible implications, and to evaluate any missing areas where cooperation could be employed. The critical reassessment and evaluation of International Energy Initiatives should be focused on an initiatives performance, i.e. their current status and compliance with their stated goals.

EXAMPLES OF MAJOR INITIATIVES IN THE APEC REGION

A long non-exclusive list of major initiatives in the APEC region include projects, programmes and other types of cooperation activities implemented under:

The APEC Energy Working Group under the APEC secretariat, for example the Energy Business Network and the Energy Literacy Initiative, *etc.*

The ASEAN organisation, like the ASEAN Centre for Energy as an independent body and subsequent projects under it;

The United Nations family (which include UNDP, UNESCAP, UNFCCC, IAEA, and a lot more international organisations) like the Kyoto Protocol to the UNFCCC, the Sustainable Energy Finance Initiative, the Kitakyushu Initiative for a Clear Environment, and the Nuclear Fuel Bank Initiative, *etc.*

International financial institutions (such as the World Bank (WB), Asian Development Bank (ADB), Global Environment Fund (GEF), among others), for example the Rural Energy Enterprise Development, ADB Clean Development Mechanism Facility, Clean Air Initiative for Asian Cities, Global Gas Flaring Reduction and the WB Carbon Finance Unit, *etc.*

Some specialised bodies associated with energy-related government activity within regional organisations, include for example the Asian Cooperation Dialogue, the Association of Northeast Asia Regional Governments, OECD, Pacific Islands Forum, G8+. Under the International Energy Agency (IEA) there is the Oil Stock and Emergency Response Potential; and the Gleneagles and St. Petersburg Plans of Action can be found under the G8 Forum, *etc.*

International business and professional associations, including for example, the Renewable Energy and Energy Efficiency Partnership, Gold Standard, the World Association of Nuclear Operators, the Forum for Nuclear Cooperation in Asia, the International Gas Union, the Gas Exporting Countries Forum, and the FutureGen Alliance, *etc.*

Non-government and non-profit organisations like the World Energy Council, Greenpeace, the Carbon Sequestration Leadership Forum, and the Northeast Asia Gas Pipeline Forum, *etc.*

Many of these major initiatives are presented in the annex to this report in a structured way,

where the title of the initiative, actors and participants, their mission, objectives, and mechanisms are outlined and references for in-depth perusal are provided.

ISSUES FOR INTERNATIONAL ENERGY COOPERATION

CONCEPT OF SUSTAINABLE DEVELOPMENT¹

The Brundtland Commission report, “Our Common Future”², brought forth the concept of sustainable development as a critical and urgent innovation required in governance. Sustainable development emphasized the dynamic linkages among human well-being, economic development and their inherent environmental underpinnings. The basic concepts are intra- and inter-generational equity; interdependence of all peoples living on the Earth, and thus multi-stakeholder perspectives of international cooperation; as well as adaptive learning and management of planning practice to adjust for complexity and uncertainty of development processes.

To translate these principles into practice, governments are creating and implementing sustainable development strategies, both domestically and in the context of international cooperation. Strategies in their many forms represent a more systematic approach to policy planning and for managing sustainable development.

While it is assumed that building regional and global multilateral regimes should be based on the principles of sustainable development, the risk of proliferation of bilateral agreements exists, as it is much more difficult to reach useful consensus among several stakeholders, instead of just two negotiating parties. Without such trust building among partners, development of energy infrastructure – which are all a long-term, and high-risk businesses – like cross-boundary transmission lines and pipelines, LNG facilities, and the inherent “feeding” infrastructure, such as power plants, and oil/gas fields, may not be possible.

¹ IISD (2007)

² WCED (1987)

Box 1 What is sustainable energy development?³

In the 1987 report, “Our Common Future”, the World Commission on Environment and Development defines sustainable development as development that “*meets the needs of the present without compromising the ability of future generations to meet their own needs*” (p. 8 of the Report). The report further describes sustainable development “as a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potentials to meet human needs and aspirations” (p. 46). In its broadest sense, the report notes, “*the strategy for sustainable development aims to promote harmony among human beings and between humanity and nature*” (p. 65 of the Report).

The relationship between energy production and use and sustainable development has two important features. One is **the importance of adequate energy services for satisfying basic human needs**, improving social welfare, and achieving economic development — in short, energy as a source of prosperity. The other is that **the production and use of energy should not endanger the quality of life of current and future generations and should not exceed the carrying capacity of ecosystems**.

The development and introduction of sustainable energy technology must occur in a socially acceptable manner, with a broad range of citizens participating in the decision-making process.

However, no energy production or conversion technology is without risk or waste. Somewhere along all energy chains — from the extraction of resources to the provision of energy services — pollutants [or damage] are produced, emitted, or disposed of, often with severe impacts on human health and the environment.

ECONOMIC GROWTH REQUIRES ENERGY SUPPLY

Whether it is provided in a sustainable or unsustainable way, the fact remains that the APEC’s twenty-one economies represent more than half of the world’s combined GDP.

³ WEA (2004)

Accelerated industrialisation, urbanisation, and improvement in living standards, has resulted in APEC's energy consumption surging in recent years; economic and population growth has driven energy consumption in the APEC region, which has increased at an annual average growth rate of 2.6 percent from 3.4 Gtoe in 1980 to 5.9 Gtoe in 2002, and is projected to increase up to 10.3 Gtoe in 2030 at an annual average growth rate of 2.0 percent. However, the general trend observed is that economies with higher per capita energy demand tend to exhibit slower growth over the long-term.

ENERGY IMPORT DEPENDENCY

While the APEC region is host to the top four energy consumers in the world, namely the US, China, Russia and Japan, which together account for about 48 percent of the world's total primary energy demand, APEC is also host to three of the world's four largest energy exporters – Russia, Australia and Canada, – and currently is a net exporter of natural gas and coal. Energy resources are distributed unevenly and international cooperation is required to sustain primary energy supply through trade. The result is expected dramatic expansion in the trade of energy resources through to 2030, especially for the major oil and gas consuming economies. This increasing trade will extend the overall import dependency of the APEC region from 10 percent in 2002 to 20 percent in 2030. For the major fossil fuels, the import dependency of oil will swell from 36 percent in 2002 to 52 percent in 2030; likewise natural gas will increase from a major net export position in 2002 to a net import position of 14 percent in 2030. This increasing import dependency will have serious consequences for energy supply security. The status of import dependency (the ratio of net imported primary energy to total primary energy demand, with nuclear considered as a domestic energy source) for all APEC member economies in 1980, 2002, and 2030, is presented in Table 1. Only seven APEC economies (Australia, Brunei Darussalam, Canada, Indonesia, Mexico, Papua New Guinea and Russia) will remain net exporters, while China, Malaysia and Viet Nam will switch from a net energy export to net import position over the outlook period.

Table 1 Net energy import dependency of the APEC Economies in 1982-2030, %

| Economy | 1980 | 2002 | 2030 |
|-------------------|------|--------------|--------------|
| Australia | -25 | -121 | -193 |
| Brunei Darussalam | -630 | -668 | -688 |
| Canada | -6 | -48 | -33 |
| Chile | 41 | 63 | 84 |
| China | -3 | <i>negl.</i> | 18 |
| Hong Kong, China | 99 | 100 | 100 |
| Indonesia | -120 | -55 | <i>negl.</i> |
| Japan | 88 | 82 | 78 |
| Korea | 77 | 84 | 77 |
| Malaysia | -44 | -57 | 32 |
| Mexico | -50 | -59 | -9 |
| New Zealand | 43 | 19 | 27 |
| Papua New Guinea | 96 | -100 | -120 |
| Peru | -25 | 27 | 18 |
| Philippines | 54 | 51 | 68 |
| Russia | -42 | -72 | -67 |
| Singapore | 100 | 97 | 99 |
| Chinese Taipei | 81 | 87 | 89 |
| Thailand | 52 | 53 | 81 |
| USA | 17 | 30 | 36 |
| Viet Nam | 8 | -26 | 15 |

Note: Negative values mean net export to domestic consumption rate

Source: APERC Analysis (2006)

GROWING IMPACT ON THE ENVIRONMENT

According to the Outlook of the APEC region Energy Demand and Supply⁴ emissions of hazardous air pollutants will experience growth both in absolute and per capita terms. Sulphur oxides (SO_x) are projected to increase from 79 million tonnes in 2002 to 155 million tonnes in 2030 or from 30 kg per capita to 52 kg per capita. Nitrogen oxides (NO_x) are projected to increase from 75 million tonnes in 2002 to 121 million tonnes in 2030 or from 25 kg per capita to 40 kg per capita. Energy-related emissions of carbon dioxide (CO₂), although not hazardous, it is generally regarded as one of the major greenhouse gases, is projected to increase from 15 billion tonnes in 2002 to 27 billion tonnes in 2030, or from 6 tonnes per capita to 9 tonnes per capita. Air pollution and GHG emissions are important, but not the only negative environmental impacts from humanities thirst for acceptable and affordable energy. Energy-related activities also can cause a worsening of water supplies; vanishing, contamination and impoverishment of arable land; landscape degradation and biodiversity loss – all of

⁴ APERC Analysis (2006), p. 71-72.

these issues have now become undeniable and form an important part of multilateral energy cooperation.

OUTLINE OF THE REPORT

In **Chapter I** elements of International Energy Initiatives are discussed, followed by a taxonomy of International Energy Initiatives, where the two ultimate purposes – energy supply security and minimisation of negative impacts on the environment from energy consumption – and the six modes to achieve such purposes (namely, energy infrastructure development, financial mechanisms, regulatory framework, research and development, information sharing, education and capacity building) are discussed in **Chapter II** through to **Chapter VII**. These chapters have similar structures, where the definition of each mode is given, followed by the principal actors, characteristics of their respective driving forces, objectives, and analysis of representative initiatives by drawing examples from initiatives in the database. Each chapter is provided with a summary of challenges, which initiatives could face by undertaking this mode of cooperative activity. In **Chapter VIII** implications from both analyses of the International Energy Initiatives elements and in-depth studies by modes are provided. In the **Annex**, the glossary, abbreviation and acronym list, and the International Energy Initiatives database with supplemented index, are presented.

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ELEMENTS OF THE INTERNATIONAL ENERGY INITIATIVES

OVERVIEW

To understand the nature of multilateral activities to reach energy-related goals through cooperation of various actors within the APEC region, the structure and interaction of elements common to International Energy Initiatives will be discussed in this chapter. Analysis of the initiative database collated for this study led to identification of several basic elements for initiatives: the actors involved; their driving forces, and mechanisms for the initiative's implementation, including the structure of organisations that manage and govern the flow of the initiatives progress. Given the high political stock in most International Energy Initiatives, social science methodologies should be applied to investigate the elements and their interrelationships. Quote from "Getting it done: postagreement negotiation and international regimes", edited by Bertram I. Spector and I. William Zartman is helpful to make parallels and understand the motivation to cooperate under similar social and political phenomenon. Although this quotation was in relation to "order" rather than for "cooperation", it provides a clear idea of the reason why actors are willing to participate in multilateral international cooperation "...the regimes are a problem-solving effort, impelled by a felt need for some order – norms, rules, regulations, and expectations – in existing interactions, because the cost of disorder and transaction inefficiencies impedes the achievement of the purposes for which the transactions were instituted."⁵

The taxonomy provided in this chapter, or **structure** of International Energy Initiatives, is based on the type and method of international cooperation that is required to solve energy-related problems, which arise around issues of sustainable energy supply at the national/international level.

The initiatives by themselves are complex political and social phenomena, and rely heavily on **actors**, driven by their own interests, motivations, commitments and circumstances. The actor's **driving forces**, incentives and relationships are crucial for the very inception and further development of the initiative. Although the initiatives are market-external by nature they are supposed to solve the issues through a market

approach by involving profit-seeking businesses into mechanisms to attain the initiative's objectives. The most recent evidence of such an approach is a boom of innovative financial mechanisms to mitigate GHG's on the threshold of entering the first commitment period of the **Kyoto Protocol** from 2008.

The important aspect of an initiative that needs to be ascertained is the initiative's sustainability, that is, how the initiative operates, adapts, transforms, and remains central to the interests of its stakeholders. Problems are not static and neither are their solutions, just as the power and interests of the actors are also fluid. The process through which international cooperation goals in energy-related areas are achieved is deemed an **initiative's life cycle**, which includes the establishment and development of relationships among the actors, and mechanisms to manage the initiatives progress. Usually such mechanisms are implemented through newly established, existing, or the subsidiary bodies of international organisations.

As part of energy-related policy, International Energy Initiatives are inherently dependent on qualified human resources in governance and management, and may even be dependent on public acceptance of such policies. However, the commercial viability of an initiative is of certain value, either in the sense of garnering enough financing for the initiative's current operations, or eventually by exceeding the expected cost through anticipated benefits for an initiatives actors'.

METHODOLOGY

Policymakers the world over have grasped onto the word "initiative" as a convenient common term to use when referring to coordinated international cooperation. The definition of the word "initiative" in this context, however, is unclear. Its etymologic roots range from conveying a sense of "beginning" to one of "readiness", and, finally, "a power or right", yet none of these usages satisfactorily describe the word "initiative" as discussed in this report. A primary goal of this study, therefore, was to develop a suitable definition for this term both to provide an internal working framework and to

⁵ GID (2003) p. 20

offer it to the lexicon of the greater political discourse.

At the conceptual level a “learning while doing” approach was implemented to explore the nature and current scope of International Energy Initiatives in the APEC region. Establishing of the IEI working definition and collation of the database for the most representative initiatives according to this definition was undertaken in an iterative way, eventually leading to the final versions of both items. Major and representative examples to illustrate ongoing activity have being collated in the database and analysis of the content was undertaken to characterise the nature of the IEI phenomena and provide the *status quo* in the APEC region.

Analysis of IEI by modes has been undertaken in a uniform way, starting with mode definitions, stakeholder’s description, provision of driving forces by actors and implementation mechanisms to meet the objectives, supported by examples from the annexed database.

DEFINING INTERNATIONAL ENERGY INITIATIVES

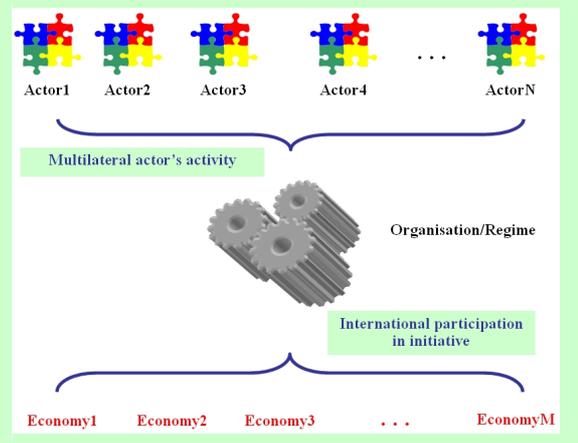
International Energy Initiatives are the process through which problems in energy-related areas, which are to be solved through international cooperation, are identified, respective goals are established, and appropriate mechanisms to achieve such goals are introduced. The working definition which follows was evolved through analysis of the IEI database collated during the course of the study:

- By international – as a rule, the initiative involves partners in three or more APEC member economies, i.e. has more complex nature than bilateral cooperation (Box 2).
- By energy – the initiative focuses on issues which arise through the whole chain from extraction and/or production of energy to providing useful energy services – energy supply security, the environmental impact of energy consumption, or both.
- Initiative – as a coordinated strategy to reach explicit goals within energy-related problems, which is voluntarily undertaken to address the needs or ambitions of diverse partners. An initiative often evolves over time as such needs change.

Box 2 Multilateral and International Aspects

The need to cooperate is applicable to both actors and economies. International refers to multiple economies – at least three APEC economies – participating in the initiative. Distinguishing between multilateral initiatives and unilateral initiatives can be viewed as follows; the former is composed of multiple actors, such as the APEC EWG, while the second one has only one actor and is implemented within multiple economies, such as BP Statistical Review of World Energy (business) or Greenpeace (NPO). Principles of the multilateral approach to consensus building through negotiation are presented in Figure 1.

Figure 1 International and multilateral aspects of initiative



This culminates in the following definition for IEI

Box 3 Working definition of International Energy Initiatives

An International Energy Initiative is the process through which goals for international cooperation in energy related areas are achieved.

We see an initiative as a **coordinated strategy to reach explicit goals within energy-related problems, which is voluntarily undertaken to address the needs or ambitions of diverse partners.** An initiative often evolves over time as such needs change.

PURPOSES AND MODES OF INTERNATIONAL ENERGY INITIATIVES

TAXONOMY OF INTERNATIONAL ENERGY INITIATIVES

There are two ultimate purposes International Energy Initiatives have to meet – security of future energy supply, and minimisation of the environmental impacts of energy consumption. Concerns on future energy supply are fuelled by soaring energy consumption, which is foreseen not to be met by adequate energy supplies in the future, worries in relation to the exhaustion of the world's finite energy resources, and barriers arising from not being able to deliver secure energy from producing facilities to national consumers. Degradation of the environment and climate change are both deemed to be the result of human activities, where energy-related operations are blamed for a large part of this damage. These issues or problems are deemed to be the two **ultimate and overarching purposes** for International Energy Initiatives for this report. Therefore, when initiatives are designed to mitigate these ultimate purposes, a number of different types of **mode** are employed. Six such modes were proposed, and the taxonomy used throughout this report is presented in Table 2.

Table 2 Structuring International Energy Initiatives

| Ultimate purposes | |
|------------------------|---|
| Energy supply security | Minimum negative environmental impact of energy consumption |
| Modes | Infrastructure Development |
| | Financing Mechanisms |
| | Regulatory Framework |
| | Research and Development |
| | Information Sharing |
| | Education and Capacity Building |

Both of the ultimate purposes for IEI could be considered as the desired future situation – or desired status of the energy supply chain and the related regulation, technological, social, financial, *etc.* framework. Activities to achieve this desired future (identification of problems) and proposed approaches to solve these problems is termed “planning”, of which a short description/

discussion is given in Box 4 (at the end of this chapter). The planning concept will be also helpful in the second phase of the study when procedures for assessment of initiative effectiveness will be discussed.

Energy security and environmental protection can either reinforce or conflict each other. For example, securing energy supply often leads to an increasing share of coal and nuclear energy in the primary energy mix; this in turn could deepen the impact on the environment and raise concerns on the proliferation of nuclear weapons. On the other hand, enhancing energy efficiency, energy conservation, consumer behaviour/consumption patterns and promotion of renewable energy could aid in the strengthening of an economy's energy balance. *“The issue is to make twin aims of energy security and environment concerns to work in the same direction, rather than against each other”*.⁶

Energy Supply Security

Energy is a fundamental prerequisite for any human activity, from cooking to transportation and the production of commodities. The more cheaply, concentrated, and technologically feasibly energy is consumed the more wealthy society becomes. For example there is a huge difference in the energy per capita consumption to GDP per capita between the developed and developing economies around the world, and also within the APEC region. Thus energy security – cheap and reliable energy – has become imperative for policy-makers when trying to achieve higher levels of economic development. However, the major problem facing many economies is that energy resources are not located uniformly around the world and a shortage of natural gas, oil and sometimes even renewable types of energy to provide sufficient primary energy supply is often cited as a problem. While few economies are rich in energy reserves, international cooperation could facilitate better primary energy supply structure through trade (including power grids, gas and oil pipeline systems/interconnections) and technology transfer. Energy security is essential for energy-intensive economies in the East Asian and North American regions, as well as exporting economies within APEC that deem energy security as a necessary prerequisite for establishing a stable energy market. It is important to stress that security of energy supply is not just a problem for economies that lack energy resources, but is also a

⁶ David Howell (2006)

problem for energy exporting economies as well and there is no all-encompassing solution for securing energy supply in the APEC region without the involvement of all parties.

Environmental Issues

The energy sector can have great effects on the natural environment, whether these effects are local, regional or international in extent. At the local level, transportation can cause health problems from exhaust fumes along busy roads, or fossil fuelled power plants/industrial activities may emit pollutants that affect a small localised region. As energy facilities are placed not only where energy consumption occurs, but along the whole energy supply chain, a lot of negative effects could be encountered at the local level, from landscape disfiguration at coal mining sites to electromagnetic wave interference close to electricity transmission lines. On a more regional level sulphur dioxide emitted from power plants can cause acid rain and adverse atmospheric conditions, accompanied by soil contamination and have an impact on biodiversity. Sometimes such impacts can far exceed national boundaries – in 2005 the Environmental Protection Agency of the US traced mercury deposition as far as China and India. At the global level, two topics that have become the focus of international attention in recent years, the first being ozone layer depletion, which promulgated in the Montreal Protocol. The other is the growing awareness of global climate change. The International Panel of Climate Change (IPCC), which operates under the auspices of the United Nations Environmental Programme (UNEP) and the World Meteorological Organisation (WMO), in February 2007 released their fourth assessment report of which the following is an excerpt: “*Most of the observed increase in globally averaged temperatures since the mid-20th century is very likely⁷ due to the observed increase in anthropogenic greenhouse gas concentrations*”. For example, energy-related activities are responsible for 4 percent of carbon dioxide, 7 percent of nitrous oxides, and 16 percent of methane, all calculated from combined natural and human-induced emissions of these GHG’s to the atmosphere.⁸

⁷ In the context of the IPCC report *very likely* is given the probability of greater than 90 percent, while *likely* is given the probability of greater than 66 percent.

⁸ WEA (2004), p.41

THE SIX MODES

Infrastructure Development

Energy infrastructure development relates to the processes of construction and renovation, technological refurbishment and operation along the whole energy supply chain – from exploration, and subsequent extraction/production of primary energy, to transformation and transportation – for providing useful work and services to customers in the form of final energy consumption. The need for international cooperation is usually driven by increasing energy demand and net energy imports, insecurity of motor fuel supplies, large environmental footprints in relation to energy consumption (including those, caused by low energy efficiency), positive synergistic effects of larger gas and power grids, requirements for capital investments which are not affordable by a single entity, weak oversight of the nuclear fuel cycle, and insufficient penetration of new and renewable technologies.

Being mainly profit-seeking and economic stimulating projects, international cooperation for energy infrastructure development also facilitates positive political processes among partners, and might become an important factor to ease regional political tensions, or, *vice versa*, an indicator of such processes.

Financial Mechanisms

Market-external in nature, financial mechanisms refer to innovative tools or funds that are to facilitate investment in the energy sector and in relation to the environment. International cooperation in financial mechanisms build-up is thought to internalise social external costs in order to make energy infrastructure projects commercially profitable and thus facilitate investment flow. Lack of appropriate tools/mechanisms, unstable investment markets, low rate of return, insufficient start-up funding and high transaction costs for implementation of renewable energy and energy efficient technologies are the major forces that encourage participants to cooperate under this mode for IIEI’s.

Regulatory Framework

Regulatory activity is driven by the necessity to create and maintain international regimes for avoiding abuse of the commons and lack of international accountability, as well as being the main mode to fulfil those initiatives which have wide and complex objectives. While being strongly

dependant on the actors involved and the nature of their interactions, some other reasons seems to motivate international cooperation within the regulatory framework mode, including international relations, improvement and synergies in the development of cross-border trade and exchange; the limited reach of any one economy's own policy agenda on the international scene; or replicating economy-level initiatives on the international stage.

Research and Development

Research and development activity, *i.e.* sustaining and extending the level of knowledge and technologies and/or commercialisation have become more expensive and lengthy as the technologies themselves become more complex. Long-term research is a luxury only a monopoly or very wealthy economies are able to pursue. Driving forces for research activity to provide commercially available technological advances synchronised with economic needs, while minimising society's spending and risk are reducing import dependency, improving energy efficiency and working together at the international level on key components to reduce adverse environmental impacts.

Research and development, together with information sharing and education activities, in turn are able to facilitate investment within the national economy, which is why governments are supportive in relation to advancing domestic R&D activities on the international scene. However, as researchers become more intellectually savvy – more willing to solve the immediate needs of business – it has become more difficult and often controversial to participate in international R&D cooperation while maintaining intellectual property rights to maintain a technological advantage.

The other type of research is providing reports on important current issues within the international energy sector to the general public, industry professionals, or policymakers.

Information Sharing

The driving forces for international cooperation in information sharing are concentration of research activity for data/information gathering in order to minimise the cost of such collection and analysis; the need to improve communication to the general public and enhance the level of education; disseminate knowledge and promote best practices among professionals. Implemented in an efficient way,

information sharing can help overcome such burdens to energy cooperation such as language barriers; diversity, inconsistency, and incompatibility in resource categorisation and energy units; inaccurate data and information; and the lack of transparency in market signals.

However, with the emergence of the Internet, access to information by the general public has become much easier and thus people are able to access large quantities of information online. Traditional technologies and the expense of printing papers, journals and proceedings of meetings used to be a barrier to the widespread dissemination of information. One important factor to be considered is that the information that each actor is using for assumptions and evaluations of current and future desired situations (see Box 4) has a solid scientific and moral basis, as the danger of disinformation and pseudoscience could lead to errors and finally to the failure of this particular initiative.

Education and Capacity Building

Education and capacity building is about helping facilitate human capital growth, extending the education level of society and improving professional skills, disseminating knowledge and best practices, networking of experts, awareness of new ideas and consensus building around upcoming issues on the international energy scene. Distinction between the education process and public information is that the educator bears responsibility for the personal level of knowledge, while information is provided just according to the own interests of the provider. Participation in international cooperation on education and capacity building could significantly reduce the cost of human resource development for the national economy, as the most important facility for energy infrastructure development within this mode is technological transfer to developing economies.

The importance of capacity building can be highlighted by hypothetical variation of the impact of professional culture⁹ on negotiation across the negotiation process stages, Table 3.

The general public needs education (energy and environmental literacy) primarily as they may be directly or indirectly involved in an issue and

⁹ “Professionals may have their own special culture shaped by educational, formal training and common experience, and this culture may differ from his/her national or ethnic culture to a significant degree.” IIASA (2003), p.3

has some concerns, so people need to be informed of the available policies and options. “Blue collar-workers” need training to acquire knowledge and skills, while capacity building allows professionals to exchange views with other professionals around an issue through the use of a common language.

Table 3 *Impact of Professional Culture on Negotiations*

| Process stages in negotiations | Impact targets of professional culture on negotiations | | |
|--------------------------------|--|-----------------|--------------------|
| | Communication | Problem-solving | Agreement-building |
| Pre-negotiation | M | L | M |
| Agenda-setting | H | H | M |
| Formula | M | M | H |
| Detail | L | M | H |
| Post-negotiation | H | H | M |

Where **H** – mean high requirements for professional culture, **M** – moderate, and **L** – low.

Source: IIASA (2003), p. 252

ACTORS

Major actors for the International Energy Initiatives among international public organisations are the UN Family, APEC, ASEAN, OECD, the WB, ADB, the Energy Charter Treaty, G8, etc. However, only for some of them the whole mission is devoted to energy issues, others either have a special energy body established, or energy-related programme arranged. These organisations were established as mechanisms for the implementation of coordinated international cooperative activities. In order to fulfil their mission, these entities in turn could participate in different kinds of cooperative activities, thus introducing new initiatives and/or complicating interrelationships either within a given organisation, or within a network of them.

Different types of relationships among initiatives actors can take place, while some hierarchy could be presented. That is the status of an actor within an initiative – whether they are a **participant**, stakeholder, or decision maker. The former refers to all of those who are affected by initiatives, both active insiders and passive recipients of an initiative’s benefits. **Stakeholders** undertake an active role as one of an initiative’s

participants, and provide power, assets or experience to facilitate and promote an initiative’s progress, therefore their voice in the decision making process within an initiatives governing body is important. **Decision makers** can have various roles at different stages of an initiative’s progress, as an implementation body is introduced after the official launch of an initiative, and the decision-making procedure within this initiative changes over time.

INTERNATIONAL GOVERNMENT-BASED ORGANISATIONS

The list of international government-based organisations, which operate in the APEC region and have energy-related initiatives, include entities within the **United Nations** family like the International Atomic Energy Agency, **APEC** itself, the Association of Southeast Asian Nations (**ASEAN**) and extensions of it to cooperate with other regional economies, like Japan (ASEAN+Japan), Northeast Asia (ASEAN + Japan, China and Korea; ASEAN + Japan, China, Korea, and Russia); ASEAN+6, and so on. APEC economies participate in the Organisation of Economic Development (**OECD**), World Bank (**WB**) family and Asian Development Bank (**ADB**), while there are many more similar global and regional organisations. One good example of an international organisation that has encouraged national governments to participate as stakeholders together with private sector entities, international development banks and investment funds, non-governmental organisations, financial and technical experts, and other interested parties is the Methane to Markets Partnership (MMP), established in 2004.

For the APEC region, a network of energy-related bodies has already been created. From the top down, annual Leader’s meetings, Senior Official and Energy Ministers meetings are undertaken regularly and are supported by the Energy Working Group (EWG) and some taskforces under other Working Groups within the APEC Secretariat. Furthermore, some task forces under EWG’s authority were created, including the Energy Group of Experts in Data Analysis (EGEDA) and **Asia-Pacific Energy Research Centre (APEREC)**, with the latter being supervised by EGEDA. Much of the energy-related cooperation within ASEAN is concentrated in the **ASEAN Centre for Energy (ACE)**. While “EWG and ACE both lack, by design, regulatory authority, their accomplishments have been in coordination, facilitation, data collation, research, policy coordination, fund raising, and harmonisation of standards, as well as joint

implementation of cooperative projects. Both organisations have five-year plans that provide vision for the programmes and set their goals, activities and indicators".¹⁰

OECD has embedded within it two Energy Agencies – the **Nuclear Energy Agency (NEA)**, established in 1957 as the European Nuclear Energy Agency), and the **International Energy Agency (IEA)**. The IEA received its *raison d'état* in the Agreement on an International Energy Programme (IEP), which established the Agency in 1974. IEP is a treaty ratified by 26 countries with the following objectives, which guide and govern the activities of IEA in general:

- To maintain and improve systems for coping with oil supply disruptions; and
- To promote rational energy policies in a global context through co-operative relations with non-Member countries, industry and international organisations.

When several member states of the IEA face a problem that could be better addressed in an international or multilateral way, rather than domestically, the organisations stakeholders start the discussion/negotiation by a very low key, risk free approach. For the IEA, initiatives give it the chance to sound out future activities and organisational shape to adapt and remain vital to the interests of their stakeholders. For its member economies, the initiatives can offer a vehicle for a trial and error negotiation on problems and concerns that are not static.

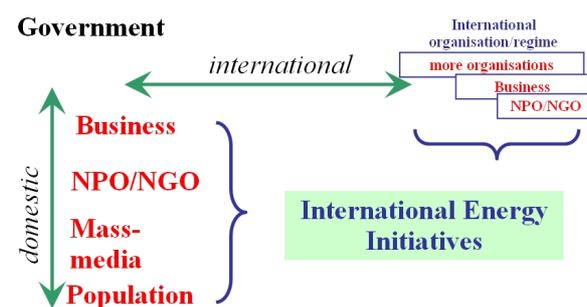
There are a lot of regional regimes and organisations, whose main purpose is to facilitate mutual understanding and cooperation on political, economic and social issues, like the Asia Cooperation for Development (ACD), Association of Northeast Asia Regional Governments (ANEARG); Korean Energy Development Organisation (KEDO), and the sibling Six-party talks in 2003-2007 in North-east Asian region; The **Group of Eight**, plus invited Leaders of major economies and international entities; **Energy Charter Treaty**, regional economic and cooperation organisations like OLADE for Latin America, and Pacific Islands Energy for Sustainable Development (PIESD) under the Pacific Islands Forum. Summarising the observations of missions, objectives, goals and mechanisms, the main purposes for such international cooperative activity at government level are:

- Identifying and promoting areas of bilateral, multilateral and private sector collaboration in energy-related areas, such as security of energy supply and energy-specific environmental impacts;
- Improving the legal, regulatory, financial, institutional, and other conditions necessary to overcome barriers and attract investment in energy-related projects;
- Identifying cost-effective opportunities to enhance energy supply security and minimise the environment footprint of energy consumption through collaborative projects and identifying potential financing mechanisms to encourage investments.

Role of National Governments

Of the actors that participate in international cooperation, national governments have the most influential role. Due to their inherent responsibility, national governments, in which both the executive and legislative branches are included, has to interact either with international bodies and other governments in order to start and support cooperation, as well as interact with domestic actors, in order to gain understanding and consensus on development goals, approaches, mechanisms for their actual implementation into the economy. This complex relationship is schematically presented in Figure 2.

Figure 2 Government involvement in initiative and interaction with other actors is two-dimensional



An important feature of national governments is that unlike other categories of actors, they are subject to the choice of “voters” within an economy and are thus much more sensitive to changing morale and political dominance in their respective domains.

BUSINESS

Businesses are by definition profit-seeking entities, either related to energy extraction, transformation, transportation, energy wholesales

¹⁰ Nexant (2005)

or retail trading, or even to energy-intensive manufacturing and energy-related services like research and development, education and training, or financing. However, important tasks for any business entity, either it be small local energy service company (ESCO) or multinational like BP, are lobbying their market interests and promoting their corporate image to the general public as a socially responsible company.

The business community is a very important actor in energy-related activities, as it brings entrepreneurship and skilled operations within a market framework to the implementation of International Energy Initiatives. Thus much of the business involvement within international cooperation occurs within activities to spend government funds in order to achieve market-external goals, like social energy services, mitigation of energy-originated environmental footprints, greenhouse gas reduction, and promotion of new and renewable energy. Professional associations like the International Renewable Energy Alliance provide a coalition advocacy group to build linkages on common interests within the energy-related community and facilitate information and contacts to other relevant businesses, research, civil-society, governmental and international organisations.

NON-GOVERNMENT AND NON-PROFIT ORGANISATIONS

The number of actors and their variety is growing very fast with the spread of international communications and the sophistication of mechanisms for capital flow. Thousands of non-profit organisations, from those who deal with child healthcare and education to non-nuclear and peace-making activities, link their problems to the issue of access to reliable energy services and the environmental acceptability of such services. Examples of non-government and non-profit organisations including **Gold Standard**, **Greenpeace**, **Northeast Asia Gas Pipeline Forum (NAGPF)** are implementing high energy efficiency and environmentally friendly building standards, organise campaigns and education for concerned people, workshops and training courses for policymakers, researchers and business on a daily and/or regular basis, lobbying national governments to amend/improve or expand legislation and regulatory frameworks, introduce new financial mechanisms, start to construct infrastructure projects, joint technological research, technological transfer, and information sharing, *etc.*

Professional associations and international organisations of energy professionals, for example, the International Gas Union and the World Energy Council, are also powerful and important actors for International Energy Initiatives.

GENERAL PUBLIC

The **general public** is most likely to support actions when it is involved in the decision-making process. When involved at all levels of the decision making process the general public is at least aware of the rationale behind the decision that has been made. However, there are times when information is not publicised as it is deemed unnecessary to publicise it, or the disclosure of sensitive information or arguments which could undermine decisions is omitted. However, eventually it is the people of APEC economies who provide the legitimacy for any International Energy Initiatives, and thus act both as participants and stakeholders.

Another very important actor is that of the mass-media. The process of international energy cooperation deeply involves people's preferences, expectations, modelling of current and future situations, establishing goals and choosing approaches to reach such goals. The information and educational role played by the paper/electronic publishing and broadcasting activities of the mass-media and the Internet have become extremely influential as sources of information transference.

DRIVING FORCES

An initiative's actors have their own goals, objectives, and preferred mechanisms to meet their needs and desires. Such needs and desires are incentives that direct an actor's behaviour and **act as motivation** in their activity. Personality is a very important factor, as an actor's behaviour is determined not only by their corporate or professional interests, but also by individual characteristics. However, in this study driving forces for actors are considered as impersonalised, and thus free of such influence.

Most of problems identified as driving forces for International Energy Initiatives are related to non-market or market external issues that society faces, or could face in the future. However, the general market approach has proved to be an indispensable way to deal with economic issues; however it needs to be customised to handle externalities. For the success of an initiative, as an international cooperative effort, it is important that

the cost to society to solve such market-external problems would be less if the implementation mechanism could be introduced in such a way that profit's for business would be attractive enough compared to the regulation. This situation when **business could have profits while benefits for society overcome total social (external) costs** is assumed as the commercial viability of the initiative.

DRIVING FORCES AND MODES

While actors in International Energy Initiatives could have their own motivation, there are driving forces which exist independently of actors. Some initiatives with broad missions thus have complex mechanisms to reach their objectives. It is a purely political task to have the ability to compile such a list of driving forces, and finally make priorities in relation to the actors involved, participants expected, and results desired. There are a set of driving forces behind each actor, and their interaction bring dynamics to the process of an initiatives development through balancing of all the participating party's interests. A non-ordered, non-exclusive list of driving forces for the International Energy Initiatives by mode is presented in Table 4. This table provides evidence for the fundamental role of capacity building activities, which are considered to be "soft"

approaches for International Energy Initiatives – in that they are based on training, communication and knowledge exchange that can be achieved more easily/readily. On the other hand, "hard" approaches, which are dependent on the transfer of technology, the securing of finance and ultimately the construction of assets are more sparsely observed in International Energy Initiatives and are a result of and built upon the foundations that are laid down in the formation of "soft" approaches – such as infrastructure development and regulatory framework.

INTERACTION OF THE ELEMENTS

The initiatives rely heavily on the dynamics of interactions among the initiative's elements, as well as on the impact of current political, economic and cultural frameworks to the initiatives development. An initiative's life-cycle essentially involves all the elements discussed above, and provides an explanation of the interrelations and dynamic nature of such interrelations from the initial steps to the end, whether that be reaching the goal of the initiative, that is fulfilment of the initiative's mission, or abandonment of the initiative (Figure 3).

Figure 3 Initiative's life cycle

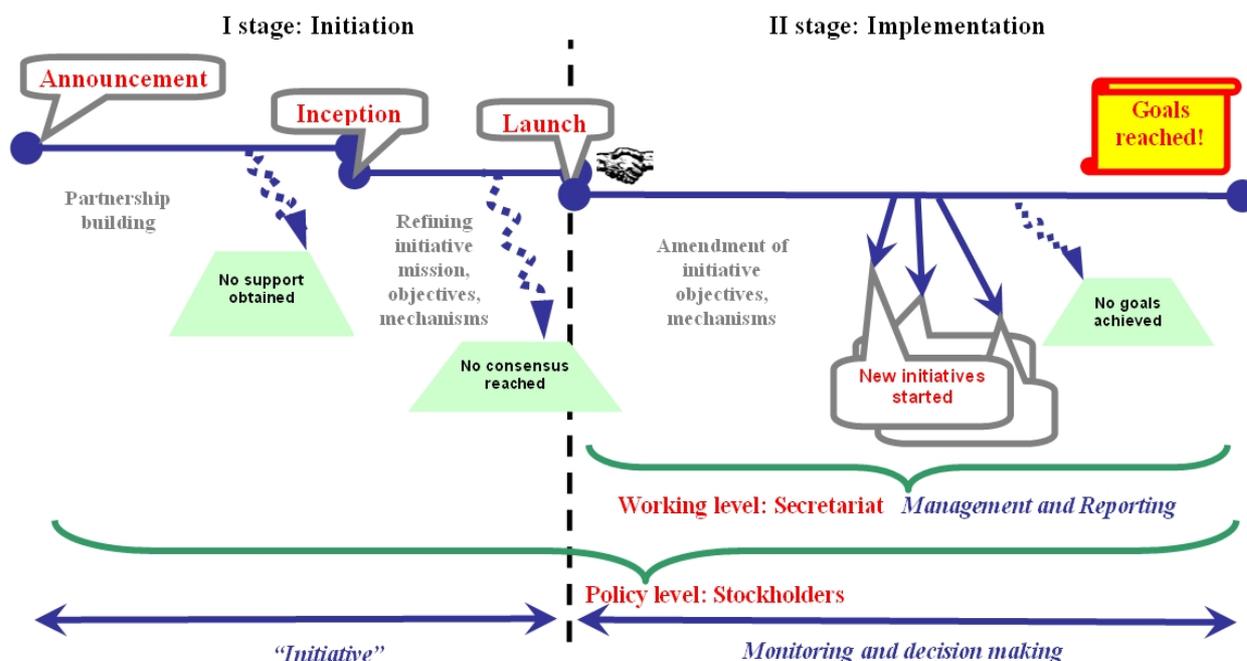


Table 4 Cross-relations of driving forces and modes of International Energy Initiatives to achieve ultimate purposes

| Driving force | Infra-structure Development | Financing Mechanisms | Regulatory Framework | Research and Development | Information Sharing | Education and Capacity Building |
|--|-----------------------------|----------------------|----------------------|--------------------------|---------------------|---------------------------------|
| Insecurity of oil supply, increasing energy consumption and energy imports | • | • | • | • | • | • |
| Lower environment footprint along the energy supply chain | • | • | • | • | • | • |
| Improving international relations with neighbours | • | • | • | • | • | • |
| Awareness of new ideas and upcoming issues | | | | | | • |
| Incremental energy supply and introduction of new energy sources | | • | • | • | | • |
| High project cost for single economy | • | • | | | | • |
| Synergistic effects of larger gas and power networks / macro-level synergies in trade | • | | • | • | | • |
| Reliability and quality of energy services | | • | • | | • | • |
| Energy efficiency improvement | • | • | • | • | | • |
| Insufficient penetration of new and renewable technologies | | • | | | • | • |
| Weak oversight of nuclear fuel cycle | • | | • | | | • |
| Shortage of qualified human resources in governance, management, and the workforce | | • | | | • | • |
| Communication with general public concerning energy and environmental issues | | | | | • | • |
| Sustaining scientific and technological levels | | • | | • | | • |
| Poor communication with general public concerning energy issues | | | | | • | • |
| Lobbying or advocacy as a mechanism to facilitate cooperation | | | • | • | | • |
| Abuse of commons, lack of international accountability, or limited reach of policy goals | | | • | | | • |
| Lack of financial mechanisms | | • | | • | • | • |
| Language barriers, inconsistent statistic methodologies and energy units | | | | | • | • |
| Inaccurate data and information on both domestic and international levels | | | | | • | • |
| Lack of transparency in market signals | | | | | • | • |

- Problem identification by the initiative's creator, announcement of the initiative's objectives and approaches/strategies proposed, followed by partnership building, which is finalised in the initiative's inception. In the case that support can not be obtained the initiative will usually cease to exist.
- Capacity building process to refine mission, objectives, and mechanisms to be implemented to reach the initiatives objectives, enhancement and strengthening of partnership, which in the case of satisfactory progress for stakeholders leads to the initiatives launch. Otherwise the initiative will cease to exist at this stage.
- In the case of successful start/launch of the initiative the first (initial) stage will be transformed into the second (implementation) stage. At that point an organisational body – secretariat – is established to manage the initiatives development and maintain implementation of mechanisms to meet the objectives and fulfil the initiatives mission. At this **working level** the secretariat also has to review its activity on a regular basis and report on the initiatives progress to the **policy level**. At the policy level, on the other hand, regular monitoring of an initiative's activity is usually made. As the initiative progresses, more issues might emerge additional to the original mission, thus amendments in the objective's mechanisms often occur, including initiation of a new, narrower initiative to support a weak point that was revealed in the implementation stage. In the worse case, it may be noted that some changes in an actors position, perception, interest, or in the initiative's environment, or failure to achieve some or all of the objectives, could lead to the total failure of the initiative.

Financial issue – without money an initiative inevitably dies; and also the commercial viability of an initiative is important – either if it means profit for participating businesses, or more benefits than associated costs for society/particular economy.

SUMMARY

In this chapter a working definition of International Energy Initiative was introduced, the ultimate purposes and modes for IEP's were defined, common elements of IEP's and their interaction along the process of an initiative's evolution was described, theoretical background was provided to validate structuring of International Energy Initiatives and propose

evaluation procedure for IEP's on the basis of decision-making processes.

In the next chapters more detailed and in-depth analysis of International Energy Initiatives by their modes are presented. Each chapter has a definition of the mode, description of the major actors and driving forces, mechanisms to implement missions and examples of the most representative and important International Energy Initiatives in the APEC region.

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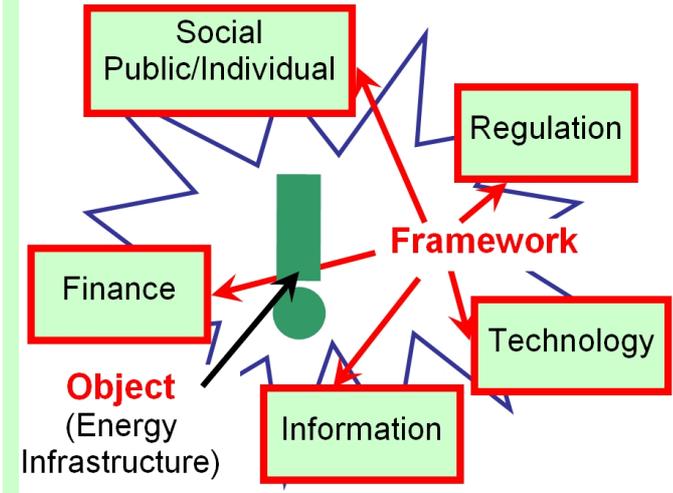
Box 4 Concept of Planning and a background for International Energy Initiative’s structuring

PART I. CONCEPT OF PLANNING

In this section establishment of International Energy Initiatives goals, modes to reach them and effectiveness of such activity are provided based on the planning concept.

As any of an initiative’s actors have their own vision of a desired future, and a willingness to reach it, they enter into the planning activity. The desired future is associated with **situation**¹¹ - which is the relationship of the **mode** (energy infrastructure) under consideration and the **framework** around it, see Figure 4.

Figure 4 Situation: relationship of energy infrastructure and it framework



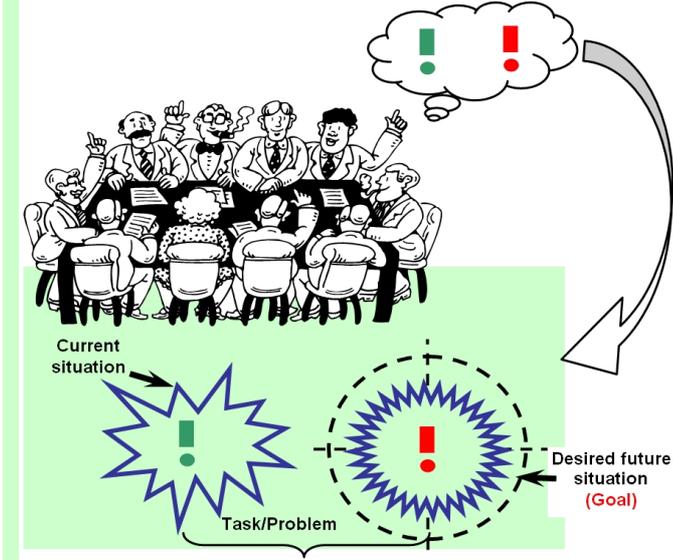
Energy infrastructure is a mode under consideration, and it consists of all of the physical facilities along the whole energy supply chain – from primary energy production /extraction to transportation, transformation, and distribution – to final consumption and providing useful energy services for consumers.

The framework is a set of available technologies, public and individual social characteristics, technical, economical, financial regulations, financial facilities, and information, etc.

The current or future situation could be assessed by an actor according to their own preferences/criteria – energy security, and minimisation of the environment footprint.

Construction of a desired future situation means establishment of an actor’s **goals** for the initiative.

Figure 5 Planning Concept



At the next step, identification of the difference between the current and future desired situation lead to the identification of either a **task**, or **problem**, see Figure 5.

- Problem arises when uncertainties exist, the goal is vague and non-standard, and innovative procedures to reach such slipping goals are essential.

As a result of such planning activity:

- problem is identified;
- initiative goals / objectives are established;
- mechanisms to reach them are proposed;
- associated benefits and costs of the initiative can be evaluated.

¹¹ S. L. Optner (1965)

Box 4 Concept of Planning and a background for International Energy Initiative’s structuring

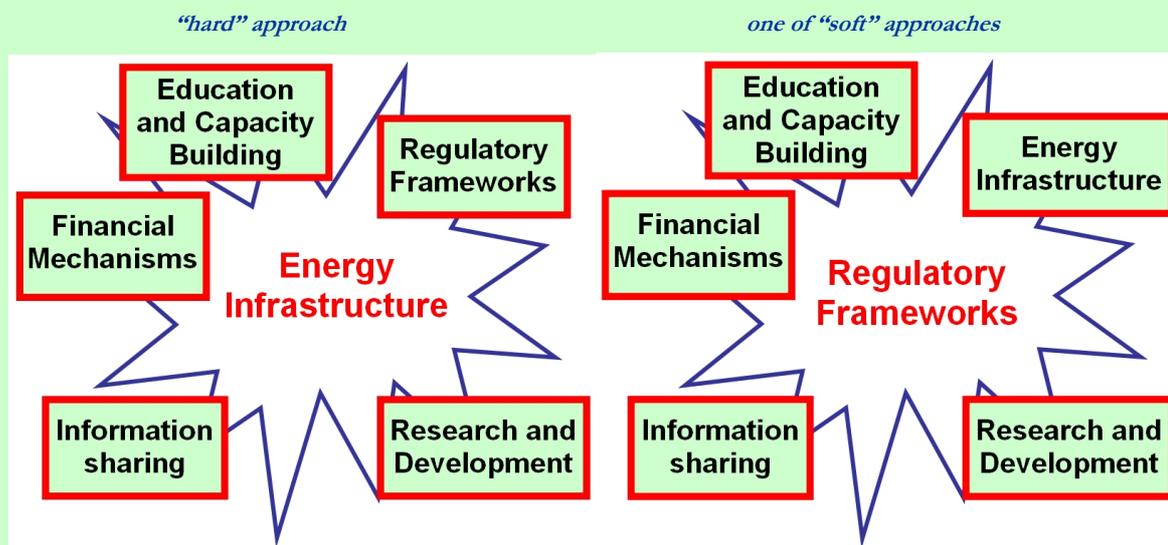
PART II. BACKGROUND FOR INTERNATIONAL ENERGY INITIATIVES STRUCTURING

In this section the rationale for IEI taxonomy is provided, based on the planning concept.

Energy security and minimal environment footprints are considered as the future desired situation, in which energy infrastructure and related surroundings are to be placed. Situation, or object and framework around it, could be considered as a kind of a “single whole”. The framework is split into particular activities that are non-overlapping, thus providing a single and exhaustive list of “modes”. Development of energy infrastructure, which is a core object in such a system is supposed to present a “hard” approach to the problem solving in the planning procedure. However, if in this system (a “single whole”/situation) mode (energy infrastructure) were to be exchanged into one framework area, it would present the “soft” approach to problem solving, Figure 6.

In other words, reaching an initiatives goal will lead to changes in the framework; while this will not directly solve the main problem (change situation in a desired direction), it will amend the framework around the core mode and thus facilitate a favourable solution to the main problem, which is the ultimate purpose of the initiative.

Figure 6 Illustration to the structuring of initiative modes to reach ultimate purposes:



INFRASTRUCTURE DEVELOPMENT

OVERVIEW

Issues of energy security and minimisation of the environment footprint of energy consumption are primarily defined by the quantity and quality of energy flow through the supply chain, *i.e.* the availability and extent of energy infrastructure. Infrastructure is a set of interconnected structural elements that provide a framework of the basic facilities, services, and installations needed by society to function. In this section the infrastructure as in all the facilities which are built/constructed or manufactured to provide energy services to society through the whole energy supply chain will be regarded:

- exploration, development and production / extraction of primary energy (for example, coal, biomass, wind, *etc.*)
- transformation of energy (for example, electric power generation, oil refining to motor fuels, *etc.*)
- energy transmission and distribution (for example, different voltage electric power transmission lines, oil/gas pipelines and stockpiles, LNG supply chains, *etc.*)
- providing useful work or service (for example, lighting and space conditioning, transportation of passengers or goods, substance transformation during manufacturing processes, *etc.*)

Energy infrastructure is usually separated into supply, and demand side, while transformation, transportation (including storage), and energy consumption can occur on either side. Even economies deficient in sources of domestic energy, like Singapore and Korea, export significant amounts of motor fuels, meanwhile they are almost entirely dependant on crude oil imports. On the other hand, Russia has the problems of securing energy transportation routes and export markets. Thus energy security issues should be considered equally for both the supply and demand sides, or in other words, energy security issues are related both to net energy importers, as well as to net energy exporters within the APEC community. Additionally, energy consumption is not restricted to providing useful services to final users, like transport, residential/commercial sectors, heavy industry, *etc.* Energy consumption also includes the energy utilised in energy

extraction, transportation and transformation facilities in oil and gas, coal, power, and similar industries and energy services. The share of such transformation and distribution losses in total energy consumption is not negligible. For example, “*considering the capacity to work (that is, the exergy) of primary energy relative to the exergy needed by useful energy according to the second law of thermodynamics, the efficiency of today’s energy systems in industrialised countries is less than 15 percent*”¹², respectively 85 percent of total primary energy is wasted and transferred to low- and medium-temperature heat. Similarly, the environmental impact of energy consumption is not concentrated on any one specific activity, like extraction, or transformation, or final useful energy, but is spread along the whole energy-supply chain (that is, energy infrastructure).

Any change to an economy’s energy infrastructure has an impact on energy security and the environment. The converse case is also true – if we need to improve energy security and the environment then energy facilities should be installed, renovated, decommissioned, *etc.*, which is regarded as infrastructure development. Thus activities to reach the desired level of energy security and environmental health are central for international energy cooperation in infrastructure development.

The definition of energy infrastructure development in this section includes all types of activity, directly related to the design, construction, and operation of energy facilities, including financing, obtaining permission, equipment renovation and decommissioning. However, energy infrastructure does not include demonstration and pilot projects, whose ultimate purpose is to prove the technological ability to provide a desired energy service, which is considered to be part of research and development activities.

