Asia-Pacific
Economic Cooperation

Energy Efficiency in Industry of APEC Economies

Survey of policies and programs to measure and promote energy efficiency

APEC Energy Working Group
Expert Group on Energy Efficiency and Conservation

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Glossary

Btu	British thermal unit
EEO	Energy Efficiency Operations
ESCO	Energy service companies
GHG	Greenhouse Gas
mtoe	Million tonnes of oil equivalent
MMBtu	Million British thermal units
PJ	Petajoule
toe	Tonnes of oil equivalent

APEC Economy abbreviations

AUS	Australia
BD	Brunei Darussalam
CDA	Canada
CHL	Chile
PRC	People's Republic of China
HKC	Hong Kong, China
INA	Indonesia
JPN	Japan
ROK	Republic of Korea
MAS	Malaysia
MEX	Mexico
NZ	New Zealand
PNG	Papua New Guinea
PE	Peru
RP	The Republic of the Philippines
RUS	Russia
SIN	Singapore
CT	Chinese Taipei
THA	Thailand
US	United States
VN	Viet Nam

Executive summary

This study has been prepared for the Expert Group on Energy Efficiency and Conservation (EGEE&C) and Asia-Pacific Economic Cooperation (APEC), overseen by Mr C. Harvey Major, the US Department of Energy representative to the EGEE&C. This study brings together existing literature on the policies and programs implemented across APEC, targeting energy efficiency in the industrial sector. This research has then been supplemented and brought up to date through a survey of APEC member economies.

This survey was distributed to all APEC member economies[1], nine of which responded providing specific information on the programs and policies implemented in their economy, benchmarking activities, and case studies of policies and programs that have been particularly effective in improving energy efficiency.

Drawing trends from the research and survey responses is difficult to do, with most economies employing a broad suite of policies to target energy efficiency. These include:

- agreements (voluntary or mandatory) to reduce energy consumption