ACTORS

International government-based organisations such as the UN-family and specialised energy bodies of regional organisations (for example, EWG at APEC, ASEAN Centre for Energy, *etc.*), financial institutions like ADB and WB, as well as diverse international economic and environment

¹² UNEP, UNDESA and WEC (2000)

funds, provide the international institutional platform for energy infrastructure. They also play a catalytic role in background activities, such as carrying out studies towards an integrated energy system to enhance energy security for different regions under consideration and provide forums for the sharing of interregional experiences and practices with an emphasis on practical applications. This may include facilitating policy dialogue between national governments and other partners, including the business community and international development agencies. An interesting example is the ADB acting as a mediator between the governments of the Greater Mekong Sub-Region to facilitate implementation of the multipurpose GMS infrastructure project. However, the ultimate aim for these actors in energy infrastructure development is construction, retrofitting, or improving facilities to provide more reliable, environmentally compatible and socially acceptable energy services, whether domestic or international.

National governments are among those actors who are the most heavily involved in international cooperation for energy infrastructure development. Among other issues they are in charge of the nation's long-term energy security. It might include development of energy infrastructure at either the domestic or international level. In the latter case there is the necessity to cooperate with other national governments and regimes. While bilateral cooperation is more convenient for negotiations, there are some advantages in multilateral cooperation. National governments are often the guarantor for investments, the customer of energy projects, and the promoter of domestic business interests. However, if such international projects for energy infrastructure development are purely related to financial/profit gain, it can not be included as an International Energy Initiative, as these projects main purpose is not to contribute to the improvement of energy security, or minimisation of the environmental footprint from energy consumption, but to extract profit.

The public and private business community is strongly involved in energy infrastructure development, as it affects very important and vital economic sectors of industry, manufacturing and services. Although the primary goal for business is profit-making, public companies, especially in developing economies, tend to be budget-borrowers – usually from government – instead of self-funding. The reason is that it is much easier for governments to manipulate these public companies to capture their own social and political

benefits, rather than constrain government-to-business relations to fiscal and contractual issues. Typical business actors are national power generators and grid companies, national and international oil and gas companies, manufacturers (those who utilise energy-intensive technologies, as well as producers of energy equipment and subcontractors), and energy service companies (ESCO's).

The establishment of international infrastructure can lead to synergistic effects that provide additional benefits to participants. For example, the construction of international transmission lines can reduce the requirements for generating reserves within an economy as electricity can be easily imported from other economies. Moreover, the construction of transmission lines can also allow the connection of remote rural areas to the national grid that otherwise would not be connected due to their distant location and the cost to the economy of investing in connection programmes, which would be deemed unprofitable.

Non-profit organisations play a relatively small role in infrastructure development, usually being involved in promotion projects that have high social importance, or participating as experts in terms of capacity building.

DRIVING FORCES

The main driving forces for international cooperation in energy infrastructure development are:

- Continuously increasing energy demand and net energy imports
- Insecurity of motor fuel supply (low inventories and expensive stockpiling)
- Environmental footprint of energy consumption (both domestic and global)
- Positive synergistic effects of larger gas and power networks
- High project costs for a single economy
- Weak oversight of the nuclear fuel cycle
- Insufficient penetration of new and renewable technologies

CONTINUOUSLY INCREASING ENERGY DEMAND AND NET ENERGY IMPORTS

The exposure of a net energy importing economy to oil supply disruption, and increasing primary energy consumption emphasise the need

to improve energy efficiency and expand the utilisation of domestic energy resources. International cooperation, encouraged by funding and advanced financial mechanisms is aimed to proliferate energy efficient technologies, examples are **ADB Energy Efficiency Initiative, Initiative for ASEAN Integration, Japan Four-point initiative, Canadian Cooperation Fund on Climate Change, EC-ASEAN COGEN Programmes, EC-ASEAN Energy Facility, Cebu Declaration on East Asian Energy Security**. The latter initiative was established at the beginning of 2007, and one of its mechanisms is to facilitate the improvement of energy efficiency along the whole energy supply chain in East Asian economies by accelerating the introduction of advanced technologies by technological transfer and project funding.

INSECURITY OF MOTOR FUEL SUPPLY (LITTLE AND EXPENSIVE STOCKPILING)

The establishment and maintenance of collective oil stocks emerged after the first oil crisis in 1973, as part of the OECD's **International Energy Programme** in 1974. Although the utilisation of these facilities since this time is limited, oil stockpiling has proved to be important in achieving oil supply security for developed economies. As the import dependency of most APEC economies, especially in Asia is expected to increase; this option is considered a powerful tool in APEC's **Energy Security Initiative**. While the maintenance of oil stockpiling facilities is conducted at the national level and the cost is covered domestically, the additional cost of coordinated emergency response activities should be spread among the participants. Moreover, the cost for each participant would be lower in contrast to pursuing and maintaining oil stocks individually, due to risk distribution. This is the case, when an increasing number of participants lead to scaling down of the total cost of maintenance of emergency reserves and increase in energy supply security both overall and individually.

ENVIRONMENTAL FOOTPRINT AND INSUFFICIENT PENETRATION OF NRE TECHNOLOGIES

Introduction of renewable energy resources to national energy balances can have an impact on both energy security and the environment. Rural electrification and poverty relief in developing economies are other drivers for implementation of NRE. Access to these state-of-the-art NRE technologies is limited, and cooperation is needed to transfer the technology from manufacturers and

entities with expertise to grass-level ESCO's. This movement could benefit consumers of energy services (as they are provided with more stable and environmentally-friendly energy supplies), manufacturers of such equipment (enhance their market share), both donor and recipient economies – the former supports the domestic R&D sector and development/manufacturing, while the latter attains social goals and enhances the domestic energy market. There is also a synergistic effect in the demand reduction for traditional fossil fuels and a corresponding decrease in the economy's environmental footprint. In the **Cebu Declaration on East Asian Energy Security** mechanisms for the “expansion of renewable energy systems and biofuel production/utilisation” are expected to be introduced, the **Concentrating Solar Power Global Market Initiative** is targeting to construct “5 GW of concentrated solar power worldwide over the next 10 years”. Parts of the **Danish Cooperation Fund for Renewable Energy and Energy Efficiency in Rural Areas, the Dutch Cooperation Fund for Promotion of Renewable Energy, Energy Efficiency and Renewable Energy Financing, Financing Green, High Performance Buildings and Communities in the APEC Region**, are all examples of the initiatives that are targeted towards the construction of NRE facilities in order to reduce the consumption of fossil fuels.

HIGH PROJECT COSTS FOR A SINGLE ECONOMY

For some energy projects, despite their high international importance and the benefits that could be shared by a number of economies, even from the perspective of profitability, they could be hampered by the high investment cost of construction for a single economy. Although international entities that intend to aid in the alleviation of this problem have been established, like the WB and ADB, mechanisms for cost sharing and the distribution of benefits from international energy infrastructure development have as yet not been fully implemented and are needed. Examples of such initiatives are the **ASEAN Power Grid Initiative**, possible joint oil stockpiling under APEC's Energy Security Initiative, energy infrastructure aspects of the **Greater Mekong Sub-Region Economic Cooperation Programme, the Initiative for ASEAN integration, and the Trans-ASEAN Gas Pipeline Project**.

WEAK OVERSIGHT OF THE NUCLEAR FUEL CYCLE

Nuclear energy is emerging at both the regional and global levels, while the concept of sustainable development is directing the progress of nuclear technologies toward a closed nuclear fuel cycle. This inevitably will incorporate a dramatic increase in enrichment and storage facilities, which are critical technologies to be controlled to prevent the proliferation of nuclear weapons of mass destruction (WMD). Nuclear energy technologies are extremely expensive, thus they could benefit greatly from economies of scale if employed internationally. In this case, the nuclear non-proliferation regime, currently monitored by the IAEA, should be improved significantly and respective infrastructure for sustainable and peaceful utilisation of nuclear energy on a global scale should be introduced in the future. Meanwhile, the **KEDO** initiative provides an example of such nuclear cooperation in the APEC region, which consequently failed.

POSITIVE SYNERGISTIC EFFECTS OF LARGER GAS AND POWER NETWORKS

One of the most evident and important drivers for International Energy Initiatives are the extension of existing and/or the building of new power and pipeline networks beyond national boundaries. The major benefits for such development are:

- reduction of operation and management costs
- economies of scale
- increased reliability of supply
- domestic “piggy-backing” on international energy grids

Examples of such infrastructure initiatives already under implementation are the **ASEAN Power Grid (APG)**, and as part of it – the **Greater Mekong Sub-Region Economic Cooperation Programme (GMS)** for interconnected regional power grids; while the **Trans-ASEAN Gas Pipeline Project (TAGP)** aims to integrate ASEAN’s gas fields and consumption centres with a large and complex regional natural gas supply system.

The factors, which assist such activity, are geographic, political and the regional economic scene – smaller, more evenly populated, and less developed economies in the ASEAN region tend to be much more receptive to these grid interconnection projects. By contrast economies

that already have some established power or natural gas pipeline interconnections like North America, or are separated by natural barriers like the Andes Mountains in South America, or have difficult terrain – combination of extensive deserts, mountains, permafrost *etc.* – in Northeast Asia are less likely to pursue power or gas pipeline interconnection.

MECHANISMS FOR COOPERATION

The major mechanism for international cooperation in developing energy infrastructure is **construction projects**. This includes financing, new construction, or retrofitting of existing facilities, or dismantling obsolete facilities, in order to provide more energy-efficient and environmentally compatible equipment. Examples include hydropower stations under the **GMS** project, interconnected transmission lines under **APG**, more efficient generators under **COGEN**, utilities for renewable energy involvement and energy efficiency improvement under numerous GHG mitigation projects, *etc.* Although the **KEDO** project was politically stipulated, it has all the typical features of an international energy infrastructure project, whose goal was to ensure energy supply security for Democratic People’s Republic of Korea (DPRK) while attempting to reduce international concerns in relation to nuclear weapons proliferation.

Other types of mechanism for international cooperation in energy infrastructure are activities under international regimes. These activities require additional expenses, like maintenance of emergency oil stockpiles, or generation reserve for interconnected electricity grids, or underground storage facilities for international natural gas pipeline systems. Taking into account projected growth in nuclear energy consumption, and rising concerns on nuclear proliferation, it seems that such regulation, with proper sharing of costs and benefits among stockholders, should be extended to the global nuclear fuel market.

EXAMPLES OF INITIATIVES

INFRASTRUCTURE DEVELOPMENT TO REDUCE ENVIRONMENTAL IMPACT

Most of environmentally-driven international activities in energy infrastructure development are regulatory driven, for example the **Canadian Cooperation Fund on Climate Change** initiative. This infers that only after the introduction of binding caps on harmful pollutant emissions, does real money flow and the construction of

environmental projects are started. The Canadian Climate Change Development Fund (CCCDF) was established in 2000 to promote activities addressing the causes and effects of climate change in developing economies, while helping to reduce poverty and promote sustainable development. Originally a five-year fund, the CCCDF was extended for two more years between 2005 and 2006. Although developing economies are particularly vulnerable to the potential impacts of climate change such as floods, drought, hurricanes, changing disease vectors, and some developing economies such as China, India, and Brazil are growing contributors of GHG emissions, industrialised economies have been responsible for the majority of GHG emissions up until this point. As of 2005, the CCCDF has supported projects in over 50 economies, with priority given to GHG emissions reduction projects in China, and through this initiative Canada has made valuable contributions to meeting their international commitments on climate change.

The process of external costs internalisation through development of international and domestic regulatory frameworks seems to be one of prerequisites for environment-related international energy infrastructure initiatives.

ENERGY SUPPLY DEFICIENCY AND RENEWABLE ENERGY

Improvements in energy efficiency are typically linked with the removal of energy price regulation, which then leads to the introduction of advanced and less energy-intensive technologies. Contrary to this, renewable energy is in most cases unprofitable¹³, unless Renewable Energy Portfolio Standards (RPS) is established. This condition is exaggerated by an absence of financing, which is often the case within developing Asian economies, with initiatives such as the **Japan Four-Point Initiative** having been promoted to deal with this situation. This initiative was proposed at the Cebu ASEAN plus three meeting early in 2007, and Japan will provide US\$1 billion in Official Development Assistance (ODA) over the next three years to develop power generation facilities and promote energy efficiency in these developing Asian economies.

THE GREATER MEKONG SUB-REGION INTERCONNECTION

The Greater Mekong Sub-Region (GMS) is made up of the six economies that border the Mekong River, namely Cambodia, Lao PDR, Myanmar, Thailand, Viet Nam, and China. Under the GMS Programme, the ADB has identified eight priority sectors for involvement including transport, telecommunications, trade, investment, environment, human resources development, tourism and energy. In 1992, with ADB's assistance, the programme of sub-regional economic cooperation within these six economies was started, while the World Bank has also provided valuable advice and technical assistance. This assistance has mainly been provided through a special global technical assistance programme known as the Energy Sector Management Assistance Programme (ESMAP). This programme is sponsored by the World Bank and the UN Development Programme (UNDP) and relies on donor funding for its activities. As at December 2005, the ADB had committed more than US\$1 billion to the GMS Programme, either in loans or technical assistance grants.

Major benefits to member economies can be gained by cooperating in the development and complementary use of the sub-region's energy resources, especially given their uneven distribution. The GMS interconnection project began to develop in the 1970s as Asian economies experienced strong growth. The first agreement was a power purchasing agreement between Lao PDR and Thailand when the Nam Ngum 1 hydropower plant in Lao PDR with 150 MW of installed capacity was completed in 1971. In 2002 the Energy Ministers of GMS economies signed the Inter-Governmental Agreement (IGA) on Regional Power Trade in the Greater Mekong Sub-Region, allowing members to cooperate in the planning and operation of their power systems. The IGA states that cooperation within GMS economies is based on a mutually beneficial approach, equal rights and obligations of participants, and regional power trading will occur in accordance with environmentally sustainable development. The IGA established the Regional Power Trade Coordination Committee (RPTCC) to coordinate implementation and development of regional power trading. The RPTCC reports to the GMS Ministerial Level Conference and the respective national governments, while the RPTCC remains independent in order to achieve its main objectives.

¹³ See, for example, Renewable Electricity in the APERC Region: Externalities in Power Generation (2005)

The major challenges to this project is in relation to the environmental issue of constructing giant hydropower dams, which has delayed the schedule, and failure in the coordinated planning practices of regional authorities, both of which have hampered financing by international financial institutions resulting in the missing of scheduled targets.

POWER GRIDS INTERCONNECTIONS

The possibility of an integrated **ASEAN Power Grid** first began to be considered by a forum of the Heads of ASEAN Power Utilities/Authorities (HAPUA). “ASEAN Vision 2020”, endorsed at the ASEAN Summit in 1998, and seeks to establish interconnecting arrangements for electricity, natural gas and water through the ASEAN Power Grid, Trans-ASEAN Gas Pipeline and Water Pipeline systems. One of its aims was to provide a policy framework and facilitate implementation of a Trans-ASEAN energy network, which is related both to the ASEAN power grid and the Trans-ASEAN gas pipeline projects. Although four power grid interconnections already exist in Southeast Asia, 11 to 14 new projects are proposed. These interconnections have improved political relations between economies and provided opportunities to develop closer regional energy cooperation. The hydro potential of Myanmar and Lao PDR under the independent **GMS interconnection** initiative will be developed to provide cheap and clean energy to the unified ASEAN power grid; however, full integration of the ASEAN grid could take some decades to develop.

The ASEAN Interconnection Master Plan Study (AIMS) was completed in 2003 under the auspices of HAPUA, and adopted at the ASEAN Meeting of Energy Ministers. In AIMS eleven potential interconnection projects were selected for potential implementation through 2020, and all of them have been found to be cost-effective, however the economic viability of each needs to be clearly established and accepted by the participating economies. Additionally, there is a need to introduce an effective regulatory framework, and concerns remain in how to raise capital for participating low-income economies, and unforeseen technical difficulties for a few of the interconnections.

Energy cooperation in Northeast Asia (NEA)¹⁴, especially in the electric power industry

so far has been considered only as a subject for discussion among related professionals. All Northeast Asian economies are net energy importers, seeking stable sources to diversify their energy supplies. While there is still huge untapped hydro and gas resources in Eastern Siberia and the Far East of Russia. While several studies into the technological potential of interconnection of national electricity grids across borders between Russia and China; Russia and Mongolia; Russia and Japan, and between Democratic Peoples Republic of Korea and Korea have been investigated, to date none of these projects have received official endorsement and thus have not evolved into projects.

The importance of establishing a regional electricity network in Northeast Asia has been recognised by the UN Economic and Social Commission for Asia and the Pacific (UNESCAP). In October 2001, UNESCAP organised a North-East Asia Expert Group Meeting in Khabarovsk, Russia to promote inter-economy cooperation in the development of the electric power sector. This process eventually led to the establishment of an Intergovernmental Collaborative Mechanism on Energy Cooperation in North-East Asia in 2005, which expanded the original objective of power grid interconnection to a much wider concept of energy security within Northeast Asia through facilitation of energy cooperation. The Intergovernmental Collaborative Mechanism was adopted by the first session of the Senior Officials Committee on Energy Cooperation in NEA. Under this mechanism a working group on energy planning and cooperation was established to identify possible future energy cooperation activities. As a first practical step, the working group developed country reports on energy policies, data and statistics and identified information gaps.

In South America, there are two APEC member economies, namely Chile and Peru, both of which are participating simultaneously in the Latin American Integration Association (OLADE). The energy integration process between Chile and some other Latin America economies started two decades ago, and currently Chile, Argentina, Brazil, Uruguay and Paraguay make power exchanges through transmission lines. However, the integration of power grids in Latin America has not been advanced due to a lack of specific regulation for international trade and therefore a

¹⁴ Here Northeast Asia includes Russia, Mongolia, China, Japan, Korea, and Democratic Peoples Republic of Korea,

which is different from traditional Northeast Asia region definition in APEC.

regulatory risk. In spite of this, Argentina at present supplies natural gas to Chile, Uruguay and Brazil.

Under the Andean Community of Nations (The CAN), a General Framework Agreement was signed, which in part aims at promoting sub-regional interconnection of power systems and inter-community electricity exchanges. In practice, exchanges within the above mentioned framework started in March 2003 and proved to have significant economic benefits for all the parties involved.

While Chile is an associated member of MERCOSUR, Peru is member of the Andean Community of Nations. In addition to the nature barriers of deserts and mountains this type of regional blocking seems to be a political obstacle to infrastructure development between these two APEC economies.

ESTABLISHING INTERNATIONAL GAS PIPELINE SYSTEMS

The **Trans-ASEAN gas pipeline project (TAGP)** was first discussed in 1990, and the Trans-ASEAN Gas Task Force was launched in 1999 by the ASEAN Council on Petroleum (ASCOPE), however, the first cross-border gas pipeline from Malaysia to Singapore was commissioned in 1992. Since then some regional gas pipelines have been completed and to date a total of seven cross-border pipelines of more than three thousand kilometres are in operation, with a total capacity of some 19 BCM per year. Several more projects are in the process of design and construction or are under consideration. The cost of construction of the TAGP is estimated at more than US\$7 billion, including pipeline infrastructure, gas extraction facilities and compression equipment. The challenges to further success of interconnection under this project are increasing investment costs, synchronisation of national technical and security regulation requirements, reaching consensus on adapting contractual arrangements and/or principles for the supply, distribution and transportation of natural gas, as well as gas pipeline network management procedures and cost sharing.

The 1st international conference on the **Northeast Asian Natural Gas Pipeline** was held in Tokyo in March 1995, which was the first step for multilateral cooperation in the pipeline gas industry among the economies of Northeast Asia. At the 3rd conference held in Seoul in November 1997, the representatives of China, Japan and the

Korea adopted the statutes and established the Northeast Asian Gas and Pipeline Forum (NAGPF), a non-profit organisation. Through these conferences, the NAGPF has been able to build up information and knowledge related to natural gas policies, the present situation and trends with regard to natural gas infrastructure, and carry out pre-feasibility studies, "*A Long-term Vision for a Natural Gas Trunk Line in Northeast Asia*". What virtually all gas pipeline proposals have in common is high capital cost, long distances for trunk pipelines, long lead times for completion (typically five years or more), and formidable technical and, especially, political barriers to project implementation.

OIL STOCKPILE INITIATIVES

At the first meeting of the ASEAN energy ministers and their counterparts from China, Japan and Korea held in Manila, the Philippines in June 2004, the ministers recognized the importance of oil stockpiles for supply security. At present, only Japan and Korea (both IEA members) among the ASEAN+3 economies have national oil stockpiles in addition to the legally required private-sector stockpiles, while recently China has established a national oil stockpile programme. Joint stockpiling by ASEAN economies has been raised in various forums within the region as an initiative on energy security but real progress has yet to be made. It is still unknown the purpose for the stockpiling – whether to focus on emergency supply disruptions, instability of oil prices in the world market, to hold supplies in expectancy of higher prices, or to provide subsidies. Stockpiles involve considerable financial commitment in terms of the cost of the oil held in reserve as well as the investment in construction and maintenance of large storage facilities.

The situation in the ASEAN region is exaggerated by the existence of the ASEAN Petroleum Security Agreement (APSA), a binding treaty enforced in 1986, which obliges all ten ASEAN economies to provide oil mutually in the case of sudden shortfalls in oil supplies in the ASEAN region. The agreement specifically established an ASEAN Emergency Petroleum Sharing Scheme for petroleum products in times of both shortage and oversupply. In cases of shortage, the oil exporting members of ASEAN would move to assist the affected members. However, in 1999 at the 17th ASEAN Energy Ministers Meeting, the ministers expressed a need to review the provisions of the ASEAN Petroleum

Security Agreement in relation to the financial crisis and increasing price of oil.

INITIATIVES TO SECURE PEACEFUL NUCLEAR ENERGY UTILISATION

The Governments of Japan, Korea, and the US signed an agreement on the establishment of the **Korean Peninsula Energy Development Organisation (KEDO)** in March 1995. The objective of this agreement was to resolve the nuclear issue surrounding the Democratic Peoples Republic of Korea (DPRK), as referred to in the agreed framework between the US and the DPRK, signed in Geneva in October 1994. Under this framework DPRK was to suspend construction of its suspected nuclear projects. In return, two 1,000 MW light-water reactors (LWRs) were to be provided to the DPRK by a target date of 2003, with annual deliveries of 500,000 metric tons of heavy fuel oil until the reactors became operational. Eight APEC member economies were among KEDO's 13 members. The construction site chosen was exactly the same that was proposed in the early 80's by a joint USSR – DPRK project to construct the first DPRK nuclear power plant. This project assumes construction of seven small units (300 MW each), which was a more reliable and appropriate option for this economy as both power grid security restrictions and prospects for development were considered in a holistic approach.

KEDO's activities have been significantly affected by developments in the international diplomatic field over the past several years. In December 2002, KEDO suspended shipments of heavy fuel oil to the DPRK. One year later, KEDO suspended work at the Kumho construction site in DPRK and in November 2005, KEDO's Executive Board members began discussions regarding termination of the construction of the LWR projects. On January 8, 2006, KEDO completed the withdrawal of all workers from the project site. As it is announced at the KEDO web site, *"The Executive Board of KEDO decided on May 31, 2006 to terminate the LWR project. This decision was taken based on the continued and extended failure of the Democratic People's Republic of Korea (DPRK) to perform the steps that were required in the KEDO-DPRK Supply Agreement for the provision of the LWR project"*. However, there were some project faults which also helped to undermine its realisation.

Policy experiments such as the Agreed Framework and KEDO should be based on scrupulous preliminary technical and financial

analysis, and requires consistent high-level support and strong political leadership to sustain them. However, functional cooperation alone cannot reconcile conflicting security interests, but must be embedded in a broad strategic programme that addresses the vital national, regional and global security interests at stake.

CHALLENGES

The main challenges faced by international cooperation in developing energy infrastructure are stability and transparency of regulations (technical standards, open market, and legal framework) and tax regimes. A business is very sensitive to property issues and requires long-term guarantees for the investments it has made, assets accumulated, and intellectual property rights it owns. Procedures, rules and norms for cost distribution of common infrastructure maintenance within participants are also an important issue. Without a supportive political background, activities pertaining to the interconnection of infrastructure are almost not possible. Energy markets are vulnerable to blockages in delivery systems which can impede their free operation. Delivery blockages can occur at a variety of upstream and downstream positions, particularly across national borders. For example, China and Korea will possibly need to establish a transit route through DPRK for power transmission lines, oil and natural gas pipelines, but DPRK has as yet not defined their position. The APG interconnection project is an example of where a supportive political background has helped to facilitate the creation of international economic interconnections.

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FINANCIAL MECHANISMS

OVERVIEW

Financing is one of the key elements to expand the market for renewable energy (RE), and energy efficiency (EE) technologies, which provide alternative measures to reduce GHG from the use of fossil fuels. Financial initiatives discussed in this section cover programmes that facilitate investment in the energy sector and in relation to climate change, which are financing mechanisms or tools, and funds development, such as carbon market funds and co-financing facilities. Funds for energy infrastructure development are discussed under the infrastructure section. It is understood that regulatory reform should be viewed in conjunction with financing issues as regulatory barriers often restrain the flow of investment from business into the energy market. As both issues are important cooperative areas for international initiatives, they will be discussed separately in this section. Also, initiatives, which are giving direction on financial development such as declaration type initiatives are discussed in the section of education and capacity building. It should be noted that the financial initiatives given in the database are market external in nature although a return on investment or profit might be made indirectly under some initiatives. Financial initiatives in the database provided in the Annex of this report are mainly focused on helping developing economies where a lack of capital for energy development in relation to EE improvement, development of RE technology applications, and mitigation of climate change through carbon trading, CDM and JI projects is often encountered.

ACTORS OR PARTICIPANTS

The major responsible entities for financing initiatives in the database include ADB, the WB, the UN family, APEC EWG and ASEAN. Both ADB and the WB are multilateral financial development institutions established to provide finance and technical assistance to their member economies. The UN family's relation to financing initiatives includes UNEP, UNDP, UNESCAP, UNFCCC and UNF, focusing mainly on reducing GHG emissions and mitigating climate change. The APEC EWG is focused mainly on financing of EE and the development of RE in APEC member economies through providing technical services and capital for pilot energy efficiency and renewable energy projects. Many of these financial

initiatives are initiated by a combination of government, business and NPOs.

Participants of financial initiatives can be divided into donor and recipient groups. The donor group typically consists of the governments of developed economies, multinational business and international public regimes, which provide capital or funds for facilitating energy development and the establishment of innovative financing mechanisms. On the other hand, the recipient group consists of local investors or businesses and often the governments of developing economies, which lack money/capital to undertake investment in the energy sector and ultimately achieve their environmental protection goals.

DRIVING FORCES

Forces to encourage participants to cooperate in financial initiatives are typically as shown below:

- High transaction costs
- Insufficient capital (start-up) funding
- Low and slow rate of return
- Market is unstable for investment
- Lack of financial mechanisms

HIGH TRANSACTION COSTS

Compared to conventional centralised sources of energy, the transaction costs of investing in RE are much higher, mainly as RE technologies such as off-grid electricity systems and solar heating systems are usually small and decentralised.¹⁵ Generally, the transaction costs differ depending on the nature of the project. In relation to climate change projects, transaction costs could be categorised into technical assistance, follow-up, administration, reporting, negotiation, approval, monitoring, verification and validation.¹⁶ The transaction costs for climate change projects can vary greatly and values of between US\$0.02 and US\$261 per tonne of CO₂ avoided have been observed. It has also been documented that the transaction costs decreased as the tonnes of CO₂ avoided increases. However, as RE projects are often small-scale with a limited amount of CO₂

¹⁵ UN (2007)

¹⁶ Jayant Sathaye and Scott Murtishaw (2004)

emissions reduction, transaction costs are expected to take a large share of total project costs. In addition, the transaction costs in a CDM project may include (1) project design costs on preparation, (2) other CDM costs regarding adaptation, CER validation, verification and certification, executive board administrative costs and registration fees, and (3) other potential costs, such as insurance services. To make the CDM project viable, the market price of CERs should be higher than US\$7.5 per ton or a larger volume of CERs should be offered in order to compensate for the relatively high transaction costs.¹⁷ But in reality the price of CERs has fluctuated over time.

INSUFFICIENT CAPITAL (START-UP) FUNDING

Developing RE energy always has high initial capital costs, particularly in rural and remote areas, as small energy users find it difficult to access the necessary credit to compensate for the high up-front capital costs of RE energy projects. Generally, investors expect the up-front cost of conventional revenue streams to be not more than 5 to 7 percent of the net present value of revenue.¹⁸ However, the percentage of start-up capital for some small RE projects is much higher than what many investors expect, and in many cases private capital is insufficient.

Financial initiatives have a desire to stimulate capital with capital, such as leverage private funds against public funds, or public funds against private funds. For example, the **Patient Capital Initiative (PCI)** provides a fund called the Global Renewable Energy fund of Funds (GREFF), which is a public-private equity-financing scheme to facilitate investment in renewable energy projects in developing and transitional economies.

LOW AND SLOW RATE OF RETURN

Both high transaction costs and high up-front costs affect investment from financial institutions such as banks in the development of RE and in financial products such as EE loans, particularly in developing economies. Lenders and investors estimate the financial viability of a project based on the cash flows over the first few years of project operation. But for RE projects, it is difficult to ascertain what the likely cash flow for guaranteeing these loans is. Also, the ratio of development costs to project investment is higher than for conventional energy projects. The lenders and

investors estimate that the internal rate of return (IRR) on the equity portfolio of RE investments is roughly between 5 and 15 percent, which is not enough to compensate for the risks perceived by them.¹⁹ In addition, the pay back period of RE and EE projects is relatively long compared with conventional energy projects. Therefore, private investors are often not willing to invest in RE and EE projects. Another reason the banking sector does not consider investment in RE and EE projects is a lack of the necessary skills and experience to tackle such investments. Many of the additional benefits offered by RE and EE technologies – enhanced energy security and lower environmental emissions – are discounted from the conventional calculation of risk and return for RE and EE projects, thus reducing their commercial attractiveness.

MARKET IS UNSTABLE FOR INVESTMENT

Generally, carbon finance is defined as a “risky” business due in part to the emergent nature of the GHG abatement market and carbon trading projects that are located in emerging markets with unstable fiscal and political situations. Any changes in the political and regulatory framework influence development of the carbon market, either in terms of its creation or market fundamentals. Therefore, in different parts of the world development of the carbon market is different, based on local and regional policies. Another factor affecting the stability of the carbon market is the volatility of the emission reductions (ERs) prices. The price of emission reductions is fixed at the forward contracting stage, but is often different from the market ERs price at the time of ERs’ certification period. Buyers are taking the risk of ERs backwardation, but sellers are concerned about contango.²⁰

Therefore, the carbon market is still underdeveloped and is not mature enough to attract more buyers into the market as it is currently dominated by some large buyers of emissions reduction credits. That is, currently the carbon market suffers from a lack of competition. Under these circumstances, the overall benefits for sellers of emission reductions may also have negative effects, such as the contracted ERs price may be lower than they expected as limited buyers would join to compete the ERs quota.²¹ To build

¹⁷ UNDP (2003)

¹⁸ Kirsty Hamilton (2007)

¹⁹ JREC (2004a)

²⁰ WB (2006)

²¹ ADB (2003)

a better investment environment, market information on carbon trading is important for both emission reduction sellers and buyers in their decision making.

In most developing and transitional APEC economies, energy companies are generally state-owned. Thus, in order to expand access to private capital and develop a better marketing environment to attract investors, privatisation of the energy sector has been a key mechanism. The establishment of market-based generation companies and energy service companies (ESCOs) in the energy industry has been encouraged, particularly in relation to RE. However, these ESCOs have limited capital and are unable to finance or obtain financing for RE and EE projects on a regular basis from their lenders or customers because they are unable to provide guarantees on the potential energy saving which is considered to have the highest value to these lenders. Thus, it is necessary to raise the awareness of energy investment opportunities in RE and EE markets to both the ESCOs and the lenders or bankers.

LACK OF FINANCIAL MECHANISMS

In some developing and transitional economies there is a lack of or limited domestic equity formation and delivery mechanisms for equity finance in RE and EE markets as they are underdeveloped. In addition, access to overseas funds can also be limited for developing economies because of legislative restrictions on foreign investment, complicated financial instruments of local companies and financial services laws and currency volatility, reducing local borrowers’ ability to provide returns in leading currencies. Furthermore, the equity finance that is available often does not go to RE and EE projects due in part to the fund controllers lack of experience in investing in the energy sector, and insufficient availability of renewable business examples for reference.²²

A feasibility study on establishing a new financing initiative highlighted that there are few institutions offering equity finance to small businesses or energy projects for developing market investments (Table 5). Public sector funding for emerging markets is mainly provided in the form of debt and grants, due partly to the governments in developing and transitional economies being less willing to finance energy

projects from domestic/public budgets. Therefore, public funds are not sufficient to meet the needs of RE and EE markets.

Table 5 Main sources of public sector funding

| | | Type of Investor by Sector | |
|-----------------|--------|--|---|
| | | Public (Government) Sector | Private (Enterprise) Sector |
| Type of funding | Debt | <ul style="list-style-type: none"> EIB, World Bank (IBRD, IDA) Regional Development Banks (ADB, etc.) Government Aid and Export Agencies Development Banks | <ul style="list-style-type: none"> EIB, IFC, KfW, FMO, JDA, etc. Regional Development Banks Government Aid and Export Agencies Government Development Banks |
| | Equity | Not Applicable | <ul style="list-style-type: none"> DEG, FMO and IFC Few others except through funds |
| | Grant | <ul style="list-style-type: none"> World Bank Government Aid and Export Agencies Development Banks | <ul style="list-style-type: none"> Economic Cooperation Funding Government Aid and Export Agencies Development Banks |

Source: JREC (2004b)

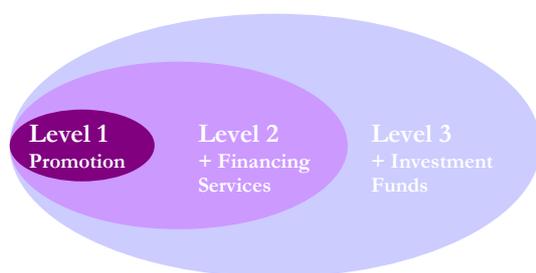
Money borrowing from local banks for small EE or RE project development is also difficult. For instance, a small energy business company, focused on producing and delivering clean and affordable energy services in a rural area, tried to expand their business by borrowing money from a local bank. However, due to the small size of the business and the high risk for investment, the bank does not normally lend money. The company needs to source money from other financial institutions or search for a development partner. Therefore, initiatives, which provide funds for energy market development and have a network of enterprises at both the national and international levels, could help these small businesses. Moreover, there is the possibility of capital transfer from developed economies to developing economies, with this investment likely to have the largest impact on enhancing energy security and mitigation of environmental pollution.

²² JREC (2004b)

EXAMPLES OF INITIATIVES

Among the financial initiatives, three levels of international cooperation have been identified based on the objectives or functions of the initiatives. Level 1 is general cooperation on promoting or facilitating financing and investment in energy and environmental aspects. Those initiatives are focused on developing a road map or a business plan regarding guides, tools and databases, thus helping to develop the market. Level 2 initiatives are complementary to Level 1 and include all of those elements plus provide financing services and products, or develop financing mechanisms, tools or financial products. These initiatives have provided technical and financial assistance on project preparation, training, advisory services and institutional support through workshops or other means. Finally in Level 3 – which is a culmination of all the subsequent levels – the establishment of investment funds and/or project co-financing facilities are provided. Initiatives provide capital for a project, particular at the initial stages (Figure 7). Initiatives under these three levels will be discussed in the following sections.

Figure 7 Three levels of financial initiatives



LEVEL 1

Financial initiatives under Level 1 of cooperation are focused on promoting trade and investment in RE, EE and clean energy technologies, and services. The basic mechanisms for promoting investments from the private sector are workshops, seminars and feasibility studies. One example is the **ASEAN Forum on Coal (AFOC)**, which also organises coal business forums for promoting investment. Another example of promoting investment in the APEC region is the **Kitakyushu Initiative for a Clean Environment (KICE)**, which encourages public and private sector investment in the environment, such as for sewerage systems and solid waste treatment, and addresses the needs and financial constraints of small and medium-sized enterprises. As opposed to other financial initiatives, this initiative is promoting financial support on

environmental improvement at the city level. As of August 2006, 62 cities from 18 economies were involved in this UNESCAP initiative.

APEC 21st Century Renewable Energy Development Initiative, Collaborative VIII: Financing is designed to provide a financial roadmap to facilitate financing of RE projects in the APEC region through existing international commercial and multilateral financing mechanisms, and providing interactive financial analysis tools on a website. Since its inception in 2000, the first report “Financial Roadmap for the APEC Region” was published in 2004. Another two projects are currently being implementing, one is to provide training for local banks in financing EE and RE projects, and the other is to disseminate information on best practices, model language and key lessons learned from EE activities around the world. Regarding feasibility studies for investment projects, the **Dutch Cooperation Fund for Promotion of Renewable Energy and Energy Efficiency, and Greenhouse Gas Abatement (PREGA)** conducted various studies by considering commercial, multilateral and bilateral sources of finance, such as the GEF and CDM for RE and EE projects during its period of operation between 1995 and 2006. In addition, PREGA produced financial models for RE, EE and greenhouse gas abatement technology projects, and highlighted the policy and institutional barriers to the dissemination of those technologies.

To overcome the difficulties of obtaining financial sources for energy projects, the **Methane to Market Partnership (MMP)** provided a linkage between energy developers and interested investors and financiers through supporting project expos and sponsoring project financing workshops under their coal division. During the meetings, the developers can sell MMP’s coal mine methane (CMM) projects to potential investors and financiers. They also arranged capacity-building programmes such as workshops and training to identify project financing sources and country-specific activities to facilitate investment in CMM projects. In addition, the oil and gas division under the MMP has carried out activities to identify and overcome financial barriers, such as providing criteria to be used by the financiers to approve a project, information on financing mechanisms and a background paper on project financing opportunities.

LEVEL 2

In addition to promoting investment, financial initiatives under this level of cooperation provide

financing services, develop financing mechanisms or products and provide both technical and financial assistance.

As mentioned before, ADB is one of the most active actor initiating financial initiatives in the APEC region. In 2001, they first developed the **ADB Renewable Energy, Energy Efficiency, and Climate Change (REACH)** programme to provide technical assistance activities with relation to climate change, RE, EE and CDM for their member economies. The REACH programme coordinates funding for climate change related capacity building from four international trusts, including the **Canadian Cooperation Fund on Climate Change (Canadian Cooperation Fund)**, the **Danish Cooperation Fund for Renewable Energy and Energy Efficiency in Rural Areas (Danish Cooperation Fund)**, **PREGA**, and the Finnish Technical Assistance Grant Fund. Regarding APEC member economies, the Canadian Cooperation Fund has given high priority to funding grants to China on the programmes related to GHG emission reductions, and Indonesia on carbon sequestration. Each grant funds technical assistance projects composed of policy advice, project preparation, training, institutional support, and other country-specific technical activities. As in the Canadian Cooperation Fund, technical assistance projects on the application of RE and increased EE in rural areas and small towns are provided under the Danish Cooperation Fund. Between 2002 and 2004, three of the eight projects carried out were in the APEC region located in Indonesia, the Philippines and China. Besides coordinating funding, ADB has also established funds to support national sustainable development in developing member economies. These types of initiatives are defined under Level 3 and will be discussed in the next section.

Another initiative providing technical assistance on market development is the **Global Gas Flaring Reduction (GGFR)**, which was developed by the World Bank in 2002. This initiative is a public-private partnership bringing stakeholders from governments, industry, financial institutions and local communities to overcome barriers for reduction of associated gas flaring. The technical assistance programme, which was established by the World Bank, gives advice to the public and private sectors in developing domestic and international gas markets through small-scale utilisation demonstration projects. In addition, they assist in demonstration projects to evaluate the applicability of Kyoto carbon financing

mechanisms to reducing gas flaring. Since its establishment, demonstration projects have been undertaken in Russia, Indonesia and some non-APEC economies to exhibit the viability of gas flaring reduction projects with the help of carbon credit trading. The two demonstration projects in the APEC economies are at the initial stage of project development, which are now focusing on capacity building to develop CDM or JI projects. Those activities will be financed by the GGFR. The project in Russia is designed to demonstrate how the carbon finance under the JI mechanism supports the gas utilisation project and the pilot project selection process has started. Indonesia's project has also started the pilot CDM project selection process in the oil and gas sector. A workshop for regulatory capacity building was conducted in Indonesia in 2004. Although the pilot projects have been in progress for sometime, the programme is running behind schedule, due partly to the government facing a challenge in identifying the ownership of emission credits under production sharing agreements, which they are currently still working on. In addition, two studies are now being conducted, one on the application of CDM to gas flaring reduction and the other on a comprehensive associated gas survey and the formulation of a flaring reduction strategy.

Considering financial initiatives operating at the regional level, one of the representative initiatives is the APEC **Energy Efficiency and Renewable Energy Financing (EERE Financing)**. This initiative started recently to scale up financing by developing the market capacity to commercialise financing on RE and EE projects. Activities related to financing under this initiative include establishing financial intermediaries or special purpose entities, developing integrative public-private sector financing, and establishing finance guarantee facilities in order to reduce transaction costs and risks, increase transparency of transaction costs and raising capital, increase the ability to replicate projects, develop new financial products and services, and promote supportive host economy policies and incentives. Financial intermediaries have been established in Mexico to mobilise and pool financing and to address the risks of using loan guarantees or other credit enhancements. In addition, new financial products and services will be developed by the established EE and RE Financing Task Force. The task force will also assist in building up public-private partnerships between local financial institutions, government agencies and commercial entities in order to link

private capital to project development. In 2006, they produced energy efficiency financing assessment reports for Mexico and Thailand as part of the background materials for developing an International Energy Efficiency and Renewable Energy Financing Protocol (IEEEP). The IEEEEP is targeted to bankers and aims to increase their understanding in relation to project-based loans for EE and RE projects.

LEVEL 3

Financial initiatives at Level 3 are to establish investment funds and/or provide project co-financing facilities to the project developers or initiatives' participating members. Besides providing funds, this level of initiatives also promotes investment and provides technical services on EE and RE projects in connection with climate change. The first financial mechanism aids developed economies to help developing economies expand the use of clean energy and mitigate climate change was the **Global Environment Facility (Climate Change) (GEF-CC)**, which was launched in 1991 through collaboration between the UNFCCC, UNDP, UNEP and WB. GEF funding has provided grants and generated co-financing from other sources to support environmental projects in more than 160 developing and transitional economies. GEF also manages a number of special funds including two under the UNFCCC, namely the Least Developed Countries Fund and the Special Climate Change Fund, and one called the Adaptation Fund under the Kyoto Protocol.

With the increasing necessity to finance climate change projects in the developing carbon market, some international financial institutions and organisations have started providing funds to foster the development of EE and RE under the UNFCCC and Kyoto framework, such as ADB and the WB. In 1999, the WB established the **Carbon Finance Unit (CFU)** using money contributed by governments and companies in OECD economies on purchasing verified emission reductions (VERs) or certified emission reductions (CERs) in developing and transitional economies within the framework of the Kyoto Protocol. Normally, the carbon price offered by the WB is lower than that from other buyers in the market as the risks taken by the WB are higher, because the WB will take carbon-specific and regulatory risks when they purchase VERs. The WB has to pay the full VERs to the developer before the regulatory review on the provision that all of the VERs will be converted to CERs. In addition, the

WB is prepared to advance funds for the preparation of documentation for these projects.

To stop the lack of upfront financing in the carbon market, ADB first established a pilot co-financing programme called the **Clean Development Mechanism Facility (CDM Facility)** in 2003 primarily to boost the viability of alternative clean energy sources and GHG emissions reduction projects under the Kyoto Protocol. This facility offered their developing member economies governments' the ability to lower transaction costs and aimed to make the CDM process more risk-free, assisting the whole CDM cycle, and providing capacity building. In 2005, ADB opened their first CDM facility project to carbon buyers. The project is an ADB-backed Coal Mine Methane/Coal Bed Methane Utilisation Project in Fuxin, China and it is estimated to generate more than five million carbon credits between 2006 and 2012. During the same year, ADB launched another co-financing facility, called the **Carbon Market Initiative (CMI)** to facilitate investment in new CDM projects in Asia and the Pacific by providing a project co-financing facility, carbon credit marketing programme and technical support.

Besides focusing on climate change projects, initiatives at this level also provide funds or money for EE and RE for sustainable development. UNEP in 1999 established a joint initiative among the UNEP Renewable Energy and Finance Unit (REFU), UNEP Finance Initiative (UNEP FI) and Basel Agency for Sustainable Energy (BASE) – **Sustainable Energy Finance Initiative (SEFI)** – to promulgate partnerships within the finance sector. SEFI provides incentives for new financial product development, and provides tools and support to sustainable energy financiers. In 2005, bank partnership programmes were initiated in China and a number of other non-APEC economies. UNEP financed more than 20,000 solar loans and the credit markets have started to become mature. In 2006, UNEP planned to launch a new bank partnership lending programme for solar thermal and PV systems in Indonesia and other economies. Another initiative also established to create a public-private equity-financing scheme is the **Patient Capital Initiative (PCI)** by JREC. PCI is “*to provide equity-linked capital to the local entrepreneur and project developer on a basis that is affordable, where there was either no such capital available before or available only on unaffordable terms or with damaging delay*”. Equity funding provided under this initiative is called the Global Renewable Energy Fund of Funds (GREFF),

which is an innovative financial product for developing markets by internalising externality benefits. The difference between this fund and funds provided by other initiatives is that this fund is focused on the required energy services needed, including a broad mix of renewable enterprises, micro-financing, services businesses and project investment opportunities. However, JREC has not presented the progress of this initiative.

The **Renewable Energy and Energy Efficiency Partnership (REEEP)**, established in 2004 is one of the global public-private partnerships focused on the development of RE and EE policy, business, regulatory and financing issues. In terms of financing, REEEP highlighted the obstacles of investing in RE and EE projects, and provided innovative financing mechanisms and repayment schedules for those projects that are deemed difficult to finance. This programme has offered support to 51 projects in over 44 economies. Through 2007 and 2008, funding priority has been given to the energy efficiency sector, and projects related to business and financing issues, particularly in China. The programme will not support projects which are designed to spend the majority of the money on such capacity-building activities as workshops, seminars, study-tours or conferences.

There are initiatives providing capital for enterprise development in the clean energy sector. The **Rural Energy Enterprise Development (REED)** is one of these examples providing capital to small and mid-size entrepreneurs (SMEs) in developing economies. Through providing start-up financing, the SMEs are better able to deliver cleaner and higher quality energy services through new business ventures. Since its inception in 2000, the programme has begun operating in five economies, where China's Yunnan Province is one of them. Also, the programme provides technical support services to SMEs including information, tools, consulting and the capacity building required to develop business skills and investment plans. Two manufacturing based energy entrepreneurs applied for capital support for their business expansion in the first half year of the initiative's operation.

CHALLENGES

Although more than half of the financial initiatives are designed to tackle carbon trading projects or promote the development of the carbon market, the number of CDM or JI projects in the APEC region does not appear to have increased much, due partly to the complicated and

expensive application procedure for CDM or JI project certification. Likewise, it is unknown whether or not these financial initiatives have actually had a positive impact on the number of CDM or JI projects within the APEC region and have contributed to the carbon market working more efficiently. The effectiveness of promoting investment from the private sector for RE and EE projects through initiatives is also uncertain and difficult to prove or verify.

Regarding new EE technology development, potential investors still do not have enough knowledge to assess the risks and opportunities of investing in EE technologies. Even now, the investors are using the conventional calculation of risks and return for EE projects.

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REGULATORY FRAMEWORK

OVERVIEW

Cooperation is a central component to any International Energy Initiative. But, by necessity, cooperation on an international scale introduces a complex system of relationships and responsibilities. Creation of a regulatory framework can be regarded then as way to deal with the complexities of interaction between otherwise sovereign bodies on an institutionalised level. This approach is used equally often when the ultimate purpose of the cooperation is to achieve energy security as when the cooperation deals with questions of energy and the natural environment. Moreover, the flexibility of regulatory frameworks makes them easily adaptable to act in concert with other tools and techniques employed by International Energy Initiatives, such as data sharing or capacity building.

Regulatory framework in International Energy Initiatives exist both as means (modes to fulfil the other objectives of an initiative) and, more interestingly, as ends (the motivation for cooperation in the first place). As ends for themselves, regulatory framework-based initiatives seek to establish structure in the void – codifying convention, policy, and protocol to govern in the grey areas which arise between legally-independent but needs-dependent actors. The discussion of regulatory framework in the following section will focus on this latter manifestation.

ACTORS

Understanding of the scope and nature of regulatory frameworks depends on the perspective of the actor who is influenced by them. Institutional level, scale, and timing are also important. For example, the regulatory frameworks codified through international initiatives function in many spheres:

- within multiple member economies' own public institutions (at any level of governance)
- across multiple member economies, under international organizations or frameworks (which, in turn, are often codified internally within each member economy to gain legal force)
- between multiple civil or business entities who work on an international stage

Drawing from this last “sphere”, it is important to note that regulatory frameworks are not limited to laws which exist in public institutions. There are many examples of International Energy Initiatives which rely on the creation of regulatory frameworks to fulfil the co-dependent needs of civil or business entities that much like sovereign states identify the advantage of novel partnership to achieve a shared goal more easily than attempting it alone. The specific structure of such cooperation might vary from those between public (i.e., government) groups, but the spirit is the same. So, while public actors (such as high-level government negotiators) generally dominate regulatory framework-based International Energy Initiatives due to their intrinsic connection to and dependence on legal systems, they nevertheless lack exclusive control. Just as public entities benefit from legal-focused cooperation, business and civil entities do as well (though generally on a different scale).

As with any international initiative, regulatory framework initiatives are never mandatory (i.e., membership is always voluntary) – between sovereign partners. However, as noted above, once the negotiating player of an initiative assumes membership, those entities over whom the negotiating player holds authority or represents might be subject to mandatory participation. The **Kyoto Protocol** offers an example of such a situation – notwithstanding a private Energy Service Companies position on the initiative, it is still held legally responsible for the membership decisions of its parent member economy, though generally through domestic laws enacted to give legal force to that protocol's international regulatory frameworks rather than the international body representing the protocol itself.

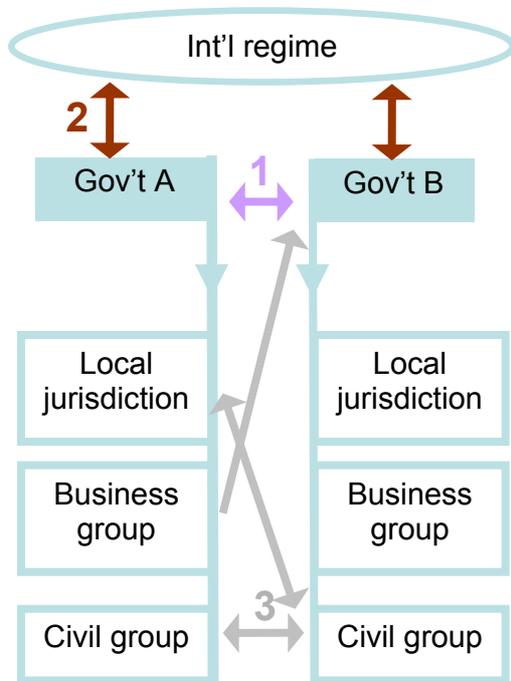
And though membership to an International Energy Initiative may be voluntary, the regulatory framework aspect of an initiative can still be legally binding once in place. Not all initiatives that focus on regulatory frameworks *need* be legally binding – in fact, regulations between negotiating parties are usually adopted and enforced in good faith alone – but legal responsibilities are indeed more common among initiatives dealing with regulatory framework issues than those that do not. For an initiative to be legally binding, members should be *subject* to ramifications for non-compliance, generally arbitrated by a neutral intra-national body

which may have been created as part of the regulatory framework. **The Energy Charter Treaty** is an example of such a voluntary yet legally-binding International Energy Initiative. Whether or not such ramifications or penalties of legally binding initiatives are ever actually enforced is a separate question, however, and as such the *threat* of ramification should actually be what characterises a legally binding regulation.

STRUCTURE AND DRIVING FORCES

The driving forces for regulatory framework initiatives can be described according to 3 broad characterisations of actors involved and the nature of their interaction. These characterisations are represented below:

Figure 8 Structure of Regulatory Frameworks



1. Governments interact directly to negotiate and agree on joint regulations and laws which are then codified domestically. Once codified, government bureaus, local government jurisdictions, business entities, civil entities, and the general public within that member economy are bound by this domestic regulatory framework. The negotiating government entity, however, is typically not bound within a regulatory framework between parties.

Driving forces for such regulatory framework-based interaction include: the desire to improve international relations and create “peace dividends” between neighbours (such initiatives are typically regional in scope), and; the prospect

for rapid development encouraged by creating macro-level synergies in cross-border trade and exchange (often achieved through international harmonisation of product standards, legal conventions, or economic incentives).

Representative International Energy Initiatives to which this characterisation applies include the **Great Mekong Sub-region Economic Cooperation Programme** and the **APEC Energy Standards and Labelling Cooperation Initiative**.

2. In the second characterisation, governments interact through a specially-created international forum to negotiate and create a supra-national regime with its own set of laws and regulations which are then codified domestically. As with the first case, above, government bureaus, local government jurisdictions, business entities, civil entities, and the general public within each partner member economy are bound by their own resulting domestic regulatory framework. However, in the second characterisation, the negotiating governments of the member economies themselves are also subject to the regulatory framework of the supra-national regime (legally binding or not). In this case, negotiating governments in a sense cede part of their own sovereignties in order to create a potent international regime.

Driving forces for such regulatory framework-based interaction include: the abuse or neglect of common international resources in the *laissez-faire status quo*; the lack of international accountability, and; the limited reach of any one member economy government’s own policy agenda on the international stage.

Representative International Energy Initiatives to which this characterisation applies include the **Kyoto Protocol** and the **Energy Charter Treaty**.

3. Initiative actor interaction in the third characterisation is quite complex as it includes cooperation between business and civil actors in addition to the public entities discussed above. Because of this, the driving forces for creation of regulatory frameworks are diverse and vary depending on the precise relationship structure. Also, with this set of actors, unlike above, interaction can be both bi- and uni-directional.

For example, a business group might form an initiative to lobby a number of public government bodies in order to tilt domestic regulations in their favour—a predominantly unidirectional interaction. Or, a number of civil organizations might form

together in an international partnership to create a unified front (and leverage each partner organisation's comparative advantages and resources) for pursuing their policy goals – essentially another form of lobbying. Alternately, a civil group might work bi-directionally with a number of local jurisdictional public bodies, such as cities, to form regulations based upon a certain expertise – in this sense, working as advisors, or as contractors. All such interactions are crucial components of the regulatory framework formation process. Moreover, regulatory frameworks can be created below the national level directly between business and civil parties to an initiative and without any public involvement. Such a framework might not be legally codified in an economy's laws, but it can still be potent and even enforced by contract. Actually, regulatory framework initiatives in this third category can be thought of as microcosms of the same sort of initiatives formed at the national level – functioning at a different scale, but preserving the basic nature of interaction.

Representative International Energy Initiatives to which this characterization applies include the **Global Gas Flaring Reduction** initiative, **Gold Standard**, and the APEC **EWG Energy Business Network**.

ISSUES AND EXAMPLES

TYPE I – REGIONAL ENERGY POLICY HARMONIZATION

GREATER MEKONG SUB-REGION ECONOMIC COOPERATION PROGRAMME (GMS)

Launched in 1992 and with efforts intensified since the turn of the millennium, **GMS** seeks to stimulate sustainable economic development by strengthening relationships among its six members: China (represented by Yunnan and Guangxi Provinces), Thailand, and Vietnam inside the APEC region, and Cambodia, Lao PDR, and Myanmar outside of APEC. Initiative activities are spread across nine focus areas, of which one is energy.

In general, GMS relies on the enhancement of economic corridors and cross-border linkages to help bind its members together into a cohesive bloc with co dependence for trade and energy. It is foreseen that efficiencies can be realized through such linkages by leveraging each member economy's comparative advantages in human, natural, and economic capital. Practically, GMS must rely on regional harmonization of economic

and political goals – implemented locally through domestic codification of agreed upon priorities – to create the enabling environment for such cross-border linkages to grow. The “Plan of Action” that GMS presents at multi-yearly summits is a reflection of the government-to-government direct negotiation needed to align domestic regulatory frameworks that avoid barriers to trade and other exchange.

Beyond the direct tangible or economic benefits of cooperation in building cross-border linkages, GMS actually describes its most significant contribution to the region as the creation of a “peace dividend” among its members – staking a claim that strengthened interconnection has made it less susceptible to intra-regional economic, political, or military conflict.

However, while the reasoning for this judgment is appealing, there is little evidence to support causation for this thesis in the GMS region; while it is true that the sub-region has avoided major military conflict since the inception of the GMS Programme, it is unclear whether such harmony has been the result of intra-regional cooperation, or if regional harmony itself was in fact the enabling environment for building closer GMS ties in the first place. Moreover, even an argument for correlation between harmonized regulatory frameworks and a peace dividend in the sub-region is weak with respect to certain GMS projects. One example is the construction of the Nam Theun 2 hydropower project in Lao PDR. This project, ongoing since 1993, seeks to provide a source of income for its host economy by selling electricity to satisfy Thailand's ever-growing energy market. And from an infrastructure perspective, the project might be labelled a success for helping to alleviate Southeast Asian energy poverty. However, in part because of inconsistent energy and environmental policy across the stake holding member economy governments, which precludes the consistent accounting mechanisms needed to internalize environmental and social effects of such a project, conflict has become evident. Ultimately, it is unclear if this was a result of insufficient implementation of GMS's Programme objectives intended to prevent just such inconsistency in cross border regulatory frameworks (i.e., not enough action), or if the harmonization approach itself is flawed in handling such international relationships (i.e., wrong action). The GMS Programme and ADB ideology (ADB acts as an informal secretariat for the programme) suggests the former – through which simply more work

should and will be done in the future along similar lines to the current action that has been undertaken.

TYPE I – STANDARDS, LABELLING, AND TRADE

APEC Energy Standards and Labelling Cooperation Initiative

This APEC initiative, launched in 2002, seeks to facilitate trade of electrical products in the APEC region by harmonizing energy efficiency standards, performance requirements, and testing procedures across the region's member economies. Because such standards and procedures are generally codified at the national level in each member economy, cross-border trade can be impeded by conflicting or confusing requirements. From a business perspective, manufacturers in such a situation suffer from uncertainty that their products might not be approved for sale in another member economy. For consumers, purchasing opportunities are limited from a lack of imports which might satisfy domestic energy requirements. And for policymakers, the situation is unattractive because the energy standard itself could in fact be suppressing innovation into newer and more efficient products because of high price and a lack of access to intellectual property from manufacturers abroad.

One key objective, then, for fulfilling the mission of this harmonization initiative is the formation of “a general policy framework that would allow for the progressive development and implementation” of such product and testing standards according to each member economy's situation, needs, and desires. In this way, the regulatory framework assumed by each member economy becomes “binding” for domestic entities once agreed by the negotiating government, but the negotiating government itself is given the flexibility to engage in further discussion domestically to help decide the smoothest implementation route and timing (which may well be a voluntary route). This method eases business acceptance of the initiative as a whole, and is particularly important for cross-border regulatory implementations in a region with wide variations in the overall level of development. The drawback of this approach, however, is significant – the benefits of adopting an international standard are low when participation is low or so slow as to make the standard outdated by the time the initiative members achieve full participation.

The APEC **Energy Standards and Labelling Cooperation Initiative** is actually a continuation of the APEC **Framework for Cooperation on Energy Efficiency Testing Standards**, which ran from 2000 to 2002 and was overseen by the APEC EWG Expert Group on Energy Efficiency and Conservation. In its more recent form, the objectives of the initiative were expanded in scope to continue the previous initiatives activities for development and domestic implementation of a consistent standard while at the same time expanding the focus to include transparent data sharing about each member economy's energy standards. This reframing of the initiative is an illustrative example of the impermanent and fluid nature of the initiative process, whereby objectives are recast to reflect the involved actors changing priorities as well as the realities of implementation encountered in the initial stage.

The way that such shifting needs are addressed, or not addressed, in initiative revision varies by the scope of the initiative and the conventions of the initiative's responsible entity. In APEC EWG, the time span for any initiative is generally limited to three years. On one hand, this practice might induce excess bureaucratic and administrative overheads and preclude the addressing of issues that demand patience. But, on the other hand, it gives involved parties a clear target for implementation and lends itself to periodic communication and revision which can avoid unnecessary or inefficient pursuit of dated goals. In this case, as the original Energy Efficiency Testing Standards initiative gained support among APEC member economies, the second initiative served to widen the initial impact which was seen by the members as having been generally satisfactory. The follow-up initiative then was confirmation of sorts of the original initiatives commitments.

TYPE II – DOMESTIC IMPLEMENTATION OF INTERNATIONAL REGIMES

Kyoto Protocol to the United Nations Framework Convention on Climate Change (Kyoto Protocol)

The **Kyoto Protocol** is the defining International Energy Initiative whose interaction is defined by the creation of an international regime that operates above the level of individual governments. If ever some international need should demand the creation of such a global regime, global climate change would seem a perfect candidate due to its nature as a downfall of discreet entities' ability to effectively manage a

common resource/responsibility in the absence of property rights. This is compounded by the special characteristic of anthropogenic carbon dioxide emissions, where damage are not localised and captured by the polluter alone, but are instead spread across the globe, so the marginal perception of their harm is so small as to be an ineffective deterrent to mitigation. In fact, this marginal damage is so small, that even at the level of an entire member economy; individual action is not encouraged by status quo market or regulatory mechanisms. By creating an international regime, a preponderance of sovereign global members can form a unified and legally-potent entity which captures all damage (or benefits) of any effects or actions which would otherwise be lost to the commons. The logic for creation of international regulatory frameworks around such an organization is strong.

The Kyoto Protocol is designed to be legally binding for its members. That is, the Annex I member economies which are signatories to it are obliged to meet negotiated reduction targets in GHG emissions by a certain date. This arrangement in itself is a type of regulatory framework between voluntary parties (member economy governments) who have chosen to yield a small part of their own sovereignties, within a carefully designated scope and time period, for what they hope will bring about a greater good (presumably, for themselves – though, due to particular negotiation outcomes, this is more obvious and tangible for some parties than for others). These commitments, however, are only the beginning of a long chain of regulatory frameworks which must then be installed at successively lower governmental and sectoral levels so that each signatory member economy government can fulfil what each has bound itself to accomplish. Often, these “lower” levels are deeply involved in the negotiation and ratification process – for example, industry interests might present lobbies of their positions on the treaty, or national governmental bodies might reject ratification altogether and withdraw from the treaty at a late stage (such as forced by the United States Senate following initial support during Kyoto Protocol planning). It is arguable that in the case of the Kyoto Protocol, these “lower” entities in fact have more at stake in the negotiation and ratification process than the member economy government itself, because while the government as a whole will be subject to the somewhat lenient international regime’s legal structure, entities such as ESCOs within a signatory member economy will eventually become

legally bound by the framework to their government’s commitments through their own domestic legal system, which has a much stronger and more accepted power to enforce penalties.

This last point is important to help understand the motivations of each actor and stakeholder in the complex negotiations of the Kyoto Protocol. Member economy governments, as sovereign representatives, are essentially asked to commit to (possibly painful) actions for which other domestic entities will face responsibility. Domestic implementations do, of course vary, and not all ratifying member economies enact (strictly-speaking) legally-binding implementation policies. So, while the New Zealand government might take a strongly top-down approach such as mandating a (business-unpopular) biofuel integration target with high fines for domestic non-compliance, the Japanese government tends to adopt softer approaches such as heavy R&D investment in low-carbon technologies.

Whatever the local implementation, however, any grievances are domestically-constrained. For example, unlike the **Energy Charter Treaty**, or the World Trade Organization, there is no commonly accepted international court of arbitration to address grievances among members, or to forcefully dole out penalties for non-compliance to Kyoto commitments. Ramifications for non-compliance with Kyoto targets are only now being debated, and will apparently be limited to imposing less favourable treatment (more-stringent targets) for negligent members in the next round of treaty negotiations in 2012. The effectiveness of such a “soft” penalty in signalling dramatic action among ratifying parties today is questionable. Such weak ramifications certainly pale in comparison to possible monetary damages faced by domestic corporations for their non-compliance with any domestically legislated government policies. As a result, following negotiations and during Protocol activity, there is natural pressure from domestic entities towards their governments to *ex post facto* loosen internal enforcement of commitment shares; this very phenomenon occurred in Canada, for example, when a newly-elected government slashed funding for carbon-reducing programmes, calling Canada’s Kyoto commitments “impossible” to reach. Of course, member governments are not entirely insulated from their commitments to the international regime (many European governments, for example, donate large sums to encourage the development of CDM projects in Annex II economies, see **ADB** and **WB carbon market**

initiatives), but the general asymmetric incentive structure still stands.

When incentives are not fully aligned among cooperating partners, such as in the case of the Kyoto Protocol, it becomes difficult for the initiative to become self-sustaining or organically grow and evolve over time, despite whatever market-inspired mechanisms might be contained within. Given this, it is unsurprising the low level of compliance seen today across Kyoto Annex I member economies. Whether, however, such inconsistency is inherent in the structure of regulatory framework initiatives where actor relationships are characterized by the creation of supra-national international regimes, or if it is instead a result of poor implementation – i.e., less than ideal transfer of supra-national regulatory frameworks to domestic entities remains to be proven.

The asymmetry of incentives described above, should not necessarily be taken as sign that Kyoto, or other Kyoto-style international regime initiatives, should be abandoned. Rather, it should highlight the importance of accountability and the domestic implementation of international agreements. The European carbon trading market, for example, seems to be a good mechanism to encourage horizontal, rather than vertical, accountability at the sub-national level, so that the actual implementers of the international regime's target objectives are all subject to a similar implementation and communication (if not ramification) system, despite national boundaries.

TYPE II – CONFLICT RESOLUTION IN LEGALLY-BINDING INTERNATIONAL REGIMES

Energy Charter Treaty (ECT)

Like the **Kyoto Protocol**, the **Energy Charter Treaty** is an international regime-based legally binding energy initiative. ECT differs from Kyoto, however, in that the provisions of its legal framework specify a central, supra-national mechanism for enforcing pecuniary penalties and resolving conflict among members through arbitration. In the 12 years since its inception the ECT Secretariat records 14 known investor-state dispute settlement cases, at least two of which have resulted in the award of monetary remuneration for damages. In this way, ECT avoids many of the pitfalls of domestic implementation faced under Kyoto, as all sub-national responsible actors are subject to the same, consistent, supra-national

regulatory framework, rather than facing a patchwork of domestic implementations.

The Energy Charter Treaty, originally a creation of the European Community in 1990, but now expanded into an international organisation with a broader geographic coverage including a number of other European and Asian economies, aims to hold its members to a consistent set of rules for engagement in international energy investment, development, and transport. Relying on a multilateral regulatory framework rather than numerous bi-lateral or non-codified agreements between energy importing and energy-exporting economies, the Charter is thought to lower transaction costs, and, more importantly, reduce the risk to both parties in energy investments or other energy cooperation. Again, with its cross-border focus, ECT is an illustrative example of an International Energy Initiative which was created to fill the legislative gap which becomes obvious when different sovereign parties decide to deepen their interaction on a particular issue.

In fact, the legally-binding enforcement mechanisms of the Energy Charter agreements are rather extensive. Most investment-related conflicts are subject to binding international arbitration, and transit disputes can be resolved through an “independent conciliator” who has the authority to independently set transit tariffs for up to one year if rapid settlements cannot be reached between parties. In practice however, both mechanisms are not as commonly used as might be expected – most disputes are settled before the arbitration stage, and in the case of transit disputes, such as between Russia and the Ukraine in early 2006, ECT legal mechanisms took a back seat to traditional bilateral negotiations. Because Russia has signed but not fully ratified the Treaty (which includes related agreements), the legal foundation of ECT conciliation in that dispute would have been weak. For all the advantages of strong, supra-national legal enforcement mechanisms in International Energy Initiatives, then, this case highlights a weakness: in part because of the weariness in ceding so much domestic legal sovereignty/authority upon ratification, key members might never actually agree to ratify in the first place. For a strong international legal framework to succeed, then, political concessions are all but inevitable, which, in turn, weaken the potency of the framework. Overcoming this initial threshold is a key challenge in development of International Energy Initiative regulatory frameworks.

TYPE III – REGULATORY FRAMEWORKS IN BUSINESS

Global Gas Flaring Reduction (GGFR)

As part of its activities, **GGFR** seeks to develop a voluntary global standard for gas flaring which applies to each of its members and to establish and promulgate best practices for regulatory frameworks in developing countries that encourage utilization of currently flared gas in oil-producing fields. Organized by the World Bank, its structure is noteworthy in that it involves direct interaction between private and state-owned businesses in its attempt to create a regulatory framework which crosses national boundaries, yet exists below the level of government. Public actors are represented in this initiative, but activity actually focuses at a lower level. Therefore, membership of private businesses involved in initiative activity is in this case voluntary. In this way, GGFR differs from the International Energy Initiatives discussed above in that it relies less on a top-down government-to-domestic implementation style, and more on building horizontal linkages among willing sub-national stakeholders. Importantly, though a top-down approach is not used, GGFR still seeks to address a global environmental issue (the anthropogenic release of the GHG methane) just as **Kyoto** does, though obviously with a much narrower focus and set of actors.

Under the initiative, BP, Chevron, ENI, ExxonMobil, Marathon Oil, Hydro, Shell, Statoil, and TOTAL cooperate internationally to implement standards and develop demonstration projects. Such horizontal communication is designed to allow for efficient information flow. However, the weakness of this bottom-up approach is also evident in the limited reach of these private international corporations into state-controlled gas-flaring facilities. For example, GGFR counts among its partners 5 of the top 10 global gas flaring regions, (representing ~70 percent of global flaring volume if OPEC is included), and has been largely successful in the infrastructural aspects of the initiative – building various demonstration projects – but as of now has had little success in persuading member governments to implement or even endorse suggested regulatory plans (such as issuing permits, monitoring flaring, or modifying pricing structures) at the national level.

In this sense, a GGFR-type structure of willing sub-national actors addressing a cross-boundary issue is like a double-edged sword; the involved

actors might be highly successful in achieving objectives under their direct control, but are less suited than governments to extend the reach of their initiative beyond their immediate sphere of influence. Put another way, sub-national actors, by their nature, generally cannot transfer initiative responsibility the way governments can. Really, GGFR attempts to establish not one but two forms of regulatory framework: first among willing business partners (at which it succeeds); and second within the governmental legal framework of participating public members (where it has struggled). That GGFR has struggled in this second regard is unsurprising; it seems bottom-up implementation of regulatory frameworks on unwilling actors can be just as difficult as top-down implementation.

TYPE III – REGULATORY FRAMEWORKS IN THE CIVIL SOCIETY

Gold Standard (GS)

GS, originally a programme of WWF, the global conservation organization, but since spun off to become a Swiss-based independent internationally-registered NGO with over 40 global NGO partners, was formed in anticipation that conventionally-certified CDM and JI projects under the **Kyoto Protocol** would be fundamentally unsatisfactory because of additionality, project-type, or sustainability concerns. It was felt that certification conditions under Kyoto would be insufficient in these regards, and that this would undermine the total long-term good of carbon credit markets. To address this, GS developed a stricter and more extensive set of requirements and monitoring programmes that prospective project developers must meet to receive the initiative's premium "Gold Standard" carbon-credit certification. GS simultaneously works with project developers through planning, construction, and operation stages to help them meet these requirements. Through the initiative, carbon credit buyers are thought to benefit by knowing and being able to advertise that their premium credits are "the best of the best" in terms of environmental and social sustainability, while credit sellers have the opportunity to receive a premium price for their labours.

The GS structure is noteworthy in that, much like GGFR, it seeks to address a global issue through establishing a sub-national, yet legally binding (in the form of signed contracts) regulatory framework purely among willing parties. Unlike GGFR, however, the only public

involvement in the initiative is through funding, not in implementation. Because GS focuses on implementing this single legal framework among willing parties, it encounters less resistance. Essentially, the framework simply guarantees the actions that everyone involved was willing to do from the start. This finding suggests an intriguing thesis regarding international regulatory frameworks. Namely, success is more likely the fewer parties must be coerced into following the framework (e.g., GS). If some coercion is inevitable, it helps if “sibling” actors (i.e., those linked horizontally) are treated equally with regards to responsibilities and the rights to address grievances within the framework (e.g., **Energy Charter**). If neither of these are possible, the prudent planner might explore alternate (i.e., non-regulatory) modes to fulfil their initiatives mission and objectives.

TYPE III – THE ROLE OF LOBBYING

APEC EWG Energy Business Network (EBN)

The **EWG Energy Business Network**’s classification as a regulatory framework-based International Energy Initiative is less obvious than the initiatives described above, as its focus is less on leveraging regulatory frameworks as tools to achieve a particular objective, and more on enhancing the applicability and acceptability of regulations proposed by other initiatives. That is, an important role of the EBN is to lobby. Though often connected with negative connotations, lobbying is really just a form of direct communication between policy makers, and some of the best-represented and most-mobilised parties who will either be affected by or who will actually implement the framework being considered. Generally, the lobbying parties (be they civil or business) are few in number when compared to the general public, and they are seen by the policy maker as being important because of their insight, influence, or special ability to enact any proposed action. As such, lobbying, though often maligned, is an important communication tool in the regulatory framework-building process. Moreover, though such communication is essentially uni-directional when compared to other framework-negotiation initiatives on the international stage, lobbying nevertheless offers a forum for some degree of bi-directional information flow as well, which can be crucial to ensuring commercial or public acceptance to publicly-negotiated actions.

In the case of the EWG EBN, meetings are held in concert with EWG meetings themselves,

and member economy government-nominated EBN representatives from each APEC member economy discuss issues which are important to them, or make suggestions for future APEC EWG action. The outcomes of such discussions are then reported directly to EWG. The EBN also meets together with the APEC Energy Ministers in their yearly meeting. Such direct access between business representatives and APEC energy policy makers might seem excessive, but one advantage of formalizing the lobbying process through the creation of a special initiative like EBN is that the process becomes transparent to both the general public and other business representatives or policy makers. In fact, by creating this EBN-style formalisation, the incentive to attempt to influence the policy creation process without proper oversight is lessened, and regulation (from both perspectives) is enhanced.

However, having an avenue for lobbying that incorporates a fairly rigid oversight structure such as in EBN can also diminish the communicative value of the initiative. For example, whereas EBN was once viewed by the APEC regional business leaders as a valuable forum to convey their concerns to energy policy makers, business community enthusiasm has waned as formality and regulation has increased within EBN. Today, for some EBN representatives (two are appointed from each APEC member economy), the process is seen more as a chore to satisfy the information demands of policy makers. This is particularly true among EBN representatives from non-English-speaking and less-developed member economies, who feel that their input might be less valued than that of representatives from more economically powerful member economies. Moreover, although the member economy EBN representative selection process is designed to allow for “equal” representation, the heterogeneity across development levels, trade blocs, and private/public ownership can make it quite difficult for EBN representatives to actually form a coherent message to policy makers (as they even lack consensus among themselves). APEC EWG and energy ministers, then, might face 21 different messages from business rather than 1 or 2, decreasing the odds that any one can really be addressed. Once again, the need for balance between central and disaggregated initiative oversight becomes obvious.

CHALLENGES

International energy initiatives seeking to leverage regulatory frameworks in order to meet their goals face a host of imposing challenges. Because there are no simple solutions for such challenges, organizing parties must first make themselves aware of the possible advantages and disadvantages of each approach so that they might choose to implement the regulatory framework form which best suits their particular needs, or, decide that regulatory frameworks are inherently unsuitable for a particular cause.

As discussed above, it is important for international initiative developers to recognize the difference between top-down involuntary domestic implementation of type II supra-national regulatory agreements with centralized (international) versus non-centralized (domestic) accountability structures, and the trade-offs inherent in each. Here, as a general rule, standardised central accountability is more effective and consistent once operational, but demanding it creates high barriers to initiative membership relative to patchwork domestic implementation.

This point also highlights the importance of asymmetric incentives in the supranational regulatory framework negotiation process (between public representatives and their domestic agreement implementers), and the need to be sensitive to whose action under the regulatory framework is voluntary and whose action is truly required/coerced. One might argue that the nature of the supra-national public negotiation structure necessitates some amount of inequality, complaint, and possible inaction at the domestic level, and so other, non-regulatory means should be used to address international externalities. However, it is equally plausible that the flexibility of this structure is in fact an advantage given the wide range of variability in development, organization, and political power of the world's national governments, and that through careful consultation with domestic stakeholders, this might in fact be the path of least resistance. Following this argument, chaos might actually trump "order".

More broadly, the concept of asymmetry in regulatory framework negotiation as a part of International Energy Initiatives can be extended to include political mobilisation bias at a general level in initiative negotiation. Regulation formation across diverse stakeholders is necessarily directed

by political considerations that may be far outside the scope of the initiative being discussed. Moreover, these "political" considerations are not limited to negotiations undertaken by the public sector – civil and business entities are equally subject to outside concerns of their own during negotiation. And because better organized, more cohesive, and more consistent voices will tend to be louder in the ears of initiative founders, any regulatory framework created might be viewed as unfair, or even unusable, by the less well represented constituents – even though this underrepresented group might be (and often is) the "majority".

This concern is a real one for initiative planners considering fair representation in the implementation of regulatory framework tools, but it is hardly endemic to International Energy Initiatives – political mobilisation bias exists almost everywhere laws are made. However, with the ad hoc structure of international initiatives, where this "silent majority" is often the presumed benefactor of initiative activities (treating the general public as the best representative for "the commons", for example) yet their participation in the initiative planning process is extremely limited or non-existent when compared to larger and better organized interest groups (businesses for example), initiative designers must be particularly aware of the tendency for bias towards certain beneficiaries. Otherwise, if even an otherwise "successful" initiative's final result is flawed by biased design from the outset; it undermines the legitimacy of the international initiative process itself.

RESEARCH AND DEVELOPMENT

OVERVIEW

In this section, research and development activity (R&D) will be divided into two main types. Research that is undertaken by research institutions, universities or governments for the purpose of generating conceptual ideas – usually conveyed to readers or policy makers in report form – about current issues within the energy sector. The other type of R&D activity is to promote technological changes or improvements.

Conceptual R&D is primarily focused on “adding value” to the “status quo” within a particular field in the energy sector and is usually focused on emerging issues. Academic institutions, universities and governments through experimentation and both qualitative (literature reviews) and quantitative (models) analysis, detail new findings to the general public, academic community and policy makers that complement and enhance the current knowledge base on a specific issue. These findings are disseminated to the general public via a variety of media including journals, reports, websites and official government communiqué and declarations.

On the other hand technological R&D is focused on the development of new technologies; improving the commercial attractiveness of existing technologies – such as solar and wind power; the rationalisation/refinement of a technologies through which it energy efficiency is improved; and the construction of pilot plants and demonstration units to support the commercialisation of new technologies.

ACTORS

CONCEPTUAL R&D

For the first type of research activity, which focuses on “adding value” to the “status quo” there are three main actors. At the governmental level a number of international organisations exist that facilitate R&D activities by bringing together people with academic backgrounds to assist in the enhanced understanding of the current knowledge base. Examples of these actors include, **APERC**, **ACE** and the **IEA** among others. The primary function of these organisations is to provide reports and / or the dissemination of information about a topic that has been derived through a process of qualitative or quantitative analysis and

in many cases (especially in regards to the IEA) involves the subcontracting of work to business, which undertakes analysis and/or the implementation of feasibility studies/pilot studies to create best practices and training manuals for the dissemination of this information.

Universities and other academic institutions within the civil sector are also important actors for this type of R&D, which can operate at both the national and international levels. At the national level universities/academic institutions undertake research to broaden the scope of academic knowledge that is available internationally. Likewise, at the international level a number of universities/academic institutions can form an alliance to promote research in a particular area of expertise.

The third actor is the business community, which also works at both the domestic and international levels. At the domestic level, businesses – especially in the manufacturing and process sectors – undertake R&D within their companies to produce plans and conceptual ideas about future projects and programmes. In addition businesses can form associations that are related to one type of business, as in the New South Wales Minerals Council, which represents a coalition of businesses with mining operations within the State of New South Wales, Australia that produce reports of the current levels of production and forecasts of future production and investment requirements. Likewise, these associations can be a coalition of different businesses within an economy, as is the case with the Keidanren in Japan, which represents businesses from a wide-spectrum of Japan’s economy and is used as a platform from which to ascertain the current business activities in operation within the Japanese economy. At the international level, there are also alliances of the business community within the energy sector, for example, the World Business Council on Sustainable Development (WBCSD), which is a CEO-led global association of 190 companies dealing exclusively with business and sustainable development. In each of these business led associations the aim of the actors is to collect, collate and analyze the information available and disseminate it among members such that the “status quo” in terms of business operations can be improved and streamlined.

TECHNOLOGICAL R&D

In terms of this type of R&D the main actors within the international arena tend to be national governments and the private sector. Primarily this is due to the fact that this type of R&D tends to be very capital intensive and requires the expertise of professionals in a particular field. Often this type of R&D is developed between the actors through a complex process of negotiation and the formation of a mutually compatible cooperative understanding that formally addresses the interrelation between the actors and the extent to which the actors are able to disseminate information within the public domain. These agreements also address many legal issues surrounding the development of new technologies and the intellectual property rights that arise as a result of this development.

Examples of International Energy Initiatives that contain these types of actors include the International **Thermonuclear Experiment Reactor (ITER)**, in which a number of economies around the world participate. On a slightly different note **Futuregen** while being a predominantly private-sector based international initiative is backed by governmental funding in the form of grants.

DRIVERS FOR R&D

There are many drivers that initiate R&D within the energy sector, including:

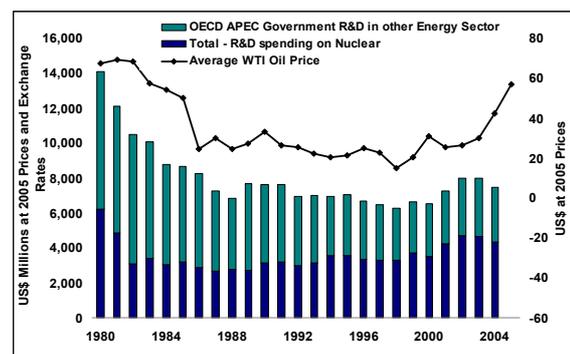
- Import dependency;
- Energy efficiency and improving energy intensity;
- Global consensus on an international issue that requires the integration of the international scientific community to solve.

IMPORT DEPENDENCY

Energy prices on the main international markets have remained very high by historical standards over the past five years. As a proxy for energy prices, the West Texas Intermediate (WTI) oil price has been plotted in parallel with government R&D expenditure for the OECD economies in the APEC region, with an emphasis on the share of nuclear R&D expenditure (Figure 9). It can be broadly seen that typically when prices are high there is a larger expenditure by governments in R&D activities. In more recent years it can also be seen that there is a slight lag between the price signals and the increase in governmental R&D expenditure. While oil prices

are just a proxy for energy prices overall, these price signals can act as precursor for economy's to pursue R&D in the hopes of enhancing energy security – using domestic resources in a more efficient manner – and reducing the economy's import dependency – for net oil and gas importing economies such as Japan, Korea and China – on international sources of energy.

Figure 9 WTI Oil Price as a Proxy for Government R&D Expenditure in the Energy Sector



Note The amount of R&D in the energy sector given above is only for the OECD APEC economies, namely: Australia, Canada, Japan, Korea, New Zealand and the United States.

Source: IEA Energy Policies of IEA Countries, 2006 Review and Market Data from various sources.

This type of R&D can be driven by either of the two purposes that are outlined in this report – energy security or energy impact on environment. In terms of energy security, for example after the second oil shock in the early 1980's, many economies found themselves over reliant on the cheap oil that they imported from the Middle East; however, with the price rises at this time governments increased R&D spending in alternative sources of energy – primarily nuclear – to reduce Middle East oil import dependence (Figure 9).

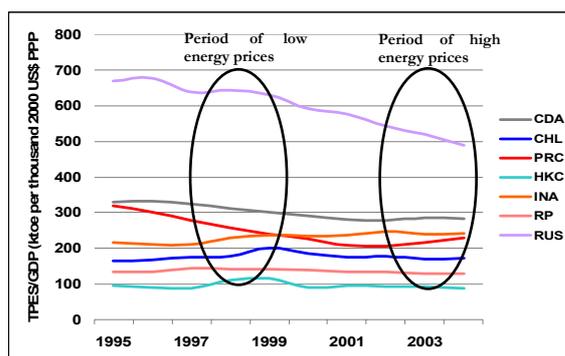
Similarly, R&D can be driven by factors that lead to a cleaner environment and maximise the utilisation of domestic resources, for example technological advance in renewable energy technologies; improving the thermal efficiency of existing fossil fuel facilities; or the commercialisation of new energy technologies has occurred in recent years, with the aim of decreasing the volume of fossil fuels imported, thus reducing an economy's import dependence of energy resources.

ENERGY EFFICIENCY AND IMPROVING ENERGY INTENSITY

Changes of a regulatory nature within an economy are usually imposed as a result of an external “factor”, whether this factor is as a consequence of high energy prices or due to environmental concerns, an economy’s government or a group of governments will collaborate to facilitate R&D through partnership with the private sector to support the implementation of technologies that will meet more stringent standards or efficiencies as a result of regulation²³. Energy efficiency acts as a driver for R&D especially in a high price environment where “savings” can be garnered through investment in programmes that act to obtain the greatest possible economic value from existing resources.

In the APEC region over the past 15 years energy intensity has shown a gradual improvement, especially in the case of Russia (Figure 10).

Figure 10 Total Primary Energy Supply per GDP for APEC economy’s to represent energy efficiency improvement in 1995-2004



Source: IEA Statistics (2006)

Moreover, the drive to use resources in a more efficient manner, that is improving the energy intensity of energy related processes – be they improving the passenger kilometres per unit of fuel used or the unit of energy required to produce a product in the industry sector – is one of the key drivers of R&D in many International Energy Initiatives, especially in relation to the improvement of currently commercially viable technologies. In general this R&D is undertaken in the developed economies and in turn transferred to the developing economies through a process of cooperation, capacity building and technology

transfer. However, in many cases the cost of implementation of this new or improved technology is inhibitive to the developing economies and financial mechanisms that can either provide funding or grants to these developing economies or allow the recipient economy to borrow capital at lower interest rates are often used to accelerate the deployment of technology transfer. Given this situation there is large scope for International Energy Initiatives to facilitate R&D activities and promote technology transfer – as is the case of **APP**.

GLOBAL CONSENSUS ON CLIMATE CHANGE

Often an “issue” of international importance will drive the advancement of R&D. For example, global awareness of climate change has driven a wide range of initiatives within the APEC region in relation to the reduction and control of GHG emissions and the promotion of new technologies. The potential of the global energy system moving towards a more carbon-constrained future has become more prevalent in recent years as driving forces such as, global consensus on the role that anthropogenic emissions of GHG and other pollutants play on the global environment have become more widely understood and regulatory changes at the national level have brought about changes in the efficient use and allocation of energy resources. This has in turn spurred R&D in energy industries, which includes the development of International Energy Initiatives in low-carbon technologies and methods to reduce the “GHG footprint” along the whole energy supplying chain.

The main driver for this collaborative action is awareness that if nothing is done to rectify the situation it is not just one economy that will suffer from the consequences, but the world as a whole. The main mechanism through which R&D is undertaken in relation to climate change is through the creation and implementation of multinational organisations – **International Panel for Climate Change (IPCC)** and the **United Nations Framework Convention for Climate Change (UNFCCC)** – that cooperatively pool expertise from many interdisciplinary specialties and through a process of negotiation, and in some cases through the formation of applicable legal frameworks form binding regimes to promulgate action at the international level – for example the **Kyoto Protocol**.

STRUCTURE OF THE DISCUSSION

The following discussion will focus on a number of important aspects of R&D,

²³ As an example, the Federal government of Australia passed legislation in 2007 to phase out incandescent light bulbs in the economy by 2009 to improve energy efficiency in the residential and commercial sectors.

concentrating on what has driven their course of action and to which of the two main purposes (energy security and environment) they pertain.

EXAMPLES OF INITIATIVES

ENERGY SECURITY

Energy security pertains to the supply and demand of energy sources. Most international energy R&D initiatives are concerned with either the demand-side – that is reduction in the amount of energy consumed by an economy – or with the supply-side – that is increasing the availability of energy resources. The following will investigate current R&D activities within the APEC region with respect to the demand and supply-side.

Demand-side R&D

The main driver for demand-side restraint and the promotion of energy efficiency and conservation (EE&C) improvements is usually from an economic standpoint, in that when the price of energy commodities increases there is an incentive for industries and consumers to reduce energy demand to save on costs/overheads. Other reasons may also exist, such as reducing an economies reliance on energy imports, using domestic resources in a more efficient manner, or maximising profits, that is obtaining the greatest economic output for a given product per unit of energy used (lowering energy intensity). In this respect R&D forms the backbone of measures through which APEC member economies coordinate and undertake methods to promote and deploy EE&C.

There are three initiatives that are actively researching and promoting EE&C within the APEC region, namely the **IEA Demand-Side Management, Energy Efficiency in Buildings and the IEA Energy Conservation in Buildings and Community Systems**. The latter two focus primarily on energy efficiency within buildings; however, the IEA Demand-Side Management initiative also focuses on the industrial, residential and commercial sectors.

The IEA Demand-Side Management (DSM) initiative was established in 1995 and includes stakeholders from both the public and business sectors. Currently there are five APEC economy's involved in this initiative. The main R&D objectives within this framework are the development of DSM technologies such that they reach their ultimate market potential and to develop a “tool-box” for collaborating

governments and utilities such that DSM technologies can be implemented in each economy. A number of R&D projects exist within this initiative including, the “Advanced Lighting Programme”, “Network-Driven DSM” and the “Contractors (ESCO) Tool-box”. Ultimately it is hoped that the results of this initiative can be implemented in all sectors of the economy from industrial applications to the domestic sector.

The **Energy Efficiency in Buildings (2006)** and the **IEA Energy Conservation in Buildings and Community Systems** initiatives are primarily focused on the R&D and construction/deployment of buildings that have lower energy intensity – thus a lower environmental footprint – than buildings that have been constructed in the past. However, recently awareness of the amount of energy that is wasted or utilised inefficiently in many urban buildings has grown, and methodologies for lowering energy intensity have been sought. In general, energy security can be enhanced through using more efficient electrical appliances and measures to improve insulation during construction by reducing the overall energy demand of buildings and thus using less primary energy in energy transformation sector. In terms of R&D, these initiatives aim to identify the long-term energy; environmental, economic and technical issues associated with new building construction and will aim to ascertain new technologies and practices that could be developed to improve the energy efficiency of newly constructed buildings.

Supply Side R&D

In addition to driving demand-side measures, high energy prices also drive technical innovation on the energy supply-side as well. For example, technologies to enhance the development of currently exploitable resources are expanded (**Enhanced Oil Recovery**) on top of technological innovation to utilise as yet un-commercial energy resources, such as biofuels, non-conventional energy resources (tar sands, oil shale's, and deep-sea drilling techniques) and new and renewable energies.

The IEA has an international energy initiative that pertains to enhanced oil recovery, which was established in 1979 at the time of the second oil crisis. While there is very little information available in the public domain, the activities under this initiative are still being carried out with the last official conference, the “27th Annual IEA Workshop & Symposium on Enhanced Oil Recovery” held in France in 2006. This initiative is

purely R&D orientated in nature with the results of the findings from these conferences only available to participants of the initiative.

IMPROVING EXISTING TECHNOLOGY

In the short to mid-term it is projected that the major share of fossil fuels in primary energy supply will continue. R&D has traditionally played an important role in increasing the efficiency of energy transformation and final consumption. In addition, from an environmental point of view it is becoming necessary to improve existing technologies such that their inherent “carbon footprints” are minimised. However, at the APEC level there are few International Energy Initiatives that attempt to take a coordinated approach to transportation, tending to be focused mainly at the national level. Most initiatives have been focused instead on technology transfer and efficiency improvement in the power and industrial sectors, for example **IEA Clean Coal Centre, Asia Pacific Partnership on Clean Development and Climate (APP/AP6)**, and the **Global Environment Facility (GEF)**.

The **Clean Coal Center** was established in 1975 and is by far the largest and the longest running single programme under the IEA. The Center is governed by six economies and the European Union of which four economies are from the APEC region. There is also private sector participation through eight associations/companies representing the interests of a single economy of which three are from the APEC region. The main objectives of the Center are to support member economy’s “*efforts to make the production, transportation and use of coal sustainable*”, and services are provided to member economy’s through “*reports and reviews on important topics, advisory services to governments and industry, support for relevant R&D, and by providing networking opportunities that foster international co-operation within and amongst developed and developing countries*”. Of the family of clean coal technologies, the one with the most significant history and implementation throughout much of the 1980’s – 1990’s was that of pulverised coal combustion (PCC); however, with the aim of reducing the amounts of localised pollutants – particularly SO_x, NO_x and particulate matter – emitted from electricity generation the development of fluidised bed combustion (FBC) – through process operations such as bubbling, circulating and pressurised systems has been pursued. In addition, while still in the pilot phase, the development of Integrated Gasification Combined Cycle (IGCC) has been pioneered. While much of the R&D that

led to the development of this technology was implemented during the late 1990’s, many challenges remain before the commercialisation of this technology can be fully realized, due to the high temperature of the syn-gas produced during the initial combustion process being greater than 1700°C and the necessity for extremely large and cumbersome heat exchange units, which cap the ultimate size of the electricity generation station that can be built (as these heat exchangers are difficult to move). However, IGCC technology enables the efficient and economic collection of GHG emissions from the combustion process, which makes it a likely substitute for other coal technologies in the future should carbon taxes or caps be imposed on the electricity sector.²⁴ In addition to R&D on the combustion design of coal-fired power plants much investment has been carried out in the arena of emissions mitigation – during the combustion process – and retrieval – from the flue gases – of SO_x, NO_x and particulate matter to meet stricter air quality regulations and promote efforts to protect human and ecosystem health around the facilities.

Asia Pacific Partnership on Clean Development and Climate was established by six economy’s – of which five are from the APEC region – in 2006 and is promoted as a counterbalance to the Kyoto Protocol in that rather than “caps and trade”, the bulk of GHG emissions reductions would be realised through a “technology-based” approach. APP uses a similar mix of public and private sector funding, but takes a slightly different approach to R&D activities than the IEA example above. In the case of APP the R&D is primarily undertaken within the domestic economies and then through a mechanism of technology transfer and capacity building (development of best practices) this technology is to be transmitted from the developed to the developing economies within the programme. The other interesting aspect of APP is that it takes a sectoral approach to GHG emissions mitigation, focusing on eight task forces of which three is within the energy-intensive industrial sector – steel, cement, and aluminium. In addition, the Cleaner Fossil Energy Task Force will be primarily focused on existing fossil-fuel technologies and the aim is to devise “*a range of advanced coal and gas technologies designed to enhance energy security and reduce GHG*”

²⁴ However, as this technology is at this point not proven there is much debate – especially in the US – on whether the next generation of coal-fired power plants should use IGCC or PCC technology with a view to carbon capture in the future.

*emissions*²⁵. In addition to this R&D a programme through which reduction of possible barriers to the implementation of these cleaner technologies within member economies – including technical, financial and other barriers that can occur in terms of consents, licensing and public acceptance will also be pursued.²⁵

While the Global Environment Facility, which was established in 1991 under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC) takes yet another approach to the deployment of clean technologies through the utilisation of financial mechanisms to induce investment in R&D. While the GEF has historically been primarily focused on the promotion of NRE for developing economies, from 2006 programmes that aim to improve the efficiency of existing electricity generating assets and investment in new and low-GHG emitting energy-generating technologies; thereby lowering their cost and increasing their market share will be undertaken. Through this mechanism the GEF aims to make sure that the best available technologies can be provided to developing countries earlier and with a wider scope of implementation such that the reduction in cost can be translated into increased supply.

In terms of efforts to minimise the “carbon footprint” of existing technologies a number of International Energy Initiatives exist. These include **FutureGen Alliance (FutureGen)** and the **Carbon Sequestration Leadership Forum (CSLF)**. CSLF and FutureGen have only recently been implemented as International Energy Initiatives, in 2003 and 2005 respectively; however, both of these initiatives deal with how to capture and store the CO₂ that is produced through the combustion of fossil fuels. The FutureGen Alliance is a public and private sector collaborative initiative that plans to build the pilot coal-fired, near zero emissions electricity generation plant through a grant in excess of US\$1 billion. The main objective of this initiative is to R&D technologies that allow the capture and permanent storage of GHG emissions, while producing hydrogen and other by-products that can be used in other industrial processes – thus all waste-streams from the plant are minimised as much as possible. One of the major challenges that this initiative faces is the protection of intellectual

property rights²⁶ in relation to the development and deployment of new technologies. This has culminated in the development of a legal framework that specifically targets how intellectual property rights will be governed within the initiative.

On the other hand the CSLF is an initiative that includes stakeholders from all relevant sectors, including public, civil and private organisations. This initiative is focused on how CCS can be commercialised in such a manner that all stakeholders ultimately benefit from the R&D undertaken. The main focus of the R&D activities under this initiative include, the identification of areas for multilateral collaborative efforts to address carbon separation, capture, transport and storage technologies, in addition to fostering collaboration R&D and demonstration projects using various technologies that fully reflect the needs of the contributing stakeholders. The ultimate aim of this collaboration is to make available information and promote capacity building such that public perceptions and awareness of the available CCS technologies are made available in a timely manner. Within this initiative there is also a programme to make the general public aware of new technology, how it operates and through consultation gain public support and prevent negative perceptions.

NEW AND RENEWABLE ENERGY TECHNOLOGIES

Another method through which the utilisation of domestic resources to reduce import dependency and GHG emissions and localised pollutants is through the development and deployment of NRE on a large scale. These technologies have been commercially viable for sometime now; however, R&D to make them more cost competitive with traditional energy sources is ongoing as can be seen in a number of International Energy Initiatives, such as **IEA Bioenergy**, **IEA Geothermal Research and Technology**, and biofuels.

The economics of NRE technologies are constantly changing and becoming more competitive in electricity markets. The main driver for the uptake of these technologies is two-fold; in that by better utilisation of domestic resources energy security can be enhanced – and import

²⁵ The Cleaner Fossil Energy Task Force will also look at issues surrounding carbon capture and storage, which will be discussed with other examples in a later section.

²⁶ In law, intellectual property (IP) is an all encompassing term for various legal entitlements that are attached to certain names, written and recorded media, and inventions/technologies.

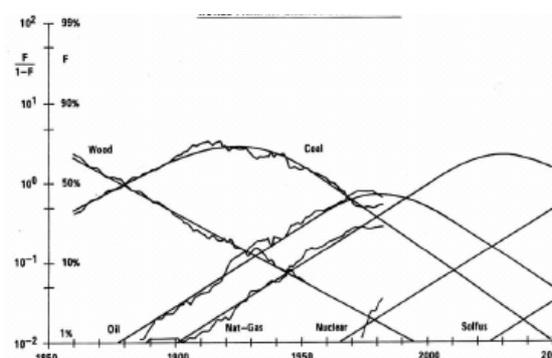
dependency for fossil fuel importing economies can be reduced – and that high energy costs on international markets act as an impetus to R&D efforts to reduce the implementation costs of these technologies. Moreover, commercialisation of these technologies can help to decrease GHG emissions, thus reducing the environmental footprint of the economy. There are many International Energy Initiatives in the APEC region that focus on NRE and R&D to make them more cost competitive. Among these the GEF – as previously mentioned – uses financial mechanisms to promote the uptake of NRE in developing economies. On the other hand under the IEA there are many initiatives that have been undertaken since the late 1970's – bioenergy, geothermal, solar, hydropower and wind – that are purely R&D in nature and aim to collect available data/information on these technologies and through analysis and the utilisation of feasibility studies and pilot projects identify and promote best available practices and technology to support the diffusion of NRE within IEA member economy's.

Driven by recent high international energy prices and environmental concerns at both the local and regional level, biofuels have become a major focus for R&D activities. Currently within the APEC region there is no International Energy Initiative that truly encompasses this issue, with most of the R&D efforts being undertaken by each individual economy based on the available substrates for biofuel production and the particular standards that currently exist within each economy. In Europe there exists a common standard for all economies under the auspices of the European Commission; however, at this stage a similar type arrangement within the APEC region would seem unlikely given the differing levels of biofuel development and the differing substrates for production available in each economy. Another challenge that arises is that there is no cohesion within the APEC region, with each individual economy undertaking their own strategy to implement biofuels.

Towards the future of less-carbon intensive energy resource utilisation, R&D in hydrogen energy has been undertaken. Throughout human history the fuel sources that have been utilised have slowly become less carbon-intensive. With each of these transitions the amount of carbon imbedded within each fuel has slowly reduced from very high in the case of biomass to a single carbon atom in the case of natural gas – methane. Therefore, it stands to reason that in the future the

next step is to utilise a fuel that contains no carbon at all, with the most likely candidate being hydrogen.

Figure 11 Historical Decarbonisation of the energy sector over time



Note: Note the F equals the market share and the solid line represents the expected trajectory of the share of the fuel and the jagged line shows the actual historical trend.

Source: N. Nakicenovic, IIASA, 1984.

To this end, R&D has been carried out through the **IEA Hydrogen Implementation Agreement**, which was established by the IEA in 1977 and the **International Partnership for the Hydrogen Economy (IPHE)**.

The IPHE was launched in 2003 under the auspices of a collection of 16 economies (including the European Commission as a single unit) of which eight economies are located within the APEC region. By creating the IPHE, “*the partners have committed to accelerate the transition to a hydrogen economy through the development of hydrogen and fuel cell technologies to improve their collective energy, environmental and economic security.*”²⁷ In addition, one of the major purposes for establishing the IPHE was such that the partners could “*leverage scarce international R&D funds; thereby reducing the cost of the hydrogen and fuel cell research programmes of the IPHE partners. [Thus the] IPHE partners will benefit from increased information sharing, which will facilitate efficiencies in their research and demonstration programmes.*”²⁸

NUCLEAR RENAISSANCE

Given the high energy prices seen over the past several years, reinvestigation of nuclear has garnered momentum from an energy security perspective and in trying to reduce an economies reliance on energy imports. With the exception of two accidents nuclear energy has an excellent

²⁷ IPHE – Introduction and Overview

²⁸ IPHE – Introduction and Overview

safety record; however, public perception to the perceived risks of nuclear energy, both in terms of the handling and disposal of nuclear waste in a manner that does not adversely affect the environment and the risks associated with nuclear power plants operations on human health and the local environment have hampered efforts to expand the utilisation of this form of energy in many economies.

With this in mind, many governments in coordination with the private sector have instigated R&D activities to strengthen the applicability and safety compliance of currently utilised technologies through the development of next generation nuclear technologies. The major International Energy Initiatives within this category include the **International Project on Innovative Nuclear Reactor (INPRO)**, **Generation IV International Forum (GenIV)** and the **Global Nuclear Energy Partnership (GNEP)**.

International Project On Innovative Nuclear Reactors And Fuel Cycles was initiated by the IAEA in 2000 after the President of the Russian Federation at the UN Millennium Summit called upon IAEA Member States to join their efforts in developing innovative nuclear technologies in order to reduce gradually risk of nuclear proliferation, resolve problems of radioactive wastes simultaneously with energy supply security issues and decrease impact of energy consumption on environment. Agency Member States, both technology holders and technology users, was invited to cooperate in considering the issues of nuclear fuel cycle, examining innovative and proliferation-resistant technologies in order to comply with long-term world energy needs in the 21st century. One of INPRO objectives is *“to create a process that involves all relevant stakeholders that will have an impact on, draw from, and complement the activities of existing institutions, as well as ongoing initiatives at the national and international level.”* As INPRO objectives stretch to the middle of the century, limited supplies of both fossil fuels and nuclear fuel should be taking into account under this initiative. Utilisation of hydrogen as an energy carrier and seawater desalination for the production of potable water is also considered as one of the major issues for sustainable development. INPRO looks at the whole range of innovative nuclear technologies for both reactors and fuel cycles, which include regulation amendment and infrastructure development. While INPRO was initiated through a resolution of the IAEA General Conference, it is an open process, and access to results is given to all IAEA Member

States. The issue of proliferation resistance is inherited to this initiative as IAEA is its parent organisation.

The Generation IV International Forum was launched in 2001 with the major stakeholders being national governments and has a medium time horizon for completion of the first pilot plant reactor by around 2030. The main objective of this forum is *“to develop the next generation of nuclear energy systems to meet the world’s future energy needs”*. As mentioned previously nuclear energy does not emit GHG emissions to the environment, thus with a view to reducing these emissions, globally, increased attention has been focused on the new construction of nuclear power plants; however, in the current heightened global climate of international security surrounding the utilisation of nuclear energy and the waste produced, the main challenge and objective of this initiative is measures to prevent the proliferation of nuclear based military operations. Other R&D related issues include safety, waste minimisation and efficient use of resources, and decreasing the cost of construction of operation of nuclear power plants. Likewise the Global Nuclear Energy Partnership, which was established in 2006 under the auspices of the US government, also aims to R&D *“a nuclear fuel cycle that enhances energy security, while promoting non-proliferation”*. This initiative will achieve this goal by making sure that the fuel for nuclear power plants – in currently non-nuclear economy’s – will be provided by economy’s that have strict controls on fresh fuel supplies and recovery of spent fuel through recycling operations. Finally this initiative will focus on R&D to demonstrate the critical technologies required in order to change the way used nuclear fuel is managed to develop recycling technologies.

In addition, with the intention of further promoting the utilisation of nuclear energy into the next century and beyond R&D has been carried out under the auspices of the IEA other national governments to ascertain the applicability of fusion power as the next generation of nuclear technologies. Currently a number of International Energy Initiatives are focused on the development and possible commercialisation of fusion technologies including the **IEA Environmental Safety and Economic Aspects of Fusion Power** and the **International Thermonuclear Experiment Reactor (ITER)**.

The **ITER** was established in 2006 by a number of national governments including five from the APEC region with the objective of *“demonstrating the scientific and technical feasibility of*

fusion power". The main purpose of this experimental process is to ascertain what are likely to be the greatest barriers to the implementation of this technology and methods for containment of the fusion reaction as it takes place – fusion reactions are similar to those that take place on the sun. The ultimate aim of the R&D work is to construct the first international pilot scale fusion reactor within the next ten years in Cadarache, France.

On a slightly different note, the IEA Environmental and Economic Aspects of Fusion Power is a scenario-based approach to formulating the future implications of the introduction of fusion energy technologies and is currently conducted within the IEA with the collaboration of four APEC economies. The focus of R&D activities are on the development and validation of models for environmental and safety analysis, evaluation and comparison of the current methodologies used in Europe, Japan and the US for safety and environmental analysis and produce projections of the possible role that fusion power could play in future energy markets. While this initiative has some overlap with the International Thermonuclear Experiment Reactor initiative, R&D within both initiatives are necessary to overcome the technical, safety, environmental and economic aspects of the introduction of this new technology in the future.

CONCEPTUAL R&D

Conceptual R&D is related to all of the driving forces outlined above and is predominantly undertaken by research centres, civil and business organisations. These organisations, such as **APERC**, **ACE** and the **IEA** among others produce reports such as energy outlooks and publications pertaining to issues that are prevalent within the energy sector at the time of publication – such as climate change, nuclear energy and sustainable development etc. The main purpose of these reports is to inform policymakers and the general public about current issues within the energy sector and the likely implications for the future.

CHALLENGES

INTELLECTUAL PROPERTY RIGHTS

The issue of intellectual property rights remains one of the biggest challenges to technology transfer from developed economies to developing economies. Often the proprietor of the technology will lose their "exclusiveness" to

the R&D of a new technology when it is transferred to another economy and then replicated by that economy without the prior consent of the proprietor/economy responsible for development of the technology. Use of the term "intellectual property" is associated with the "free rider problem"²⁹ in that once a technology is transferred outside of the jurisdiction of the economy that produced the technology the rights to exclusiveness can be lost to replication and plagiarism.

There are examples from the above initiatives where the issue of intellectual property has been specifically addressed in the communiqué drawn up with establishment of the initiative. An example of this would be the **FutureGen Alliance** in which it is stated clearly that "*all intellectual property arrangements involving domestic and foreign technology providers should be structured to maximise the potential to commercialise the technology being developed*"³⁰; however, while this communiqué states that non-proprietary information will be available within the public domain "*information that is deemed "proprietary" will not be available*". Similarly in the CSFL, the following is noted in relation to intellectual property "*The protection and allocation of intellectual property and the treatment of proprietary information, generated in R&D collaborations under CSLF auspices will be defined by implementing arrangements*"³¹ on a project by project basis and will be the responsibility of the technical project group to decide on. However, this logically leads to the question of what should be considered proprietary and what should be considered non-proprietary and who decides this? The aspects of intellectual property and what should remain secret for political, security or commercial reasons will remain one of the largest challenges to the implementation of R&D activities and the deployment of new technologies in the future.

LEVEL OF GOVERNMENT INTERVENTION

The degree of government intervention can have a large impact on the quantity and extent of R&D activities. As mentioned previously changes in government regulation at the national level can induce changes in R&D activities within the economy. This has been particularly the case in

²⁹ In economics, free riders are actors who consume more than their fair share of a resource/technology, or shoulder less than a fair share of the costs of its production.

³⁰ FutureGen (2006)

³¹ CSFL (2005)

regards to the promotion and implementation of NRE. However, there are also examples where government intervention has stalled the amount of R&D undertaken through the introduction of grants and subsidy's that have led to companies being less inclined to invest money into R&D based initiatives. This was the case with hydrogen when the US government offered large grants to promote R&D in this field; many larger companies opted out of undertaking R&D as they were unable to secure these funds.

Therefore, the major challenge for government intervention with respect to R&D is finding the right balance between encouragement (incentives, grants, subsidies and funds) and regulation to bring about fundamental changes in the structure of the market as a whole. Another method of incentive-based techniques that has shown success in other sectors is that of using "monetary prizes" for an individual or company that is able to come up with a novel approach through which a technical obstacle can be overcome.

EVALUATION OF R&D AT THE INITIATIVE'S POLICY LEVEL

In most cases the evaluation of R&D activities at an initiative's policy level are decided based on the type of R&D activity that is being undertaken. In the case of R&D that is done by research institutions or the civil or business sectors, evaluation is usually based on peer-review of the analysis in relation to the original goals.

However, in the case of initiatives that undertake R&D on the development and deployment of improved or new technologies, evaluation is primarily based on two major aspects. The first of these aspects is the timeframe, and whether or not the R&D activities that have been undertaken over this timeframe meet with the goals first envisaged. For example the **FutureGen Alliance** envisages the development and deployment of new clean coal technology and carbon sequestration and storage technologies over a period of ten years. While it is not justified to say that if after the ten year period the R&D activities under this initiative have not born fruit and thus the initiative has failed, it will force the initiative's policy level to re-evaluate the initiative and decide whether or not to continue the R&D activities. The second major evaluation aspect is whether or not the technology can be commercialised or not. For example, it may end up that in spite of much R&D spending in an initiative that it is not cost competitive in the current market or commercialisation of the

technology is just too costly compared with the potential benefits. It will be through evaluation at the initiatives policy level that the decision to abolish the initiative or not will be decided.

INVESTMENT ISSUES

Whether through the public sector or the private sector often billions of dollars are required to develop new technologies to the point that they can be commercially integrated into the market, therefore making a return on the money invested becomes an important factor in technological deployment, even when viewed from a market external point of view.

With most of the International Energy Initiatives outlined above – especially those related to the environment – methods through which the developers of this technology benefit from its diffusion, and developing economies through either external aid or some other financial mechanism (usually market external) are able to implement this new technology within their economy will remain an important challenge to be addressed at both the national and international levels.

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INFORMATION SHARING

OVERVIEW

Information in energy can be grouped into two main types. The first type is continuous energy data or statistics, such as data on supply, trade, stocks, transformation and demand. Another type of energy information includes intelligence, news, knowledge and facts, for example, energy policy and regulation, new and renewable energy research and development, best practices on promoting LNG public education, nuclear events, and business opportunities. Information can help to facilitate measures to enhance energy security and decelerate environmental degradation. It also reflects the energy situation at the economy, regional and international levels if complete, timely and reliable energy statistics and intelligence on the energy supply chain is available. To gather the information required, individual effort from one economy or an organisation is often insufficient to achieve the target. Cooperation is a better option to facilitate information exchange and reduce the reporting burden posed by individual economies. However, information access and sharing are not simple tasks as much of the information is fragmented, difficult to find, or has restricted circulation. These challenges are exaggerated in many developing economies where a lack of human and capital resources exists to produce and disseminate information accurately and systematically.

In this section, the driving forces of initiating information sharing initiatives between the actors or organisations will be discussed, followed by a brief discussion on the information sharing mechanisms. Finally, examples of information sharing initiatives will be provided according to the areas of cooperation, such as energy data, nuclear, new and renewable energy, efficiency and technology, and the environment consequences of energy consumption.

DRIVING FORCES

The main driving forces that play a role in the various entities – public, civil and business – are saving time and money on literature studies, data collection and standardisation. Initiative's participants are able to access the information from a centralised database or obtain documents pertaining to the initiative, without spending extra

money on human capital development and time for searching and understanding the relevant information. Through the initiative, the participants could overcome the following burdens:

- Inaccurate data and information on both the domestic and international levels
- Inconsistent energy units and categorisation
- Language barriers
- Lack of transparency in market signals

INACCURATE DATA AND INFORMATION ON BOTH THE DOMESTIC AND INTERNATIONAL LEVELS

Accuracy and reliability of energy data and information affects both energy policy and market development. During the late 1990s, international oil prices have experienced unusually high volatility. Such volatility can be explained by geopolitics, economic shocks, and a lack of transparent and reliable oil statistics.³² For instance, in assessing the global oil market situation by oil analysts, the traditional statistical variation on oil data is expected to be 0.5 million barrels per day (Mb/d). Given a daily production of 85 Mb/d, the expected statistical difference should not be higher than 0.6 percent. However, it is difficult to achieve this target if considering the need for timeliness, the number of players involved in the market and the normal variation of other commodities, which have 5 to 10 percent statistical variation.³³ Another example of the dubious quality of data is in the supply and demand of biomass. Fuel wood is commonly used in remote areas and most of the wood is collected directly from the source for personal use, not from the market. Therefore, it is difficult to accurately measure the demand and supply of biomass.

In some economies, the quality and transparency of energy data is in doubt due to initial differences in the methodology utilised and insufficient comparable sources of information. For example, Singapore's Energy Market Authority is not able to provide energy supply data to the APEC Energy Data Base because of the confidentiality of this data. Currently, Singapore

³² JODI (2007).

³³ United Nation (2005)

has three oil refining companies. If the oil supply data was released to the public, the oil companies could estimate the refining capacity of their competitors and could consequently change their strategic developments within the oil market. In order to produce the Singapore's energy balance table, the database coordinator estimates the oil data based on the limited data provided by the Energy Market Authority, and compares it with data from the IEA and other sources of information. However, in the APEC Energy Database, there is no detailed explanation on how the coordinator estimates the energy data for Singapore.

The challenge of availability and reliability of data is not only found in energy sector, but also in environmental data, such as GHG's emissions. As a general rule, energy data is the base from which to calculate emissions of CO₂ or air pollutants. If the quality of fundamental data is not good, this in turn affects the reliability of the calculated emissions data as well.

Therefore, to improve the availability and reliability of energy data, both energy producers and consumers should make efforts, such as increasing the contact between energy companies, economies and organisations, to promote the evolution of fundamental thinking/attitudes toward confidentiality and reliability. Those efforts could be made through mutual cooperation or collaboration.

INCONSISTENT ENERGY UNITS AND CATEGORISATION

Due to diversification in the available indigenous energy resources and the differing primary energy demand structures among APEC economies, the units used in each economy for the energy sector are different. For instance, in China the unit of energy given in energy balance sheets for the annual energy statistical yearbook is tonnes of standard coal equivalent (TCE). In Indonesia the energy demand unit is given in barrels of oil equivalent per day (BOD). In Japan, the figures in the statistical tables are converted to standard caloric values, while in the US energy data is presented predominately in British thermal units, barrels, cubic feet and short tons. Thus, data collected from various economies is not compatible for comparison or analysis unless they are converted to a standardised or international unit. However, the process of unit conversion is complicated and time-consuming, and requires experts or experienced people working on them. Affected by the definitions of the gross and net

calorific values, the conversion equivalents between units of energy for differing coals (lignite, bituminous or sub-bituminous), petroleum products and natural gas could be different among the APEC economies. For example, the conversion factor for heat content of fuels used in the US is the gross energy content while in Russia and China it is the net energy content. Generally, the commonly utilised energy unit are either tonnes of oil equivalent (toe) or the International Standard (SI) units of energy given in joules (J).

Differences in energy categorisation are also found among APEC economies. In Vietnam, the final energy demand in the residential sector in fact includes the energy demand of light industry, through which hand-made products are produced at home using diesel oil or heavy fuel oil. Therefore, the method through which to extract the light industrial demand portion from total residential energy demand is a complex issue. Another example to show the definitional difference between organisations is the definition of crude oil production. In the OPEC Annual Statistical Bulletin, production of natural gas liquids (NGLs) is included in crude oil production; however, NGLs are not combined with crude oil in IEA Statistics because oil production is measured by different methodology within the process of crude oil extraction.

LANGUAGE BARRIERS

The first language or the official language used among the APEC economies is diverse, Table 6. Government bodies or entities normally use their national language to publish or release statistics and information, especially emergency information related to events such as earthquakes or nuclear accidents. Peoples cannot communicate unless they are able to speak in a common language. Translation is also often required to understand those statistics or information released in different languages. Regarding human capital, the amount of money spent to translate the information is huge. Throughout most of the initiatives detailed here, participants share their information and communicate with each other in one official language. As English is widely spoken, it has been informally adopted as the primary language of international communication or the global language. Thus, English has become the commonly used language in most of the initiatives.

Another factor leading to misunderstanding is cultural differences that assign different words to different things or assign different meaning to similar phrases, although participants use the same

language when communicating with each other. For instance, the definition of ‘urban’ is different among the APEC economies. According to the national census definition, Mexico defined ‘urban’ as “localities of 2,500 or more inhabitants”, while Korea as “population living in cities irrespective of the size of population”.³⁴ To ease communication, it is important to have a glossary or an explanation sheet included in a report providing the definition of words.

Table 6 Official Language of APEC Economies

| | |
|--------------------|---|
| Australia | English |
| Brunei | Malay |
| Canada | English, French |
| Chile | Spanish |
| PRC | Chinese |
| HKC | Chinese (Cantonese), English |
| Indonesia | Indonesian |
| Japan | Japanese |
| Korea | Korean |
| Malaysia | Malay |
| Mexico | None at the federal level, Spanish |
| New Zealand | English, Maori |
| PNG | English, Tok Pisin, Hiri Motu |
| Peru | Spanish, Quechua, Aymara and other regional languages are co-official in the areas where they are predominant |
| Philippines | Filipino, English and 14 regional languages are co-official in particular regions |
| Russia | Russian and 30 others co-official in particular regions |
| Singapore | English, Malay, Mandarin, Tamil |
| CT | Mandarin |
| Thailand | Thai |
| US | None at the federal level, English |
| Vietnam | Vietnamese |

Source: Original sources from Wikipedia (2007)

LACK OF TRANSPARENCY IN MARKET SIGNALS

Without accurate, reliable and up-to-date market information, it is difficult to assess market

structure and conditions in order to encourage new entrants and investment in the energy market and to manage energy supply and demand. Energy companies and institutions at the national or international level may not respond correctly to market signals such that they contribute to either under-investment or over-investment in specific energy sectors or geographical regions. If detailed, timely and reliable data on the different steps of the production and consumption chain are reported promptly and systemically, market transparency can be improved. In 2003, a report from the European Federation of Energy Traders (EFET) highlighted the importance of transparency in information on the wholesale power market, including transmission, demand and generation. They found that the main obstacle of developing an efficient and liquid wholesale market was the lack of information released to the market.³⁵ Market data is designed to improve wholesale market competition, to eliminate entry barriers and to accelerate market liberalisation. Liquid wholesale markets could provide signals on when to invest in new generation to meet demand. In addition, due to the lack of transparency on prices and grid access conditions, it is hard to implement efficient policies to promote renewable technologies. Therefore, to enhance supply security, efficient investment based on market signals is imperative.

Many APEC economies are considering or have undertaken market reforms and restructuring of the energy sector. However, their overall progress or their current market structure is not always clear to other APEC economies. To solve this problem, sharing their working progress between APEC economies through an initiative is an option through which this issue can be addressed.

Market information should be presented in a precise form and released at an appropriate time in order to avoid any unintentionally undermining competition, imposing an excessive burden on market participants, or facilitating collusion. To collect reliable data, guidelines and standardised tables are normally used in a data sharing initiatives. The ideal situation for information sharing is a “level playing field” where all participants have access to the same information at the same time.

³⁴ UNSD (2004)

³⁵ European Federation of Energy Trader (EFET) (2004)

SHARING MECHANISMS

Among the initiatives, an entity or organisation share information through one or more of the following mechanisms:

- Web-based databases and websites
- Meetings, workshops, seminars and forums
- Reports and publications in electronic format or print, e.g. newsletters
- Communication systems, e.g. chat systems and mailing systems

Web-based databases are the most popular and easy way to share information, in particular numerical statistics. Initiative's participants can access up-to-date information from the website at anytime and anywhere. Database information, depending on the objectives of the initiative, can be of two types – only accessible by the participants themselves, or open to the general public. Besides database sharing, people commonly share their information in printed format during meetings, workshops, seminars and forums organised under the initiative. For some initiatives, if they are targeted to educate the general public, they share information through publications or opening their website to the public.

EXAMPLES OF INITIATIVES

Initiatives using the mode of information sharing could be grouped into two main types. The first type of initiatives has a clear objective of sharing information in order to promote the free flow of information, promote best practices, for ease of discussion, or to provide technical assistance. The second type of initiatives is using information sharing as a tool or mechanism to facilitate other activities within initiative in regards to energy infrastructure development, financing, regulatory framework or policy analysis, research and development, and education and capacity building.

In this section, representative examples of each type of initiatives are presented, with emphasis on their objectives, scope of work and operational progress.

WITH THE EXPRESS PURPOSE OF SHARING INFORMATION

Energy Data

Globally the most well-known energy initiative related to information sharing is the **Joint Oil**

Data Initiative (JODI). This initiative was established in 2001 by the joint effort of six international organisations, including APEC, Eurostat, IEA, OLADE, OPEC and UNSD, to increase oil data transparency. Under this initiative, oil data is sourced from three main groups of players in the oil market, namely industry, economies and international organisations. As of period from January to June 2006, 96 economies participated and submitted oil data to JODI. To coordinate and manage the huge amount of oil data from the six organisations, the International Energy Forum Secretariat (IEFS)³⁶ serves as the coordinator of JODI with the support of the six organisations. Due to the fact that the methodology of data collection, processing and consolidation between the organisations is different, it is necessary to compare the collected data with other sources. However, there is a lack of comparable sources of information for further analysis in some economies. Hence, it is not easy to improve the quality and transparency of data over a short period of time.

In the past few years, the six organisations have put extra effort into improving the data collected for the top 30 oil producing and consuming economies. The timeliness, coverage and reliability of oil data for many economies are of reasonable levels. Although the database is now freely accessible to public, the database is still a “work in progress”. To improve the timeliness, completeness and reliability of oil data, JODI organised the first training workshop in 2006 for Latin-American countries to discuss assessment of the data quality, legal framework and confidentiality of oil statistics, and to compare their common practices in the gathering of oil data. Through the training, JODI can disseminate their methodology manual and have direct communication with economies involved. The organisations fully understand the limitations of the current database and the challenges of collecting data on time and increasing the coverage to other economies. The main purpose of JODI is not only to raise the awareness of all oil market players of the need for more transparency in oil market data, but also to improve the national statistic system in many economies. Also, the evolution of attitudes towards data confidentiality and reliability has to become more transparent.

³⁶ IEFS is an inter-governmental entity, established in 2003 to enhance and provide continuity to the global producer-consumer dialogue undertaken within the IEF.

Under JODI, each organisation represents different geographic locations for the collection of oil statistics, or shows different stages of economy development. In fact, each organisation had started collecting oil and/or other energy related data before this initiative was launched. In addition, the information dissemination strategy of each organisation is different, normally based on their respective objectives, reporting obligations and financial constraints.

Under the auspices of the APEC, Energy Working Group (EWG) which was launched in 1990, and is responsible for energy issues in all 21 economies of the APEC region, to promote the exchange and wider dissemination of energy information the **APEC Energy Database** was established. Since 1991, the Database has been developed and maintained by the EWG's Expert Group on Energy Data and Analysis (EGEDA), who has appointed the Energy Data and Modelling Center (EDMC) of the Institute of Energy Economics, Japan (IEEJ) as Coordinating Agency (CA). The purpose of the Database is to establish a comprehensive, up-to-date and consistent energy database within the APEC region. APEC economies are encouraged to regularly submit yearly or quarterly data on energy demand and supply, disaggregated final energy demand by sector, energy prices with respect to the import CIF, wholesale, and consumer prices. To support JODI, APEC economies are further requested to submit monthly oil data to the CA. In the APEC Energy Database website, the energy supply and demand data for all APEC economies is free to access by the public. But, energy prices, detailed thermal electricity generation and refining capacities, macro indicators related with energy, major economic indicators, CO₂ emissions tables, and the UN Energy Statistics Database, can only be accessed by the APEC member economies. Besides the website database, the CA has published *APEC Energy Statistics* annually since 1993, covering the full supply chain from the primary energy production to final consumption.

International Energy Agency (IEA) – an autonomous agency linked to the Organisation for Economic Co-operation Development (OECD) – is the energy forum for its 26 Member economies. Among the Member economies, six economies are also APEC members, including Australia, Canada, Japan, Korea, New Zealand and the US. Although IEA Member governments are committed to taking joint measures to meet oil supply emergencies, any energy programme or measure developed under the IEA is a non-binding

agreement. Nevertheless, the members have agreed to share energy information and to cooperate in the development of energy programmes. They publish more than 10 publications annually or quarterly covering the areas of energy production, trade, stocks, transformation and demand for all fuels for over 130 economies, regions and the world. According to the organisation's mandate, economies throughout the world are divided into two groups, OECD and non-OECD economies respectively. Energy data on OECD and non-OECD countries are collected by a team in the Energy Statistics Division of the IEA Secretariat through frequent cooperation with national administrations in both public and private companies. In addition, the European Commission takes part in the work of the IEA. On the IEA website, energy statistics of OECD and non-OECD Member countries can be freely accessed. IEA also publishes the monthly *Oil Market Report* and the biannual *World Energy Outlook*.

The Latin-American Energy Organisation (OLADE) – an international public entity – was established to develop their energy resources effectively and efficiently in order to contribute to the social and economic development of Latin America and the Caribbean. OLADE has 26 ratified economies, and two of them – Mexico and Peru – are also members of APEC. The major difference between OLADE from the other five organisations is that OLADE uses Spanish as the language of communication between members, but the other organisations use English. The information available on OLADE's website is also written in Spanish only. One of the objectives of OLADE is to manage official statistics, publications and regional energy planning. They have published energy statistics report annually in both English and Spanish, and their *Sistema de Información Económica Energética* is available on the Internet and on CD-ROM, but the report is not free of charge.

United Nations Statistics Division (UNSD) started collecting energy statistics in 1950 from more than 190 economies, and is engaged to collect and disseminate energy data and to produce energy balances and electricity profiles. UNSD updates and maintains the Energy Statistics Database, which contains comprehensive energy statistics on more than 215 economies, through sending questionnaires to national statistical offices, ministries of energy, other authorities responsible for energy statistics in an economy, and the energy industry and other players in the energy production

and distribution system. All the UNSD publications related to energy statistics require purchase and are not available for free. They have two major flagship publications on energy, namely *Energy Balance and Electricity Profiles* and *Energy Statistics Yearbook*. In addition, through the *Monthly Bulletin of Statistics*, monthly energy statistics are disseminated.

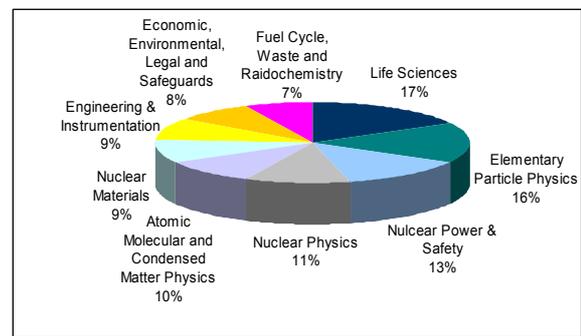
Besides oil data, APEC economies are also interested in sharing information on the supply side. **APEC Network of Minerals and Energy Data (ANMED)** is another initiative operating actively in the APEC region. ANMED is an initiative of the Expert Group on Minerals and Energy Exploration and Development (GEMEED), which is one of the five expert groups under the auspices of the APEC EWG. ANMED has been developed to provide a linked database for their target audience through accessing up-to-date information on the minerals and energy resources in the APEC region. Target audience includes governments of APEC economies, business enterprises and business bodies of APEC member economies, and business enterprises of other economies. Through sharing the database information, ANMED aims to facilitate the strategic planning for both government and business enterprises and to encourage investment in mineral and energy resource exploration and development in the APEC region. However, the operation of ANMED is not running smoothly as it perhaps could. Due to funding problems, it was temporary suspended for a period between 2003 and 2004. At the outset this initiative was developed and operated from 1997 with the financial support of the APEC Central Fund. The network was re-established on the Internet with the financial assistances from a number of individual APEC economies in June 2004.

Nuclear Information

International Nuclear Information System (INIS) was established in 1970 according to the mandate of the International Atomic Energy Agency (IAEA) on promoting the exchange of scientific and technical information in the use of nuclear energy. Currently, there are 117 economies and 23 international organisations that are members of INIS. In general, INIS has three major components, the INIS Database, a collection of non-conventional literature (NCL), and the INIS Multilingual Thesaurus. Information sharing under this initiative is only available for members or subscribers. INIS has created a kind

of “reservoir of knowledge” on current and future nuclear science and technologies by processing and integrating most of the world’s scientific and technical literature into their database. In 1992, INIS expanded their subject scope to include the environmental and economic aspects of non-nuclear energy sources. The INIS database covers more than nine subjects containing 2.8 million bibliographic records in relation to IAEA’s interests and activities in nuclear energy (Figure 12). Of these topics the three with the largest share covered by the INIS Database are life sciences (17 percent), elementary particle physics (16 percent), and nuclear power and safety (13 percent).

Figure 12 Subjects covered in INIS Database



Source: IAEA (2007)

The information dissemination mechanism of the INIS has evolved over time based on changes in technological development. INIS primarily produced their information in printed and electronic forms in the early 1970’s. However, in 1977, they made the NCL full texts available on microfiche, and the following year the INIS database was accessible for the first time through online system. While CD-ROMs are popularly used to distribute computer software, INIS only started to disseminate their database through CD-ROM in 1991. Six years later, INIS made their NCL full texts available on CD-ROM and they started the electronic document delivery service with the implementation of new electronic technology. In 1998, INIS launched their database on Internet. The INIS online database is updated weekly and the INIS Database on CD-ROM has a monthly update service for those with a subscription of 12 months.

The NCL collection consists of about 700,000 full-text documents in sixty-three languages. To overcome the language barriers, the INIS provides a multilingual thesaurus, which is a tool for describing nuclear information in a structured form. In the past twenty years, the multilingual thesaurus has developed to include the languages of French, Russian, German and Spanish. The

INIS also provides a multilingual dictionary for English-French-German-Russian-Spanish to their subscribers.

Furthermore, the INIS provides a training programme to their members in order to promote the exchange of scientific and technical information and enhance the quality and coverage of the database. The training programme currently includes a) seminars for the personnel newly involved in input preparation and utilisation of output products, b) distance learning programme to provide comprehensive instructions about input preparation in the areas of bibliographic description and subject analysis, and c) technical cooperation assistance for developing countries participating in the INIS.

Regarding the subject of nuclear resources, the IAEA in cooperation with the Nuclear Energy Agency (NEA) under the auspices of the **Joint NEA/IAEA Uranium Group** publishes a biennial publication, called "*Uranium Resources, Production and Demand*", which is also known as the "Red Book". The Group encourages the exchange of technical information in the fields of uranium resource exploitation, exploration and production technologies. The publication of the *Red Book* is sponsored by the governments of the NEA members.

Besides exchanging scientific and technical information, the international community is also interested in the occurrence of significant nuclear events such as accidents in nuclear power plants or in the transport of radioactive materials. **Nuclear Events Web-based System (NEWS)**, which is jointly operated by the IAEA, NEA and World Association of Nuclear Operators (WANO), was established in early 2001 to provide flexible and authoritative information on the occurrence of nuclear related events immediately to their participants and partly to the general public. Once an event has occurred, NEWS will add event descriptions, International Nuclear Event Scale (INES) ratings and press releases in the national language and in English into the NEWS database, which is under the NEWS website and is freely accessible by the general public. Once there is an update on the NEWS database, the participants will be automatically notified by email.

Another collaborative work focusing on providing a database on the safety and environmental aspects of the use of nuclear energy is the **Environmental Safety and Economic Aspects of Fusion Power**. This collaborative work is one of the nine major collaborative

programmes under the study of fusion power in the IEA. Participating economies and organisations include Canada, the European Commission, Japan, Russia and the US. Database development is one of their working programmes to foster information dissemination between their members.

Nuclear information sharing at regional level is also commonly found between APEC economies. The **Forum for Nuclear Cooperation in Asia (FNCA)** was established to promote efficient nuclear energy cooperation with neighbouring Asian economies. Under their working framework, the forum encourages members to exchange nuclear information on scientific and technological development, utilisation, waste management, public information related to nuclear energy, and health and safety. Members share information during their FNCA meetings at the ministerial and senior official levels, the Coordinators meetings and during the course of cooperative activities. Nine APEC economies are the members of this forum.

New and Renewable Energy Information

In order to enhance energy diversification, many APEC economies are considering or have considered increasing the use of new and renewable energy. The number of international initiatives on sharing information related to the promotion and application of new and renewable energy is increasing, and they are operating at both the regional and international levels.

At the regional level, **APEC 21st Century Renewable Energy Development Initiative (APEC 21st Century REDI)** was established in 2000 to advance the use of renewable energy for sustainable economic development in the APEC region. This initiative is operated under the APEC EWG Expert Group on New and Renewable Energy Technologies (EGNRET). It has acted as a platform to link projects that are collaborative efforts of individual APEC economies under a single organisation. Currently, there are nine collaborative works operating under this initiative that cover the areas of renewable energy infrastructure, development needs, training requirements, needs for analysis tools and methods, policy formulation, financing, joint-venture development and the removal of trade barriers. One of the collaborative works is focusing on information dissemination – Collaborative VII: Web-based Renewable Energy Information Dissemination. This collaborative project was established to provide news and information on

the application of renewable energy within APEC economies, using the Internet as the information dissemination mechanism. In addition to providing news and information, a web-based database of renewable energy products and best practices for APEC economies has been set up under the Collaborative VI: Renewable Energy Technology Applications. Also, the participants exchange information during the workshops organised under this collaboration.

At the international level, the International Renewable Energy Alliance (Ren-Alliance) was formed in 2004 by three founding organisations – the World Wind Energy Association (WEEA), the International Hydropower Association (IHA) and the International Solar Energy Society (ISES). One of the key objectives under this alliance is to facilitate the exchange of renewable energy information between relevant business, technical, conservation, research, civil, governmental and international organisations. However, there is no clear information from their website showing how they share the information or how this alliance operates.

Efficiency and Technology Information

Similarly to new and renewable energy, increased effort has been put into energy efficiency improvement and technology development. **Energy Technology Data Exchange (ETDE)**, which was formed under the IEA in 1987, is an international information exchange agreement between governments (governmental or energy technology entities representing governments), industry (energy technology companies) and the research community (research institutes and universities) of the IEA member economies. The initiative was established to provide an extensive range of information on energy research, science and technology and to increase information dissemination to developing economies. ETDE World Energy Database (ETDEWEB) is an Internet tool developed under this initiative for disseminating the information. The Database contains four general types of information: a) energy sources, b) energy production, utilisation, and management, c) energy conversion and storage, and d) the basic information developed in support of energy production, conversion, and utilisation. ETDE also expanded the coverage of data by collecting information on nuclear, coal, and global climate change through cooperation with other international organisations. INIS under the IAEA is one of the key ETDE partners on exchanging information in the area of nuclear energy. Because

of this collaboration, most of the INIS database is also included in ETDEWEB. In addition, the ETDE members are also members of INIS. The Database is updated with new information twice a month by an Operating Agent. As of the end of 2006, the Database had collected over 3.8 million bibliographic records and more than 17 thousand full text documents.

The Database can only be accessed by the ETDE members, INIS members, and those developing economies that have been granted free access by the ETDE. ETDE members have to pay an annual fee to fund basic operations of ETDE.

In relation to information sharing on energy efficiency, APEC's **Pledge and Review Programme (P&R Programme)** is one of the initiatives working at the regional level. This P&R programme is to share energy efficiency policies and programmes implemented in individual APEC economies during the EWG biannual meetings. In addition, the programme planned to develop indicators and a database that would enable measurement of performance over a period of time. APEC economies report the specific energy efficiency policies and programmes by using a standardised form, which was developed by the EWG Secretariat. Moreover, members are encouraged to report on a specific energy efficiency topic using the standardised form. To improve the consistency of the reporting, a questionnaire will be provided to the members as a guideline.

Emergency Information

In addition to the exchange of information in relation to nuclear events, earthquake information is also an area of interest to the actors as a severe earthquake occurring in an economy could cause serious damage to energy supply infrastructure and overall economic development. The **Earthquake Response Cooperation Initiative (ERCI)**, which was established in 2000 and completed in 2003 under the APEC EWG, to address earthquake prevention and response measures for energy supply systems. This initiative was developed based on purposes given at the policy level – “APEC Framework for Capacity Building Initiative on Emergency Preparedness”, which was endorsed by the APEC Energy Ministers in 1998. The APEC Energy Ministers supported preventative and responsive measures that would be aided through improved information sharing and capacity building among APEC economies. Concerning information sharing, the ERCI

established two mechanisms to improve regional energy supply security. One of the mechanisms is an information system for every APEC economy to share their emergency preparedness programmes. Another mechanism is in relation to earthquake response cooperation for energy supplies between participating APEC economies in the event of a major earthquake. Concerning capacity building, a series of seminars focusing on earthquake resistance standards, safety regulations for basic energy facilities and experiences on rescue and emergency supply programmes were conducted during the three years of operation of this initiative.

Another example of emergency information sharing was also commenced by the APEC EWG, namely the **Real-time Emergency Information Sharing (RTEIS)**. Under this initiative, a web-based mechanism for an APEC economy's emergency contacts to share energy data was developed, post information via a bulletin board and communicate in real-time via a chat-system in the event of an energy-related emergency. Oil data shared in this initiative is sourced from the monthly oil data of JODI. Thus, information shared in one initiative can also be used in another initiative to achieve different purposes.

Energy and the Environment

Of the initiatives in this study's database, only a few initiatives related to information sharing have a purpose of environment improvement. For example, the **Clean Air Initiative (CAI)** was established to improve air quality in cities by sharing knowledge and experiences through partnerships in selected regions of the world. Currently, the initiative is implementing in the regions of Asia, Latin America and Sub-Saharan Africa, Europe and Central Asia. Regarding the initiative related to APEC economies, the **Clean Air Initiative for Asian Cities (CAI-Asia)** and the **Clean Air Initiative in Latin American Cities (CAI-LAC)** are both included in supplemented database as they link local energy consumption and cities air quality. Both initiatives maintain a website database of research and air quality-related documents for member regions. Considering the languages used in Latin American Cities, the website information of CAI-LAC is written in English, Spanish and Portuguese.

AS A TOOL TO FACILITATE OTHER INITIATIVE ACTIVITY

Financing/Investment

Investment in energy infrastructure is essential to support economic activities and growth of APEC economies. However, the financing of energy projects brings many challenges to the energy sector, particularly to developing economies. Initiatives on financing through sharing information are designed to provide clear market signals, or to strength and accelerate financing. Collaborative VIII: Financing under the **APEC 21st Century Renewable Energy Development Initiative** is established to provide a roadmap for facilitating financing of renewable energy projects in the APEC region with the help of existing international commercial and multilateral financing mechanisms. Under this collaboration, an *Information Sharing on Financing Public Sector Energy Efficiency and Renewable Energy Project*⁹ is being conducted. The project is planned to disseminate information focusing on best practices, technical language used in finance and key lessons learned from energy financing activities within or outside the APEC region.

Another example of an initiative focusing on promoting and facilitating increased investment is the **Sustainable Energy Finance Initiative (SEFI)**. The initiative is targeted towards mainstream financiers and developers by changing their attitudes with regard to sustainable energy investments. One scope of this undertaking is to provide current, relevant and timely information on any new developments within the economic sector to aid the financiers and developers. Thus, they would have an understanding of the need or importance of including environmental and climate issues in their investment decisions on newly installed or upgraded energy infrastructure.

Regulatory Framework

Information sharing also plays an important role in an initiative that is designed to remove barriers on trade, or to harmonise regulatory standards for energy systems or product movement between economies. One of the examples from the initiatives database is the **Energy Standards and Labelling Cooperation Initiative**. Under this initiative, a web-based Standards Notification Procedure was developed to disseminate information regularly on the development of energy standards and labels and regulations to all participating members. In addition to that information, testing standards,

minimum energy performance standards and labelling requirements of electrical products in the APEC region is also posted on a website, which was developed and is maintained by the **APEC Energy Standards Information System (ESIS)**. The participants generally agreed that both the Standards Notification Procedures and the ESIS website increased their interest in aligning energy performance standards within the region. The initiative and the ESIS website are operated due to financial contribution from APEC economies provided on a year-by-year basis. In 2004, the APEC ESIS also received financial support from the Collaborative Labelling and Standards Programme (CLASP) to continue operations and to expand the information covered in the website to include several non-APEC economies. However, there is uncertainty over future funding and operation of the initiative and information system. Commitment from the governments of individual APEC economies will likely become a key factor in the continued operation of this initiative.

Research and Development (R&D)

Literature search/review and analysis on a subject are always the first step of doing research and development. In R&D initiatives, participating members are interested in sharing literature and other research documents with each other. For example, **IEA Hydropower** established a network of information on the Internet to foster the dissemination of technical information on the hydroelectric industry. In addition to the initiative's report posted on the website, areas of information include economic, environmental management, facility management, power plant maintenance, power plant operations, safety, reliability of hydropower facilities, and watershed management.

Education and Capacity Building

Information is a fundamental element of education and capacity building. Sharing correct and accurate energy information to the public or target audiences is important. For example, the public have a Not-in-My-Backyard (NIMBY) attitude to electricity distribution networks or LNG infrastructure projects due to their misconceptions about the likely health and safety impacts of the proposed energy infrastructure. To deal with this kind of problem, for example, the **LNG Public Education and Communication Information Sharing Initiative** was established under the APEC EWG to share information on

public education and communication in regards to LNG infrastructure through a website. The website is open to the public and it is also used as a mechanism for APEC economies to review and analyse related topics, such as documents on public perceptions concerning LNG safety and security risks.

CHALLENGES

Financial support is one of the key factors to sustain the operation of an initiative. Without financial support, the programme running under the initiative is often stopped or suspended, such as the service of APEC's ANMED suspended for a year due to insufficient budget financing from the APEC Central Fund. In addition, economies often have to withdraw from an initiative if government support for that initiative wanes. Therefore, governments have an important role in supporting financially the operational aspects of an initiative.

The information dissemination mechanism has evolved overtime to become associated with technology development. With the world-wide diffusion and ever easier access to the Internet, information sharing has been made easier through the posting of information on a website. On the other hand, direct transfer of information between organisations is not always easy due to ownership rights and data confidentiality issues, differences in definitions, units, coverage, timeliness, and data quality. Harmonisation of concepts, units and methods between the organisations is the next step for most of the information sharing initiatives.

Benefits of an initiative could be maximised if the collected information could also be shared in other initiatives. The cooperation between INIS (under the IAEA) and ETDE is a good example to show information exchange in the nuclear area between two initiatives. Challenges on the sustainability and reliability of national or international statistics systems at both the regional and international levels has also been aggravated due to liberalisation of energy markets, budget cuts and a shortage of experienced staff. The ability and capacity of individual economies to provide the required information is an important factor for the successful dissemination of reliable energy statistics. To secure the budget for data collection, policy makers need to understand the constraints and problems encountered by statisticians or national statistics agents. In addition, sustained training and capacity building to build and increase the reporting expertise and capacity of member economies and organisations is required.

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EDUCATION AND CAPACITY BUILDING

OVERVIEW

This section will highlight some of the activities International Energy Initiatives have been undertaking with respect to education and capacity building, and will focus mainly on initiatives that have been organised and participated in by actors from government-based organisations. Compared to initiatives under other themes, an initiative under education and capacity building is “soft” in character. It does not aim at establishing a hard system of relationships and responsibilities to implement a coordinated solution around a certain issue, but to provide for participants venues to discuss and obtain understanding of the issue, and if appropriate, tools and options to solve it.

The primary function of capacity building initiatives is to promote an effective platform from which collective learning through common understanding/discussion can occur, and may or may not culminate in the preparation of a political declaration. These types of initiative thrive on the premise of personal contact and are a gathering people for the purpose of giving attendants aid in the development of knowledge in relation to an issue in the hope that this knowledge can be utilised by participants within their economies. Capacity building attempts to enhance the capability of participants to do something better as a result of additional training or discussion, and is usually offered to persons directly involved with the issue under consideration. Different positions in government structures require different forums for technical training and capacity building.

Throughout our lives education is experienced on numerous occasions and through various media – schooling, vocational training or in fact reading a newspaper – however, in the context of this study, education activities within International Energy Initiatives is defined as a process through which participants – primarily the general public – are provided with a variation of media – websites, journalism or press releases from the national government or associated agencies – to enhance the understanding of the general public about an issue facing the economy.

ACTORS

Definitions for the types of capacity building encountered in International Energy Initiatives depend predominantly on the actors involved and

the level of understanding of these actors with respect to a certain issue.

STATESMEN/GOVERNMENTAL OFFICIALS

For statesmen, capacity building entails the ability to exchange views with other statesmen with a common set of language around the issue under discussion. Statesmen need this capacity in order to explore the issue together, to arrive at a common understanding of the issue and be able to devise an appropriate course of action to be taken. Examples of this type of initiative are the Cebu declaration on East Asian Energy Security at the 2nd East Asia Summit and the Plans of Action under the G8. These declarations are signed by the heads of state/government, and affirm to work closely together with other organisation towards goals and measures to achieve the goals set out in the declaration. The necessary follow-up actions that need to be undertaken to ensure implementation of the measures are usually also specified. This provides a good foundation from which to build further concrete measures.

POLICYMAKERS

For policymakers such as government officials, capacity building concerns the ability to understand the problems and implications of a new issue in order to help statesmen to take political actions. Then, after an agreement has been made by statesmen around the issue, government officials may need to enhance their awareness of the current development in the international political scene, so as to develop adequate measures for implementing the necessary political will. Hence, an international capacity building event for policymakers, usually a workshop, tends to be methodical and thorough.

PROFESSIONAL TRAINING

Training is one particular form of capacity building that is aimed at participants at the working level. This is an activity through which attendants are given a standardised process of acquiring knowledge and skills around a problem to be solved. The usefulness of the said knowledge and skills has been tested and confirmed in the past. A training programme with the same text may be able to be repeatedly applied. With the acquired knowledge and skills attendants are expected to solve the problem by themselves when they return

to their own economies. The success rate of a training programme for a specific initiative offered can be measured by various methods, for example an exam during the last session of a course.

With the above three types of actors the main mechanism to promote capacity building initiatives is through the following scheme.

In this section capacity building in relation to International Energy Initiatives is seen to take place during international activities and involves the interaction of three actors (Figure 13). As can be seen the “secretariat” of an organisation provides a venue for the workshop/conference and often also organises “providers”, whom will give speeches or presentations about the issue under investigation to the “participants”, whom are members of the APEC community – with the professional level of participants varying according to the three sections outlined above.

In our working definition, initiatives for educative purposes are activities offered to the general public, mainly local, who are indirectly involved in the issue but could suffer the ramifications of policy regulation designed to mitigate the issue, or when concerning an all encompassing issue such as global climate change will be affected as a result of environmental or lifestyle changes. The aim is to improve the energy and environmental literacy of the general public so as keep people informed of the issues and garners their support in the design of government policies that benefit all parties. The local journalism community is one of the prominent targets of education initiatives.

GENERAL PUBLIC

In general, when proposing a solution to an issue, statesmen and policymakers need support from the general public. This is all the more apparent if the issue and its solution has regional or international characteristics. The economy’s government has to ratify and accept the agreements they have negotiated through cooperation in International Energy Initiatives locally. Moreover, domestic stakeholders have to be convinced that they will get potential benefits from accepting the potential costs and risks of implementation of these agreements. The solution may call for domestic laws, rules and standards to be modified. Therefore, the general public may often become inadvertently held liable to the internationally negotiated solutions, which can affect people’s lifestyles or way of living negatively

often to accommodate the “common good” represented in that solution.

For educative initiatives, the results of the capacity building from the International Energy Initiatives is transferred to the general public via the local media (newspapers or other types of journalism and/or websites) or via press releases from the national government that are communicated to the general public through town meetings or in some instances websites (Figure 14).

Figure 13 Actors in Capacity Building Initiatives

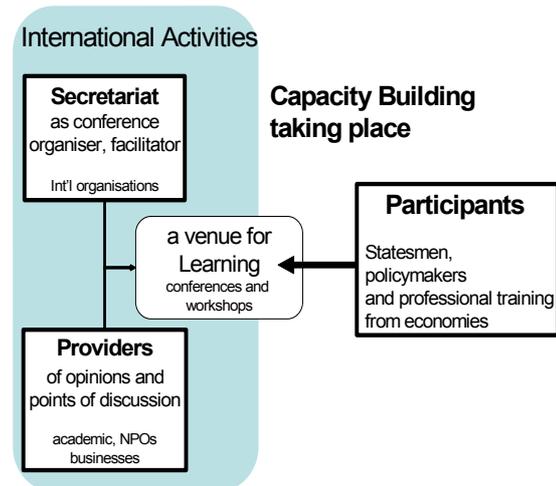
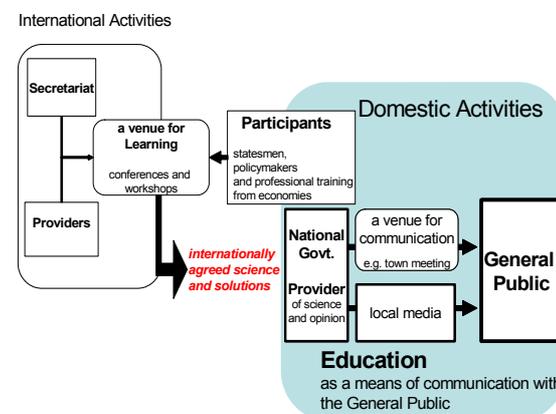


Figure 14 Actors in Educative Initiatives



DRIVING FORCES

There are three drivers which initiate and sustain education and capacity building activities in APEC region, including:

- Communication with the general public concerning energy and environmental issues
- Shortage of qualified human resources in policy making and the workforce
- Need for continued awareness of new ideas and upcoming issues on the international stage

COMMUNICATION WITH THE GENERAL PUBLIC CONCERNING ENERGY AND ENVIRONMENTAL ISSUES

Energy and environmental issues inevitably address sciences unfamiliar to the general public, some of whom desire to satisfy themselves that the proposed solutions are the product of sound science and robust reason, and ultimately not detrimental to their way of living. Statesmen and policymakers play the role of the communicator, and are expected to take responsibility in facilitating and ensuring the transparency of scientific investigations and discussion that are undertaken around the issue and in the proposed options to solve the issue.

The **LNG Public Education and Communication Information Sharing Initiative** is an example that deals with this type of public awareness and education. The purpose of the Initiative is “*to build positive perceptions about LNG by highlighting demonstrated safety and reliability and emphasising its economic, environmental and energy security benefits*”.

SHORTAGE OF QUALIFIED HUMAN RESOURCES IN POLICY MAKING AND THE WORKFORCE

Statesmen and policymakers are asked to build their capacity to understand issues within their complex local, regional and international boundaries, and their task starts from discussion/learning with the help of experts. But, a joint declaration that stresses the importance of addressing an issue is not always sufficient to create and carry out technically complicated solutions. Without enhancing human resources with good technical capacities, concrete results are not always to be expected.

The Training Seminars APERC and other organisations run aim at the transfer of know-how to build a strong knowledge foundation in the APEC region. Energy and environment experts in APEC economies are able to acquire updated econometric modelling techniques as a basic tool for analysis, then to apply them to their local economies in view of their energy position, and subsequently craft appropriate policy options. Another example is the JODI Training Workshop where statisticians from various economies have the opportunity to brush up their skills to that of international standards.

NEED FOR CONTINUED AWARENESS OF NEW IDEAS AND UPCOMING ISSUES ON THE INTERNATIONAL STAGE

Energy prices in recent years have been high by historical standards, which has placed a renewed emphasis on the need of each economy to pursue policies that aid in securing energy supply – enhancing energy security. Another example that has emerged on the international stage is the issue of global climate change and the associated contribution from anthropogenic greenhouse gas emissions. This issue has become topical over the past decade, which has seen an evolution in cooperative international discussion together with advancements in science, and the development of regulation and the market. Policy issues and objectives at the domestic level have also shifted accordingly. In the APEC region, this evolution can be observed in the series of initiatives that the ADB has run over the past ten years. In the 1990’s ADB offered to statesmen and policymakers in the APEC region opportunities to understand the science and logic of climate change and the implications of COP3 that resulted in formation of the Kyoto protocol. Ratification of Kyoto Protocol between 2000 and 2006 by a number of APEC economies has highlighted the potential benefit of hosting CDM projects. ADB’s capacity building activities on CDM started creating clients among policymakers, local businesses and financiers, who felt the need of skills in order to understand/comprehend and adopt the legislative requirements of CDM schemes.

EXAMPLES OF INITIATIVES

Capacity building happens at an off-the-cuff tea break at a G8 summit, at an international conference for government officials scheduled regularly and at a well organised workshop for multi-disciplinary stakeholders around the issue in question. Design of a capacity building event can be varied along with the attendants and venue. Experts on the focused issue are often invited to present science and an impartial introduction to the current status of the issue. Experts work as catalysts to activate conversation and discussion amongst the attendants.

Capacity building and education initiatives can be broadly divided into the following four groups of activities:

- A Communiqué from heads of government
- Express purpose of capacity building

- Formation of tool boxes/best practices
- Public awareness

Each of the above types of capacity building will be explained in the following section with examples of the International Energy Initiatives that relate to them.

COMMUNIQUÉ FROM HEADS OF GOVERNMENT

The highest form of capacity building is through declarations surrounding a certain issue that are the result of a meeting between the heads of state of a number of economies. While these declarations do not contribute to capacity building directly, they often point out the areas in which heads of state would like capacity building or international cooperation to be undertaken. There are a number of these types of initiatives within the APEC region including the **Cebu Declaration on East Asian Energy Security, Gleneagles Plan of Action – Climate Change, Clean Energy and Sustainable Development** and the **St. Petersburg Plan of Action – Global Energy Security**.

Gleneagles Plan of Action states that “*the world faces the serious and linked challenges of tackling climate change, promoting clean energy and achieving sustainable development*”. Whilst the St. Petersburg Plan of Action states “*energy is essential to improving the quality of life and opportunities in developed and developing nations. Therefore, ensuring sufficient, reliable and environmentally responsible supplies of energy at prices reflecting market fundamentals is a challenge for all economies. There are many overarching and interlinked challenges that will need to be investigated such that the goal is met*”. The underlying principle of these initiatives is to garner the cooperation of the global community from all sectors, which will be required to aid in mitigation of the issue under investigation. These initiatives also provide areas where capacity building between institutions can be enhanced, for example under the Gleneagles Plan of Action “best practices” in the financing sector with respect to investment should be developed so that future energy infrastructure investments also includes aspects of the future environmental impacts.

CAPACITY BUILDING

The goal of capacity building is to enhance the understanding of a new issue and its implications, individually and collectively. Participants are encouraged to go into discussion rather than to receptively acquire information. They are asked to give thoughts on the issue, and to exercise their

good sense to learn from others. The organiser of the capacity building event expects attendants to discover the issue under a wider context and elaborate on the issue through collaboration.

Multi-stakeholder Capacity Building

There are many examples of this type of capacity building within the APEC region, where participation from the public, civil and private sectors occurs within an initiative to educate and bring to the “floor” new ideas to tackle an issue. The following are a number of cases related to environmental issues.

The **Clean Air Initiative – Asia (CAI-Asia)** is an example of this type of capacity building. In the CAI-Asia Initiative, participants can encounter the complex problem of urban air quality deterioration in their local economies, through a deeper understanding of the issue at both the regional and international levels. CAI-Asia was launched in 2001 and is still active. ADB is a founding member of the initiative and, along with the World Bank, jointly hosts the CAI-Asia Secretariat. This initiative functions as a multi-stakeholder network of institutions and individuals committed to make efforts to improve Air Quality Management (AQM) in Asia. An important characteristic of CAI-Asia is its large and varied number of stakeholders. At present there are over 100 members that can be grouped into five categories, namely: 29 city governments, 26 national government agencies, 59 NGOs and academic institutions, nine international development agencies and international foundations, and ten private sector organisations.

The Clean Air Training Network for Asia (CATNET-Asia) is the vehicle to exercise CAI-Asia’s activities. CATNET-Asia offers workshops for AQM Training. The programme includes: a benchmarking study on the AQM capability of Asian cities, best practices in AQM, and fundamentals of emission inventory development, fuel quality strategy and urban air quality management. Participants of CAI-Asia workshops and other events can discover their local AQM issues under a wider context, and elaborate on them in workshop discussions. Exchange of views and experiences and free conversation amongst the participants can cultivate a variety of opportunities. At present, key strategies of CAI-Asia are the establishment of local networks in economies and cities, and the identification of investment opportunities to assist in the implementation of AQM policies and strategies.

Within the Asian Development Bank, there have been a number of initiatives launched to facilitate a coherent understanding of the issues surrounding global climate change and how developing economies can benefit the introduction of **Clean Development Mechanism Facility (ADB-CDM Facility)** through the utilisation of capacity building mediums. The **Renewable Energy, Energy Efficiency and Climate Change (REACH)**, which was launched in 2001 is one of these initiatives. Similarly the **Carbon Market Initiative (CMI)**, which was established in 2006, is a new initiative that follows on from the activities undertaken by the ADB-CDM Facility³⁷, which ended in 2006. CMI will provide capacity building along with project co-financing facility, carbon credit marketing programme, and technical support for project preparation and implementation of CDM-eligible projects.

Research Organisations

There are many organisations in the APEC region which provide capacity building venues for energy/environment related issues. **APERC** is one such venue, with another being the **ASEAN Center for Energy (ACE)**. ACE proclaims one of its goals as “*to strengthen the region's capability in addressing global and regional issues in energy by enhancing the coordination of energy strategies of the ASEAN member [economies].*” To achieve this goal ACE employs strategies which include, “facilitating regular high-level policy dialogues” and “establishing nodal networking”. Examples of initiatives that have been undertaken in the ASEAN region to achieve the above goals and also actively promote capacity building include the **ASEAN-EC Energy Management Training and Research Centre**, the **ASEAN Energy Business Forum** and the **Regional Energy Policy and Planning Sub-Sector Network**. Similarly since 1996, APERC through the Institute of Energy Economics, Japan (IEEJ) has been conducting a programme known as the APERC Training Seminar. This programme refers to the regular running of special training sessions to build the capacity of energy researchers and analysts in energy data management and in demand/supply outlook preparation.

³⁷ ADB-CDM Facility has given the underlining finance to coalmine methane CDM projects in Shanxi and Liaoning provinces in the China and renewable energy projects in Indonesia.

Capacity Building through Professional Exchange

Often capacity building occurs at a conference that is set up with the private and public sector in attendance. At these conferences capacity building is achieved through both business networking and seminars/presentations that focus on prevailing issues in the current and future contexts as these issues will affect business. Both the **APEC Gas Forum (APGAS)** and the **GHG Emission Reduction from Industry in Asia and the Pacific (GERIAP)** are examples of initiatives that fall into this category of capacity building. The APGAS initiative focuses on encouraging dialogue between government, buyers, sellers and users of gas to foster a greater understanding of the needs and concerns of each other and how through the building of transparency and trust within the industry, superfluous regulation can be avoided. Likewise GERIAP also focuses on providing a venue through which all stakeholders are able to discuss the relevant issues amongst themselves, while propagating professional networks and partnerships and engaging businesses to improve the sustainability/performance of their operations.

TOOL BASED CAPACITY BUILDING

Capacity building activities focused at providing course attendants with standardised tools and approaches for addressing problems to solve will be covered in this section. Tools are like energy databases, models, data gathering methods, best practices, and/or energy audit procedures. Examples of approaches that are often taken include, training courses/workshops can introduce methodologies for energy/environmental policy planning and supply security assessment. Course attendants are usually trained by international technical experts on how to use the tools and apply them to their own economy.

Databases and Models

Under the **Joint Oil Data Initiative (JODI)**, through the cooperation of six international organisations the JODI World Database was officially launched in October 2005. However, in order to gather oil data and information of higher quality JODI has started to implement training workshops to enhance the capacity of local statisticians to collect and disseminate the required data. The 1st JODI Training workshop was held in Caracas from the 14-18 of August 2006 and had the following agenda, assessment of data quality, data gathering, legal framework and confidentiality of oil statistics. The workshop also gave trainees

the opportunity to compare country practices amongst each other to foster mutual understanding.

Best Practices

In relation to the formulation and implementation of “best practices”, in 2000, the APEC EWG established the **E-Commerce in Energy Initiative**, which has the aim of addressing the issue of E-commerce as it relates to energy, including barriers and the role of government. Over a period of several years a “compendium of “Best Practices” in Energy E-Commerce/Energy Services” was produced. With the aid of this publication APEC member economies are then able to use appropriate measures to implement these best practices within the context of their own economy. Moreover, the **Asia Pacific Partnership on Clean Development and Climate (APP)** with the aim of “*promoting an enabling environment for the development, deployment, and diffusion of technology*”, also has a number of capacity building activities. These activities are to help create a “road-map” and the derivation of “best practices” to help developing economies to reduce their “carbon” and environmental footprints.

PUBLIC AWARENESS

The goal of an initiative with educative activities is to evoke the awareness of the general public to a certain issue having been discussed internationally and ultimately to bring about political support. Strategies of how to engage the public have to be carefully prepared and policymakers are responsible to choose the right path to convey the proper messages to those who are not involved directly, but could suffer the ramifications of policy regulation designed to mitigate the issue, or when concerning an all encompassing issue such as global climate change will be affected as a result of environmental/lifestyle changes. These paths range from setting up a website with related information accessible to the public, to visible exposure at town meetings with the attendance of interested parties, which can include members both for and against the issue as well as experts.

Local journalists are often an important media to deploy relevant information, thus statesmen and policymakers try to “educate” these journalists, however, journalists naturally have other platforms through which they can acquire information and knowledge outside of official channels. For instance the **Alliance of Communicators for Sustainable Development (COM+)** is a partnership of international organisations and

professionals committed to using communications to advance a vision of sustainable development that integrates three main pillars, being economic, social, and environmental aspects.

The **APEC Energy Literacy Initiative** takes a slightly different approach to providing education on energy related issues to the general public. The ultimate goal of this programme is to “*promote energy education globally, thus improving energy literacy, which will help facilitate the appropriate use of energy*”. Under this initiative, which was established in 2003, education of both children and adults within the greater community is promoted through school-based programmes and courses for children and university courses/energy-related symposiums for adults. Moreover, there is a programme within this initiative that is specially tailored towards improving the literacy of the general population in developing economies. In this programme, interested communities that feel in need of educational training will request the dispatch of experts in a specific energy related field to help facilitate learning. Likewise, the invitation of trainees for energy education upon request from interested communities is also actively promoted. This type of educational initiative is taking a bottom-up approach to learning, in that through promoting a greater understanding of energy-related issues from a young age, when these members of society reach an age in which their actions and voice are able to make a difference in the economy, they will have the knowledge of how to make a difference.

Another example of an initiative that had its intention to educate the general public is the **LNG Public Education and Communication Information Sharing Initiative**. This initiative was formulated at the 6th Meeting of APEC Energy Ministers in Manila, the Philippines in 2004, where Ministers declared that “*economies should promote public education campaigns to build positive perceptions about LNG by highlighting its demonstrated safety and reliability and emphasising its economic, environmental and energy security benefits.*” In March 2005, an APEC LNG Workshop was held in Chinese Taipei which again suggested the enhancement of public information and education the promotion of LNG as one of the topics for future workshops. The system would be used as a framework to organise related information on a website, however, work on this website has to this point not progressed. The **Carbon Sequestration Leadership Forum** is also focussed on how to develop strategies to address the issues of public perception of carbon sequestration technologies.

CHALLENGES

From the viewpoint of capacity building, any gathering or meeting/ workshop that brings people together with a shared understanding of an issue (whether for or against it) is a type of capacity building.

COMMUNICATION

In all education and capacity building initiatives communication between the various participants and coordinators is at the heart of the issue and the most important aspect of any exchange of ideas or discussion. Therefore, it is essential that participants start out with a common understanding of the issue under discussion. Only through a common understanding can all of the various actors interact with each other to their fullest potential such that the discussion is fruitful and brings positive benefits to all participants.

There are examples of initiatives that have become politicised for various reasons, with the failure to reach a common understanding leading to a declaration that lacks “teeth” when it comes to the business end of implementation or measures to mitigate the issue under investigation.

CONFIDENTIALITY

The challenge of confidentiality can come up for a number of varying reasons. Often meetings that are carried out by heads of state or policy-makers/ministers are carried out behind closed doors, with the information not being made available to the public. In meetings that concern discussions between members of the business community there are often issues of confidentiality surrounding the circulation of data/information and/or presentations that contain company-specific information that is sensitive in nature. This may or may not elicit the meeting to employ the “Chatham House Rule”³⁸, such that anonymity of the speaker and company is kept long after the meeting has finished.

This challenge of confidentiality can be a barrier to the free-flow of discussion and the introduction of ideas that are innovative, but which are not widely understood within the public domain.

MEASURING EFFECTIVENESS

For an initiative whose prominent purpose is to provide education and capacity building activities, its performance can be measured by the effectiveness of communication.

In case of direct training courses and workshops, measuring the effectiveness of the course for the participants can be by the use of examinations or tests. This method of examinations is the only truly concrete method through which effectiveness can be acquired.

In the case of off-the-cuff meetings at the side of a conference or networking by business professionals it is much more difficult to quantitatively evaluate the effectiveness of the meeting. Being qualitative there is no true method from which to gauge the overall success of the conference and it remains up to each participant to take the messages obtained through discussion back to their economy and employ them in the derivation of policy.

Likewise, the evaluation of an initiative for education to the general public is extremely difficult to gauge. When the information is disseminated by websites on the Internet – the number of hits is often utilised as a method; however, this often falls short of the true picture. It should also be noted that the general public has many methods through which information about a specific issue can be investigated. One of the only available quantitative methods of determining the general public's understanding of a particular issue is utilisation of questionnaires and opinion polls; however, these are labour intensive to undertake and because they only sample a small portion of the total population are subject to a margin of error.

³⁸ "When a meeting or part thereof, is held under the Chatham House Rule, participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed"

IMPLICATIONS

PUBLIC ACCEPTANCE

Public acceptance is of extreme importance, both for public entities or business, when siting of any energy infrastructure is considered, or social conditions of energy consumption are going to be changed. Even for currently commercially viable technologies such as refineries, LNG, coal-fired and nuclear power plants there is a large degree of resistance from the public – primarily stemming from the NIMBY (Not in My Backyard) and BANANA (Built Absolutely Nothing, Anywhere Near Anything) syndromes. This is particularly the case when it comes to technologies that rely on nuclear and fusion energy or the eventual advent of the hydrogen economy. Making the public aware of the risks and benefits of each technology is an extremely important part of the international energy cooperation process. Moreover, making sure that the information is disseminated in a way in which all participants are able to understand fully the potential risks and benefits is indispensable.

CAPACITY BUILDING AND INFORMATION SHARING

All initiatives depend on the involvement of people, without which there would be no international cooperation on energy issues. A large majority of the initiatives that have been shown in this report are concerned with capacity building and information sharing, that is the formation of a platform from which people are able to come together and communicate/share knowledge about how issues are dealt with in their home economy and how best to approach the issue.

The building of capacity and information sharing should be at the forefront of all activities that are undertaken in relation to discussion and cooperation at the international level. By bring the “best minds” to the table the ability of all participants under an initiative to find the best available solution is enhanced greatly.

Building the capacity of human resources such that the level of expertise across all economies is of the same quality is another important aspect that should be considered. Often in addition to workshops and conferences “hands-on experience” at the economy level could be enhanced in such a way that all persons within a particular department or industrial sector have the same basic knowledge. However, relying on a

persons attending a conference to pass-on the knowledge gained as a result of capacity building may not always lead to the desired results – if for example the knowledge is not passed on to the people who are going to undertake the responsibility for doing the work.

LEVEL OF DEVELOPMENT

For many of the International Energy Initiatives that are outlined in this report there is a large difference between the expectations of developing and developed economies. The economic status of the economies significantly influences the behaviour of the actors. For the developed economies the aspect of national interests and benefits is an important consideration when undertaking an initiative. These economies generally have sufficient liquidity in their domestic credit markets that the funding of initiatives is not such a large concern; however, on the whole these economies will undertake projects that are in their best interests. On the other hand developing economies, which have difficulties in raising the required capital to finance initiatives, are often relegated to the “passenger seat” in relation to the operation of these initiatives. But it is these economies that are able to get the most benefits from the transfer of technology, knowledge and funding, thus they should be given a leading role in the formation and implementation of International Energy Initiatives.

BUSINESS INVOLVEMENT

Many of the International Energy Initiatives that are carried out by both the public and private sectors have two-fold aims. First, the business sector is often able to help in the funding of initiatives and also has a great deal of expertise overcoming many of the technical challenges encountered through undertaking research and development. Second, in the beginning subsidies are usually offered by the government to promote the initiative and to get the private sector committed, but over the long-term the commercialisation of the technology is one of the major factors behind bringing the private sector into such initiatives. Third, the operation of a transparent and open market system is a necessary prerequisite for businesses to operate in the international market. Thus elimination of barriers to trade and regulations that inhibit the ability of multinational businesses to operate at the international level is extremely important. With

the business sector aboard, the economics of multilateral energy co-operations are greatly enhanced.

RAPID CHANGES

One of the interesting aspects of International Energy Initiatives is the speed at which they can change direction. In most cases International Energy Initiatives are based on current topical issues that actors' – whether governments, policymakers or businesses – consider being important. However, new initiatives can change direction extremely quickly. For example, under the G8 a new communiqué is produced each year and the issues that are addressed can change swiftly. The Gleneagles Plan of Action (Climate Change, Clean Energy and Sustainable Development) was released in 2005; however, the following year this Plan of Action was incorporated as one section within the St Petersburg Plan of Action – Global Energy Security, as the initiative evolved to incorporate other important energy related issues in addition to climate change.

There are also instances where a conference or summit will bring about changes in the number of initiatives within a certain area. For instance, as a result of the World Summit for Sustainable Development in Johannesburg in 2002, there was an explosion in the number of initiatives intended to help mitigate and combat the issue of climate change, environmental issues and sustainable development.

Therefore, care should be taken to make sure that the initiative evolves over time to take into consideration the changes that are occurring at the international level. If an initiative fails to change and keep up with developments at the international level it runs the risk of losing funding from major donors, as the objectives now no longer meet the needs of the stakeholders. The implications of this funding deficit is to cause the stakeholders to pursue other sources of funding, or face the risk of having funding cut and the initiative dying.

AFTERWORD

In the second phase of the study on International Energy Initiatives analysis will be performed to

- ascertain the effectiveness of the initiatives that have been undertaken up to the present;
- identify and highlight possible overlapping areas between initiatives that are carried out by different organisation within the international community;
- examine possible gaps within each mode for international cooperation;

Ultimately providing policymakers in the APEC community with implications to strengthen cooperation in their joint effort to solve issues of securing energy supply and minimise environmental impact of energy consumption to keep on road for sustainable development in the APEC region.

ANNEX

| | |
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GLOSSARY

| Term | Definition |
|--|---|
| Actor | One who takes part; a participant <i>Dictionary of the English Language, Fourth Edition</i> <i>Copyright © 2000 by Houghton Mifflin Company.</i> |
| Aim | <ul style="list-style-type: none"> ▪ An anticipated outcome that is intended or that guides your planned actions; ▪ The direction or path along which something moves or along which it lies <i>TheFreeDictionary by Farlex</i> |
| BANANA syndrome | Built Absolutely Nothing, Anywhere Near Anything syndrome |
| Commercial viability of the initiative | Situation when business could make profits while total benefits for society overcome total social (external) costs due to initiative implementation |
| Driving force for the initiative | Actor's need or desire, which is deemed to be the motive for his activity in this initiative. This need or desire arises when difference between desired (wishful) future and current situation is considered |
| Education and capacity building | <ul style="list-style-type: none"> ▪ enhancement of the capacity of human resources with effective manners around an issue calling for solutions ▪ for statesmen, Capacity Building means abilities to exchange views with other statesmen with a set of common language around a new issue ▪ for policymakers such as government officials, Capacity Building means abilities to understand the problems and implications of a new issue in order to help statesmen to take political actions ▪ for peoples at working level (blue collars) training is needed to acquire knowledge and skills around a problem to solve ▪ general public needed education (energy and environment literacy) as it has been indirectly involved in the issue but has due concerns, so people became informed of government policies |
| Executive level of initiative | Body to implement initiatives' mechanism, and policy level decisions in order to comply with initiative's objectives |
| Financial mechanisms | Market-external in nature, innovative mechanisms, tools or funds to facilitate investment in the energy sector and in relation to environment. |
| Framework | Social, economic, environment, regulatory, information, technology <i>etc.</i> encirclement within which object is considered |
| Goal | The purpose toward which an endeavour is directed <i>TheFreeDictionary by Farlex</i> |
| Initiative | A coordinated strategy to reach explicit goals within energy-related problems, which is voluntarily undertaken to address the needs or ambitions of diverse partners. An initiative often evolves over time as such needs change. |
| Initiative participant | Those who are affected by initiatives, both active insiders and passive recipients of initiative's benefits |
| Initiative stakeholder (decision maker) | Active part of initiative participants, as they provide their power, assets or experience to facilitate and promote initiative's progress, thus deserved to have their voice in decision making process within initiative's governing body |

| Term | Definition |
|-----------------------------------|---|
| Infrastructure | <p>All kinds of facilities which are build, constructed, or manufactured to provide energy services to society:</p> <ul style="list-style-type: none"> ▪ exploration, development and production/extraction of primary energy (for example coal, biomass, wind, <i>etc.</i>) ▪ transformation of energy (for example electric power generation, oil refining to motor fuels, <i>etc.</i>) ▪ transmission and distribution (for example different voltage electric power transmission lines, oil/gas pipelines and stockpiles, LNG supply chains, <i>etc.</i>) ▪ provision of useful work or service (for example lightning/conditioning, transportation of passengers or goods, substance transformation during manufacturing processes, <i>etc.</i>) |
| Information sharing | <ul style="list-style-type: none"> ▪ timeless energy data or statistics (like data on oil supply, national energy balance tables, <i>etc.</i>) ▪ intelligence, news, knowledge and facts (about energy policy, regulation, technological research and development, best practices, business opportunities, <i>etc.</i>) |
| Intellectual property | Various legal entitlements that are attached to certain names, written and recorded media, and inventions or technologies |
| Legally Binding | A legally binding initiative is generally ratified by involved parties to make explicit that the initiatives goals or legal framework will supersede existing national laws (in the public case), and parties will generally be accountable for failure to observe the initiative through punitive action (public, private, or civil-though less clear for civil) |
| Method | <ul style="list-style-type: none"> ▪ a procedure, technique, or way of doing something, especially in accordance with a definite plan ▪ a manner or mode of procedure, esp. an orderly, logical, or systematic way of instruction, inquiry, investigation, experiment, presentation, etc ▪ order or system in doing anything ▪ orderly or systematic arrangement, sequence, or the like <p><i>Random House Unabridged Dictionary, © Random House, Inc. 2006</i></p> |
| Mode of the initiative | Course of action by implementing which ultimate purpose of the initiative could be achieved. Approach, that lead to the desired future situation of the object (ultimate purposes for energy infrastructure and it framework). |
| NYMBY syndrome | Not in my back yard syndrome |
| Negotiations | <p>Is the process that keeps regimes vital and alive, renewing and revising them as knowledge, problems, interests, norms, and expectations change</p> <p>GID (2003), p.3</p> |
| Organisation | <p>the persons who make up a body for the purpose of administering something</p> <p><i>WordNet® 2.1, © 2005 Princeton University</i></p> |
| Piggy – backing | Connection of remote domestic energy consumers to major transmission lines, or pipelines |
| Policy level of initiative | Body for establishing initiatives' objectives, mechanism, monitoring initiative's implementation and making decisions in order to comply with initiative's mission |

| Term | Definition |
|---|---|
| Problem situation | Occur when desired future result (goal) is vague and non-standard, and necessity for innovative procedures or mechanisms to reach such slopping goal is essential |
| Professional culture | Professionals may have their own special culture shaped by educational, formal training and common experience, and this culture may differ from his/her national or ethnic culture to a significant degree. |
| Purpose | A result or effect that is intended or desired; an intention <i>TheFreeDictionary by Farlex</i> |
| Regime | Principles, norms, rules and decision-making procedures around which actors expectations converge in a given issue area <i>Krasner, Stephen, ed. 1983, International Regimes. Ithaca, N.Y.: Cornell University Press</i> |
| Regulatory framework | <ul style="list-style-type: none"> ▪ modes to fulfil the other objectives of an initiative ▪ structure in void – codifying convention, policy, and protocol to govern in the grey areas which arise between legally-independent but needs-dependent actors. |
| Research and Development | <ul style="list-style-type: none"> ▪ activity that is undertaken by an organisation or a group of interested professionals/ parties with the aim of “adding value” to the “current state of the art” in a particular field or energy sub-sector ▪ new or novel approach to undertaking an activity (like development of new technologies) ▪ rationalisation/refinement of a technical process through which an “object” can be manufactured using less energy, fewer raw materials or contain a lower number of parts for easier disassembly and recycling |
| Situation | Relationships of the object considered and it’s framework |
| Stakeholder | Actors with an interest in the success of initiative |
| Strategy | A plan, method, or series of manoeuvres or stratagems for obtaining a specific goal or result <i>Random House Unabridged Dictionary, © Random House, Inc. 2006</i> |
| Target | A desired goal <i>TheFreeDictionary by Farlex</i> |
| Task situation | Occur when desired future result (goal) is well-known, and it is possible to build robust algorithm to reach it. |
| Ultimate purpose of the initiative | Desired future situation, which should be achieved after successful completion of initiative’s mission |
| Voluntary | Apart from such instances as international sanctions (public-public), military action (public-public), forced nationalization (public-private), hostile takeover (private-private), revolution (civil-public), boycott (civil-private), exploitation (private-civil, though questionable), etc., international "initiatives" are generally voluntary in nature - in contrast (especially in the public sector) with national initiatives, which are often, though not always, mandatory. It is important to note that a voluntary initiative can still be legally-binding (e.g. Kyoto Protocol, Energy Charter), but that voluntary formation necessarily affects the formation and goals of an initiative. |

ABBREVIATIONS AND ACRONYMS

| | |
|-----------------|---|
| ACE | ASEAN Centre for Energy |
| AFOC | ASEAN Forum on Coal |
| AMEM | ASEAN Ministers on Energy Meeting |
| ASCOPE | ASEAN Council on Petroleum |
| AQM | Air Quality Management |
| CA | Coordinating Agency |
| CDM | Clean Development Mechanism (under Kyoto Protocol) |
| CER | Certificate of Emission Reduction |
| CMM | Coal Mine Methane |
| CSP | Concentrating Solar Power |
| DMC | Developing Member Country |
| EE | Energy Efficiency |
| EE&C | Energy Efficiency and Conservation |
| ER | Emission Reduction (of GHG's) |
| ESCO | Energy Service Company |
| ESTIA | European Solar Thermal Power Industry Association |
| GHG | Greenhouse gas (six of them, as described in Kyoto protocol), and omitting those covered by Montreal convention |
| HAPUA | Heads of ASEAN Power Utilities/Authorities Forum |
| IAEA | International Atomic Energy Agency |
| IEA | International Energy Agency |
| INES | International Nuclear Event Scale |
| IRR | Internal Rate of Return |
| JI | Project of Joint Implementation (under Kyoto Protocol) |
| NCL | Non-conventional Literature |
| NGO | Non-government Organisation |
| NPO | Non-profit Organisation |
| NRE | New and Renewable Energies |
| ODA | Official Development Assistance |
| R&D | Research and development |
| RE | Renewable Energy |
| RPS | Renewable energy Portfolio Standard |
| SEIA | US Solar Energy Industries Association |
| SME | Small and Mid-Size |
| SOME | ASEAN Senior Officials on Energy Meeting |
| UNEP | United Nations Environmental Programme |
| VER | Verified Emission Reduction |
| WBCSD | World Business Council for Sustainable Development |
| WMD | Weapons of Mass Destruction |
| WWF | World Wide Fund For Nature |

INITIATIVE DATABASE

In order to understand the breadth, aims, and scope of International Energy Initiatives operating in the APEC region, APERC created an internal database to collate and describe a wide sample of initiatives. The following appendix is an output from this database and aims to give an easily understandable overview of existing energy initiatives with pertinent details included from each. Initiatives are arranged alphabetically, and several thematic indexes are provided for reference. The printed form which follows offers the following reader benefits:

- It is a useful reference for readers of the main body of the report, as it includes extended descriptive information about initiatives highlighted repeatedly (but not necessarily explained in full) in the main body of the report.
- It establishes, through numerous examples, a novel and comprehensive taxonomy for a wide range of International Energy Initiatives in the APEC region which can be used to better understand the extent, relationships, and shared characteristics of such initiatives.
- It allows the reader to make quick background and ancillary reference to initiatives, both discussed and not discussed but still highly relevant, while reading the main report.
- Moreover, the printed annex which follows is designed to be able to stand on its own as an independent reference. The report of the previous pages is enriched by the annex, and the annex, in turn, enriches the content of the report. However, on its own, the annex provides a clear, straightforward, and unique catalogue of International Energy Initiatives in the APEC region which has been specifically designed to be browsed in a physical format so that interested readers can better understand the state and extent of these initiatives – a primary goal of this study.

SCOPE

As described earlier, International Energy Initiatives in the APEC region for the purpose of this report are defined as:

International – involves partners in three or more APEC member economies (with either

multilateral or “unilateral” implementation structures)

Energy – focusing primarily on issues of energy security, the impact of energy on the natural environment, or both

Initiative – a coordinated strategy with explicit goals voluntarily undertaken to address the market-external needs or ambitions of diverse partners--an initiative often evolves over time as such needs change

Other “International Energy Initiatives” which might be seem important in the APEC region, but which do not conform to the definition above, are not included in this database output. Moreover, international *entities* or *organisations* (e.g. UN, ADB, ASEAN) are generally not included in their own right unless they originally began as an initiative and later evolved into their current organisation state (e.g. IAEA). Related to this, the scope of what should be considered as an “initiative” is subject to somewhat fuzzy interpretation. To address this concern, the database output presented here attempts to achieve consistency in its initiative inclusion with regard to cut-off levels and lifecycle processes.

With regard to time period, most listed initiatives are currently ongoing, however, a number of initiatives have also been formally concluded, replaced by a successor, or significantly changed in scope. Examples of such initiatives are included in the database output.

Finally, it is important to note that the database output which follows is *not exhaustive*. It is, however, quite extensive and attempts to represent the variety and overall nature of International Energy Initiatives in the APEC region. Focus, however, has been placed on initiatives with a strong influence from the public-sector, such as those launched or managed by international publicly-supported bodies. Such multilateral initiatives, therefore, are far better represented in the following output than “unilateral” (non-cooperatively managed but internationally implemented) initiatives, such as those often launched by civil society organisations or businesses. Such initiatives were deemed to have slightly different objectives from other multilateral initiatives, but illuminative examples are nevertheless included for the reader’s benefit. Omissions, however, should not necessarily be

interpreted as intentional, and reader input is appreciated regarding oversight or database errors.

CONTENT

TITLE

Official initiative title is provided, preceded by the short name of launching entity, if commonly used.

ABBREVIATION/SHORT NAME

Abbreviations are given only if commonly used by the initiative organisers or third parties.

START AND END DATES

Dates are listed for initiative founding or ratification and actual end date (if initiative has formally concluded).

PURPOSE

Icons represent the 2 possible energy-related purpose of the initiative: energy security (oil barrel icon) or energy and the environment (flowing river icon). Most initiatives belong to only one purpose category, few belong to both.

ACTORS

Labelled tabs represent the sectors which are directly involved or targeted in the initiative: public, civil, or business. Government of any level and international government-supported organisations, such as UN or WB, are considered public actors. Civil actors might include international environmental NGOs, independent non-profit research organisations, universities, religious groups, the general public, or any other civil society organisation. Business actors are generally local or multinational corporations which operate for profit and are private, publicly-listed, or state owned. Because, however, this report excludes initiatives which operate purely for profit in a “market-internal” sense, business involvement then demands that objectives of the initiative as a whole go beyond standard rent-seeking activities. A sector is not listed here if actor participation from that sector is limited purely to initiative funding as opposed to a degree of management or implementation.

MODES

Icons represent the six possible modes which characterise an initiative’s activity: infrastructure development (transmission tower icon), financial mechanisms (yen, dollar and euro symbols),

regulatory frameworks (legal document icon), research and development (Erlenmeyer flask icon), education and capacity building (alphabet icon), and information sharing (data stream icon). A single initiative may include all six modes, but generally, initiatives are categorised into the one or two most prominent mode for implementation.

MISSION STATEMENT

The (abbreviated) mission statement of the initiative is given, and quotation marks are used to indicate that the text has been copied from official initiative literature/source.

PARTICIPATING APEC MEMBER ECONOMIES

The name of each participating member economy from the APEC 21 is listed. The list is inclusive, so the appearance of a member economy’s name does not imply equal standing or participation in the initiative; initiative founding members, late-joiners, financiers and donors, implementation hosts, signatories, ratifying members, and directors are all listed together and in the same manner (for example, the Kyoto Protocol lists signatory-only United States as a participant alongside ratifying parties such as Russia, Japan, *etc.*).

OBJECTIVES

Objectives and goals for the initiative are listed in multiple fields, and quotation marks are used to indicate that the text has been copied from official initiative literature. Generally, initiatives will have 3-4 objectives which are more detailed or narrowly defined than the mission statement, but which do not explicitly cover the concrete steps or actions that are planned to implement the initiative and achieve the mission.

MECHANISMS

Mechanisms and outputs for the initiative are listed in multiple fields, and quotation marks are used to indicate that the text has been copied from official initiative literature. Generally, initiatives will have 3-4 mechanisms which describe the concrete actions or methods which will be used to reach the stated objectives. The mechanisms relied upon by the initiative generally dictate the initiative’s mode. Mechanisms are diverse, and examples include construction of pilot plants, holding of conferences and workshops, development of information databases, initiative timelines, or any number of other initiative activities. The mechanisms section may also list sub-initiatives that are organised under the listed initiative.

RESPONSIBLE ENTITIES

Responsible entities, if they exist, are listed according to their short names. These entities and organisations are often the founding or managing body for the initiative. Alternately, the responsible entity can be a logical organisational “parent” for the initiative. Many such responsible entities are international publicly-supported bodies or organisations, such as APEC, ASEAN, UN, or IEA.

SECRETARIAT

The initiative secretariat is the officially recognised entity to manage current initiative activity. Not all initiatives have permanent secretariats. Generally, the secretariat does not decide initiative policy, but is instead charged with organising implementation of governing body decisions.

COMPLIMENTARY INITIATIVES

Complimentary initiatives or entities, if they exist, are listed according to their short names (if the initiative is listed elsewhere in the IEI database) or long names (if unlisted). These are initiatives or entities with either formal or informal links to the initiative being described. Not all initiatives have complimentary initiatives. Often, a complimentary initiative might have overlapping objectives or similar mechanisms to the listed initiative. Alternately, complimentary initiatives can describe “sibling” initiatives which have exclusive objectives but which operate under the same parent organisation in a supplementary or supporting fashion.

SOURCE

The official initiative website is listed alongside other useful literature sources concerning the operations of that initiative.

| Initiative Database: Table of Contents | | Environment | Security | Infrastructure | Finance | Regulation | Research | Information | Education |
|---|-----|-------------|----------|----------------|---------|------------|----------|-------------|-----------|
| ADB Asia Least-Cost Greenhouse Gas Abatement Strategy | 107 | ☒ | | | | | | ● | ● |
| ADB Carbon Market Initiative | 108 | ☒ | | | | | | | ● |
| ADB Clean Development Mechanism Facility | 109 | ☒ | | | | | | | ● |
| ADB Energy Efficiency Initiative | 110 | ☒ | ☒ | | ● | | | | |
| ADB Renewable Energy, Energy Efficiency, and Climate Change | 111 | ☒ | | | | | | | ● |
| APEC Gas Forum | 112 | ☒ | | | | | | | ● |
| APEC Natural Gas Initiative | 113 | ☒ | | | | | ● | | ● |
| APEC Network of Minerals and Energy Data | 114 | ☒ | | | | | | ● | |
| ASEAN + 3 Framework for Comprehensive Economic Partnership (Energy Cooperation) | 115 | ☒ | | | | | ● | ● | ● |
| ASEAN Centre for Energy | 116 | ☒ | | | | | ● | ● | ● |
| ASEAN Energy Business Forum | 117 | ☒ | | | | | ● | | ● |
| ASEAN Forum on Coal | 118 | ☒ | ☒ | | | | | ● | ● |
| ASEAN Power Grid Initiative | 119 | ☒ | | | | | ● | | |
| ASEAN-EC Energy Management Training and Research Centre | 120 | ☒ | | | | | | ● | ● |
| ASEAN-Japan Framework for Comprehensive Economic Partnership (Energy Cooperation) | 121 | ☒ | ☒ | | | | ● | ● | ● |
| Asia Pacific Economic Cooperation 21st Century Renewable Energy Development Initiative | 122 | ☒ | ☒ | | | | ● | ● | ● |
| Asia Pacific Energy Research Centre (Energy Research Centre Initiative) | 123 | ☒ | | | | | ● | | ● |
| Asia Pacific Partnership on Clean Development and Climate | 124 | ☒ | | | | | ● | | ● |
| Canadian Cooperation Fund on Climate Change | 125 | ☒ | | | | | ● | | ● |
| Carbon Sequestration Leadership Forum | 126 | ☒ | | | | | ● | | ● |
| Cebu Declaration on East Asian Energy Security | 127 | ☒ | | | | | ● | | ● |
| Clean Air Initiative for Asian Cities | 128 | ☒ | | | | | | ● | ● |
| Clean Air Initiative in Latin American Cities | 129 | ☒ | | | | | | ● | ● |
| Com+ Alliance of Communicators for Sustainable Development | 130 | ☒ | | | | | | ● | ● |
| Comprehensive Action Initiative Recognising The Need For Strengthening The APEC Energy Security Initiative - Energy Security, Sustainable Development And Common Prosperity | 131 | ☒ | | | | | ● | | ● |
| Concentrating Solar Power Global Market Initiative | 132 | ☒ | | | | | ● | | |
| Danish Cooperation Fund for Renewable Energy and Energy Efficiency in Rural Areas | 133 | ☒ | | | | | ● | | ● |
| Dutch Cooperation Fund for Promotion of Renewable Energy, Energy Efficiency, and Greenhouse Gas Abatement | 134 | ☒ | | | | | ● | | ● |
| Earthquake Response Cooperation Initiative | 135 | ☒ | | | | | | ● | ● |
| EC- ASEAN COGEN Programme, COGEN 1 and 2 | 136 | ☒ | ☒ | | | | ● | ● | ● |
| EC- ASEAN COGEN Programme, COGEN 3 and Follow-up | 137 | ☒ | ☒ | | | | ● | ● | ● |
| EC-ASEAN Energy Facility | 138 | ☒ | ☒ | | | | ● | ● | ● |
| E-Commerce in Energy Initiative | 139 | ☒ | | | | | | ● | ● |
| Energy Charter Treaty | 140 | ☒ | | | | | ● | | |
| Energy Efficiency and Conservation Sub-Sector Network | 141 | ☒ | ☒ | | | | ● | ● | ● |
| Energy Efficiency and Renewable Energy Financing | 142 | ☒ | ☒ | | | | ● | ● | ● |
| Energy Efficiency in Buildings | 143 | ☒ | | | | | ● | ● | |
| Energy for Sustainable Development: The Contribution and Role of APEC Energy Working Group (WSSD Type 2 Partnership Initiative) | 144 | ☒ | | | | | | ● | ● |
| Energy Literacy Initiative | 145 | ☒ | | | | | | | ● |
| Energy Regulators Forum Initiative | 146 | ☒ | | | | | ● | | ● |
| Energy Security Initiative | 147 | ☒ | ☒ | | | | ● | ● | ● |
| Energy Standards and Labelling Cooperation Initiative | 148 | ☒ | | | | | ● | ● | |
| Energy Standards Information Development | 149 | ☒ | | | | | | ● | |

| | | Environment | Security | Infrastructure | Finance | Regulation | Research | Information | Education |
|--|-----|-------------|----------|----------------|---------|------------|----------|-------------|-----------|
| Environmentally Sound Energy Infrastructure Initiative | 150 | ✘ | ✘ | | | ● | | ● | |
| Environmentally Sound Power Infrastructure | 151 | ✘ | ✘ | | | | | ● | |
| EWG Business Network | 152 | ✘ | ✘ | | | ● | | | |
| Financing Green, High Performance Buildings and Communities in the APEC Region | 153 | ✘ | ✘ | | ● | ● | | ● | ● |
| Forum for Nuclear Cooperation in Asia | 154 | ✘ | ✘ | | | | ● | ● | ● |
| Framework for Cooperation on Energy Efficiency Testing Standards | 155 | ✘ | ✘ | | | ● | | ● | |
| Futuregen Alliance | 156 | ✘ | ✘ | | ● | | ● | | ● |
| Gas Exporting Countries Forum | 157 | ✘ | ✘ | | | | | | ● |
| Generation IV International Forum | 158 | ✘ | ✘ | | | | ● | | |
| GHG Emission Reduction from Industry in Asia and the Pacific | 159 | ✘ | ✘ | | | | | | ● |
| Gleneagles Plan of Action - Climate Change, Clean Energy and Sustainable Development | 160 | ✘ | ✘ | | | | ● | | ● |
| Global Environment Facility (Climate Change) | 161 | ✘ | ✘ | | ● | ● | ● | | |
| Global Gas Flaring Reduction | 162 | ✘ | ✘ | | ● | ● | | | ● |
| Global Village Energy Partnership | 163 | ✘ | ✘ | | | | | | ● |
| Gold Standard | 164 | ✘ | ✘ | | ● | ● | | | |
| Greater Mekong Subregion Economic Cooperation Program | 165 | ✘ | ✘ | | ● | ● | | | |
| Greenhouse Gas Protocol Initiative | 166 | ✘ | ✘ | | | ● | | | ● |
| IEA Advanced Fuel Cells | 167 | ✘ | ✘ | | | | ● | ● | |
| IEA Bioenergy | 168 | ✘ | ✘ | | | | ● | | |
| IEA Clean Coal Centre | 169 | ✘ | ✘ | | | | ● | ● | |
| IEA Climate Technology Initiative | 170 | ✘ | ✘ | | | | | ● | ● |
| IEA Cooperative Programme on Geothermal Energy Research and Technology | 171 | ✘ | ✘ | | | | ● | | |
| IEA Demand-Side Management | 172 | ✘ | ✘ | | | | ● | ● | |
| IEA Energy Conservation in Buildings and Community Systems | 173 | ✘ | ✘ | | | | ● | ● | ● |
| IEA Energy Technology Data Exchange | 174 | ✘ | ✘ | | | | | ● | ● |
| IEA Energy Technology Systems Analysis Program | 175 | ✘ | ✘ | | | | ● | ● | ● |
| IEA Enhanced Oil Recovery | 176 | ✘ | ✘ | | | | ● | | |
| IEA Environmental Safety and Economic Aspects of Fusion Power | 177 | ✘ | ✘ | | | | ● | ● | |
| IEA Fluidised Bed Conversion of Fuels Applied to Clean Energy Production | 178 | ✘ | ✘ | | | | ● | | ● |
| IEA Hydrogen Implementation Agreement | 179 | ✘ | ✘ | | | | ● | ● | ● |
| IEA Hydropower | 180 | ✘ | ✘ | | | | ● | ● | ● |
| IEA Networks of Expertise in Energy Technology | 181 | ✘ | ✘ | | | | | | ● |
| IEA Photovoltaic Power Systems | 182 | ✘ | ✘ | | | | ● | ● | ● |
| IEA Solar Heating and Cooling | 183 | ✘ | ✘ | | | | ● | ● | |
| IEA SolarPACES | 184 | ✘ | ✘ | | ● | | ● | ● | ● |
| Initiative for ASEAN Integration | 185 | ✘ | ✘ | | ● | ● | ● | ● | ● |
| Intergovernmental Collaborative Mechanism on Energy Cooperation in North-East Asia | 186 | ✘ | ✘ | | | | | | ● |
| International Atomic Energy Agency | 187 | ✘ | ✘ | | | ● | ● | ● | ● |
| International CFL Harmonisation Initiative | 188 | ✘ | ✘ | | | ● | | | |
| International Energy Programme Agreement/ International Energy Agency | 189 | ✘ | ✘ | | | ● | ● | ● | ● |
| International Nuclear Information System | 190 | ✘ | ✘ | | | | | ● | |
| International Partnership for the Hydrogen Economy | 191 | ✘ | ✘ | | | | ● | | ● |
| International Project on Innovative Nuclear Reactors and Fuel Cycles | 192 | ✘ | ✘ | | | | ● | | |
| International Thermonuclear Experimental Reactor | 193 | ✘ | ✘ | | | | ● | | |
| International Union for the Conservation of Nature and Natural Resources Climate Change Initiative | 194 | ✘ | ✘ | | | ● | | | ● |
| Japan Four-Point Initiative | 195 | ✘ | ✘ | | ● | | | | ● |
| Joint NEA/IAEA Group on Uranium | 196 | ✘ | ✘ | | | | | ● | |

| | | Environment | Security | Infrastructure | Regulation | Research | Information | Education |
|---|-----|-------------|----------|----------------|------------|----------|-------------|-----------|
| Joint Oil Data Initiative | 197 | | ☐ | | | | ● | ● |
| JREC Global Renewable Energy Policies and Measures Database | 198 | ☐☐☐ | | | | | ● | |
| Kitakyushu Initiative for a Clean Environment | 199 | ☐☐☐ | | | ● | ● | ● | ● |
| Korean Peninsula Energy Development Organization | 200 | ☐ | | ● | | | | |
| Kyoto Protocol to the United Nations Framework Convention on Climate Change | 201 | ☐☐☐ | | | ● | ● | | |
| LNG Public Education and Communication Information Sharing Initiative | 202 | ☐☐☐ | | | | | ● | ● |
| Measuring the Impacts of the Application of New Technologies on the Energy Sector in APEC Economies | 203 | ☐☐☐ | | | | ● | | ● |
| Methane to Market Partnership | 204 | ☐☐☐☐☐ | | | ● | ● | ● | ● |
| New and Renewable Sources of Energy Sub-Sector Network | 205 | ☐☐☐☐☐ | | | | ● | ● | ● |
| Northeast Asian Natural Gas & Pipeline Forum | 206 | ☐☐☐☐☐ | | ● | | ● | | ● |
| Nuclear Events Web-based System | 207 | ☐☐☐☐☐ | | | | | ● | |
| Nuclear Fuel Bank Initiative | 208 | ☐☐☐☐☐ | | | | ● | | |
| OECD Nuclear Energy Agency | 209 | ☐☐☐☐☐ | | | | ● | ● | ● |
| Patient Capital Initiative | 210 | ☐☐☐☐☐ | | | ● | | | |
| Pledge and Review Program | 211 | ☐☐☐☐☐ | | | | | ● | |
| Program on Best Practice in Energy Services | 212 | ☐☐☐☐☐ | | | | | | ● |
| Real-Time Emergency Information Sharing | 213 | ☐☐☐☐☐ | | | | | ● | |
| Reduce, Reuse and Recycle Initiative | 214 | ☐☐☐☐☐ | | | | | | ● |
| Regional Energy Policy and Planning Sub-Sector Network | 215 | ☐☐☐☐☐ | | | | | ● | ● |
| Renewable Energy and Energy Efficiency Partnership | 216 | ☐☐☐☐☐ | | | ● | ● | | ● |
| Rural Energy Enterprise Development | 217 | ☐☐☐☐☐ | | | ● | | ● | ● |
| St. Petersburg Plan of Action - Global Energy Security | 218 | ☐☐☐☐☐ | | | | ● | | ● |
| Strengthening Operational Aspects of APEC Energy Micro-Economic Reform | 219 | ☐☐☐☐☐ | | | | | | ● |
| Sub-Committee on Non-Conventional Energy Research | 220 | ☐☐☐☐☐ | | | | ● | ● | ● |
| Sustainable Development in Asia and the Pacific (WSSD Type I Initiative) | 221 | ☐☐☐☐☐ | | | | | | ● |
| Sustainable Energy Finance Initiative | 222 | ☐☐☐☐☐ | | | ● | ● | ● | ● |
| Training & Communication Program for Energy Regulators on the Benefits of Structure Reform | 223 | ☐☐☐☐☐ | | | | ● | | ● |
| Trans-ASEAN Gas Pipeline Project | 224 | ☐☐☐☐☐ | | ● | | ● | ● | ● |
| United Nations Framework Convention on Climate Change | 225 | ☐☐☐☐☐ | | | | ● | ● | ● |
| USEPA Integrated Environmental Strategies | 226 | ☐☐☐☐☐ | | | | ● | | ● |
| World Association of Nuclear Operators | 227 | ☐☐☐☐☐ | | | | | ● | ● |
| World Bank Asia Alternative Energy Program | 228 | ☐☐☐☐☐ | | | ● | ● | | ● |
| World Bank Carbon Finance Unit | 229 | ☐☐☐☐☐ | | | ● | | | ● |
| World Bank Energy Sector Management Assistance Program | 230 | ☐☐☐☐☐ | | | | ● | | ● |

| | | Environment | Security | Infrastructure | Finance | Regulation | Research | Information | Education |
|---|-----|-------------|----------|----------------|---------|------------|----------|-------------|-----------|
| <i>ADB Initiatives</i> | | | | | | | | | |
| ADB Asia Least-Cost Greenhouse Gas Abatement Strategy | 107 | ☒☒☒ | | | | | | ● | ● |
| ADB Carbon Market Initiative | 108 | ☒☒☒ | | ● | | | | | ● |
| ADB Clean Development Mechanism Facility | 109 | ☒☒☒ | | ● | | | | | ● |
| ADB Energy Efficiency Initiative | 110 | ☒☒☒ | ☒ | ● | | | | | |
| ADB Renewable Energy, Energy Efficiency, and Climate Change | 111 | ☒☒☒ | | ● | | | | | ● |
| Canadian Cooperation Fund on Climate Change | 125 | ☒☒☒ | | ● | ● | | | | ● |
| Clean Air Initiative for Asian Cities | 128 | ☒☒☒ | | | | | | ● | ● |
| Danish Cooperation Fund for Renewable Energy and Energy Efficiency in Rural Areas | 133 | ☒☒☒ | | ● | ● | | | | ● |
| Dutch Cooperation Fund for Promotion of Renewable Energy, Energy Efficiency, and Greenhouse Gas Abatement | 134 | ☒☒☒ | | ● | ● | ● | | | ● |
| Greater Mekong Subregion Economic Cooperation Program | 165 | | ☒ | ● | | | ● | | |

| <i>APEC EWG Initiatives</i> | | Environment | Security | Infrastructure | Finance | Regulation | Research | Information | Education |
|---|-----|-------------|----------|----------------|---------|------------|----------|-------------|-----------|
| APEC Gas Forum | 112 | | 000 | | | | | | ● |
| APEC Natural Gas Initiative | 113 | | 000 | | | ● | | | ● |
| APEC Network of Minerals and Energy Data | 114 | | 000 | | | | ● | | |
| Asia Pacific Economic Cooperation 21st Century Renewable Energy Development Initiative | 122 | 000 | 000 | | ● | ● | ● | ● | |
| Asia Pacific Energy Research Centre (Energy Research Centre Initiative) | 123 | | 000 | | | ● | | ● | ● |
| Comprehensive Action Initiative Recognising The Need For Strengthening The APEC Energy Security Initiative - Energy Security, Sustainable Development And Common Prosperity | 131 | | 000 | | | ● | | ● | ● |
| Earthquake Response Cooperation Initiative | 135 | | 000 | | | | | ● | ● |
| E-Commerce in Energy Initiative | 139 | | 000 | | | | | ● | ● |
| Energy Efficiency and Renewable Energy Financing | 142 | 000 | 000 | ● | ● | | | ● | ● |
| Energy for Sustainable Development: The Contribution and Role of APEC | 144 | | 000 | | | | | ● | ● |
| Energy Working Group (WSSD Type 2 Partnership Initiative) | 145 | | 000 | | | | | | ● |
| Energy Regulators Forum Initiative | 146 | | 000 | | | ● | | | ● |
| Energy Security Initiative | 147 | | 000 | ● | | ● | ● | ● | ● |
| Energy Standards and Labelling Cooperation Initiative | 148 | | 000 | | | ● | | ● | |
| Energy Standards Information Development | 149 | | 000 | | | | | ● | |
| Environmentally Sound Energy Infrastructure Initiative | 150 | 000 | | | | ● | | | ● |
| Environmentally Sound Power Infrastructure | 151 | 000 | | | | | | | ● |
| EWG Business Network | 152 | | 000 | | | ● | | | |
| Financing Green, High Performance Buildings and Communities in the APEC Region | 153 | 000 | | ● | ● | | | ● | ● |
| Framework for Cooperation on Energy Efficiency Testing Standards | 155 | | 000 | | | ● | | ● | |
| Joint Oil Data Initiative | 197 | | 000 | | | | | ● | ● |
| LNG Public Education and Communication Information Sharing Initiative | 202 | | 000 | | | | | ● | ● |
| Measuring the Impacts of the Application of New Technologies on the Energy Sector in APEC Economies | 203 | | 000 | | | ● | | | ● |
| Pledge and Review Program | 211 | 000 | | | | | | ● | |
| Program on Best Practice in Energy Services | 212 | | 000 | | | | | | ● |
| Real-Time Emergency Information Sharing | 213 | | 000 | | | | | ● | |
| Strengthening Operational Aspects of APEC Energy Micro-Economic Reform | 219 | | 000 | | | | | | ● |
| Training & Communication Program for Energy Regulators on the Benefits of Structure Reform | 223 | | 000 | | | ● | | | ● |

| <i>ASEAN Initiatives</i> | | Environment | Security | Infrastructure | Finance | Regulation | Research | Information | Education |
|---|-----|-------------|----------|----------------|---------|------------|----------|-------------|-----------|
| ASEAN + 3 Framework for Comprehensive Economic Partnership (Energy Cooperation) | 115 | | | | | | | | |
| ASEAN Centre for Energy | 116 | | | | | | | | |
| ASEAN Energy Business Forum | 117 | | | | | | | | |
| ASEAN Forum on Coal | 118 | | | | | | | | |
| ASEAN Power Grid Initiative | 119 | | | | | | | | |
| ASEAN-EC Energy Management Training and Research Centre | 120 | | | | | | | | |
| ASEAN-Japan Framework for Comprehensive Economic Partnership (Energy Cooperation) | 121 | | | | | | | | |
| Cebu Declaration on East Asian Energy Security | 127 | | | | | | | | |
| EC- ASEAN COGEN Programme, COGEN 1 and 2 | 136 | | | | | | | | |
| EC- ASEAN COGEN Programme, COGEN 3 and Follow-up | 137 | | | | | | | | |
| EC-ASEAN Energy Facility | 138 | | | | | | | | |
| Energy Efficiency and Conservation Sub-Sector Network | 141 | | | | | | | | |
| Initiative for ASEAN Integration | 185 | | | | | | | | |
| New and Renewable Sources of Energy Sub-Sector Network | 205 | | | | | | | | |
| Regional Energy Policy and Planning Sub-Sector Network | 215 | | | | | | | | |
| Sub-Committee on Non-Conventional Energy Research | 220 | | | | | | | | |
| Trans-ASEAN Gas Pipeline Project | 224 | | | | | | | | |

| | | Environment | Security | Infrastructure | Finance | Regulation | Research | Information | Education |
|--|-----|---|---|----------------|---------|------------|----------|---|---|
| <i>G8 Initiatives</i> | | | | | | | | | |
| Gleneagles Plan of Action - Climate Change, Clean Energy and Sustainable Development | 160 |  |  | | | | |  |  |
| Reduce, Reuse and Recycle Initiative | 214 |  |  | | | | | |  |
| St. Petersburg Plan of Action - Global Energy Security | 218 | |  | | | | |  |  |

| <i>OECD IEA Initiatives</i> | | Environment | Security | Infrastructure | Finance | Regulation | Research | Information | Education |
|--|-----|-------------|----------|----------------|---------|------------|----------|-------------|-----------|
| Concentrating Solar Power Global Market Initiative | 132 | ☹☹☹ | | | | | | | |
| IEA Advanced Fuel Cells | 167 | ☹☹☹ | | | | | | ●● | |
| IEA Bioenergy | 168 | ☹☹☹☹ | | | | | | ● | |
| IEA Clean Coal Centre | 169 | ☹☹☹☹ | | | | | | ●● | |
| IEA Climate Technology Initiative | 170 | ☹☹☹ | | | | | | ●● | ● |
| IEA Cooperative Programme on Geothermal Energy Research and Technology | 171 | | ☹☹ | | | | | ● | |
| IEA Demand-Side Management | 172 | ☹☹☹☹ | | | | | | ●● | |
| IEA Energy Conservation in Buildings and Community Systems | 173 | ☹☹☹☹ | | | | | | ●●● | ● |
| IEA Energy Technology Data Exchange | 174 | ☹☹☹☹ | | | | | | ●● | ● |
| IEA Energy Technology Systems Analysis Program | 175 | ☹☹☹☹ | | | | | | ●●● | ● |
| IEA Enhanced Oil Recovery | 176 | | | | | | | ● | |
| IEA Environmental Safety and Economic Aspects of Fusion Power | 177 | | ☹☹ | | | | | ●● | |
| IEA Fluidised Bed Conversion of Fuels Applied to Clean Energy Production | 178 | ☹☹☹☹ | | | | | | ● | ● |
| IEA Hydrogen Implementation Agreement | 179 | ☹☹☹☹ | | | | | | ●●● | ● |
| IEA Hydropower | 180 | ☹☹☹☹ | | | | | | ●●● | ● |
| IEA Networks of Expertise in Energy Technology | 181 | ☹☹☹☹ | | | | | | | ● |
| IEA Photovoltaic Power Systems | 182 | ☹☹☹☹ | | | | | | ●●● | ● |
| IEA Solar Heating and Cooling | 183 | ☹☹☹☹ | | | | | | ●● | |
| IEA SolarPACES | 184 | ☹☹☹☹ | | | | | | ●●● | ● |
| International Energy Programme Agreement/ International Energy Agency | 189 | ☹☹☹☹ | | | | ● | ● | ●●● | ● |
| Joint Oil Data Initiative | 197 | | ☹☹☹ | | | | | ●● | ● |
| JREC Global Renewable Energy Policies and Measures Database | 198 | ☹☹☹☹ | | | | | | ● | |

| <i>UN Family Initiatives</i> | | Environment | Security | Infrastructure | Finance | Regulation | Research | Information | Education |
|---|-----|-------------|----------|----------------|---------|------------|----------|-------------|-----------|
| Com+ Alliance of Communicators for Sustainable Development | 130 | ☹☹☹ | | | | | | ●● | ●● |
| GHG Emission Reduction from Industry in Asia and the Pacific | 159 | ☹☹☹ | | | | | | | ●● |
| Global Environment Facility (Climate Change) | 161 | ☹☹☹ | | | ● | ● | ● | | |
| Global Village Energy Partnership | 163 | ☹☹☹ | ☹☹☹ | | | | | | ●● |
| International Atomic Energy Agency | 187 | ☹☹☹ | ☹☹☹ | | | ● | ● | ●● | ●● |
| International Nuclear Information System | 190 | ☹☹☹ | ☹☹☹ | | | | | ● | |
| International Project on Innovative Nuclear Reactors and Fuel Cycles | 192 | ☹☹☹ | ☹☹☹ | | | ● | | | |
| Joint NEA/IAEA Group on Uranium | 196 | ☹☹☹ | ☹☹☹ | | | | | ● | |
| Joint Oil Data Initiative | 197 | ☹☹☹ | ☹☹☹ | | | | | ●● | ●● |
| Kitakyushu Initiative for a Clean Environment | 199 | ☹☹☹ | | | ● | ● | | ●● | ●● |
| Kyoto Protocol to the United Nations Framework Convention on Climate Change | 201 | ☹☹☹ | | | ● | ● | | | |
| Nuclear Events Web-based System | 207 | ☹☹☹ | | | | | | ● | |
| Nuclear Fuel Bank Initiative | 208 | ☹☹☹ | ☹☹☹ | | | ● | | | |
| Rural Energy Enterprise Development | 217 | ☹☹☹ | ☹☹☹ | | ● | | | ●● | ●● |
| Sustainable Development in Asia and the Pacific (WSSD Type I Initiative) | 221 | ☹☹☹ | | | | | | | ●● |
| Sustainable Energy Finance Initiative | 222 | ☹☹☹ | | | ● | ● | | ●● | ●● |
| United Nations Framework Convention on Climate Change | 225 | ☹☹☹ | | | | ● | ● | ●● | ●● |
| World Bank Carbon Finance Unit | 229 | ☹☹☹ | | | ● | | | | ●● |
| World Bank Energy Sector Management Assistance Program | 230 | ☹☹☹ | ☹☹☹ | | | ● | | | ●● |

| <i>WB Initiatives</i> | | Environment | Security | Infrastructure | Finance | Regulation | Research | Information | Education |
|--|-----|-------------|----------|----------------|---------|------------|----------|-------------|-----------|
| Clean Air Initiative for Asian Cities | 128 | ⌘⌘⌘ | | | | | | ●● | ●● |
| Clean Air Initiative in Latin American Cities | 129 | ⌘⌘⌘ | | | | | | ●● | ●● |
| Com+ Alliance of Communicators for Sustainable Development | 130 | ⌘⌘⌘ | | | | | | ●● | ●● |
| Global Environment Facility (Climate Change) | 161 | ⌘⌘⌘ | | | ●● | ●● | ● | | |
| Global Gas Flaring Reduction | 162 | ⌘⌘⌘ | | | ●● | ●● | | | ●● |
| Global Village Energy Partnership | 163 | | ⌘⌘ | | | | | | ●● |
| IEA Networks of Expertise in Energy Technology | 181 | ⌘⌘⌘ | ⌘⌘ | | | | | | ●● |
| World Bank Asia Alternative Energy Program | 228 | ⌘⌘⌘ | ⌘⌘ | | | ●● | ●● | | ●● |
| World Bank Carbon Finance Unit | 229 | ⌘⌘⌘ | | | ● | | | | ●● |
| World Bank Energy Sector Management Assistance Program | 230 | | ⌘⌘ | | | ● | | | ●● |

ADB Asia Least-Cost Greenhouse Gas Abatement Strategy

(ADB-ALGAS) 1995 - 2000



Public



"to provide technical assistance to 12 Asian nations to meet their commitments under the (UNFCCC), to raise their awareness, and to build their capacity to benefit from the Kyoto CDM"

Objectives

- "develop and enhance the national and regional capacities to prepare and report inventories of greenhouse gas (GHGs) sources and sinks" in 1990 and 2020
- "develop and install national and regional capacities to identify, formulate, and analyze GHGs abatement options"
- "prepare a portfolio for each participant country of GHGs abatement projects that are consistent with the national development objectives"
- "improve [the ALGAS-11's] understanding and estimates of the sources and sinks of GHGs emissions and the adverse impacts of climate change"
- "more effectively assess, based on acceptable and verifiable methodologies, the options for reducing sources and enhancing sinks of GHGs"
- "identify and implement cost-effective opportunities for limiting GHGs emissions, increasing GHGs sinks, and mitigating the adverse impacts of climate change"

APEC Economies

China
Indonesia
Korea
Philippines
Thailand
Viet Nam

Mechanisms

- A team of national technical experts (NTEs) undertook each country study, with the active involvement of governments through a designated national counterpart agency (NCA).
- The NTEs were drawn from the different institutions of each country, and were assisted in their tasks by a team of international technical experts (ITEs).
- regional training workshops
- "electronic networking" of participating country teams

Responsible Entities

ADB

Secretariat

ADB as "Executing Agency"

Complimentary Initiatives

ADB Capacity Building for Kyoto Protocol and CDM

ADB Carbon Market Initiative

(ADB-CMI) 2006 - present



Public

Business



"to support sustainable development goals of [ADB developing member countries], address global climate change concerns, and assist developed countries to meet their emissions reduction commitments"

Objectives

- "project co-financing facility"
- "carbon credit marketing program"
- "technical support for project preparation and implementation of CDM-eligible projects and their developers"

Mechanisms

- "upstream support in project preparation"
- "downstream support in project execution and commercialization"
- "technical, financial, legal, safeguards, governance; capacity development and policy reform; carbon credit valuation; documentation preparation for credits; obtaining host country approvals"
- "implementation and/or commissioning; monitoring and verification; certification and issuance of credits to Fund and project developers"
- ADB co-financing of projects, caps CDM transaction costs at USD 100,000, provides upfront loans worth 25-50% of future carbon credits

APEC Economies

Australia
 Brunei Darussalam
 Canada
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 New Zealand
 Papua New Guinea
 Philippines
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Responsible Entities

ADB

Secretariat

ADB acts as facilitator

Complimentary Initiatives

ADB-CDM Facility, ADB-EEL, Asia Pacific Carbon Fund

ADB Clean Development Mechanism Facility

(ADB-CDM Facility) 2003 - present



Public

Business



"help support national sustainable development goals in DMCs, address global climate change concerns, and assist developed countries to meet their [Kyoto] commitments"

Objectives

- "promote projects that contribute to poverty reduction, sustainable development, and greenhouse gas (GHG) mitigation"
- "lower CDM transaction costs by supporting CDM project identification, development, registration, and implementation"
- "help find competitive prices for Emission Reductions (ERs), or carbon credits, arising from projects"
- "facilitate access to underlying-finance by improving project viability"

Mechanisms

- for project developers: assistance in project identification, validation, documentation, government facilitation, and ERPA negotiation
- for DMC governments: coverage of upfront transaction costs, project risk guarantee, streamline transaction costs, assist in bidding process, capacity building
- for carbon buyers: ADB involvement mitigates financial, social, and environmental risk, rapid access to CERs, lower transaction costs, help with host country approval
- project focus areas include renewable energy, energy efficiency, sustainable agriculture, forestry
- ADB co-financing of projects, caps CDM transaction costs at USD 100,000, provides upfront loans worth 25-50% of future carbon credits

APEC Economies

Australia
 Brunei Darussalam
 Canada
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Philippines
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Responsible Entities

ADB

Secretariat

ADB acts as facilitator

Complimentary Initiatives

ADB-REACH, ADB-CMI, ADB-ALGAS

ADB Energy Efficiency Initiative

(ADB-EII) 2005 - present



Public

Business



"to expand ADB's annual investments in energy efficiency projects to USD 1 billion...in market segments that have a high priority for intervention, are suitable to ADB's role and strengths, and have replication and scale-up potential"

Objectives

- "phase I (2005-2006) establish rationale, prepare initial analysis of clean energy market and priorities, identify resource requirements"
- "phase II (2006-2007) develop country-level action plans according to ADB's Clean Energy Strategy and Action Plan"
- "phase III (2007-2010) implementation of non-lending and lending projects"

Mechanisms

- lending-based renewable energy and efficiency projects on both supply and demand sides:
 - renewable energy projects include: "solar, wind, small hydropower plants, biomass, biogas and bio-fuels, waves and tides, and geothermal energy sources" both on- and off-grid
 - supply side efficiency projects include: "improvements in energy conversion processes; the adoption of state-of-the-art technologies for power generation and machines that have higher operating efficiencies; transmission and distribution system improvements to minimize delivery losses for electricity, gas and district heat; and the production, capture and use of coal bed methane"
 - demand side efficiency projects in "all sectors"
- "Non-lending [energy efficiency] projects include assistance for DMCs in establishing market based incentives for [energy efficiency], such as appropriate government policies (tax rebates, efficiency standards and labels for appliances); monitoring and evaluation; enforcement of standards; and community awareness."

APEC Economies

Australia
 Brunei Darussalam
 Canada
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 New Zealand
 Papua New Guinea
 Philippines
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Responsible Entities

ADB

Secretariat

ADB

Complimentary Initiatives

ADB-CMI

ADB Renewable Energy, Energy Efficiency, and Climate Change

(ADB-REACH) 2001 - present



Public

*"ADB's Technical Assistance activities related to climate change, renewable energy and energy efficiency"***Objectives**

-to coordinate funding for climate-change related capacity building from 4 international trusts

-"reorientation of energy sector activities to address regional and global environmental impacts"

Mechanisms

-Canadian Cooperation Fund on Climate Change

-Danish Cooperation Fund for Renewable Energy and Energy Efficiency in Rural Areas

-Dutch Cooperation Fund for the Promotion of Renewable Energy and Energy Efficiency

-Finnish Technical Assistance Grant Fund

APEC Economies

Australia
 Brunei Darussalam
 Canada
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 New Zealand
 Papua New Guinea
 Philippines
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Responsible Entities

ADB

Secretariat

ADB coordinates funds with steering committee secretariat and working group

Complimentary Initiatives

ADB-CDM Facility, ADB-ALGAS

APEC Gas Forum

(APGAS) 2005 - present



Public

Civil

Business



"to achieve a common understanding amongst the Asia Pacific Economic Cooperation (APEC) economies on the actions necessary to ensure free and unhindered trade in gas and LNG"

Objectives

- "to enhance energy security by encouraging commercially sustainable cross-border gas trade in the region"

Mechanisms

- "facilitating a 'meeting of the minds' between senior members from all stakeholders in the Asia-Pacific gas trade - governments, regulators, industry, financiers and communities"

- "critically examining the functioning and interaction of gas markets regionally and globally to determine how the various players can contribute to the development of gas industry "best practice" in Asia-Pacific"

- "encouraging dialogue between government, buyers, sellers and users of gas to foster understanding of the needs and concerns of each"

- "building greater commercial transparency and community trust"

APEC Economies

Australia
Brunei Darussalam
Canada
Chile
China
Hong Kong, China
Indonesia
Japan
Korea
Malaysia
Mexico
New Zealand
Papua New Guinea
Peru
Philippines
Russia
Singapore
Chinese Taipei
Thailand
United States
Viet Nam

Responsible Entities

APEC EWG

Secretariat

organised by a Steering Committee comprising key executives drawn by the APEC EBN from the natural gas industry

APEC Natural Gas Initiative

1997 - 1999



Public

Business



Objectives

"provide to APEC Ministers a series of policy recommendations that will form a framework for the APEC economies to promote the acceleration of investment in natural gas supplies, infrastructure and trading networks in the region"

Mechanisms

-a series of workshops: organize discussion on the policy recommendations and provide an opportunity for APEC members and the business community to provide input to the initiative

-recommendations on policy submitted to APEC Energy Ministers for consideration

Responsible Entities

APEC EWG

Secretariat

A steering group oversees the initiative and is co-chaired by Japan and the US. Every APEC economy is invited to nominate a representative to the Steering Committee.

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

APEC Network of Minerals and Energy Data

(ANMED) 1997 - present



Public

Civil

Business

*"encouraging investment in minerals and energy exploration and development in the Asia Pacific Region"***Objectives**

- "facilitating capital investment in minerals and energy development within member economies, through providing easy access by small, medium and large enterprises to minerals and energy resource information, data and business opportunities"

- "facilitating strategic planning by member economies' governments, including definition of new trends, investment development, production, trade, transport and other aspects of exploration and development of their minerals and energy resources"

- "facilitating free flow of information between member economies on scientific and technological developments in the sustainable and environmentally-sound exploration and development of their minerals and energy resources"

Mechanisms

- "ANMED is a linked database that provides up-to-date Internet access to data and information on minerals and energy resources in the APEC region, and opportunities for investing and trading in them."

- "It contains a broad range of geoscientific data and information on APEC member economies' legal and regulatory frameworks, finance and investment opportunities, land access (including environment) and relevant educational institutions."

APEC Economies

Australia
Brunei Darussalam
Canada
Chile
China
Hong Kong, China
Indonesia
Japan
Korea
Malaysia
Mexico
New Zealand
Papua New Guinea
Peru
Philippines
Russia
Singapore
Chinese Taipei
Thailand
United States
Viet Nam

Responsible Entities

APEC EWG

Secretariat

EWG Expert Group on Minerals and Energy Exploration and Development

ASEAN + 3 Framework for Comprehensive Economic Partnership (Energy Cooperation)

(ASEAN+3 Cooperation) 2002 - present



Public

Civil



"to promote greater energy stability, security and sustainability" among ASEAN+3 partners

Objectives

- "achieve common goal of greater energy security and sustainability in the region"
- "diversify sources of primary energy supply in recognition of the expected increase of the region's dependency on imported oil in the future"
- "enhance energy exploration and wider utilization of indigenous energy resources"
- "strengthen partnership with China, Japan and ROK to address mutual issues and concerns in energy security, natural gas development, oil market studies, oil stockpiling and renewable energy"

APEC Economies

Brunei Darussalam
China
Indonesia
Japan
Korea
Malaysia
Philippines
Singapore
Thailand
Viet Nam

Mechanisms

- an annual meeting of senior officials, the SOME + 3 Consultations, "serves as a venue for high-level policy discussions and exchange of relevant information in the field of energy in the East Asia".
- establish the SOME+3 Energy Policy Governing Group (SOME+3 EPGG), which "provides overall policy direction and programme management for ASEAN + 3 energy cooperation"
- convene "five forums of experts... to serve as platforms for information and best practices sharing towards greater understanding of global and regional issues in energy security, natural gas, oil markets, oil stockpiles, and renewable energy and energy conservation and efficiency"
- develop an "ASEAN Plus Three Energy Security Communications System and enhance cooperation in natural gas through infrastructure development, investment promotion, trading arrangements and application of new technologies"

Responsible Entities

ASEAN SOME, Japan METI, China SPDC, Korea MOCIE

Secretariat

The SOME + 3 Energy Policy Governing Group (EPGG)

ASEAN Centre for Energy

(ACE) 1998 - present



Public

Business



"The ASEAN Centre for Energy will accelerate the integration of energy strategies within ASEAN by providing relevant information, state-of-the-art technology and expertise to ensure that over the long term, necessary energy development policies and programs are in harmony with the economic growth and the environmental sustainability of the region."

Objectives

- "(1) establish the Centre as a regional institution of excellence in the initiation, coordination and facilitation of ASEAN programmes in energy
- (2) strengthen the region's capability in addressing global and regional issues in energy by enhancing the coordination of energy strategies of the ASEAN Member Countries
- (3) facilitate intra-regional trade in energy through the establishment of interconnecting arrangements for electricity and natural gas within ASEAN such as the proposed Power Grid and Trans-ASEAN Gas Pipeline
- (4) promote ASEAN cooperation in energy efficiency and conservation as effective mechanisms for demand-side management
- (5) promote the development of new and renewable energy resources in the ASEAN as an instrument towards sustainable energy development in the ASEAN Member Countries over the long term
- (6) serve as an energy information network and exchange centre at both regional and global scales
- (7) enhance the development of ASEAN expertise in energy development and management
- (8) promote private sector investment and participation in energy activities of the region"

APEC Economies

Brunei Darussalam
Indonesia
Malaysia
Philippines
Singapore
Thailand
Viet Nam

Mechanisms

-"maintenance of the ACE website as an information clearinghouse for all ASEAN's energy related activities and subgroups; maintenance of the ASEAN Energy Database on the ACE website; establishment of the Green IPP Program website and newsletter"

-"focal point for international cooperation partners; representation of ASEAN as an official observer at the Energy Charter [Treaty] in Brussels;

-"implementation of the projects conducted with the EU-ASEAN Energy Facility (EAEF) and coordinating calls for proposals"

-coordinate the ASEAN Energy Awards, the ASEAN Energy Business Forum, workshops, trainings and meetings; produce ASEAN Energy Bulletin and the ACE Mid-week News

Responsible Entities

ASEAN SOME

Secretariat

governing council/ executive director

ASEAN Energy Business Forum

(AEBF) 1997 - present



Public

Business

*"to provide a unique platform for close interaction with government authorities, international and regional energy experts"***Objectives**

- "AEBF is a venue where policymakers and other stakeholders can meet to discuss potential private-public partnerships, and learn about opportunities in energy financing."

APEC Economies

Brunei Darussalam
Indonesia
Malaysia
Philippines
Singapore
Thailand
Viet Nam

Mechanisms

- "AEBF meetings include an exhibition area, the ASEAN Energy Awards night, and plenary sessions."

- "AEBF held in conjunction with the annual SOME/AMEM meetings, to give high profile visibility and attract greater participation of the private sector from ASEAN and non-ASEAN countries."

- "ACE will assist in organising the AEBF as well as pursuing the mission and objectives of the AEBF."

Responsible Entities

ASEAN SOME/AMEM

Secretariat

The AEBF is overseen by SOME, and ASEAN member countries take turn to host and organize the event.

Complimentary Initiatives

ACE

ASEAN Forum on Coal

(AFOC) 2000 - present



Public

Business

**Objectives**

- "to cooperate and promote sustainable development and utilisation of coal while addressing environmental issues and facilitating intra-ASEAN coal-related issues"

APEC Economies

Indonesia
Malaysia
Philippines
Thailand
Viet Nam

Mechanisms

- actions taken under 5 strategies:

- "(1) strengthen institutional and policy framework: provide assistance in policy reviews
- (2) promote clean coal technology (CCT): organize seminars on CCT; organise technical visits on CC; facilitate feasibility studies on CCT for rural electrification; facilitate/organise technical training on CCT including coal bed methane
- (3) promote private sector investments: organise investment seminars; facilitate feasibility studies on coal infrastructure projects and low rank coal projects
- (4) promote intra-ASEAN coal trade: update directories of coal specifications of consumers and producers (which will be uploaded in the AFOC website); facilitate feasibility studies on establishing an ASEAN coal commodity market; organise coal market seminars
- (5) promote environmental assessment of coal projects: provide assistance on environmental impact assessment of projects; organise seminars on environmental impact"

Responsible Entities

ASEAN SOME

Secretariat

AFOC Council and ACE

ASEAN Power Grid Initiative

(APG) 1997 - present



Public

Business



"to strengthen collective cooperation among ASEAN power utilities/ authorities in pursuing the ASEAN Power Grid for optimum use of energy resources for ASEAN development"

Objectives

- "interconnect the power grids of ASEAN countries through an integrated series of bilateral connections to create a single integrated ASEAN Grid"
- "optimise the generation sub-sector"
- "encourage critical private sector participation"
- "address barriers to interconnections"
- objective under the ASEAN Plan of Action for Energy Cooperation 1999-2004: "to establish the policy framework and implementation modalities of the electricity networks comprising the ASEAN Power Grid"
- objective under the ASEAN Plan of Action for Energy Cooperation 2004-2009: "to facilitate the implementation of the ASEAN Interconnection Master Plan and to further the establishment of policy framework of the electricity network comprising the APG"

APEC Economies

Brunei Darussalam
Indonesia
Malaysia
Philippines
Singapore
Thailand
Viet Nam

Mechanisms

- The ASEAN Interconnection Masterplan (AIMS) developed by the HAPUA in 2003
- "The [ASEAN] Power Grid is interconnected through a cooperative agreement among the power utilities/authorities of the ten countries. Although it is a regional grid, agreements are made bilaterally between the countries."
- The power system is split into two systems: East and West, with 11 interconnections.
- "AMEM has approved these 11 projects, of which only two are currently operational. Two other projects are scheduled to be commissioned by 2007, with three others to be begun by 2009. The remaining projects would commence after 2009, with the goal of all interconnections being operational by 2020."

Responsible Entities

ASEAN SOME

Secretariat

Heads of ASEAN Power Utilities/Authorities (HAPUA), a specialist organization under ACE, oversees the implementation of the ASEAN Power Grid.

ASEAN-EC Energy Management Training and Research Centre

(AEEMTRC) 1988 - 1999



Public



"to strengthen cooperation among the ASEAN countries and between ASEAN and the European Community (EC) in the field of energy through proper energy management to secure energy supply for economic and social development"

Objectives

- "operate... as a training centre, an information clearinghouse, and a focal point for ASEAN-EC cooperative projects"

APEC Economies

Brunei Darussalam
Indonesia
Malaysia
Philippines
Singapore
Thailand
Viet Nam

Mechanisms

- "organise exchange of research results on energy policy management, planning techniques, energy statistics and forecasting for institutes, administrations, industries and other institutions of ASEAN countries"

- "support energy research activities for ASEAN researchers and arrange joint ASEAN - EC energy management research programmes"

- "organise exchange of energy researchers between the ASEAN countries and the EC, in particular to act as an institutional link between ASEAN and European energy institutes, industries and administrations"

- "train energy planners and experts of the ASEAN countries at different levels of management"

- "assist in arranging short term training programmes and visits in European energy institutes and industries"

- This centre was replaced by ACE in 1999.

Responsible Entities

ASEAN SOME

ASEAN-Japan Framework for Comprehensive Economic Partnership (Energy Cooperation)

(ASEAN-Japan Cooperation) 1999 - present



Public



"to enhance dialogue partnership between ASEAN and Japan"

Objectives

- "provide for cooperation in the energy sector, particularly in oil stockpiling, natural gas utilization and promotion of energy efficiency"
- "strengthen multilateral and bilateral cooperation in the areas of energy, security, electricity infrastructure, natural gas, energy efficiency and conservation, and renewable energy"

Mechanisms

- "develop energy policy dialogue and support ongoing capacity building programmes under ASEAN-Japan cooperation such as the Energy Supply Security Planning in the ASEAN (ESSPA) and the Promotion of Energy Efficiency and Conservation (PROMEEC) to enhance energy security in East Asia"
- "cooperate in developing infrastructure, including energy facilities such as power stations, oil and gas pipeline network by using concessional loans, other schemes or private finance"
- convene an annual meeting of senior officials, the SOME-METI Consultations, "to enhance dialogue partnership between ASEAN and Japan"
- provide training workshops and study tours, conduct seminars and meeting, and conduct energy efficiency and conservation studies
- support ASEAN Energy Database (AED) development and analyze energy demand & supply and energy security situations
- develop a database, benchmarking system, and guidelines for energy conservation in buildings and industries

Responsible Entities

ASEAN SOME, Japan METI

Secretariat

SOME-METI Consultations

APEC Economies

Brunei Darussalam
Chile
Indonesia
Japan
Malaysia
Philippines
Singapore
Thailand
Viet Nam

Asia Pacific Economic Cooperation 21st Century Renewable Energy Development Initiative

(APEC 21st Century REDI) 2000 - present



Public

Civil

Business



REDI acts "as a base to link [various APEC renewable energy] projects together by way of a series of collaborative efforts that specifically address the renewable energy-based needs and issues of individual APEC member economies"

Objectives

- "advance the use of renewable energy for sustainable economic development and growth of the APEC region"

- "foster a common understanding of regional renewable energy issues, facilitating trade and investment in renewable energy technologies and services, and reducing the environmental impact of the energy sector through applications of renewable energy technologies"

- "develop with EGNRET a series of collaboration efforts that specifically address the renewable-energy-based needs and issues of these economies, as they relate to sustainable economic development and growth"

Mechanisms

- "build a web-based tool to facilitate renewable energy project development"

- organise meetings, workshops, seminars, and trainings; develop databases for information dissemination; conduct feasibility studies; and provide recommendations

- "Projects developed under the initiative take into consideration renewable energy infrastructure, development needs, training requirements, needs for analysis tools and methods, policy formulation, financing, joint-venture development, and the removal of trade barriers."

- Nine collaborative efforts created: (1) stakeholder dialogues, outreach forums and symposiums; (2) micro-business development; (3) renewable energy training and certification network (assess renewable energy training and accreditation needs for the APEC region); (4) renewable energy standards; (5) distribution resources (sharing); (6) renewable energy technology application (identification); (7) web-based renewable energy information dissemination; (8) financing (develop a roadmap); (9) alternative transport fuels (provide advice and measures)

- "Each collaborative effort [is] developed and implemented by multi-economy and multi-disciplinary "program teams", consisting [of] representatives from governments, the private sector, NGOs, utilities, and financing organisations. At least three APEC member economies [are] represented on each team."

APEC Economies

Australia
Brunei Darussalam
Canada
Chile
China
Hong Kong, China
Indonesia
Japan
Korea
Malaysia
Mexico
New Zealand
Papua New Guinea
Peru
Philippines
Russia
Singapore
Chinese Taipei
Thailand
United States
Viet Nam

Responsible Entities

APEC EWG

Secretariat

APEC Expert Group on New and Renewable Energy Technology (EGNRET)

Asia Pacific Energy Research Centre (Energy Research Centre Initiative)

(APEREC) 1996 - present



Public

Civil

**Objectives**

- "foster understanding amongst APEC economies of global, regional and domestic energy demand and supply trends, energy infrastructure development, energy regulatory reform and related policy issues in view of the regional prosperity."

Mechanisms

- "The role of this centre [is] related to the objectives of the EWG and it [is] bound by terms of reference agreed by the EWG and complies with the protocols and guidelines of APEC."

- "APEREC is guided by the APEC Energy Working Group through the Expert Group on Energy Data and Analysis (EGEDA). Its research and related activities are undertaken by visiting researchers from APEC member economies under a system of research fellowships as well as by several resident researchers from Japan."

- "APEREC conducts three types of research studies:

1. a regional energy outlook and...projections of energy demand and supply, energy analysis by sector and the development of energy models
2. analysis of energy policy issues that are identified as being of high priority by the EWG
3. [research] subjects [are] closely connected with the activities of the EWG's expert groups"

- "APEREC undertakes training courses for member economies that are designed to transfer knowledge on a broad range of energy subjects including energy demand and supply balances and energy demand projection techniques."

Responsible Entities

APEC EWG

Secretariat

Managed by APEC EWG Expert Group on Energy Data and Analysis (EGEDA)

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Asia Pacific Partnership on Clean Development and Climate

(AP6, APP) 2005 - present



Public

Business



"technology based" approach to CO2 reduction

Objectives

-to promote an enabling environment for the development, deployment, and diffusion of technology

APEC Economies

Australia
China
Japan
Korea
United States

Mechanisms

-eight public-private sector task forces carry out activities: cleaner fossil energy, renewable energy and distributed generation, power generation and transmission, aluminium, buildings and appliances, cement, coal mining and steel

-Each task force has its own set of objectives, mechanisms and projects for implementation. Activities generally include the following:

-research and development into the diffusion of existing technologies and methods to achieve efficiency improvements in existing industrial processes

-research and development into emerging cleaner technologies and measures to avoid the emission of GHGs and methods to reduce the emissions of CO2

-development and demonstration of a range of technologies to improve the economies of scale/lower cost of both new and existing technologies

-the creation of a "road-map" and the devising of best practises to help developing economies to reduce their "carbon" and environmental footprints

Secretariat

AP6 has a communiqué, Charter and Work Plan

Canadian Cooperation Fund on Climate Change

(Canadian Cooperation Fund) 2001 - present



Public



"to assist and engage ADB's developing member countries at the programming and policy level in the management and abatement of climate change to reduce the growth of greenhouse gas emissions"

Objectives

- "finance project preparation and capacity building through technical assistance operation for the promotion of renewable energy and energy efficiency"
- "assist projects with potential access to climate change convention-related mechanisms, including the Global Environment Facility and the Clean Development Mechanism"
- "support activities consistent with the evolving international rules regarding the use of official development assistance in the Clean Development Mechanism"
- "support carbon sequestration and adaptation to climate change"
- "fund technical assistance projects for the provision of policy advice, project preparation, training, institutional support, and other technical assistance and activities"

APEC Economies

Canada
China
Indonesia

Mechanisms

- priority given to PRC projects for greenhouse gas emissions reductions
- priority given to Indonesian projects for carbon sequestration
- priority given to "pacific country" projects for climate change adaptation

Responsible Entities

ADB

Secretariat

ADB-REACH steering committee, ADB-REACH working group

Complimentary Initiatives

PREGA, Danish Cooperation Fund

Carbon Sequestration Leadership Forum

(CSLF) 2003 - present



Public

Civil

Business



"facilitating development of cost-effective techniques for capture and safe long-term storage of carbon dioxide (CO₂), while making these technologies available internationally"

Objectives

- "identify key obstacles to achieving improved technological capacity"
- "identify potential areas of multilateral collaborations on carbon separation, capture, transport and storage technologies"
- "foster collaborative research, development, and demonstration (RD&D) projects reflecting members' priorities"
- "identify potential issues relating to the treatment of intellectual property"
- "organize collaboration with all sectors of the international research community, including industry, academia, government and non-government organizations; the CSLF is also intended to complement ongoing international cooperation in this area"

APEC Economies

Australia
Canada
China
Japan
Korea
Mexico
Russia
United States

Mechanisms

- "assess regularly the progress of collaborative R&D projects and make recommendations on the direction of such projects"
- "establish guidelines for the collaboration and reporting of their results"
- "establish and regularly assess an inventory of the potential areas of needed research"
- "develop strategies to address issues of public perception"
- "conduct such other activities to advance achievement of the CSLF's purpose as the Members may determine"

Secretariat

"The role of the Secretariat is administrative and the Secretariat acts on matters of substance as specifically instructed by the Policy Group." - there is a both a Policy and Technical Group

Complimentary Initiatives

Gleneagles Plan of Action

Cebu Declaration on East Asian Energy Security

2007 - present



Public



"to address the fundamental need of countries in East Asia for reliable, adequate, and affordable energy supplies which are essential for strong and sustainable economic growth and competitiveness"

Objectives

- "improve the efficiency and environmental performance of fossil fuel use"
- "reduce dependence on conventional fuels through intensified energy efficiency and conservation programmes, hydropower, expansion of renewable energy systems and biofuel production/utilisation, and for interested parties, civilian nuclear power"
- "encourage the open and competitive regional and international markets geared towards providing affordable energy at all economic levels"
- "mitigate greenhouse gas emission through effective policies and measures, thus contributing to global climate change abatement"
- "pursue and encourage investment on energy resource and infrastructure development through greater private sector involvement"

APEC Economies

Australia
Brunei Darussalam
China
Indonesia
Japan
Korea
Malaysia
New Zealand
Philippines
Singapore
Thailand
Viet Nam

Mechanisms

-Concrete mechanisms are not currently set. A broad outline of intended measures is currently provided by the ASEAN Secretariat at the source below.

Secretariat

ACE, along with other EAS participants

Complimentary Initiatives

ASEAN Power Grid, Trans ASEAN Gas Pipeline

Clean Air Initiative for Asian Cities

(CAI-Asia) 2001 - present



Public

Civil

Business



"to promote and demonstrate innovative ways to improve the air quality of Asian cities through partnerships and sharing experiences"

Objectives

- "sharing knowledge and experiences on air quality management"
- "improving policy and regulatory frameworks at the regional level"
- "piloting projects to encourage innovation"
- "assisting cities in implementing integrated air quality strategies"

APEC Economies

China
Indonesia
Philippines
Singapore
Thailand
Viet Nam

Mechanisms

- maintaining a website database of research, and air quality-related documents for member regions and hosting a discussion listserv
- organizing regional yearly Better Air Quality (BAQ) workshops to facilitate knowledge-sharing, regional collaboration/harmonization, strategy promotion
- implementing regional training networks (CATNet-Asia)
- spinning off "local network" partners (some legally separate entities, some not) in member nations for local implementation
- pilot projects and published reports on benchmarking and development of specific strategies or technologies
- encouraging public-private partnerships

Responsible Entities

ADB, WB

Secretariat

Secretariat jointly assumed by ADB and WB, structure, however, is that of an informal network of loose associates

Complimentary Initiatives

CAI-LAC

Clean Air Initiative in Latin American Cities

(CAI-LAC) 1998 - present



Public

Civil

Business



"to improve air quality in Latin American cities to protect the health of its habitants and to mitigate global pollution by bringing together the efforts of the appropriate authorities"

Objectives

- "to protect the health of habitants exposed to atmospheric contamination generated in the cities"
- "to promote the development and strengthening of clean air action plans in the cities, based on the participation of all the relevant actors"
- "to facilitate the exchange of knowledge and experience among participating members"
- "to facilitate public participation and the active involvement of the private sector to stimulate innovation in the use of low-emission, low-carbon technologies"
- "to achieve institutional and financial sustainability of the Initiative"

APEC Economies

Chile
Mexico
Peru

Mechanisms

- maintaining an website-based document database and listserv for discussion
- collaborative development of air quality action plans for member cities
- offering training workshops and distant learning courses on air quality issues

Responsible Entities

WB

Secretariat

WB acts as temporary "technical secretariat"

Complimentary Initiatives

CAI-Asia

Com+ Alliance of Communicators for Sustainable Development

(Com+, Complus) 2003 - present



Public

Civil

Business



"...use communications to advance a vision of sustainable development that integrates its three pillars: economic, social and environmental. By offering a platform to share expertise, develop best practice and create synergies, Com+ hopes to actively support creative and inspiring communications across the world."

Objectives

- "allow different types of organizations to work together, provide complementary expertise and resources that no one organization could provide alone"
- "enhance the role of communications and its impact on the advancement of sustainable development"
- "provide enhanced credibility to joint communication efforts"
- "to build a broad and action oriented communications platform that will facilitate outreach and interaction with global audiences"

Mechanisms

- "media development and support to media products in print, broadcast and electronic media "
- "creating credible platforms for exchange of ideas and knowledge on critical issues"
- "training of journalists and capacity building, especially in developing countries"
- Com+ identifies 5 focus areas for its activities, one of which is "environmental concerns related to energy" (specifically, atmosphere and climate change).

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Thailand
 United States
 Viet Nam

Responsible Entities

WB, UNEP

Secretariat

Secretariat in Costa Rica coordinates activities, Steering Committee of member representatives select activities

Complimentary Initiatives

GEF, WBCSD

Comprehensive Action Initiative Recognising The Need For Strengthening The APEC Energy Security Initiative - Energy Security, Sustainable Development And Common Prosperity

(CAIRNS Initiative) 2004 - present



Public

Civil

Business



CAIRNS reinforces "Members' commitment to implement the [APEC] ESI, and to address emerging challenges to energy security and reinforced the EWG's efforts to promote sustainable development and common prosperity in the APEC region"

Objectives

-[objectives are shared with original APEC ESI, and are enhanced with the following:]

-"to implement and enhance the short and longer-term measures identified in the ESI, including measures to promote sustainable development and common prosperity"

-"to assess the economic implications of high oil prices on the APEC region"

Mechanisms

-[initiative mechanisms are shared with APEC ESI]

APEC Economies

- Australia
- Brunei Darussalam
- Canada
- Chile
- China
- Hong Kong, China
- Indonesia
- Japan
- Korea
- Malaysia
- Mexico
- New Zealand
- Papua New Guinea
- Peru
- Philippines
- Russia
- Singapore
- Chinese Taipei
- Thailand
- United States
- Viet Nam

Responsible Entities

APEC EWG

Secretariat

APEC EWG

Complimentary Initiatives

ESI

Concentrating Solar Power Global Market Initiative

(CSP GMI) 2003 - present



Public

Business



"to facilitate and expedite the building of 5,000 MW of CSP power worldwide over the next 10 years"

Objectives

- "help create the conditions conducive for new CSP plants and to expedite their deployment"

Mechanisms

- "set targets for commercial, utility-scale CSP plants in each region, state and/or country"

- "establish policies and procedures in each region, state and/or country to secure cost-covering tariffs and/or bankable power purchase contracts or equivalent mechanisms to allow CSP plants to be financed and to avoid limitations on CSP plants that make them more costly"

- "assist utilities in understanding how CSP might be integrated into their capital expansion plans and facilitate the process of bringing buyers of electricity and developers of CSP plants together"

- "The collaborative effort ... will assure that the market introduction cost of CSP will be reduced by aggregating the CSP market and making best use of existing clean power instruments. All participating countries will be helped in reaching their Kyoto goals."

APEC Economies

Australia
Canada
Chile
China
Indonesia
Japan
Korea
Malaysia
Mexico
New Zealand
Papua New Guinea
Peru
Russia
Thailand
United States
Viet Nam

Responsible Entities

IEA SolarPACES, ESTIA, SEIA

Secretariat

executive committee

Danish Cooperation Fund for Renewable Energy and Energy Efficiency in Rural Areas

(Danish Cooperation Fund) 2002 - 2004



Public



"to support promotion of renewable energy in rural areas and small towns"

Objectives

- "reduce poverty and to improve living conditions for communities in areas underserved by national power grids and other forms of modern energy"
- "promote greenhouse gas abatement"
- "promotion of energy efficiency and cleaner fuels in energy supply systems and increase efficiency and conservation at the end use levels"

APEC Economies

China
Indonesia
Philippines

Mechanisms

- "finance technical assistance including project preparation, training and advisory services, and institutional support"
- "support activities on renewable energy in rural areas and small towns"
- "focus on increased energy efficiency and cleaner fuels"

Responsible Entities

ADB

Secretariat

ADB-REACH steering committee, ADB-REACH working group

Complimentary Initiatives

PREGA, Canadian Cooperation Fund

Dutch Cooperation Fund for Promotion of Renewable Energy, Energy Efficiency, and Greenhouse Gas Abatement

(PREGA) 1995 - 2006



Public



"to promote investments in renewable energy, energy efficiency and greenhouse gas abatement technologies in developing member countries"

Objectives

- "increase access to energy services by the poor"
- "help reduce greenhouse gas emissions"
- "realize other strategic development objectives"

APEC Economies

China
Indonesia
Philippines
Viet Nam

Mechanisms

- "develop capacities of national policymakers, technical experts, and staff of financing institutions"
- "support policy, regulatory, and institutional reforms, including removal of energy pricing distortions"
- "facilitate access to private sector financing"
- regional workshops held
- demonstration projects planned, implemented, and evaluated in 18 DMCs

Responsible Entities

ADB

Secretariat

ADB and "National Counterpart Agencies (NCAs), National Implementation Committee (NICs), and National Technical Experts (NTEs)"

Complimentary Initiatives

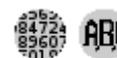
Canadian Cooperation Fund, Danish Cooperation Fund

Earthquake Response Cooperation Initiative

2000 - 2003



Public



"to identify and verify the causes for the earthquake, operate the emergency communication system and make it functional after the earthquake, re-locate the emergency energy supply system, investigate of the damage condition for the energy supply system resulted from earthquake, execute the rescue action according the rescue plan, implement the plan for the rebuilding of energy supply system"

Objectives

- "enhance and establish a mechanism on the sharing of information and experience among the member economies for preventing the damage of energy supply system during and after earthquakes"
- "improve the regional capabilities for rehabilitating the energy supply system"
- "set up the networks of contingency mechanism to improve the regional security of energy supply"
- "promote rescue cooperation and mitigate the impacts of earthquakes on energy supply infrastructure"

Mechanisms

- "Information sharing: exchange earthquake related information and experience by conducting seminars and translating relevant information into English"
- "Policy dialogue: for encouraging the awareness and harmonizing institutional measures of preventing severe damages, related policy dialogue should be established at the level of EWG meeting"
- "Emergency reactions: set up contingency communication system to monitor the rescue action, and establish the database to obtaining resources for emergency energy supply"
- "Rescue cooperation: establishing a database for assessing various resources of emergency energy supply within the member economies and exchanging necessary technologies for emergency energy supply should be promoted"
- "Rehabilitation program: rehabilitation programs should be advised for the reference of member economies. Information acquisition and management system in the aftermath should be developed"
- The actions of initiative included workshop, seminars and publication of manuals

Responsible Entities

APEC EWG

Secretariat

Chinese Taipei

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

EC- ASEAN COGEN Programme, COGEN 1 and 2

(COGEN 1/ COGEN 2) 1991 - 2002



Public

Business

*"an economic co-operation programme aiming at transferring clean and efficient biomass energy technologies from Europe to ASEAN"***Objectives**

-"The long term objectives of the programme:

- (1) increase Euro-ASEAN economic exchanges;
- (2) reduce ASEAN dependence on oil for energy requirements;
- (3) reduce the environmental load from the energy and waste sectors."

-"The immediate objectives:

- (1) increase the awareness of European technologies in the ASEAN market,
- (2) increase the awareness of EU suppliers of the ASEAN market opportunities and capabilities."

-" COGEN 1 ... is essentially a technically focussed identification phase for COGEN 2"

-"COGEN 2 ... aims at further demonstrating the technical reliability, economic viability and environmental friendliness of European technologies within the ASEAN wood and agro-industries."

APEC Economies

Brunei Darussalam
 Indonesia
 Malaysia
 Philippines
 Singapore
 Thailand
 Viet Nam

Mechanisms

-COGEN 1 (1991 - 1994):

"seven Full Scale Demonstration Projects (FSDPs) selected and implemented in the wood and rice industries" with maximum capacities limited to 2.5MW

-COGEN 2 (1995 - 1998):

"nine other FSDPs implemented in the rice, palm oil, wood and rubber industries" with maximum capacities of 10MW

Responsible Entities

ASEAN SOME, EC

Secretariat

COGEN 3 Programme Management Unit; Asian Institute of Technology

Complimentary Initiatives

COGEN 3

EC- ASEAN COGEN Programme, COGEN 3 and Follow-up

(COGEN 3/ COGEN 3 Follow-up) 2002 - present



Public

Business

*"an economic co-operation programme aiming at transferring clean and efficient biomass energy technologies from Europe to ASEAN"***Objectives**

-COGEN 1 and 2 comprise the long term and the immediate objectives of the Programme

-COGEN 3 aims to

"(1) accelerate the implementation of proven, clean and efficient cogeneration technologies using biomass, coal and gas as fuels within the industrial sectors of the ASEAN region

(2) act as a business facilitator serving the cogeneration market in South East Asia, in defining and matchmaking appropriate technology supplied by European Equipment Suppliers to ASEAN end-users. In addition assistance was provided throughout the process to ensure smooth implementation of the projects."

APEC Economies

Brunei Darussalam
 Indonesia
 Malaysia
 Philippines
 Singapore
 Thailand
 Viet Nam

Mechanisms

-COGEN 3 (2002 - 2004): National Cogeneration Weeks organized in 2003 and 2004 with over 50 seminars and trainings covering biomass and coal/gas cogeneration technologies

-Identification and feasibility studies of over 200 cogeneration projects at different stages of development, with eight promising cases implemented as FSDPs 2004

-cultivate "partnerships between ASEAN industries and power producers and European equipment suppliers"

-COGEN 3 Follow-up (2005 -): technical, financial, environmental, and socio-economic performance of FSDPs monitored and results distributed during seminars

Responsible Entities

ASEAN SOME, EC

Secretariat

COGEN 3 Programme Management Unit; Asian Institute of Technology

Complimentary Initiatives

COGEN 1 and 2

EC-ASEAN Energy Facility

(EAEF) 2002 - 2007



Public

Civil



"to facilitate partnerships between ASEAN and European organisations in developing specific joint regional projects in the energy sector"

Objectives

- "increase the security of energy supply of ASEAN countries and indirectly of Europe"
- "increase economic cooperation between European Union and ASEAN countries"
- "improve environment at local and global levels"
- "facilitate the implementation of the ASEAN Plan of Action for Energy Cooperation 1999-2004, and subsequently its continuation for 2004-2009"

APEC Economies

Brunei Darussalam
Indonesia
Malaysia
Philippines
Singapore
Thailand
Viet Nam

Mechanisms

-EAEF focuses on: "(1) electricity, focusing on the interconnection of the ...ASEAN Power Grid, the reduction of generation losses and the modernisation of distribution companies; (2) natural gas, with emphasis on gas transmission, the TAGP (Trans-ASEAN Gas Pipeline) and distribution; (3) clean coal technology ; (4) energy efficiency, and; (5) renewable energy".

-Project classification based on:

- (1) "increasing market awareness" - 10 projects
- (2) "adapting institutional frameworks" - 28 projects
- (3) "conducting feasibility studies" - 25 projects
- (4) "implementing demonstration projects" - 4 projects
- (5) "institutional strengthening and development" - 10 projects

-Typical actions supported include: "workshops, high level meetings, study tours, exchange of personnel, master plans, strategic studies, policy formulation, secondment of experts in ASEAN, staff placement in EU, training, provisions of expertise, travel, documentation and misc. study costs, contribution to equipment costs, training of O&M staff, independent monitoring, service and framework contracts," and information exchange.

-projects are "formulated by a group of at least three partners (two from the EU member countries and one ASEAN public or private entity)"

Responsible Entities

ASEAN SOME, EC

Secretariat

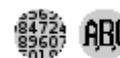
ACE

E-Commerce in Energy Initiative

2000 - present



Public



"establish an E-Commerce Energy Task Force to address the issue of E-commerce as it relates to energy, such as the barriers and the role of government"

Objectives

- "to understand [the] status of energy e-commerce sector"
- "to assess the potential of the energy e-commerce sector in international energy trade"
- "to evaluate the limitations of e-commerce in the specific energy market of oil, gas and electricity"
- "to identify the institutional barriers to e-commerce and recommend policy measures to overcome those barriers"
- "to identify the role of government in promoting the energy e-commerce sector by improving infrastructure, harmonizing regulations, etc."

Mechanisms

- 1st workshop on e-Commerce in Energy and Energy Services
- 2nd workshop concentrated on electricity or natural gas and the role of E-Commerce in these markets - focusing on information exchange and the workshop should be compatible with and not duplicate the work of broader APEC groups on E-Commerce and Services or the application on Services currently before the World Trade Organisation
- 3rd workshop produced a compendium of "Best Practice" in Energy E-Commerce/Energy Services

Responsible Entities

APEC EWG

Secretariat

Korea and Pacific Economic Cooperation Council (PECC)

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Energy Charter Treaty

(ECT) 1994 - present



Public

Civil



"to strengthen the rule of law on energy issues by creating a level playing field of rules to be observed by all participating governments, thereby mitigating risks associated with energy-related investments and trade"

Objectives

-create a regime for "inter-governmental cooperation in the energy sector, covering the whole energy value chain (from exploration to end-use) and all energy products and energy-related equipment"

-"provide a stable interface between the foreign investor and the host government" once a (foreign) energy investment is made inside a member economy signatory

-the ECT secretariat also notes, "The Treaty does not create investment opportunities for companies by forcing open access to resources or defining a certain market structure for Energy Charter member countries. These are sovereign decisions for member governments."

APEC Economies

Australia
Japan
Russia

Mechanisms

-"binding protection for foreign energy investors against key non-commercial risks, such as discriminatory treatment, direct or indirect expropriation, or breach of individual investment contracts"

-"member countries are under an obligation to facilitate energy transit in line with the principle of freedom of transit and not to interrupt or reduce established energy transit flows"

-"member countries use the Energy Charter as a forum to exchange information on programmes and policies that have been successful in improving energy efficiency", but energy efficiency/environmental targets and policies are non-binding

-Legally binding international arbitration panels, including ICSID and SCC but not the Secretariat, exist to resolve disputes between member states or private investors, and can enforce both "financial and reputational costs".

-Special, sub-arbitration-level mechanisms exist to address transit disputes, where an "independent conciliator" is appointed to help resolve disputes, and in the case of no swift resolution, can enforce interim transit tariffs for up to one year while negotiations continue.

-An additional clause, the Transit Protocol (currently under negotiation), is designed to clarify the responsibilities of members regarding transit and pipeline tariff methodology (e.g. third-party access to domestic pipeline infrastructure).

Responsible Entities

member states

Secretariat

Energy Charter Secretariat

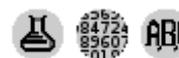
Energy Efficiency and Conservation Sub-Sector Network

(EE&C SSN) 1995 - present



Public

Business



"to reduce energy consumption without reducing the use of energy-consuming plants and equipment"

Objectives

- "strengthen cooperation in energy efficiency and conservation through institutional capacity building and increased private sector involvement including enhancing public awareness as well as expanding markets for energy efficient products"

APEC Economies

Brunei Darussalam
Indonesia
Malaysia
Philippines
Singapore
Thailand
Viet Nam

Mechanisms

- share EE&C information through the ACE website
- research and develop energy and labelling standards within ASEAN
- conduct seminars, training, workshops to enhance business involvement
- provide trainings for capacity building or technology transfer and demonstration
- promotion of ESCO business and EE in the transport sector

Responsible Entities

ASEAN SOME

Secretariat

Coordinator of the EE&C SSN; ACE

Energy Efficiency and Renewable Energy Financing

(EERE Financing) 2005 - present



Public

Business



"scale up financing by closing gaps between project development and financing and focus on market development"

Objectives

- "facilitate energy investment in the APEC region"

Mechanisms

- "public private partnerships to address unique risk profiles and investment hurdles of these projects"

- "focus on building local financial/commercial infrastructure to link private capital with project development"

- "develop new business models to commercialize and build self-sustaining financing"

- "develop an IFAT (Implementation Facilitation Assistance Team) technical assistance program that is practically oriented and flexibly designed to provide training and assistance to local financial institutions and commercial entities in participating economies in developing and marketing specialised financial products and in using standardised tools and documents to mobilise private capital for energy efficiency and renewable energy projects"

- projects approved in 2005 on four areas:

- (1) development of renewable and energy efficiency best practices and guidelines for APEC region capital market development;
- (2) developing market capacity to commercialize financing on clean and more efficient energy projects;
- (3) local banks training program for financing energy;
- (4) information sharing on financing public sector energy efficiency and renewable energy projects

Responsible Entities

APEC EWG

Secretariat

initiative task force led by the US

Complimentary Initiatives

APEC ESI; APEC Financing Green, High Performance Buildings and Communities in the APEC Region

APEC Economies

Australia
Brunei Darussalam
Canada
Chile
China
Hong Kong, China
Indonesia
Japan
Korea
Malaysia
Mexico
New Zealand
Papua New Guinea
Peru
Philippines
Russia
Singapore
Chinese Taipei
Thailand
United States
Viet Nam

Energy Efficiency in Buildings

(EEB) 2006 - present



Public

Civil

Business



"by 2050 new buildings will consume zero net energy from external power supplies and produce zero net carbon dioxide emissions while being economically viable to construct and operate"

Objectives

- "remove barriers to energy-efficient concepts in new and existing buildings"
- "produce a roadmap for reaching energy self-sufficiency in buildings by 2050, while being economical and socially acceptable"

Mechanisms

- develop "new technologies and practices with regard to improved energy efficiency in buildings"
- "The project comprises three phases, each producing reports that together form a roadmap to transform the building industry. Each report takes one year to complete and involves hearings and conferences with building contractors and suppliers, sustainability experts, government representatives, regulators, utility officials and others"
- "work ... to map how to transform the building industry, using a business perspective, from finance and design to operation"
- "Working programme:
 - (1) gather information to understand the barriers to change
 - (2) identify what needs to change at each stage of the value chain and how to make change happen
 - (3) issue a call to action to everyone involved with energy consumption in buildings in 2009"
- "frequent communication and events around the world, engaging opinion leaders and stimulating debate"
- "Workshops and conferences held in Brazil, China, Europe, India, Japan and the US"

APEC Economies

Australia
 Canada
 Chile
 China
 Hong Kong, China
 Japan
 Korea
 Mexico
 Russia
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Responsible Entities

WBCSD

Secretariat

WBCSD, Lafarge, United Technologies Corporation

Complimentary Initiatives

APEC Financing Green, High Performance Buildings and Communities in the APEC Region; IEA-ECBCS; IEA-SHC

Energy for Sustainable Development: The Contribution and Role of APEC Energy Working Group (WSSD Type 2 Partnership Initiative)

2002 - present



Public

Business



Objectives

- "demonstrate to a global audience how voluntary regional partnerships can be effectively utilised to achieve sustainable development objectives"

Mechanisms

- WSSD "sustainable development principles [are] introduced in the consideration of EWG projects and directed the EWG Secretariat to examine how [they] could be achieved".

- APEC EWG-WSSD focus principles include:

- "(1) strengthening the security and reliability of affordable energy to all within our APEC community
- (2) promoting clean and efficient technologies, and the efficient use of energy to achieve both economic gains and environmental enhancement
- (3) achieving environmental improvement of energy production, use and mineral extraction within our APEC community
- (4) harnessing all expertise available to the EWG to give effect to the above objectives"

- "To monitor the progress of its implementation, a progress report is tabled at each EWG meeting that outlines activities undertaken since the last EWG meeting" and submitted to WSSD.

- incorporate sustainable development principles into other APEC EWG activities in the future

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Responsible Entities

APEC EWG

Secretariat

Australia's and Mexico's delegate of APEC EWG

Complimentary Initiatives

WSSD Type 2 Partnerships; APEC ESI; APEC's 21st Century REDI

Energy Literacy Initiative

2003 - present



Public

Civil



Objectives

- "promote energy education globally, thus improving energy literacy, which will help facilitate the appropriate use of energy"

APEC Economies

Australia
Japan
Korea
Philippines
Thailand

Mechanisms

- "implementation of energy-related programmes and activities for children (energy boy scouts, energy summer school, etc)"

- "implementation of energy-related courses for adults (open universities, adult schools, energy-related symposiums, etc)"

- "dispatch of energy experts to low energy literacy areas based on the need of developing countries"

- "invitation of trainees on energy education upon requests from interested communities showing interest"

- "development of a network of international organisations and institutions for improvement of energy literacy (coordination with existing international organisation and institutions on energy and human resources development, etc.)"

- "development of prototypes for energy education"

Responsible Entities

APEC EWG

Secretariat

Japan is the leading partner

Complimentary Initiatives

World Bank Group support through GVEP;

"Partners recognise the complementarities which exist with REEEP."

Energy Regulators Forum Initiative

(ERF) 1996 - present



Public

Business



"enhancing business involvement in the EWG"

Objectives

- "promote discussion on, and implementation of, energy markets, institutional and regulatory reforms in member economies with a view to establishing transparent, predictable and non-discriminatory energy regulatory regimes"

- "provide member economies and their energy regulators with a forum and other mechanisms for the pooling of expertise and sharing of regulatory experiences"

Mechanisms

- regular meetings once a year

Responsible Entities

APEC EWG

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Energy Security Initiative

(ESI) 2001 - present



Public

Business



Objectives

- "strengthening the energy security and reliability of affordable energy"

- "enhancing counter-terrorism cooperation"

- "short-term measures include improving transparency of the global oil market, monitoring efforts to strengthen sea-land security, implementing information sharing system and encouraging members to have emergency mechanisms and contingency plans in place"

- "long-term policy responses include facilitating investment, trade and technology cooperation in energy infrastructure, natural gas, energy efficiency, clean fossil energy, renewable energy and hydrogen and fuel cells"

Mechanisms

- "short-term measures to respond to temporary energy supply disruptions: improving monthly oil data; real time emergency information sharing; the option of oil stocks among interested members; considering a feasibility study on possible joint stocks among interested members; organising dialogues on sea lane security"

- "long-term policy responses to address the broader challenges facing the region's energy supply: energy exploration and development; alternative fuels; high efficiency vehicles; and more energy-efficient modes of public transport"

- To accelerate the implementation of ESI, an Implementation Plan and an APEC Action Plan were established.

APEC Economies

Australia
Brunei Darussalam
Canada
Chile
China
Hong Kong, China
Indonesia
Japan
Korea
Malaysia
Mexico
New Zealand
Papua New Guinea
Peru
Philippines
Russia
Singapore
Chinese Taipei
Thailand
United States
Viet Nam

Responsible Entities

APEC EWG

Secretariat

APEC EWG Secretariat, ESI Steering Committee was established in 2004 to oversee implementation of all activities

Complimentary Initiatives

CAIRNS Initiative

Energy Standards and Labelling Cooperation Initiative

2002 - present



Public

Business



"continues the work of the previous Steering Group on Energy Standards to reduce barriers to trade created by there being different energy performance test methods and energy performance requirements"

Objectives

- "reducing barriers to trade created by there being different energy performance test methods and energy performance requirements"
- "enhancing the trade of energy-efficient products and facilitating harmonisation of energy performance test methods, standards and labels"
- "this initiative is a mechanism for information and technical exchange among APEC economies and cooperation with relevant international organisations"

Mechanisms

- a web-based platform of technical energy standards and labelling information network - expanded from the completed APEC Energy Standards Information System (APEC-ESIS) to include energy labelling information
- "operate the system of having economies notifying other economies of the energy standards they are using or intend to use (the APEC Standards Notification Procedure)"
- "establish ESIS as a recognised and useful resource"
- "establish the position of an APEC Energy Efficiency Test Procedure Coordinator and undertake the expected functions and encourage the alignment of energy efficiency requirements on a product-by-product basis"

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Responsible Entities

APEC EWG

Secretariat

APEC EWG Expert Group on Energy Efficiency and Conservation (EGEE&C)

Energy Standards Information Development

2001 - 2002



Public



"to reduce to a reasonable minimum the number of different testing standards and to have energy performance requirements compatible with each other"

Objectives

- "The overall purpose of this project is to continue the work started by previous Steering Group on Energy Standards projects on reducing barriers to trade created by there being different energy performance test methods and energy performance requirements."

- "developing, implementing and maintaining the standards web site - this will maintain information about energy standards and regulations in APEC member economies up-to-date and accurate"

- "developing the Standards Notification Procedure - to disseminate the information to all relevant parties and to provide coordination between member economies on the development of energy standards"

- "monitoring international standard processes and developing a database for standards - tracking international development in the field of energy standards"

- "liaising with APEC standards participation networks and algorithm activities within standards development where integrated with APEC priorities - liaising between relevant parties on matters concerning energy standards and regulations, and assisting in the establishment and presentation of a common "APEC stance" on energy standards being developed within relevant international standards fora"

- "monitoring and reporting on the delivery of the Steering Group on Energy Standard (SGES) work program to reduce or remove the need for multiple testing"

Mechanisms

- APEC Energy Standards Information Systems (ESIS) was established - a web-based platform

Responsible Entities

APEC EWG

Secretariat

New Zealand, co-sponsors: Hong Kong, China and Chinese Taipei

APEC Economies

Australia
Brunei Darussalam
Canada
Chile
China
Hong Kong, China
Indonesia
Japan
Korea
Malaysia
Mexico
New Zealand
Papua New Guinea
Peru
Philippines
Russia
Singapore
Chinese Taipei
Thailand
United States
Viet Nam

Environmentally Sound Energy Infrastructure Initiative

1999 - 2003



Public

Business

*"promoting good practice in environmental policy implementation"***Objectives**

- "ensure that environmental soundness and efficiency are built into the region's energy infrastructure as new capacity additions are made"
- phase 1 - "promote good policy practices that help facilitate inflows of investment while at the same time promoting environmental protection"
- phase 2 - "provide three analytical research reports that contain an analysis of energy/environmental policy practices that promote the establishment of efficient and environmentally sound energy infrastructure"

Mechanisms

- phase 1 - "promote policy practices that provide energy project developers with flexibility in meeting environmental requirements in the most flexible and cost effective manner (final reports for phase 1 published at the end of March 2001)"
- phase 2 - "three reports, including details on good environmental practices within the context of opening markets; best practices to encourage cost-based pricing of energy; and measures to encourage demand-side energy efficiency within more open markets"
- workshops on energy infrastructure investment

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Responsible Entities

APEC EWG

Secretariat

Canada

Environmentally Sound Power Infrastructure

1996 - 1997



Public

Business



"to facilitate business sector investment in power infrastructure to ensure that the electricity supply sector does not act as a bottleneck to the APEC region's economic growth potential"

Objectives

- "identify good policy practices which APEC member economies can use to meet the challenge of achieving both their environmental and electricity investment objectives"

Mechanisms

- "An Ad Hoc Business Forum on Power Infrastructure was established for the purpose of providing business sector input into the power infrastructure initiative. In 1998, the work of Ad Hoc Business Forum on Power Infrastructure had been completed. Any remaining work was carried forward to the EWG business network."

- "A workshop was held in Calgary on 11 - 13 May 1997 and provided an opportunity for member economies and the business sector to exchange experiences and identify those best environmental practices which individual economies considered appropriate to their circumstances."

Responsible Entities

APEC EWG

Secretariat

Canada

APEC Economies

Australia
Brunei Darussalam
Canada
Chile
China
Hong Kong, China
Indonesia
Japan
Korea
Malaysia
Mexico
New Zealand
Papua New Guinea
Peru
Philippines
Russia
Singapore
Chinese Taipei
Thailand
United States
Viet Nam

EWG Business Network

(EBN) 1998 - present



Public

Business



"enhancing business involvement in EWG and being as an interface between government and business"

Objectives

- "to provide a business perspective on energy-related issues that can be considered through the APEC process"

Mechanisms

- "In line with APEC protocols, any recommendations of the EWG Business Network need to be adopted by consensus, although differing views on issues may well emerge and be reported."

- "The Business Network's involvement with the EWG [is] complemented by the work of the Energy Regulators' Forum."

- "The Business Network will be invited to attend EWG meetings."

Responsible Entities

APEC EWG

Secretariat

The EWG Secretariat provides secretarial support to the Business Network

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Financing Green, High Performance Buildings and Communities in the APEC Region

2006 - present



Public

Business



Objectives

- "facilitate the development of high performance buildings and communities in the region through a number of pilot financing programs, with emphasis on public leadership especially at the municipal level and innovative financing techniques"

Mechanisms

- creation of a region-wide municipal network to promote: "energy efficient buildings and communities; the exchange of information; development of effective public-private partnerships, business models and regulatory policies and incentives; development of a network of municipalities to facilitate energy-efficient design and construction of commercial and residential structures and municipal buildings"

- pilot financing programs for building construction: "each pilot provides incentives for developers to design and construct green, high performance buildings, using a range of possible measure and incentives"

- model community energy system development: "produce new environmentally and [initiate] technologically sustainable business models for energy services on a community-scale and public policy and financing innovations to promote the integration of energy efficiency, conservation and renewable energy technologies and strategies into community design and development"

APEC Economies

Australia
Brunei Darussalam
Canada
Chile
China
Hong Kong, China
Indonesia
Japan
Korea
Malaysia
Mexico
New Zealand
Papua New Guinea
Peru
Philippines
Russia
Singapore
Chinese Taipei
Thailand
United States
Viet Nam

Responsible Entities

APEC EWG

Secretariat

task force led by the US

Complimentary Initiatives

APEC Energy Efficiency and Renewable Energy Financing; WBCSD-EEB; IEA-ECBCS; IEA-SHC

Forum for Nuclear Cooperation in Asia

(FNCA) 2000 - present



Public



Nuclear energy promotion in Asia; technology transfer

Objectives

- information exchange on long-term nuclear policy issues within energy and environment framework
- facilitate peaceful utilisation of nuclear energy through collaborative R&D and capacity building

Mechanisms

- Forum meeting: Discussion on cooperation measures and nuclear-energy policies. Forum meeting is comprised of a ministerial level meeting and a senior official level one.
- Coordinators meeting: Discussion on the introduction, revision and abolishment, adjustment, and evaluation of cooperation projects by an appointed coordinator from each country.
- R&D projects for research reactors, nuclear science in medicine, agriculture, and industry.
- to enhance the public understanding on nuclear issues through dissemination of publications

APEC Economies

Australia
China
Indonesia
Japan
Korea
Malaysia
Philippines
Thailand
Viet Nam

Responsible Entities

Member Governments

Secretariat

"FNCA coordinator office: Asia Cooperation Centre Japan Atomic Industrial Forum, Inc."

Framework for Cooperation on Energy Efficiency Testing Standards

2000 - 2002



Public



"to overcome impediments to trade related to the use in the APEC region of differing energy efficiency standards (i.e. test procedures used to measure the energy efficiency of an electrical products)"

Objectives

- "develop firm proposals for establishing a base on which mutual acceptance of accredited test facilities and standard test results obtained at these facilities can be achieved"
- "work towards the establishment of bases for the direct comparison of the outcomes of testing to different standards so that the need for testing to multiple standards can be reduced or removed"
- "develop a general policy framework that allows for the progressive development and implementation on a bilateral or multilateral basis, and product by product, as technical details are established and mutually agreed"

Mechanisms

- Steering Group on Energy Standards (SGES) established to carry out all the tasks developed under this initiative
- two projects under this initiative: energy standards information development (a website database), and; standards notification procedure

Responsible Entities

APEC EWG

Secretariat

APEC EWG Expert Group on Energy Efficiency and Conservation

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Futuregen Alliance

(Futuregen) 2005 - present



Public

Business



"FutureGen is a public-private partnership to build the world's first coal-fuelled, near-zero emissions power production plant, at a cost exceeding US\$1 billion."

Objectives

- "use cutting-edge technologies to generate electricity"
- "capturing and permanently storing carbon dioxide in geological formations"
- "produce hydrogen and byproducts for possible use by other industries"

APEC Economies

Australia
China
United States

Mechanisms

-275 Mw zero-emissions coal-fired plant will be constructed in Illinois or Texas in the United States. Plant design started in 2007, construction will start in 2009, and full-scale operations are planned for 2012.

-using existing technologies in a holistic manner at a single site to maximise the use of coal for electricity generation whilst minimising waste streams/emissions

-ensuring that all byproducts of process operations can be utilised viably by companies/organisations within the vicinity of the site (for example ash for construction materials, hydrogen for refining and sulphur for fertilizer production)

Gas Exporting Countries Forum

(GECF) 2001 - present



Public



generate "tangible cooperation among gas producing and exporting countries" so as to preserve their market power in the global gas trade

Objectives

- "foster the concept of mutuality of interests by favouring dialogue between producers, between producers and consumers and between governments and energy-related industries"
- "provide a platform to promote study and exchange of views"
- "promote a stable and transparent energy market"
- "GECF is opposed to the movement away from long term purchase contracts resulting from market liberalisation."

APEC Economies

Brunei Darussalam
Indonesia
Malaysia
Russia

Mechanisms

- "political consultations at the ministerial level on a yearly basis and at the expert level 2 to 3 times a year"
- "Research presented in the GECF is related to: worldwide gas development projects; supply-demand balance for gas; gas exploration, production and transportation technologies, and their associated costs; the structure of the gas market, regional and global; competition of gas with alternative fuels; CNG and GTL economics; the contractual framework; ways and measures to improve the share of gas in the energy mix as well as other utilisation of gas; the Kyoto Protocol and its impact on gas consumption"

Secretariat

The GECF has no official statute or charter, nor secretariat, and is but a loosely defined "group of gas producers seeking to represent and benefit their mutual interests"

Generation IV International Forum

(GIF) 2001 - present



Public



"to lead the collaborative efforts of the world's leading nuclear technology nations to develop next generation nuclear energy systems to meet the world's future energy needs...The purpose of Gen IV is to develop nuclear energy systems that would be available for worldwide deployment by 2030 or earlier."

Objectives

-The next generation of nuclear energy systems must consider an optimum use of natural resources, while addressing nuclear safety, waste and proliferation resistance and public perception concerns of the countries in which those systems are deployed

-Eight technology goals: the primary goals are to improve nuclear safety, improve proliferation resistance, minimize waste and natural resource utilization, and to decrease the cost to build and run such plants

APEC Economies

Canada
Japan
Korea
United States

Mechanisms

-collaborative R&D within the Framework Agreement for International Collaboration on Research and Development of Generation IV Nuclear Energy Systems

Responsible Entities

Member state governments

Complimentary Initiatives

INPRO, GNEP

GHG Emission Reduction from Industry in Asia and the Pacific

(GERIAP) 2002 - present



Public

Business



to reduce greenhouse gases from energy intensive industries, with a focus on the iron and steel, pulp and paper, cement, ceramics, and chemicals sectors

Objectives

- "aimed at reduction of greenhouse gas (GHG) emissions and reduce energy costs from industry in Asia and the Pacific region. As a result of dynamic industrial growth this region's GHG emissions are projected to rise steeply."

APEC Economies

China
Indonesia
Philippines
Thailand
Viet Nam

Mechanisms

- "building capacities of governments and environmental communities"
- "developing professional networks and partnerships"
- "engaging business to improve sustainability performance"

Responsible Entities

UNEP

Secretariat

UNEP secretariat in Bangkok is coordinating the project

Gleneagles Plan of Action - Climate Change, Clean Energy and Sustainable Development

2005 - present



Public



"climate change mitigation through supplying the secure, reliable and affordable energy sources that are fundamental to economic stability and development while meeting expected energy demand growth and at the same time reducing pollution to protect public health and ecosystems and make sure those persons without access to commercial energy sources gain access"

Objectives

- "transforming the way we use energy"
- "powering a cleaner future"
- "promoting R&D"
- "financing the transition to cleaner energy"
- "managing the impact of climate change"

APEC Economies

Canada
Japan
Russia
United States

Mechanisms

- 3R's Initiative, importance of raising consumer awareness of the environmental impact of their behaviour and choices
- diversification of the energy mix, including increased use of renewables. In addition, promoting the development of cleaner fossil fuels, CCS and the diffusion of renewable energy technologies
- commitment to, international cooperation in and co-ordination of research and development of energy technologies. Boost the introduction of new technologies like hydrogen and through the IEA and boost sharing of energy research findings, while promoting existing networks and encouraging broader participation
- introduction of market-based policy frameworks, which aid direct investment, leverage private capital for clean development. In addition with the WB and other multilateral development banks (MDBs) promote dialogue with borrowers on energy issues.
- promote access to information and the development of scientific capacity to allow governments to integrate climate and environment planning and mitigation into policy. Integration of risk management for climate sensitive sectors

Responsible Entities

G8

Complimentary Initiatives

3R's Initiative, CSFL, NEET/IEA, GGFR, REEEP - under the Johannesburg Plan of Implementation, IPHE, Kyoto Protocol - especially in terms of the CDM, GEF

Global Environment Facility (Climate Change)

(GEF-CC) 1991 - present



Public

Civil

Business



"As the financial mechanism of the UNFCCC, the GEF is helping developing economies to expand their use of clean energy and reduce their consumption of fossil fuels."

Objectives

- "removing barriers to energy efficiency and conservation"
- "promoting renewable energy"
- "reducing costs of low-GHG emitting energy technologies"
- "supporting sustainable transportation"
- "helping markets operate effectively" through enabling activities and national communications related to UNFCCC obligations

Mechanisms

- GEF activity is grouped into 6 categories: climate change, biodiversity, ozone depletion, persistent organic pollutants, land degradation, and international waters. The climate change category is further divided between "adaptation" and "mitigation". Mitigation activities are outlined below:

- "The intervention strategy for barrier removal aims at developing, expanding and transforming the markets for energy-efficient technologies." Post-2006 activities focus on improving the energy efficiency of electrical appliances and buildings in the industry sector, and existing electricity generation plants.

- "expand the markets for renewable energy by removing barriers to the large-scale use of renewable technologies". Post-2006 activities focus on "the expansion of grid electricity from renewable sources" and "promotion of renewable energy for rural energy services".

- investment in new, low-GHG emitting energy-generating technologies, thereby lowering their cost and increasing their market share

- measures to reduce transportation carbon intensity, focusing on modal shifts, public rapid transit, non-motorized transport, and urban land-use planning

- "Support to create a proper policy and institutional environment, while providing finance that strikes a balance between subsidization and intervention"

Responsible Entities

UNFCCC, UNDP, UNEP, WB

Secretariat

in Washington, D.C., reports to GEF council(s) and coordinates projects

APEC Economies

Australia
Canada
Chile
China
Indonesia
Japan
Korea
Malaysia
Mexico
New Zealand
Papua New Guinea
Peru
Russia
Thailand
United States
Viet Nam

Global Gas Flaring Reduction

(GGFR) 2002 - present



Public

Business



"(GGFR) brings around the table representatives of governments of oil-producing countries, state-owned companies and major international oil companies so that together they can overcome the barriers to reducing gas flaring by sharing global best practices and implementing country specific programs"

Objectives

- "facilitate and support national efforts to use currently flared gas by promoting effective regulatory frameworks and tackling the constraints on gas utilization, such as insufficient infrastructure and poor access to local and international energy markets, particularly in developing countries"

- "develop concepts for how local communities close to the flaring sites can use natural gas and liquefied petroleum gas (LPG) that may otherwise be flared and wasted"

APEC Economies

Canada
Indonesia
Russia
United States

Mechanisms

- development of a voluntary global standard for flaring to be adhered to by members

- offering advice to public and private (buyers and sellers) sectors in developing domestic and international gas markets through small-scale utilization demonstration projects

- assisting in demonstration projects to evaluate applicability of Kyoto carbon financing mechanisms to reducing gas flaring

- establishing and spreading best practices for regulatory frameworks in developing nations that encourage utilization of currently flared gas

Responsible Entities

WB

Secretariat

WB steering committee

Complimentary Initiatives

MMP

Global Village Energy Partnership

(GVEP) 2002 - present



Public

Civil

Business



"to promote social and economic development in rural and peri-urban areas of developing countries via increased access to appropriate modern energy services"

Objectives

- "catalyze country commitments to village energy programs and guide policies and investment in this area"
- "bridge the gap between investors, entrepreneurs and energy users in the design, installation and operation of replicable energy-poverty projects"
- "facilitate policy and market regulatory frameworks to scale up the availability of energy services"
- "serve as marketplace for information and best practices on the effective development and implementation of energy-poverty projects/programs"
- "create and maintain an effective coordination mechanism for addressing energy-poverty needs"

APEC Economies

Indonesia
Mexico
Peru
Philippines
Viet Nam

Mechanisms

- GVEP's main tool is the regional workshop held between stakeholders throughout a target country's energy sector.
- Workshops are supported by energy assessment reports prepared by GVEP, "supporting and helping developing countries to set up energy action plans and assisting with the associated studies and demand analyses".
- focus categories include: monitoring and evaluation; finance facilitation; capacity building; activity mapping; technology, equipment and suppliers

Responsible Entities

WB-ESMAP, UNDP

Secretariat

WB/UNDP "Technical Secretariat" and a "Partnership Board" ... "provides guidance and advice on programmatic and project investments by donors, partners and the international community, and promotes donor coordination on energy-poverty activities"

Complimentary Initiatives

REEEP, other WSSD 2002 type II partnerships, GVEP International (incorporated funding wing for GVEP founded in 2006)

Gold Standard

(GS) 2003 - present



Civil

Business



*"to ensure that CDM projects are both reducing carbon dioxide (CO2) emissions and fostering sustainable development"
(emphasis on "and fostering sustainable development")*

Objectives

- "help boosting investment in additional sustainable energy projects"
- "ensure significant and lasting contribution to sustainable development"
- "provide assurance that investments have environmental integrity"
- "increase public support for renewable energy and energy efficiency"

APEC Economies

Canada
Indonesia
Japan
Philippines
Thailand

Mechanisms

- Gold Standard works with project developers through the planning, construction, and operation process to ensure each project meets additional voluntary environmental requirements beyond CDM minimum requirements.
- "Project Type screen: supporting non-fossil energy sources in order to contribute to the long-term change of the energy sector"
- "Additionality screen: providing assistance in evaluating whether or not a project leads to a real net reduction of global emissions beyond a business-as-usual scenario"
- "Sustainable Development Screen: giving guidelines and frameworks for a transparent sustainable development impact assessment, meaningful stakeholder consultations involving local communities and NGOs and potential Environmental Impact Assessments"
- These additional requirements are evaluated independently by the Design Operational Entity (DOE)
- following approval, continued monitoring of Gold Standard projects to maintain registration

Responsible Entities

WWF

Secretariat

once WWF initiative, now independent and based in Switzerland at BASE

Greater Mekong Subregion Economic Cooperation Program

(GMS) 1992 - present



Public

Civil

Business



"...to facilitate sustainable economic growth and reduce poverty in the subregion by strengthening economic linkages among the six member countries"

Objectives

- "increasing connectivity through sustainable development of infrastructure and transnational economic corridors"
- "enhancing competitiveness in the Subregion through efficient cross-border movements of goods and people, and integrated markets and production processes"
- "building a greater sense of community facilitated by better cross-border infrastructure and a groundswell of goodwill among countries"

APEC Economies

China
Thailand
Viet Nam

Mechanisms

- projects in 9 sectors: energy, environment, transport, and telecommunications, human resource development, tourism, trade facilitation, private investment, agriculture
- investment in infrastructure projects, including many roads and rail lines
- creation of a "Plan of Action" at multi-yearly summits to coordinate subregional development activities
- GMS Business Forum acts as an official interface between government and private sector
- active energy and environment programs include: GMS Cross-Border Transport Agreement, GMS Core Environment Program, GMS Energy Sector Strategy

Responsible Entities

ADB

Secretariat

ADB acts as "coordinator" at the request of member economies

Greenhouse Gas Protocol Initiative

(GHGP) 1998 - present



Public

Civil

Business



Objectives

- "develop internationally accepted accounting and reporting standards for GHG emissions and promote their use in companies and other organizations"

- "generally expand GHG accounting capacity around the world"

Mechanisms

- "GHG Protocol provides practical tools with additional guidance to help companies calculate their GHG emissions from various sources"

- "The GHG Protocol is composed of two separate but linked modules:

(1) the GHG Protocol Corporate Accounting and Reporting Standard (Corporate Standard)

(2) The GHG Protocol for Project Accounting (Project Protocol)"

- "build partnerships in key developing countries to cultivate the technical and institutional capacity of their business, government, and NGO sectors to evaluate and manage the risks and opportunities related to climate change, and to participate in GHG markets"

APEC Economies

Australia

Canada

China

Japan

Korea

Mexico

New Zealand

Philippines

Russia

Chinese Taipei

Thailand

United States

Responsible Entities

WBCSD and WRI

IEA Advanced Fuel Cells

(IEA-AFC) 1990 - present



Public

Business



"to advance the state of understanding of participants in the field of advanced fuel cells through co-operative research, technology development and system analysis on molten carbonate, solid oxide and polymer electrolyte fuel cell systems"

Objectives

- "reduce the cost and improve the performance of molten carbonate, solid oxide and polymer electrolyte fuel cells"
- "find ways in which fuel cells and systems can be optimised for stationary, transport and portable applications, taking into account users' requirements"

APEC Economies

Australia
Canada
Japan
Korea
United States

Mechanisms

- information exchange through meetings, workshops and reports
- cooperation with other fuel cell-related research programmes in technologically advanced member economies

Responsible Entities

IEA

Secretariat

each initiative project has a leading partner

IEA Bioenergy

1978 - present



Public

Civil

Business



"to accelerate the use of environmentally sound and cost-competitive bioenergy on a sustainable basis, and thereby achieve a substantial contribution to future energy demands"

Objectives

- "provide an umbrella organisation and structure for a collective effort where national experts from research, government and industry work together with experts from other member countries to improve cooperation and information exchange between countries that have national programmes in bioenergy R&D"

- carry out biomass-related research work with a wide scope, including: biomass resources (forestry, agricultural crops & residues, oil bearing plants, municipal solid waste); supply systems (harvesting, collection, handling and storage); conversion of biochemical, thermochemical, physical/chemical processes; end products for transportation fuels, heat and electricity, and solid fuel

- integrate research themes across the value chain, including: environmental and economic sustainability, system studies, fuel standards, greenhouse gas balance, barriers to deployment, and management decision support system

APEC Economies

Australia
Canada
Japan
New Zealand
United States

Mechanisms

- IEA Bioenergy provides "collaborative opportunities" for researchers, industry, and policy makers through "cost sharing" and "task sharing" of research "tasks".

- 42 research "tasks" have been created, supported, and implemented by participating members under the initiative. 13 tasks are currently active, each with its own work programme-- normally each project lasts three years.

- A website is provided and maintained. News letters and reports under this initiative are available to general public. In the website there is a library for members only.

Responsible Entities

IEA

Secretariat

each project has a leading partner and respective "task leader"

IEA Clean Coal Centre

(IEA-CCC) 1975 - present



Public

Business

*to "provide a source of unbiased information on sustainable use of coal world-wide"***Objectives**

- support member efforts to help "make the production, transportation and use of coal sustainable"
- assess the technical, economic and environmental performance of clean coal technology and report the findings in a balanced and objective way without political or commercial bias

APEC Economies

Australia
Canada
China
Japan
Korea
New Zealand
United States

Mechanisms

- provide yearly topical reports and reviews on clean coal-related issues with support of industrial sponsors and member countries
- provide a networking opportunity to "foster international co-operation within and amongst developed and developing countries"
- A website is provided and maintained. News letters and reports under this initiative are available to general public.
- Clean Coal Projects Database; an online database of developments and applications of clean coal technologies is maintained and open to general public. The database includes brief reports on a range of activities including research plans for industry, progress and costs of major programmes, new technology developments, commercial activities (announcements and details of new plants), CO₂ capture from coal-based activities, legislation and policy issues, plus relevant developments within the R & D community. Web links and references allow the user to obtain further information.
- The Centre also provides a parallel privately-contracted consultancy service for clean coal issues using their staff and resources.

Responsible Entities

IEA

Secretariat

based in London, UK; each project has a leading partner

IEA Climate Technology Initiative

(IEA-CTI) 2003 - present



Public

Civil

Business



"to bring countries together to foster international co-operation in the accelerated development and diffusion of climate-friendly and environmentally sound technologies and practices"

Objectives

- information dissemination of climate-friendly and environmentally sound technologies and practices
- advancing the development of coherent and integrated technology needs assessments among developing and transition countries

APEC Economies

Canada
Japan
Korea
United States

Mechanisms

- "co-operative activities in partnership with developing and transition countries and other international bodies"
- regional capacity building workshops and seminars; UNFCCC, UNIDO, UNEP involved
- involvement of industry, academia and financial sector

Responsible Entities

IEA

Complimentary Initiatives

UNFCCC, UNIDO, UNEP
ADB-CMI

IEA Cooperative Programme on Geothermal Energy Research and Technology

(IEA-GIA) 1977 - present



Public

Business



to support and advance the use of geothermal energy by overcoming barriers to its development through international cooperation

Objectives

- "compile and exchange information on geothermal energy research and development worldwide concerning existing and potential technologies and practices"
- "develop improved technologies for geothermal energy utilization"
- "improve the understanding of the environmental benefits of geothermal energy and ways to avoid or minimize environmental impacts"

APEC Economies

Australia
Japan
Korea
Mexico
New Zealand
United States

Mechanisms

- Research activities are carried out according to initiative "annexes" and results are published with varying degrees of accessibility by non-members.
- A website is provided and maintained. News letters and reports under this initiative are available to general public. In the website there is a members-only library.

Responsible Entities

IEA

Secretariat

each initiative "annex" is lead by an "operating agent" and "task leader"

IEA Demand-Side Management

(IEA-DSM) 1993 - present



Public

Business



"to deliver to our stakeholders useful information and effective guidance for crafting and implementing DSM policies and measures, along with the necessary technologies and applications, which together can transform markets and facilitate energy system operations"

Objectives

- "develop and promote tools and information on demand-side management and energy efficiency"

APEC Economies

Australia
Canada
Japan
Korea
United States

Mechanisms

- "create a 'tool box' of resources and information for governments, utilities and energy companies to help them incorporate DSM measures in their energy policies and activities"

- "provide tools and information on a wide range of energy efficiency and demand reduction issues"

- "the principal tools available at present are the website, the electronic news mail, the annual report, the 'Spotlight Newsletter' and task flyers"

- conduct research studies on DSM

- organise conferences, workshops and symposia

- "The programme's work is organised into two clusters: (1) the 'load shape' cluster includes tasks that seek to impact the shape of the load curve over very short (minutes-hours-day) to longer (days-week-season) time periods; (2) the 'load level' cluster includes tasks that seek to shift the load curve to lower demand levels or shift loads from one energy system to another"

Responsible Entities

IEA

Secretariat

IEA DSM Executive Committee

Complimentary Initiatives

REEEP

IEA Energy Conservation in Buildings and Community Systems

(IEA-ECBCS) 1976 - present



Public

Business



"to facilitate and accelerate the introduction of energy conservation and environmentally sustainable technologies into healthy buildings and community systems, through innovation and research in decision-making, building products and systems, and commercialization"

Objectives

- "(1) support the development of generic energy conservation technologies within international collaboration
- (2) support technology transfer to industry and to other end-users by dissemination of information through demonstration projects and case studies
- (3) contribute to the development of design methods, test methods, measuring techniques, and evaluation/assessment methods encouraging their use for standardisation
- (4) ensure acceptable indoor air quality through energy efficient ventilation techniques and strategies
- (5) develop the basic knowledge of the interactions between buildings and the environment as well as the development of design and analysis methodologies to account for such interactions"

APEC Economies

Australia
Canada
Japan
Korea
New Zealand
United States

Mechanisms

- "Tasks are undertaken through a series of annexes that are directed at energy saving technologies and activities that support their application in practice" and ... "through centrally organised development and information exchange."

- "international co-operation, in which research activities and knowledge can be shared"

- "disseminate research results... in accessible and informative publications and software"

- "Nature of ECBCS Activities: (1) formal co-ordination through shared tasks; (2) formal co-ordination through cost shared activities; (3) informal co-ordination or initiation of activities by participants; (4) information exchanges"

- 50 projects created, of which 11 are still active

Responsible Entities

IEA

Secretariat

each project has a leading partner

Complimentary Initiatives

APEC Financing Green, High Performance Buildings and Communities in the APEC Region; WBCSD-EEB; IEA-SHC

IEA Energy Technology Data Exchange

(IEA-ETDE) 1987 - present



Public



"to provide governments, industry and the research community in the member countries with access to the widest range of information on energy research, science and technology and to increase dissemination of this information to developing countries"

Objectives

- "compile and maintain a shared database on information related to energy research and technology"
- "disseminate information related to energy research and technology"
- "explore, and where appropriate develop, other ways of collecting and disseminating information related to energy research and technology"
- "support the work of the International Energy Agency"

APEC Economies

Canada
Korea
Mexico
United States

Mechanisms

- Bibliographic records and full text documents are provided at ETDE World Energy Base (ETBEWEB) web database and on an annually distributed CD-ROM.
- Each member must cover the literature published in their country for inclusion in ETDE's Database. Contributing members are granted database access free of charge.
- Database information and membership is shared with IAEA's INIS database.

Responsible Entities

IEA

Secretariat

U.S. Department of Energy's Office of Scientific and Technical Information in Oak Ridge, TN, USA

Complimentary Initiatives

IAEA's INIS

IEA Energy Technology Systems Analysis Program

(IEA-ETSAP) 1976 - present



Public



"to serve national governments and work in international forums by fostering and supporting the development of energy technology policy options"

Objectives

- "assist decision-makers in the assessment of new energy technologies and policies in meeting the challenges of energy needs, environmental concerns, and economic development"

Mechanisms

- "establish, maintain and enhance the flexibility of consistent multi-country energy/economy/environment analytical tools and capability (the MARKAL family of models) through a common research programme"

- "assist and support government officials and decision-makers by applying these tools for energy technology assessment and analyses of other energy and environment related policy issues"

- Information dissemination:

- (1) publish newsletter and workshop proceedings, and make them available online to the public
- (2) publish reports and journals
- (3) organise open workshops at least twice a year
- (4) provide updated information on the website

- provide training courses, particularly "on the job training"

APEC Economies

Australia
Canada
Chile
Indonesia
Japan
Korea
Malaysia
New Zealand
Philippines
Chinese Taipei
Thailand
United States
Viet Nam

Responsible Entities

IEA

Secretariat

ESTAP Executive Committee

IEA Enhanced Oil Recovery

(IEA-EOR) 1979 - present



Public

*to increase the recovery of oil originally in place and extend the economic life of oil reservoirs***Objectives**

- pursue studies of "fluids and interfaces in [a] porous media"
- undertake "fundamental research on surfactants and polymers"
- research the "development of gas flooding techniques"
- research the development of "thermal recovery techniques"
- ascertain an understanding of "dynamic reservoir characterizations"

APEC Economies

Australia
Canada
China
Japan
Russia
United States

Mechanisms

- Research tasks are carried out independently by initiative partners and results shared in a once-yearly 50-75 person meeting; no central operating agency or budget.
- "Many bilateral conversations occur and the conference helps create international research EOR projects. The real value of the meeting is the small close group who share experience from their various nations perspectives."
- Meeting proceedings/ research activity results are not available to the general public.

Responsible Entities

IEA

IEA Environmental Safety and Economic Aspects of Fusion Power

(IEA-EnvEconoFusion) - present



Public



Objectives

- "assessment of environmental impact and safety issues of fusion power"
- "assessment of the cost of fusion energy and possible role in future energy scenarios"

APEC Economies

Canada
Japan
Russia
United States

Mechanisms

- "develop databases for use in safety and environmental evaluations, compare methodologies used in Europe, Japan and the United States for safety and environmental analyses"
- "development and validation of models for environmental and safety analysis"
- "produce projections on possible role of fusion power in future energy market, and advise national research programmes and the IEA on such matters"
- "USA, EU and Japan individually develop solutions on technical aspects of the environmental, safety and economic aspects of fusion power, and three parties exchange information."

Responsible Entities

IEA

Complimentary Initiatives

ITER, NTFR (Nuclear Technology of Fusion Reactors Programme)

IEA Fluidised Bed Conversion of Fuels Applied to Clean Energy Production

(IEA-FBC) 1999 - present



Public

Business



"to bring together experts wishing to work on common [fluidised bed fuel conversion technology] problems"

Objectives

- "advance the technical and environmental feasibility, reliability and economics of employing the fluidized bed technology for conversion of solid fuels and waste for energy production, namely to provide heat for power generation, industrial process or heat for district heating, and thus provide design and operating experience for wide applications"

APEC Economies

Canada
Japan
Korea

Mechanisms

- "the main activity is technical exchanges during meetings and workshops"

- "Participants carry out research on operational issues in support of local commercial fluidised bed conversion activities and share the results."

- "publish a series ... of papers on R&D activities in fluidised bed conversion and a guide book for the use of [so-called] '1D' FBC"

Responsible Entities

IEA

Secretariat

FBC Executive Committee

IEA Hydrogen Implementation Agreement

(IEA-HIA) 1977 - present



Public



"to accelerate hydrogen implementation and widespread utilization"

Objectives

- "promote acceptance of hydrogen as an energy through technology development"
- "contribute to global energy security"
- "exploit the environmental benefits of hydrogen"
- "develop cost-effective hydrogen energy systems that can compete in global markets"
- "identify and overcome barriers for hydrogen's penetration into the energy and fuel markets"
- "promote deployment of hydrogen technologies with important local and global energy benefits"

APEC Economies

Australia
Canada
Japan
New Zealand
United States

Mechanisms

- "facilitate, coordinate, and maintain innovative RD&D activities through international cooperation and information exchange"
- information exchange and task-shared collaborative R&D projects
- Twenty-one tasks or annexes have been created and six of them are still active.
- activity focuses:
 - "(1) continued expansion of conference opportunities
 - (2) enhanced potential for collaboration on hydrogen activities (four areas of study: hydrogen production technologies, hydrogen storage technologies, hydrogen utilisation technologies, analysis and evaluation)
 - (3) growing preoccupation with the question of where the hydrogen will come from"
- "HIA participation in several International Partnership for a Hydrogen Economy (IPHE) events underscores the mutual interest in collaboration"
- other training and education activities

Responsible Entities

IEA

Secretariat

IEA HIA Secretariat

Complimentary Initiatives

IPHE

IEA Hydropower

(IEA-Hydro) 1995 - present



Public

Business



"to encourage through awareness, knowledge, and support the sustainable use of water resources for the development and management of hydropower"

Objectives

- "apply an interdisciplinary approach to the research needed to encourage the public acceptance of hydropower as a feasible, socially desirable form of renewable energy"
- "increase the current wealth of knowledge on a wide array of issues currently associated with hydropower"
- "explore areas of common interest among international organizations in the continued use of hydropower as a socially desirable energy resource"
- "bring a balanced view of hydropower to the worldwide debate on its feasibility as an environmentally desirable energy technology"
- "encourage [hydropower] technology"

APEC Economies

Canada
China
Japan
United States

Mechanisms

- Programme is carried out by task forces, called annexes, in various phases. Eight annexes have been established and three new annexes are proposed for phase 3.
- phase 1 - 1995 - 2000: produce 19 technical reports (including feasibility studies) and databases, most of which are intended for use by professionals in their respective fields
- phase 2 - 2000 - 2005: provide web-based training and exchange of information, develop an extensive database of hydropower success stories
- phase 3 - 2005 - 2009: (1) disseminate information (website, meetings, seminars, workshops); (2) organise meetings, workshops and symposia; (3) carry out environmental impact assessments; (4) maintain the international database on small hydro projects on the website; (5) supports seminars and training programmes with organisations such as UNIDO, IN-SHP, NRCan
- alliance-building with organisations such as International Hydropower Association (IHA), International Committee on Large Dams (ICOLD), the United States National Hydropower (NHA), and the Canadian Hydropower Association (CHA)

Responsible Entities

IEA

Secretariat

IEA Hydropower Executive Committee Secretary

Complimentary Initiatives

a joint project with IEA-Wind

IEA Networks of Expertise in Energy Technology

(IEA-NEET) 2006 - present



Public

Civil

Business



"to foster broader, more effective international cooperation [in energy technology], in particular with non-IEA countries"

Objectives

- "enhance awareness of existing research, development and deployment networks and to facilitate broader participation"

APEC Economies

Australia
Canada
Japan
Korea
New Zealand
United States

Mechanisms

- This initiative is an implementation of part of the Gleneagles G8 Plan of Action.

- "NEET works to seek further engagement of the "plus five" countries (Brazil, Mexico, South Africa, India and China) and Russia in the IEA Energy Technology Network (and other networks like CSLF, REN21 etc.)."

- "stage events where energy technology experts and policy makers can share know-how and experience on technical issues... [and] institutional and market questions"

- "plan a series of workshops in various countries during 2006, 2007 and 2008, as well as contributions to key international events"

Responsible Entities

IEA, WB, WBCSD

Secretariat

IEA

Complimentary Initiatives

REEEP, IEA CTI

IEA Photovoltaic Power Systems

(IEA-PVPS) 1992 - present



Public

Business



"to enhance the international collaboration efforts through which photovoltaic solar energy becomes a significant renewable energy source in the near future"

Objectives

- "contribute to the cost reduction of their applications"
- "increase the awareness of their potential and value"
- "foster their market deployment by removing technical and non-technical barriers"
- "enhance technology co-operation with non-IEA countries"

APEC Economies

Australia
Canada
Japan
Mexico
United States

Mechanisms

- share objective information, create networks/provide guidelines, and organise conferences and workshops

- focus areas for 'fostering market deployment' objective: "(1) recommended practices for grid-connected and stand-alone systems; (2) guidelines for monitoring practice and analysis of PV systems; (3) overview of PV financing methods in OECD countries; (4) survey of taxation, customs duties and building regulations for PV components and systems in OECD countries; (5) planning methods to evaluate and maximize the benefits of grid-connected photovoltaic systems to the electric grid and to the customers; (6) specific studies on important issues"

- focus areas for 'enhancing technology cooperation' objective: "(1) internal staff workshops for multilateral agencies and development banks; (2) workshops in non-IEA countries, co-ordinated with bilateral and/or multilateral agencies, development banks and/or NGOs; (3) studies and publications on PV systems applications in developing countries; (4) contact point for ad-hoc advice to staff of multilateral agencies and development banks; (5) best practice deployment and implementation guide for successful PV system operation; (6) active PVPS membership and/or participation of selected non-IEA countries"

- 11 projects created, of which 6 are still active, focusing on: information exchange, photovoltaic systems performance analysis, PV hybrid systems within mini grids, PV for developing countries and PV in urban areas

Responsible Entities

IEA

Secretariat

IEA PVPS secretariat

IEA Solar Heating and Cooling

(IEA-SHC) 1977 - present



Public

Business



"to continue to be the pre-eminent international collaborative programme in solar heating and cooling technologies and designs"

Objectives

- "be the primary source of high quality technical information and analysis on solar heating and cooling technologies, designs and applications"
- "help achieve a significant increase in the performance of solar heating and cooling technologies and designs"
- "help industry and government increase the market share of solar heating and cooling technologies and designs"
- "help educate decision makers and the public on the status and value of solar heating and cooling"

APEC Economies

Australia
Canada
Mexico
New Zealand
United States

Mechanisms

- "the programme focuses its efforts on activities where it can use its strengths to take advantage of major market opportunities"
- "conduct collaborative and innovative R&D; assemble excellent technical R&D teams due to strong network of research, industry and policy experts; perform high-quality pre-normative phase work... relevant to many market and political forces, such as green, low energy, and sustainable buildings"
- "dissemination activities through its own platforms (SHC Solar Award, website, newsletter, annual report, Task reports, conference presentations, journal articles) and other channels, such as the IEA (OPEN Bulletin, CADDET newsletter, etc.), conferences/events, trade journals, etc"
- direct collaboration with other solar energy initiatives within and outside of IEA such as Energy Conservation in Buildings and Community Systems Programme, Energy Storage, Photovoltaic Power Systems, SolarPACES and International Solar Energy Society (ISES)

Responsible Entities

IEA

Secretariat

IEA SHC Executive Secretary

Complimentary Initiatives

IEA SolarPACES; APEC Financing Green, High Performance Buildings and Communities in the APEC Region; WBCSD-EEB; IEA-ECBCS

IEA SolarPACES

1977 - present



Public

Business



"SolarPACES is an international cooperative organization bringing together teams of national experts from around the world to focus on the development and marketing of concentrating solar power systems (also known as solar thermal power systems)"

Objectives

- "bring added value to the nationally based work that is already funded by member governments"
- "solve the wide range of technical problems associated with commercialization of concentrating solar technology"

APEC Economies

Australia
Mexico
Russia
United States

Mechanisms

- "conduct a programme of research and development in the field of concentrating solar power (CSP) and chemical energy systems"
- technology development: Member countries work together on activities, including large-scale system tests and the development of advanced technologies, components, instrumentation, and systems analysis techniques.
- "market development and building of awareness of the potential of concentrating solar technologies"
- system tests of pilot-scale solar power plants
- provide training and technical advice
- sharing of information and research results

Responsible Entities

IEA

Secretariat

An Executive Committee (ExCo) composed of individuals nominated from each member country

Complimentary Initiatives

GEF, CSP GMI, IEA SHC

Initiative for ASEAN Integration

(IAI) 2000 - present



Public



leverage a policy framework "to contribute, on a continuous basis, to narrowing the development gap within ASEAN."

Objectives

- "narrow the development gap between ASEAN's older and newer members"
- "enhance the productive capacity of the peoples in the CLMV (Cambodia, Lao PDR, Myanmar, Vietnam) countries"
- "make [CLMV] economies more competitive in facing the new realities in the global economy"

APEC Economies

Brunei Darussalam
Indonesia
Malaysia
Philippines
Singapore
Thailand
Viet Nam

Mechanisms

-four priority areas:

- (1) infrastructure development - to improve access, efficiency and quality of transport and energy infrastructure networks of CLMV in order to enhance their regional economic competitiveness and integration
- (2) human resource capabilities - strength the productive capacities of the CLMV countries with an improved enabling environment and strengthened support capacities
- (3) information and communication technology - offer the CLMV countries a vital opportunity and means to leapfrog the historical stages of development; working in line with the e-ASEAN initiative to develop the policy, institutional, legal and regulatory frameworks
- (4) promoting regional economic integration - build institutional capacity and HRD (human resource development) in the CLMV countries to expedite their regional economic integration into ASEAN"

- "conducting training to build up capacity, assisting in developing policy, institutional, legal and regulatory frameworks, conducting feasibility studies etc"

-The IAI work plan is comprised of 54 projects in the 4 priority areas. "Of the ten energy projects in the IAI Work Plan, 7 have secured funding as of February 2004. 4 projects funded by the European Commission ASEAN Energy Facility (EAEF) are currently under implementation."

Responsible Entities

ASEAN SOME

Secretariat

ASEAN Secretariat

Complimentary Initiatives

EAEF; e-ASEAN initiative

Intergovernmental Collaborative Mechanism on Energy Cooperation in North-East Asia

2005 - present



Public



"by 2020, improve energy security in North-East Asia through energy cooperation in a sustainable manner"

Objectives

- "[exploring potential] for developing a Sub-regional Convention or a similar instrument acceptable to all parties concerned that may facilitate future business cooperation in developing North-East Asia's Energy"

APEC Economies

China
Japan
Korea
Russia

Mechanisms

- Identify collaborative projects within framework of member state energy ministers meetings

- "The Country Reports on energy policies will form the basis in identifying collaborative projects"

Responsible Entities

Member states

Secretariat

UNESCAP acts as mediator, Korea Energy Economics Institute (KEEI) prepares country reports

International Atomic Energy Agency

(IAEA) 1957 - present



Public



"accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world"

Objectives

- "to encourage and assist research on, and development and practical application of, atomic energy for peaceful uses throughout the world"
- "to foster the exchange of scientific and technical information on peaceful uses of atomic energy"
- "to encourage the exchange of training of scientists and experts in the field of peaceful uses of atomic energy"
- "to establish ... standards of safety for protection of health and minimization of danger to life and property"

Mechanisms

- set international standards, codes, guides, and binding international conventions; promote safeguards and verification of the Nuclear Non-proliferation Treaty through the world's nuclear inspectorate
- "setting and promoting the application of international safety standards for the management and regulation of activities involving nuclear and radioactive material"
- cooperative projects in developing countries by expert services, specialized equipment, and training
- "Three IAEA Departments lead programmes in fields of nuclear science and technology: Department of Technical Cooperation; Department of Nuclear Sciences and Applications; and Department of Nuclear Energy."

APEC Economies

Australia
Canada
Chile
China
Indonesia
Japan
Korea
Mexico
New Zealand
Peru
Philippines
Russia
Singapore
Thailand
United States
Viet Nam

Responsible Entities

previously an initiative of UN General Assembly, currently and independent member of the "UN Family"

Secretariat

2000 staff from 90 countries;
"headquartered at the Vienna International Centre in Vienna, Austria. Operational liaison and regional offices are located in Geneva, Switzerland; New York, USA; Toronto, Canada; and Tokyo, Japan. "

Complimentary Initiatives

INPRO; GIF; KEDO

International CFL Harmonisation Initiative

2005 - present



Public

Civil

Business



"to deliver higher-quality, low-cost CFL lighting products to consumers worldwide"

Objectives

- "to create a uniform testing method, covering the performance features of self-ballasted CFLs, suitable for submission to national and international standard bodies to measure CFL performance"
- "to identify a number of performance specifications for self-ballasted CFLs to facilitate testing comparisons and possible rationalisation of CFL performance requirements"
- "to propose these initiatives to the wider international lighting community"
- "the[re] is no desire to create an alternative standard that competes with existing protocols in use around the world...[our goal is to] assist in the development of a protocol that is fit for purpose and that can be adopted by as many organisations as possible"
- the initiative ultimately hopes to develop a mutually acceptable and improved standard which can be codified with an international standards organization such as IEC

APEC Economies

Australia
China
Hong Kong, China
Korea
New Zealand
Philippines
Thailand
United States

Mechanisms

- focus areas relating to performance specifications, testing protocols, verification testing, and compliance
- holding conferences of stakeholders and interested parties (3-4 forums per year, international venues)
- drafting and testing frameworks and standards proposals

International Energy Programme Agreement/ International Energy Agency

(IEP / IEA) 1974 - present



Public

*to cope with supply disruptions, promotion of rational energy policies, info system, alternative energy, integration of environmental and energy policies***Objectives**

- "to maintain and improve systems for coping with oil supply disruptions"
- "to promote rational energy policies in a global context through co-operative relations with non-Member countries, industry and international organisations"
- "to operate a permanent information system on the international oil market (and other energy markets)"
- "to improve the world's energy supply and demand structure by developing alternative energy sources and increasing the efficiency of energy use"
- "to assist in the integration of environmental and energy policies"

APEC Economies

Australia
Canada
Japan
Korea
New Zealand
United States

Mechanisms

- The IEA was established to implement the 1974 IEP Agreement which outlined the objectives listed above.
- "Implementing Agreements" offering a framework for collaborative research projects; works conducted through task sharing and/or cost sharing with each participating country
- creation of a separate policy framework governing its members which outlines 9 shared energy-related goals
- member commitments under IEA's "Oil Stocks and Emergency Response Potential" agreement include: "(1) to maintain emergency oil reserves equivalent to at least 90 days of net oil imports; (2) to provide programmes of demand restraint measures to reduce national oil consumption; (3) to participate in oil allocation among IEA countries in the event of a severe supply disruption
- A supplementary agreement, the Co-ordinated Emergency Response Measures (CERM), signed in 1984, establishes an additional "set of co-ordinated stockdraw and other response measures".

Responsible Entities

OECD

Secretariat

IEA secretariat based in Paris, France

International Nuclear Information System

(INIS) 1970 - present



Public

Civil



"to foster the exchange of scientific and technical information on peaceful uses of atomic energy" in response to the IAEA's mandate

Objectives

- "create a reservoir of nuclear information for current and future generations"
- "assist with the development of a culture of information and knowledge sharing"
- "provide quality nuclear information services to Member States"

Mechanisms

- upkeep of the INIS Database, "a unique collection of about 700 000 full-text documents (non-conventional 'grey' literature) in 63 languages, including many documents that cannot easily be found anywhere else"

APEC Economies

Australia
China
Indonesia
Japan
Korea
Malaysia
Mexico
Peru
Philippines
United States

Responsible Entities

IAEA

Secretariat

IAEA Department of Energy as INIS Secretariat

International Partnership for the Hydrogen Economy

(IPHE) 2003 - present



Public



to "serve as a mechanism to organize and implement effective, efficient, and focused international research, development, demonstration and commercial utilization activities that advance the transition to a global hydrogen economy"

Objectives

- address and formulate safety codes and standards
- promote public acceptance
- overcome challenges to the realisation of the hydrogen economy, including production and delivery issues
- address the issue of storage of hydrogen

APEC Economies

Australia
Canada
China
Japan
Korea
New Zealand
Russia
United States

Mechanisms

- "promote potential areas of bilateral and multilateral collaboration on hydrogen and fuel cell technologies"
- "analyze and recommend priorities for research, development, demonstration, and commercial utilization of hydrogen technologies and equipment"
- "analyze and develop policy recommendations on technical guidance, including common codes, standards and regulations, to advance hydrogen and fuel cell technology development, demonstration and commercial use"
- "foster implementation of large-scale, long term public-private cooperation to advance hydrogen and fuel cell technology and infrastructure research, development, demonstration and commercial use, in accordance with partners' priorities"
- "coordinate and leverage resources to advance bilateral and multilateral cooperation in hydrogen and fuel cell technology research, development, demonstration and commercial utilization"
- "address emerging technical, financial, legal, market, socioeconomic, environmental, and policy issues and opportunities related to hydrogen and fuel cell technology that are not currently being addressed elsewhere"

Secretariat

The U.S. Department of Energy serves as the IPHE Secretariat

Complimentary Initiatives

St Petersburg Plan of Action, IEA-HIA

International Project on Innovative Nuclear Reactors and Fuel Cycles

(INPRO) 2000 - present



Public



"to support the safe, sustainable, economic and proliferation-resistant use of nuclear technology to meet the global energy needs of the 21st century... to establish a new nuclear power-production technology at world-wide level that would gradually eliminate the use of weapons-grade fissionable materials"

Objectives

-New design of international nuclear energy systems in view of developing technologies and securing non-proliferation regime

-"to help to ensure that nuclear energy is available to contribute in fulfilling, in a sustainable manner, energy needs in the 21st century"

-"to bring together all interested Member States, both technology holders and technology users, to consider jointly the international and national actions required to achieve desired innovations in nuclear reactors and fuel cycles that use sound and economically competitive technology, are based – to the extent possible – on systems with inherent safety features and minimise the risk of proliferation and the impact on the environment"

-"to create a process that involves all relevant stake holders that will have an impact on, draw from, and complement the activities of existing institutions, as well as ongoing initiatives at the national and international level"

APEC Economies

Canada
China
Indonesia
Korea
Russia

Mechanisms

-collaborative R&D under IAEA support, implemented in two phases

-"INPRO already participates as an observer in the meetings of the Generation-IV International Forum (GIF) Policy and Expert Groups"

Responsible Entities

IAEA

Secretariat

INPRO Steering Committee

Complimentary Initiatives

GIF

International Thermonuclear Experimental Reactor

(ITER) 1985 - present



Public



"to demonstrate the scientific and technical feasibility of fusion power"

Objectives

- "first plasma available in 10 years after beginning of construction"
- "be able to produce $Q=10$ (more power is generated by fusion than is needed to heat the plasma)"
- "implement and test the key technologies and processes needed for future fusion power plants"
- "test and develop concepts for breeding tritium from lithium-containing materials inside thermally efficient high temperature blankets surrounding the plasma"

APEC Economies

China
Japan
Korea
Russia
United States

Mechanisms

- During the initial "Engineering Design Activities" (EDA) phase, from 1992-2001, "universities, laboratories, and industries" engaged in R&D according to the negotiated ITER EDA Agreement.
- main EDA phase R&D focus areas included:
"magnet and conductor manufacture and performance proof of principle at full scale; vessel and in-vessel component manufacture and performance proof of principle at full scale, and; in-vessel remote handling equipment and technique demonstration at full scale"
- Current physics-based R&D focuses on manufacturing and implementation of ITER components; primary research and design teams are based at "Joint Work Sites" in Japan, Germany, and France.
- The first 10 years of the initiative (following 2006 funding pledges from participants) are designated for construction of a tokamak-style fusion reactor in Cadarache, France (starting in 2008), to be followed by 20 years of thermal (not electrical) generation.

Secretariat

The International Team is supported by three host organizations - Max Planck IPP, JAERI, and CEA - each hosts a Joint Work Site, in Garching (near Munich), Naka (Japan), and Cadarache.

International Union for the Conservation of Nature and Natural Resources **Climate Change Initiative**

(IUCN Climate Change Initiative) 2000 - present



Public

Civil

Business



"to assist countries to successfully mitigate and adapt to climate change in a manner that is environmentally sound and socially equitable"

Objectives

- "inform governments and societies of the impacts of climate change on ecosystems and people"
- "promote strategies to reduce vulnerability and adapt to...climate change"
- "promote environmentally sound approaches to mitigate...climate change"
- "improve governance on climate change at [all] levels"
- "promote synergies between UNFCCC and biodiversity-related agreements"

Mechanisms

- provide "technical advice on reducing greenhouse gas emissions, adapting to climate risk, and climate change impacts on nature and society" and catalyze "countries to reduce emissions and prepare for...climate change"
- "IUCN convenes dialogue with its members around critical climate policy issues and helps to create partnerships in policy development and implementation."
- IUCN "has pledged to work with [its] members to keep the pressure on governments to implement their commitments under the Kyoto Protocol".
- IUCN "has also called upon [its members] to agree as soon as possible on binding commitments to further reduce emissions, using the using the Kyoto framework as a basis".
- "The IUCN's recent work includes the following:
 - (1) assessing the species survival risk to climate change
 - (2) adjusting conservation strategies for climate change
 - (3) preparing climate risk management tools
 - (4) reducing emissions & contributing to sustainable development
 - (5) reporting on our greenhouse gas emissions"
- training workshops, seminars and technical programmes

APEC Economies

Australia
Canada
Chile
China
Indonesia
Japan
Korea
Malaysia
Mexico
New Zealand
Peru
Philippines
Russia
Singapore
Thailand
United States
Viet Nam

Responsible Entities

IUCN

Secretariat

Climate Change Advisor of IUCN

Complimentary Initiatives

Climate Change and Nature: Adapting for the Future; Task Force on Climate Change, Vulnerable Communities and Adaptation; Adapting Water Management to Climate Chang

Japan Four-Point Initiative

(J4 Cebu) 2007 - present



Public



Objectives

- "improve the efficiency and environmental performance of fossil fuel use"
- "reduce dependence on conventional fuels through intensified energy efficiency and conservation programmes, hydropower, expansion of renewable energy systems and biofuel production/utilisation, and for interested parties, civilian nuclear power"
- "encourage the open and competitive regional and international markets geared towards providing affordable energy at all economic levels"
- "mitigate greenhouse gas emission through effective policies and measures, thus contributing to global climate change abatement"
- "pursue and encourage investment on energy resource and infrastructure development through greater private sector involvement"

APEC Economies

Australia
 Brunei Darussalam
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 New Zealand
 Singapore
 Chinese Taipei
 Thailand
 Viet Nam

Mechanisms

- Japan will provide \$2 billion in aid to other member nations of the East Asia Summit over the next three years to help them develop power generation facilities and promote energy efficiency.
- Japan will receive 1,000 Asian trainees over the next five years and establish an Asian energy conservation centre, while dispatching 500 experts on energy conservation to help ASEAN nations map out energy conservation plans.
- Japan will establish a facility to jointly study technologies and standards for biofuels and will receive 500 Asian trainees over the next five years to foster biomass energy experts.
- Japan will also establish a coal liquefaction assistance centre to promote the cleaner use of coal.

Secretariat

Japanese government has recently proposed J4 CEBU, details are not yet fixed

Joint NEA/IAEA Group on Uranium

1996 - present



Public

*"exchange and consolidation of information"***Objectives**

- "co-ordinate the preparation of periodic assessments of the world's supply of natural uranium"
- "recommend to the NEA and the IAEA actions that might be taken to assure adequate long-term supply of uranium for nuclear power development"

Mechanisms

- "The group's primary area of work is producing the biennial publication of the Red Book [on world uranium resources] but it also reviews other topics of interest, such as the environmental protection practices in the uranium mining industry. It also monitors all developments that could impact the uranium industry."

Responsible Entities

NEA, IAEA

APEC Economies

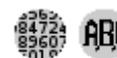
Australia
Canada
Chile
China
Indonesia
Japan
Korea
Mexico
New Zealand
Peru
Philippines
Russia
Singapore
Thailand
United States
Viet Nam

Joint Oil Data Initiative

(JODI) 2001 - present



Public



"to raise the awareness of all oil market players of the need for more transparency in oil market data" and "to establish a single global database that will report [oil] data for all organisations and economies"

Objectives

- "increase oil data transparency"
- "improve the quality and transparency of international statistics, [by] assessing the current availability of monthly oil data, both in terms of geographical coverage as in terms of product and flow availability"
- "raise the awareness of all oil market players of the need for more transparency in oil market data"

Mechanisms

- "The activity requests any voluntary participating country to complete a standard data table every month for the two most recent months (M-1 and M-2) and submit it to the organization of which it is a member. The respective organization compiles the data and makes it available to other organizations."
- As more countries participated, the database expanded to become the JODI World Database, with coverage freely accessible to public.
- issue JODI Newsletter
- training on JODI
- "JODI data include indigenous production, imports, exports, stock closing and change, refinery intake and output as well as demand for crude oil and five petroleum products."

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Responsible Entities

APEC EWG, Eurostat, IEA, IEFS, OLADE, OPEC, UNSD

Secretariat

International Energy Forum Secretariat (IEFS)

JREC Global Renewable Energy Policies and Measures Database

(GREPMD) 2004 - present



Public

Business



"to create a global searchable, web-based database of renewable energy policies and measures in JREC countries"

Objectives

- "provide up-to-date information on policies, measures and targets related to renewable energies in JREC member countries"
- "provide a global platform for enhancing the awareness and knowledge of renewable energy policies and measures"
- "strengthen renewable energy stakeholders' capacity to assimilate and generate knowledge about renewable energy for sustainable development"

APEC Economies

Chile
New Zealand
Philippines
Singapore

Mechanisms

- jointly develop a web-based database with JREC Secretariat (hosted by the European Commission) and IEA
- Currently, "the JREC Renewable Energy Policies and Measures Database has been integrated into the IEA Global Renewable Energy Policies and Measures Database".

Responsible Entities

JREC, EC, OECD/IEA

Secretariat

JREC Secretariat in cooperation with IEA and EC

Kitakyushu Initiative for a Clean Environment

(KICE) 2000 - present



Public

Civil

Business



to support and enhance the ability of local and city authorities in Asia-Pacific to leverage their resources in addressing local environmental issues

Objectives

- strengthen the ability and power of local authorities to address local environmental issues
- enhance local partnerships through dialogue between public, civil, and business stakeholders
- "strengthen environmental management capability at the local level"
- "improve the environmental technology base"
- "promote public and private sector investment in the environment"
- "strengthen international environmental cooperation based on local initiatives"

Mechanisms

- "assistance in preparing and implementing integrated and sustainable urban development plans and strategies with quantitative indicators" and "periodical monitoring of the implementation status (in terms of quantitative indicators)"
- "promotion of information exchange and sharing of experience among participating local governments" and "provision of a platform for the transfer of technology and know-how packages, good practices and a successful municipal/regional model for sustainable development"
- "linkages, catalysation and facilitation of internal and external financial support to international cooperation initiatives of local authorities"
- "facilitation of capacity-building activities for environmental administration staff in participating local governments"
- "promotion of environmental education programme in intercity cooperation, such as student exchanges"
- "encouragement of private enterprises to participate in infrastructure development and environmental quality enhancement programme"

APEC Economies

Australia
Brunei Darussalam
Canada
China
Hong Kong, China
Indonesia
Japan
Korea
Malaysia
New Zealand
Papua New Guinea
Philippines
Russia
Singapore
Thailand
United States
Viet Nam

Responsible Entities

IGES, UNEP, UNESCAP

Secretariat

Kitakyushu Initiative Network Secretariat, with support from the IGES

Complimentary Initiatives

projects for participating APEC member economies are occurring in 8 economies; recognised as a WSSD Johannesburg Type 1 Initiative

Korean Peninsula Energy Development Organization

(KEDO) 1995 - 2006



Public

Business

*to prevent nuclear proliferation by providing energy security to DPRK***Objectives**

- "provide reliable energy supply for DPRK in exchange [for] freezing and ultimately dismantling its nuclear program"

Mechanisms

- "finance and construct in the DPRK two light-water reactors (LWR) of the Korean Standard Nuclear Power Plant model"

- "provide the DPRK with an alternative source of energy in the form of 500,000 metric tons of heavy fuel oil each year for heating and electricity production until the first of those reactors is complete"

Responsible Entities

member states share responsibility

Secretariat

headquarters/secretariat in New York City, USA

APEC Economies

Australia
Canada
Chile
Indonesia
Japan
Korea
New Zealand
United States

Kyoto Protocol to the United Nations Framework Convention on Climate Change

(Kyoto Protocol) 1997 - present



Public

Civil



to reduce the amount of greenhouse gases emitted to the atmosphere by 5% from the 1990 level in the period 2008 to 2012

Objectives

- "The Protocol's major feature is that it has mandatory targets on greenhouse-gas emissions for the world's leading economies which have accepted it. These targets range from -8 per cent to +10 per cent of the economies' individual 1990 emissions levels 'with a view to reducing their overall emissions of such gases by at least 5 per cent below existing 1990 levels in the commitment period 2008 to 2012!'"

APEC Economies

Australia
Canada
Japan
New Zealand
Russia
United States

Mechanisms

-The Protocol came into force in Feb 2005 with Russia's ratification and the first commitment period is from 2008-2012.

-Clean Development Mechanism (CDM) - "provides for Annex I Parties to implement project activities that reduce emissions in non-Annex I Parties, in return for certified emission reductions (CERs). The CERs generated by such project activities can be used by Annex I Parties to help meet their emissions targets under the Kyoto Protocol."

-Joint Implementation (JI) - "an Annex I Party may implement an emission-reducing project or a project that enhances removals by sinks in the territory of another Annex I Party and count the resulting emission reduction units (ERUs) towards meeting its own Kyoto target. An Annex I Party may also authorize legal entities to participate in JI projects."

-Carbon trading - "Only Annex I Parties to the Kyoto Protocol with emission limitation and reduction commitments may participate in such trading. Parties may therefore transfer units when they do not require them for compliance with their own emission targets."

Responsible Entities

UNFCCC, IPCC

Secretariat

"Guided by the Parties to the Convention, the secretariat under the UNFCCC provides organizational support and technical expertise to their negotiations and institutions and facilitate the flow of authoritative information on the implementation of the Convention."

Complimentary Initiatives

Subsidiary Body for Scientific and Technological Advice (SBSTA), Subsidiary Body for Implementation (SBI), CDM Executive Board, Joint Implementation Supervisory Committee, Compliance Committee, UNDP, UNEP and UNCTAD, GEF, WMO/UNEP, and OECD and the IEA

LNG Public Education and Communication Information Sharing Initiative

2006 - present



Public

Civil

Business



"to assist business firms and public authorities in member economies to address the Not-in-My-Backyard (NIMBY) sentiment concerning major LNG infrastructure projects, to eliminate the misunderstanding concerning the safety aspects of LNG, and to offer approaches and ways to address similar situations for the concerned parties to consider"

Objectives

- "establish a mechanism for APEC member economies to share information on public education and communication in relation to LNG infrastructure"
- "share [member economy] experience by providing specific cases of public education and communication concerning the construction of LNG production, transportation, receiving, storage and conversion facilities, particularly with respect to perceptions of safety risk, environmental and related social impacts, as well as how such issues are dealt with in communications with the public"

Mechanisms

- "develop a classification scheme on LNG public education and communication for use as the framework for organising the information in the website"
- "collect and classify existing reports and documents on public perceptions concerning LNG safety and security risks from the open literature"
- "develop case studies documenting the experiences of major oil and gas companies in APEC member economies, particularly with respect to the process of constructing and operating an LNG receiving station, focusing on the public education and communication aspect"
- "integrate the case studies on LNG public education and communication in relation to LNG related construction, provided by interested member economies"
- "establish a website and post the information collected above according to the classification scheme developed in the first item. The website will be open to public viewing and a mechanism will be established to enable member economies to review and analyze related topics"
- "organize workshops on LNG public education and communication, and related topics [which] would allow wider communication of the issues and experience sharing"

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Responsible Entities

APEC EWG

Secretariat

Chinese Taipei

Measuring the Impacts of the Application of New Technologies on the Energy Sector in APEC Economies

2002 - 2005



Public

Business



Objectives

- "to assess the current status of energy technologies in the electricity and iron and steel sectors in APEC Economies"

- "to analysis alternative scenarios of the future development and adoption of new energy and environmental technologies in these sectors"

Mechanisms

- "provide quantitative analysis of the benefits of the uptake of new technologies to the energy sector in APEC member economies"

- "demonstrating the potential benefits in relation to energy efficiency, economic growth and sustainable development of applying new technology to existing energy assets"

- "capacity building through the sharing and transfer of knowledge related to analysis of the application of new technology between the developed and developing economies within the APEC region"

Responsible Entities

APEC EWG

Secretariat

Australia, co-sponsoring APEC members: New Zealand and United States

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Methane to Market Partnership

(MMP) 2004 - present



Public

Civil

Business



"a voluntary, non-binding framework for international cooperation to advance the recovery and use of methane as a valuable clean energy source... [MMP] has the potential to deliver by 2015 annual reductions in methane emissions of up to 50 million metric tons of carbon equivalent"

Objectives

- "minimize methane emissions from key sources, stressing the importance of implementing methane capture and use projects in developing countries and countries with economies in transition"

- The international partnership aims reduce methane emissions from 3 initial focus areas: coal mines, oil and gas systems, and landfills (later action will also include agriculture).

APEC Economies

Australia
Canada
China
Japan
Korea
Mexico
Russia
United States

Mechanisms

- "projects for cost-effective, near-term methane recovery and use as a clean energy source"

- "workshops and events for the purpose of facilitating project development and information exchange"

- "identifying and undertaking cooperative activities aimed at overcoming challenges to cost-effective methane recovery and use"

- "actions that support project development, such as emission inventories, feasibility studies, technology demonstration, technology deployment, and project finance"

- "improving the legal, regulatory, financial, institutional, and other conditions necessary to overcome barriers and attract investment in methane recovery and use projects"

Secretariat

US EPA acts as Administrative Support Group (ASG)

Complimentary Initiatives

GGFR

New and Renewable Sources of Energy Sub-Sector Network

(NRSE SSN) 1995 - present



Public



"NRSE advocates the goal of achieving a 10% share of electricity production from renewable energy by 2020"

Objectives

- "institute and maintain sustainable development on the use of renewable energy and its technologies"
- "promote the commercialisation of renewable energy (RE)"

APEC Economies

Brunei Darussalam
Indonesia
Malaysia
Philippines
Singapore
Thailand
Viet Nam

Mechanisms

- "develop a policy and institutional framework for the development of RE: recommend a regional policy on RE including setting a renewable energy target in the region; conduct institutional capacity building; continue to conduct dialogues and consultation workshops among stakeholders"
- "promote the development and contribution of RE in energy supply: increase the share of RE in ASEAN to at least 10 percent of power generation"
- "further strengthen information networking in RE: continue the implementation of PRESSEA and ASEM GRIPP Network"
- "promote intra-ASEAN cooperation on ASEAN-made products and services: update compilation of existing specification and standards of member countries in the RE-SSN Infonet of ACE; conduct market study on various RE technologies; develop/harmonize standards for RE products; strengthen local manufacturing capabilities for RE products; design and apply innovative financing instruments in support of RE projects; to increase international cooperation"
- "promote the utilization of biomass-based cogeneration technology: develop promotional activities i.e. workshops/seminars to encourage uptake of cogeneration projects; dissemination of information relating to cogeneration and market developments"
- "promote the utilization of biofuels: develop promotional activities i.e. workshops/seminars to encourage utilization of biofuels; dissemination of information relating to biofuel technology and market developments; establish linkage to the automotive and related industries to pursue cooperation in R&D activities"

Responsible Entities

ASEAN SOME

Secretariat

ACE & Malaysia is coordinator of the NRSE-SSN

Complimentary Initiatives

EC- ASEAN COGEN Programme

Northeast Asian Natural Gas & Pipeline Forum

(NAGPF) 1997 - present



Civil



"a driving force toward the construction of the International Pipeline Network in Northeast Asia"

Objectives

- "This initiative was undertaken as a part of many efforts to build up a Trans-Asian Natural Gas Pipeline Network."

APEC Economies

China
Japan
Korea
Russia

Mechanisms

- collaborative R&D and workshops to facilitate discussions on barriers and problems for the international gas pipeline projects in the Northeast Asia region

Responsible Entities

APRSJ, MRPAM, KPGA, AGPRCC, ROSASIAGAS

Nuclear Events Web-based System

(NEWS) 2001 - present



Public

Civil

Business



"to provide fast, flexible and authoritative information on the occurrence of nuclear events that are of interest to the international community"

Objectives

- "cover all significant events in nuclear power plants, research reactors, nuclear fuel cycle facilities and occurrences involving radiation sources or the transport of radioactive material"
- "communicate as quickly as possible official information on the consequences of an event to all the participating countries through the IAEA INES Information Service"

Mechanisms

- "The International Nuclear Event Scale (INES) is a means for promptly communicating to the public in consistent terms the safety significance of events reported. By putting events into proper perspective, it can facilitate common understanding among the nuclear community, the media and the public."
- "About 60 INES National Officers are registered with permission to send event information for their country (event descriptions, event ratings according to INES and press releases) and to view all information."
- "National and international media can view the INES information (event descriptions, INES ratings and press releases), and may request to be registered, so as to be notified by e-mail of any new incoming INES information."
- "The general public has free access through the IAEA Website to INES information (event descriptions, INES ratings and pressreleases) without registration"

APEC Economies

Australia
Canada
Chile
China
Hong Kong, China
Indonesia
Japan
Korea
Malaysia
Mexico
New Zealand
Peru
Philippines
Russia
Singapore
Chinese Taipei
Thailand
United States
Viet Nam

Responsible Entities

IAEA, NEA, WANO

Secretariat

Annual Steering Committee meeting of the three cosponsors

Nuclear Fuel Bank Initiative

(IAEA NFBI) 2006 - present



Public

Civil



to establish an IAEA-owned and operated low-enriched uranium (LEU) fuel reserve

Objectives

-regulate nuclear fuel cycle under "IAEA direct ownership" of processing and recycling facilities in order to prevent proliferation of nuclear "weapons-usable technologies"

APEC Economies

China
Japan
Russia
United States

Mechanisms

- "fuel reserve would assure a back-up supply for power reactors throughout the world on a non-discriminatory, non-political basis reducing the need for countries to develop their own uranium enrichment technologies"

-Amendment of current regulation for nuclear fuel processing and its strict tracking.

Responsible Entities

IAEA, NTI

Complimentary Initiatives

Russian Fuel cycle initiative 2000-2006; GNEP; INPRO

OECD Nuclear Energy Agency

(NEA) 1958 - present



Public

Civil



"to assist its Member countries in maintaining and further developing, through international co-operation, the scientific, technological and legal bases required for the safe, environmentally friendly and economical use of nuclear energy for peaceful purposes;

to provide authoritative assessments and to forge common understandings on key issues as input to government decisions on nuclear energy policy and to broader OECD policy analyses in areas such as energy and sustainable development"

Objectives

- "further the development of the production and uses of nuclear energy for peaceful purposes by the participating countries, through cooperation between those countries and a harmonization of measures taken at the national level"

- "promote the formation of joint undertakings for the production and uses of nuclear energy for peaceful purposes, endeavouring to secure the participation of the greatest possible number of countries"

- "encourage harmonisation of regulatory standards where appropriate, and enhance the efficiency and effectiveness of the regulatory process"

APEC Economies

Australia

Canada

Japan

Korea

Mexico

United States

Mechanisms

- "a forum for sharing information and experience and promoting international co-operation"

- "a centre of excellence which helps Member countries to pool and maintain their technical expertise"

- "a vehicle for facilitating policy analyses and developing consensus based on its technical work" by collaborative R&D, workshops and training courses

Responsible Entities

OECD

Secretariat

OECD steering committee for nuclear energy

Complimentary Initiatives

Nuclear Events Web-based System NEWS (IAEA, WANO)

Patient Capital Initiative

(PCI) 2004 - present



Public

Business



"to create public-private risk-sharing vehicles on the ground" through business co-funding mechanisms

Objectives

- "to provide equity-linked capital to the local entrepreneur and project developer on a basis that is affordable, where there was either no such capital available before, or available only on unaffordable terms or with damaging delay"

APEC Economies

Chile
New Zealand
Papua New Guinea
Philippines
Singapore

Mechanisms

- "The PCI is a public sector investment initiative designed to create a sustainable public-private equity-financing scheme." The PCI funding mechanism itself is known as the Global Renewable Energy Fund of Funds (GREFF).

- "Patient Capital is an innovative financial product for developing markets aimed at realising externality benefits and thereby significantly accelerating growth of viable enterprises in the sector"

- "The GREFF will focus on the energy services needed rather than targeting a specific renewable energy technology. To avoid inefficient allocation of resources, the investment scope includes a broad mix of renewables enterprises, service businesses and project investment opportunities (e.g.: wind, geothermal, solar, biomass and small hydro projects, consumer and SME finance vehicles, and manufacturing and assembly businesses)."

Responsible Entities

JREC

Secretariat

JREC Secretariat (hosted by European Commission)

Complimentary Initiatives

EU Energy Initiative (EU EI), REEEP, the Mediterranean Renewable Energy Partnership (MEDREP), GVEP, the Global Network for Sustainable Development (GNESD)

Pledge and Review Program

(P&R Program) 1999 - present



Public



"exchange of energy efficiency information"

Objectives

- "to share information on [energy efficiency] projects that are of broad interest to member economies, and are applicable to other member economies with the possibility of one-off reports on projects of broad interest"
- "improving energy efficiency in the supply, delivery and use of energy through, inter alia, sharing information and experience in achieving improved energy efficiency"
- "to develop indicators and databases that would enable performance measurement over a period of time"

Mechanisms

- "reporting on the programs developed, their specific objectives and the results achieved"
- "sharing information and experience in achieving improved energy efficiency"
- "At the first EWG meeting of each year, members agree on a specific topic for reporting at the second EWG meeting of that year. Once economy reports are tabled at the second EWG meeting the EWG Secretariat, with the assistance of the Expert Group on Energy Efficiency and Conservation (EGEE&C), will produce a consolidation report for the next EWG meeting."

Responsible Entities

APEC EWG

Secretariat

Expert Group on Energy Efficiency and Conservation

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Program on Best Practice in Energy Services

2000 - 2002



Public

Business



Objectives

- "provide education on the nature and benefits of energy services"
- "identify government policies and practices, including barriers, affecting the development and provision of energy services within individual economies and across borders"
- "identify how government policies and practices can be changed, removed, or made less restrictive"

Mechanisms

- a series of joint workshops with the E-commerce in Energy Initiative

Responsible Entities

APEC EWG

Secretariat

United States (EBN)

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Real-Time Emergency Information Sharing

(RTEIS) 2002 - present



Public



Objectives

"provide the basic data and a communication room for APEC member economies to share oil information with each other to facilitate improved crisis management during emergencies"

Mechanisms

-Communication system:

- (1) real-time communication systems - chat system
- (2) non-real-time communication systems - mailing system

-Data to be exchanged:

- (1) monthly basis (in normal circumstances) - CIF prices of crude oil, level of crude oil and oil products in stocks, demand for oil products
- (2) weekly basis (in emergencies) - sales prices of gasoline, gas oil and kerosene (sticker prices)

-RTEIS operational manual was developed in 2005 by Australia

-issue newsletter once every two months

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Responsible Entities

APEC EWG

Secretariat

IEEJ serves as System Coordinator and Secretariat

Complimentary Initiatives

JODI

Reduce, Reuse and Recycle Initiative

(3Rs Initiative) 2005 - present



Public

Civil

Business



"to support the development of cleaner, sustainable and more efficient technologies", and "cooperative scientific research on transformation technologies offer potential to improve public health by cutting pollution reducing greenhouse gas emissions to address the challenge of global climate change"

Objectives

- Reduce waste, Reuse and Recycle resources and products to the extent feasible
- reduce barriers to the international flow of goods and materials for recycling and remanufacturing
- also allow trade in recycled and remanufactured products, and cleaner and more efficient technologies within current trade obligations and frameworks

APEC Economies

Canada
Japan
Russia
United States

Mechanisms

- promote science and technology suitable for the 3Rs
- encourage cooperation among all stakeholders including voluntary and market-based activities
- cooperate with developing countries in such areas as capacity building, raising awareness, human resource development and implementation of recycling projects

Responsible Entities

G8

Complimentary Initiatives

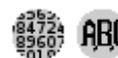
IPHE, CSLF, REEEP, GIF

Regional Energy Policy and Planning Sub-Sector Network

(REPP SSN) 2003 - present



Public



"to enhance national and regional energy policy analysis and planning towards sustainable development"

Objectives

- "objectively analyze and effectively assess the economic, social and environmental impacts of energy projects for each member country and the ASEAN region as a whole"

- "provide a permanent venue to address issues pertaining to the implementation of the ASEAN Plan of Action for Energy Cooperation 2004-2009 (APAEC 2004-2009) and matters arising among ASEAN dialogue partners"

APEC Economies

Brunei Darussalam
Indonesia
Malaysia
Philippines
Singapore
Thailand
Viet Nam

Mechanisms

- (1) energy policy and supply security information sharing network
- (2) capacity building in energy policy planning, supply security assessment and database development
- (3) incorporation of environmental and sustainable development concern in regional policy formulation
- (4) analysis and preparation of regional energy policy and outlook
- (5) strengthen collaboration/ cooperation among national and regional institutions in energy policy and planning
- (6) address energy issues pertaining to ASEAN dialogue partners/other relationships
- (7) pursue studies on evolving regional energy policy reform/issues
- (8) monitoring and evaluation on the progress of the ASEAN Plan of Action for Energy Cooperation"

-conducting studies and analysis

-conducting seminars, workshops, and training

Responsible Entities

ASEAN SOME

Secretariat

ACE and METI

Complimentary Initiatives

SOME-METI Work Program

Renewable Energy and Energy Efficiency Partnership

(REEEP) 2004 - present



Public

Civil

Business



"to accelerate the integration of renewables into the energy mix and to advocate energy efficiency as a path to improved energy security and reduced carbon emissions, ensuring socio-economic benefits"

Objectives

- "reduce greenhouse gas emissions"
- "deliver social improvements to developing countries and countries in transition, by improving the access to reliable clean energy services, and by making REES [renewable energy and energy efficient systems] more affordable"
- "bring economic benefits to nations that use energy in a more efficient way and increase the share of indigenous renewable resources within their energy mix"
- "facilitate new and innovative funding vehicles to fill the gap in the current financing of renewable energy"

Mechanisms

- projects are carried out in each year based upon changing themes and focus areas with different partners; specific mechanisms include:
 - "co-ordination of issue-focused networks, awareness raising and capacity building for all stakeholders"
 - "publication of information and other means of public relations and information management"
 - "national and international symposia and conferences"
- Projects generally focus on energy policy reviews and improving government sustainable energy regulatory frameworks.
- Another project theme, "innovative finance mechanisms," aims to increase financial viability of small NRE and efficiency projects.

APEC Economies

Australia
Canada
Chile
China
Hong Kong, China
Indonesia
Japan
Korea
Mexico
New Zealand
Philippines
Russia
United States
Viet Nam

Secretariat

8 regional secretariats, with NGO-status "International Secretariat" registered in Austria ; also, "Governing Board" and voting "Meeting of Partners"

Complimentary Initiatives

WSSD-Johannesburg initiatives; Environmental Investment Partners (EIP); GVEP

Rural Energy Enterprise Development

(REED) 2000 - present



Public

Civil

Business



"enterprise development and seed financing for clean energy entrepreneurs in developing countries"

Objectives

- "REED is primarily focused on enterprises delivering rural energy services via renewable energy or energy efficiency."

- "In terms of customers, REED is mainly focused on businesses providing services to rural areas, but nonrural (urban and peri-urban) markets can also be supported if the businesses are particularly innovative and also deliver substantial environmental improvement."

- "An underlying goal of REED deal structures is to prepare young enterprises for later growth capital from more commercial sources."

Mechanisms

- "provide support to enterprises through a combination of extensive business development services and 'seed financing'"

- REED Enterprise Development Services (EDS): "Through training activities and other enterprise development services, REED provides the information, tools, consulting, and direct assistance that entrepreneurs need to develop business skills and wisely invest the time and capital needed to build a sustainable business."

- "provide a small initial financial investment called seed capital (also called start-up capital or seed finance) to transform a good idea - and a capable entrepreneur - into a specific business that delivers improved energy services"

- "REED is targeted at developing small to mid-sized companies."

APEC Economies

Australia
Canada
Chile
China
Indonesia
Japan
Korea
Malaysia
Mexico
New Zealand
Papua New Guinea
Peru
Philippines
Russia
Singapore
Thailand
United States
Viet Nam

Responsible Entities

UNEP Energy, UNEP Renewable Working Group, UNF

Secretariat

E+Co and UNEP both specified as REED contacts

Complimentary Initiatives

AREED (Africa), B-REED (Brazil), C-REED (China), Clean Energy Services Initiative

St. Petersburg Plan of Action - Global Energy Security

2006 - present



Public

*to increase/enhance global energy security***Objectives**

- "increasing transparency predictability and stability of global energy markets"
- "improving the investment climate in the energy sector"
- "enhancing energy efficiency and energy saving"
- "diversifying the energy mix"
- "ensuring physical security of critical energy infrastructure "
- "addressing climate change and sustainable development; reducing energy poverty"

APEC Economies

Canada
Japan
Russia
United States

Mechanisms

- "broaden consumer/producer dialogue; improve and enhance the collection of and reporting of market data through JODI; support the Energy Charter and the efforts of participating economies to improve international energy cooperation"
- "save energy through demand-side measures and through introduction of advanced energy efficient technologies and CCS; promote wider use of renewable and alternative energy sources, while increasing the efficiency the current energy system and increasing market and infrastructure efficiencies"
- "comprehensive energy saving, energy efficiency and...sharing best practices to the entire energy value chain...especially in terms of statistics, reducing energy intensity and deployment of best practices [internationally]"
- development of "alternative, cleaner low-carbon energy; nuclear energy; renewables; innovative energy technologies"
- "prioritizing ... vulnerabilities among energy infrastructure sites and developing... security response best practices across all energy sectors against... terrorist attacks"
- "Addressing climate change will be undertaken under the Gleneagles Plan of Action. Reducing energy poverty will be undertaken by development of national and local institutional capacities and management improvements in the area of energy policy and related infrastructure needs. National energy investment and access targets linked to poverty reduction policies, such as private-public partnerships to foster investment and increase access to affordable energy services."

Responsible Entities

G8

Complimentary Initiatives

Gleneagles Plan of Action - Climate Change, Clean Energy, 3R's Initiative, JODI under the IEF, GVEP, REEEP, Energy Charter

Strengthening Operational Aspects of APEC Energy Micro-Economic Reform

1999 - 2003



Public

Business

**Objectives**

"promote and implement a regional strategy for institutional strengthening and capacity building amongst APEC member economies in the micro-economic reform of energy utilities"

Mechanisms

-Phase 1 examined the progress being made by APEC member economies on the implementation of the fifteen Best Practice Principles for Independent Power Producers. This phase was completed in 2000 with final report being published in May 2001.

-Phase 2 involved the undertaking of three research studies and a "Manual of Strategic Principles" was developed to assist individual member economies in establishing, implementing and managing a micro-economic reform process.

-Phase 3 involved a series of workshops aimed at explaining and promoting the "Manual of Strategic Principles" and improving the skills and understanding of regulatory institutions and government departments responsible for energy sector reform.

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Responsible Entities

APEC EWG

Secretariat

Australia

Sub-Committee on Non-Conventional Energy Research

(SCNCER) 1989 - present



Public



Objectives

- "to undertake research, development, and demonstration projects in energy technologies and management in... Natural gas utilization technology, biomass/biogas technology, clean coal technology, solar/wind/micro-hydro energy technology and energy efficiency technology"

APEC Economies

Brunei Darussalam
Indonesia
Malaysia
Philippines
Singapore
Thailand
Viet Nam

Mechanisms

- operate training workshops

- "undertake R&D technology transfer and commercialization of various non-conventional and alternative energy sources"

- "implementation of the EC-ASEAN COGEN Program Phase III"

- "strengthen information network/database for exchange and dissemination within and outside ASEAN"

Responsible Entities

The ASEAN Committee on Science and Technology (COST)

Secretariat

Advisory Body on the ASEAN Plan of Action on Science and Technology (ABAPAST)

Sustainable Development in Asia and the Pacific (WSSD Type I Initiative)

2002 - present



Public

Civil



"[to] build on the achievements made since the United Nations Conference on Environment and Development and expedite the realization of the remaining goals under the millennium development goals."

Objectives

- "poverty reduction for sustainable development"
- "cleaner production and sustainable energy"
- "land management and biodiversity conservation"
- "protection and management of and access to freshwater resources"
- "oceans, coastal and marine resources and sustainable development of small island developing economies"
- "action on atmosphere and climate change"

Mechanisms

- "a critical challenge is to ensure the necessary internal conditions for mobilizing domestic savings, both public and private, sustaining adequate levels of productive investment and increasing human capacity."
- "a crucial task is to enhance the efficacy, coherence and consistency of macroeconomic policies."
- "an enabling domestic environment is vital for mobilizing domestic resources, increasing productivity, reducing capital flight, encouraging the private sector and attracting and making effective use of international investment and assistance."
- "efforts to create such an environment should be supported by the international community."

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Thailand
 United States
 Viet Nam

Responsible Entities

UNEP

Secretariat

UN secretariat

Complimentary Initiatives

Kitakyushu Initiative for a Clean Environment

Sustainable Energy Finance Initiative

(SEFI) 1999 - present



Public

Civil

Business



"to promote, facilitate, and support increased investment in energy efficiency and renewable energy"

Objectives

- "provide current and targeted information to financiers while facilitating new economic tools that combine social and environmental factors - both risks and returns - as integral measures of economic performance"

- "provide financiers with the tools, support and networks to drive financial innovation that improves the environmental performance of the energy mix"

APEC Economies

Australia
Canada
Japan
Korea
Mexico
New Zealand
Philippines
Thailand
United States

Mechanisms

- "to address the need for finance community to include environmental and climate issues in their investment decisions for new or replacement energy infrastructure, SEFI's mainly focus is to:"

- Provide information: "(1) Develop resources, risk management tools and activities that lower barriers to investment in this sector; (2) Communicate investment activity in the sustainable energy sector to the broader finance community; (3) Promote policy frameworks within financial institutions for investing in sustainable energy"

- Facilitate networks: "(1) Bring financiers and developers together to share best practice on sustainable energy finance and promote investment in the sustainable energy sector; (2) Build credibility in the finance sector and within financial institutions for investment in sustainable energy; (3) Help financiers create common platforms on sustainable energy finance, such as investment forums"

- Develop partnerships: "(1) Develop and promote joint FI/UN initiatives and other public-private partnerships; (2) Link donor funding with the finance sector to buy down and share risks; (3) Provide incentives for new financial product development that targets regions of the world currently without access to modern energy services"

- "SEFI launched a revised, online directory of lenders and investors working in the renewable energy and energy efficiency sectors"

Responsible Entities

UNEP Energy, UNEP FI, BASE

Secretariat

Governed by a committee of representatives from the UNEP Renewable Energy and Finance Unit, UNEP Finance Initiative, Basel Agency for Sustainable Energy (BASE) and an advisory board

Training & Communication Program for Energy Regulators on the Benefits of Structure Reform

2000 - 2000



Public

Business



Objectives

- "The purpose of this project is to improve APEC energy regulators' understanding of investment risks as perceived by private sector investors in energy infrastructure projects (including Independent Power Projects)."

Mechanisms

- training and communication program

Responsible Entities

APEC EWG

Secretariat

Australia

APEC Economies

Australia
 Brunei Darussalam
 Canada
 Chile
 China
 Hong Kong, China
 Indonesia
 Japan
 Korea
 Malaysia
 Mexico
 New Zealand
 Papua New Guinea
 Peru
 Philippines
 Russia
 Singapore
 Chinese Taipei
 Thailand
 United States
 Viet Nam

Trans-ASEAN Gas Pipeline Project

(TAGP) 1997 - present



Public

Business



"to provide the region with a secure supply of energy"

Objectives

-develop an integrated gas infrastructure

-objective under ASEAN Plan of Action For Energy Cooperation 1999-2004:
"formulate strategies and plan of action for implementation and realisation" of the Trans-ASEAN Gas Pipeline Infrastructure Project "with a view to ensuring greater security of gas supply"

-objective under ASEAN Plan of Action For Energy Cooperation 2004-2009:
"facilitate the implementation and realisation of the Trans-ASEAN Gas Pipeline Infrastructure Project

APEC Economies

Brunei Darussalam
Indonesia
Malaysia
Philippines
Singapore
Thailand
Viet Nam

Mechanisms

-"establish ASCOPE Gas Centre (AGC) to serve as the strategic technical and information resource and capacity building centre in facilitation and implementation of the TAGP and gas development programmes in ASEAN"

-"build upon existing national grids and bilateral pipeline connections"

-"The program has developed through a series of plans and agreements: (1) ASEAN Memorandum of Understanding on the TAGP; (2) Masterplan for Trans-ASEAN Gas Pipeline Infrastructure Project completed in 2000; (3) Roadmap for Integration of ASEAN: Trans-ASEAN Gas Pipeline Implementation; (4) ASEAN Plan of Action on Energy Cooperation (APAEC) 2004-2009: Five Year Workplan: Programme Area No. 2 Trans-ASEAN Pipeline."

-project preparation studies, at the national and regional levels, focusing on "legal and institutional frameworks; commercial and economic feasibility; construction, financing, pipeline operation and maintenance, supply transportation and distribution"

-"ASEAN has approved eight gas interconnection projects"

Responsible Entities

ASEAN SOME

Secretariat

ASCOPE Gas Centre's TAGP Task Force

United Nations Framework Convention on Climate Change

(UNFCCC) 1992 - present



Public

Civil



"to achieve, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system [with] such a level [being] achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner"

Objectives

- "gather and share information on greenhouse gas emissions, national policies and best practices"
- "launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing [economies]"
- "cooperate in preparing for adaptation to the impacts of climate change"

Mechanisms

- The Convention entered into force in March 1994. The Conference of the Parties (COP) acts as the "supreme body" of the Convention.
- "The Convention established two permanent subsidiary bodies: the Subsidiary Body for Scientific and Technological Advice (SBSTA) and the Subsidiary Body for Implementation (SBI). These bodies [advise] the COP and each has a specific mandate and are open to participation by any party and governments often send representatives who are experts in the fields of the respective bodies."
- Promulgated through the establishment of the Kyoto Protocol in 1997. Annex I economies that have ratified the Protocol (Canada, Japan, New Zealand and Russia) are bound under international law to meet the CO₂ emissions reductions mandated. Those Annex I economies that have not ratified the Protocol (Australia and the US) are not bound - see separate entry for Kyoto Protocol
- Annex II economies are not bound legally to reduce their emissions of CO₂ period the first commitment period from 2008-2012. However, they are able to join mechanisms intended to reduce emissions.
- Of the mechanisms available that are most beneficial to Annex II economies, the Clean Development Mechanism (CDM) is the most highly purported.

APEC Economies

Australia
Canada
Chile
China
Hong Kong, China
Indonesia
Japan
Korea
Malaysia
Mexico
New Zealand
Papua New Guinea
Peru
Philippines
Russia
Singapore
Thailand
United States
Viet Nam

Responsible Entities

UN (COP/MOP)

Secretariat

"secretariat under the UNFCCC provides organizational support and technical expertise to their negotiations and institutions and facilitate the flow of authoritative information on the implementation of the Convention"

Complimentary Initiatives

UN Family, World Meteorological Organization, IPCC, G8, APP

USEPA Integrated Environmental Strategies

(USEPA-IES) 1998 - present



Public

Civil



"The IES program engages developing countries to build support for integrated planning to address local environmental concerns and, secondarily, reduce associated global greenhouse gas emissions"

Objectives

- "provide tools and approaches to help analyze and quantify environmental (air quality and associated greenhouse gas), public health, and economic co-benefits in major developing countries"
- "improve analytical methods for [air quality and GHG reduction] co-benefits analysis"
- "provide the information necessary for consideration of global issues in local energy and environmental policy initiatives"
- "build expertise in integrated energy and environmental analysis"
- "promote local support for the implementation of measures and policies with multiple benefits"

APEC Economies

Chile
China
Korea
Mexico
Philippines
United States

Mechanisms

- country-targeted: establish study area's pollution baselines, identify implementable development scenarios
- provide benefit-cost analysis of scenarios and seek feedback from stakeholders
- implement/integrate solutions in local policies

Responsible Entities

USEPA, NREL

World Association of Nuclear Operators

(WANO) 1989 - present



Public



"to maximise the safety and reliable of the operation of nuclear power plants by exchanging information and encouraging communication, comparison and emulation amongst its members"

Objectives

- "exchange operating experience in a culture of openness, so members can work together to achieve the highest possible standards of nuclear safety"

APEC Economies

Canada
China
Japan
Korea
Mexico
Russia
Chinese Taipei
United States

Mechanisms

- work programmes include:

- "(1) peer reviews (the Performance Objectives and Criteria)
- (2) operating experience sharing
- (3) technical support and exchange (comprising good practices, performance indicators, operator exchanges, and technical support missions)
- (4) professional and technical development (workshops & seminars)"

- "WANO reports are available in printed form and via the comprehensive secure web site that is restricted to its members"

- "The WANO network enables members to pose questions via the web site to receive advice from members at nuclear power plants anywhere in the world"

- "A magazine 'Inside WANO' is printed three times a year and is available on both the secure and public web sites"

- "The WANO Review is printed biennially and distributed to members. It can be downloaded from both web sites"

Responsible Entities

WANO

Secretariat

A central governing board provides the overall direction of WANO and establishes WANO policies

World Bank Asia Alternative Energy Program

(WB-ASTAE) 1992 - present



Public



"to mainstream alternative energy (renewable energy and energy efficiency) services in all Bank sectors, with priority emphasis on the Asia region"

Objectives

- "offer assistance in the identification and preparation of renewable energy and energy efficiency/demand-side management (DSM) projects for World Bank/Global Environment Facility (GEF)-supported operations in Asia"
- provide "technical assistance to improve local technical expertise, system performance and institutional capability to design and implement alternative energy investment programs"

APEC Economies

China
Indonesia
Philippines
Thailand
United States
Viet Nam

Mechanisms

- "training modules in energy efficiency and renewable energy options"
- "formulation of alternative energy policies"
- "design and implementation of pilot innovative [financial] delivery mechanisms"
- "technical support to improve the performance and availability of alternative energy systems"
- "strengthening of institutional capacities"

Responsible Entities

WB

Secretariat

WB is leading partner- WB-ASTAE is essentially a "program" within WB

Complimentary Initiatives

WB-ESMAP, WB-AFRREI (Africa), WB-RPTES (Sub-Saharan)

World Bank Carbon Finance Unit

(WB-CFU) 1999 - present



Public

Business



"to catalyze a global carbon market that reduces transaction costs, supports sustainable development and reaches and benefits the poorer communities of the developing world"

Objectives

-to act as "market facilitator and catalyst" to contribute toward the creation of carbon projects which might not otherwise be bankable through emission reduction purchase agreements (ERPAs)

-improve capacity of project developers and developing countries through learning by doing and technical assistance

APEC Economies

Canada
China
Indonesia
Japan
Mexico
Peru
Philippines

Mechanisms

-using funds from a coalition of OECD government and business lenders, WB purchases VERs from CDM and JI projects and then pays out following verification

-currently, 10 funds and facilities exist:

-Prototype Carbon Fund, BioCarbon Fund, Community Development Carbon Fund, Italian Carbon Fund, The Netherlands CDM Facility, The Netherlands European Carbon Facility, Danish Carbon Fund, Spanish Carbon Fund, Umbrella Carbon Facility, Carbon Fund for Europe

Responsible Entities

WB, CDM, JI

Secretariat

WB-CFU acts as secretariat for 10 joint carbon funds

Complimentary Initiatives

see ten individual mechanisms, above

World Bank Energy Sector Management Assistance Program

(WB-ESMAP) 1983 - present



Public



to "promote the role of energy in poverty reduction and economic growth in an environmentally responsible manner [for]... low-income, emerging, and transition economies"

Objectives

- "respond to the need for analytical work, applied research, and experimentation"
- "provide intellectual leadership"
- "spearhead the strategic agenda of the [World] Bank, donors, governments, and private sector partners on energy"
- "offer new solutions and generate new knowledge on technical, financial, and institutional energy issues"

APEC Economies

Chile
China
Indonesia
Malaysia
Mexico
Papua New Guinea
Peru
Philippines
Russia
Thailand
Viet Nam

Mechanisms

-Early ESMAP activities were limited to "Country Energy Assessments". As of 2007, however, ESMAP has broadened its scope and now operates in 4 focus areas: energy security (by addressing energy efficiency), energy poverty (by addressing gender and access issues), market efficiency and governance, and renewable energy.

-Standard operating mechanisms include "free technical assistance" to developing nations through pilot projects and feasibility/exploratory studies and "knowledge generation and dissemination" through training, workshops, publications, etc.

-ESMAP has an upstream focus (rather than being project-based) and a common mechanism used for addressing this is publication of assessments and exploratory strategies.

Responsible Entities

WB, UNDP

Secretariat

"Consultative Group (CG)" and "ESMAP Manager", composed of WB officials, donors, and regional experts administer and oversee ESMAP

Complimentary Initiatives

other WB trust-fund energy programs, WB-ASTAE (Asia), WB-AFRREI (Africa), WB-RPTES (Sub-Saharan)

INDEX OF INITIATIVES

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| ACE | ASEAN Centre for Energy | 126 | 16, 50, 58, 75 |
| ADB-ALGAS | ADB Asia Least-Cost Greenhouse Gas Abatement Strategy | 107 | |
| ADB-CDM Facility | ADB Clean Development Mechanism Facility | 109 | 6, 39, 75 |
| ADB-CMI | ADB Carbon Market Initiative | 108 | 39, 45, 75 |
| ADB-EII | ADB Energy Efficiency Initiative | 110 | 27 |
| ADB-REACH | ADB Renewable Energy, Energy Efficiency, and Climate Change | 111 | 2, 38, 75 |
| AEBF | ASEAN Energy Business Forum | 117 | |
| AEEMTRC | ASEAN-EC Energy Management Training and Research Centre | 120 | |
| AFOC | ASEAN Forum on Coal | 118 | 6, 37 |
| ANMED | APEC Network of Minerals and Energy Data | 114 | 65, 69 |
| AP6, APP | Asia Pacific Partnership on Clean Development and Climate | 124 | 3, 54, 76 |
| APEC 21st Century REDI | Asia Pacific Economic Cooperation 21st Century Renewable Energy Development Initiative | 122 | 3, 66 |
| APERC | Asia Pacific Energy Research Centre (Energy Research Centre Initiative) | 123 | 5, 16, 50, 58, 73, 75, 85 |
| APG | ASEAN Power Grid Initiative | 119 | 27, 28, 32 |
| APGAS | APEC Gas Forum | 112 | 4, 75 |
| ASEAN+3 Cooperation | ASEAN + 3 Framework for Comprehensive Economic Partnership (Energy Cooperation) | 115 | 31 |
| ASEAN-Japan Cooperation | ASEAN-Japan Framework for Comprehensive Economic Partnership (Energy Cooperation) | 121 | |
| CAI-Asia | Clean Air Initiative for Asian Cities | 128 | 6, 71 |

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| CAI-LAC | Clean Air Initiative in Latin American Cities | 129 | 71 |
| CAIRNS Initiative | Comprehensive Action Initiative Recognising The Need For Strengthening The APEC Energy Security Initiative - Energy Security, Sustainable Development And Common Prosperity | 131 | |
| Canadian Cooperation Fund | Canadian Cooperation Fund on Climate Change | 125 | 27, 28, 39 |
| COGEN 1/ COGEN 2 | EC- ASEAN COGEN Programme, COGEN 1 and 2 | 136 | 27, 28 |
| COGEN 3/ COGEN 3 Follow-up | EC- ASEAN COGEN Programme, COGEN 3 and Follow-up | 137 | 27, 28 |
| Com+, Complus | Com+ Alliance of Communicators for Sustainable Development | 120 | 4, 80 |
| CSLF | Carbon Sequestration Leadership Forum | 126 | 3, 6, 58, 80 |
| CSP GMI | Concentrating Solar Power Global Market Initiative | 132 | 27 |
| Danish Cooperation Fund | Danish Cooperation Fund for Renewable Energy and Energy Efficiency in Rural Areas | 133 | 27, 39 |
| EAEF | EC-ASEAN Energy Facility | 138 | 27 |
| EBN | EWG Business Network | 152 | |
| ECT | Energy Charter Treaty | 140 | 2, 17, 18, 44, 47, 48 |
| EE&C SSN | Energy Efficiency and Conservation Sub-Sector Network | 141 | |
| EEB | Energy Efficiency in Buildings | 143 | 56 |
| EERE Financing | Energy Efficiency and Renewable Energy Financing | 142 | 2, 27, 39, 40 |
| ERF | Energy Regulators Forum Initiative | 146 | |
| ESI | Energy Security Initiative | 147 | 27 |
| FNCA | Forum for Nuclear Cooperation in Asia | 154 | 6, 69 |
| Futuregen | Futuregen Alliance | 156 | 6, 54, 58, 61, 62 |
| GECF | Gas Exporting Countries Forum | 157 | 6 |
| GEF-CC | Global Environment Facility (Climate Change) | 161 | 2, 6, 38, 40, 57, 58, 59 |

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| GERIAP | GHG Emission Reduction from Industry in Asia and the Pacific | 159 | 79 |
| GGFR | Global Gas Flaring Reduction | 162 | 2, 6, 39, 45, 49 |
| GHGP | Greenhouse Gas Protocol Initiative | 166 | |
| GIF | Generation IV International Forum | 158 | 3, 60 |
| GMS | Greater Mekong Subregion Economic Cooperation Programme | 165 | 1, 26, 28, 29, 30, 45 |
| GREPMD | JREC Global Renewable Energy Policies and Measures Database | 198 | |
| GS | Gold Standard | 164 | 2, 6, 19, 45, 49 |
| GVEP | Global Village Energy Partnership | 163 | |
| IAEA | International Atomic Energy Agency | 187 | 6, 28, 60, 68, 69, 70, 72, 93 |
| IAEA NFBI | Nuclear Fuel Bank Initiative | 208 | 6 |
| IAI | Initiative for ASEAN Integration | 185 | 27 |
| IEA | International Energy Agency | 189 | 3, 6, 18, 31, 53, 56, 57, 58, 59, 60, 61, 64, 66, 67, 69, 70, 72 |
| IEA-AFC | IEA Advanced Fuel Cells | 167 | |
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| IEA-DSM | IEA Demand-Side Management | 172 | 56 |
| IEA-ECBCS | IEA Energy Conservation in Buildings and Community Systems | 173 | 56 |
| IEA-EnvEconoFusion | IEA Environmental Safety and Economic Aspects of Fusion Power | 177 | 60, 69 |
| IEA-EOR | IEA Enhanced Oil Recovery | 176 | 3, 56 |
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| IEA-HIA | IEA Hydrogen Implementation Agreement | 179 | 59 |
| IEA-Hydro | IEA Hydropower | 180 | 72 |
| IEA-NEET | IEA Networks of Expertise in Energy Technology | 181 | |
| IEA-PVPS | IEA Photovoltaic Power Systems | 182 | |
| IEA-SHC | IEA Solar Heating and Cooling | 183 | |
| INIS | International Nuclear Information System | 190 | 3, 68, 69, 70, 72 |
| INPRO | International Project on Innovative Nuclear Reactors and Fuel Cycles | 192 | 3, 60 |
| IPHE | International Partnership for the Hydrogen Economy | 191 | 59 |
| ITER | International Thermonuclear Experimental Reactor | 193 | 3, 54, 60 |
| IUCN Climate Change Initiative | International Union for the Conservation of Nature and Natural Resources Climate Change Initiative | 194 | |
| J4 Cebu | Japan Four-Point Initiative | 195 | 29 |
| JODI | Joint Oil Data Initiative | 197 | 3, 66, 67, 71, 77, 79 |
| KEDO | Korean Peninsula Energy Development Organization | 200 | 1, 18, 28, 32 |
| KICE | Kitakyushu Initiative for a Clean Environment | 199 | 2, 38 |
| Kyoto Protocol | Kyoto Protocol to the United Nations Framework Convention on Climate Change | 201 | 2, 5, 6, 11, 40, 43, 44, 46, 47, 48, 49, 55, 57, 77 |
| MMP | Methane to Market Partnership | 204 | 1, 18, 38 |
| NAGPF | Northeast Asian Natural Gas & Pipeline Forum | 206 | 19, 31 |
| NEA | OECD Nuclear Energy Agency | 209 | 18, 30, 69 |
| NEWS | Nuclear Events Web-based System | 207 | 69 |
| NRSE SSN | New and Renewable Sources of Energy Sub-Sector Network | 205 | |

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|--|---|---|--|
| P&R Programme | Pledge and Review Programme | 211 | 70 |
| PCI | Patient Capital Initiative | 210 | 2, 36, 40 |
| PREGA | Dutch Cooperation Fund for Promotion of Renewable Energy, Energy Efficiency, and Greenhouse Gas Abatement | 134 | 27, 38, 39 |
| REED | Rural Energy Enterprise Development | 217 | 2, 6, 41 |
| REEEP | Renewable Energy and Energy Efficiency Partnership | 216 | 6, 40 |
| REPP SSN | Regional Energy Policy and Planning Sub-Sector Network | 215 | |
| RTEIS | Real-Time Emergency Information Sharing | 213 | 71 |
| SCNCER | Sub-Committee on Non-Conventional Energy Research | 220 | |
| SEFI | Sustainable Energy Finance Initiative | 222 | 6, 40, 71 |
| TAGP | Trans-ASEAN Gas Pipeline Project | 224 | 1, 27, 28, 31 |
| UNFCCC | United Nations Framework Convention on Climate Change | 225 | 1, 2, 5, 6, 35, 40, 55, 58 |
| USEPA-IES | USEPA Integrated Environmental Strategies | 226 | |
| WANO | World Association of Nuclear Operators | 227 | 6, 69 |
| WB-ASTAE | World Bank Asia Alternative Energy Programme | 228 | |
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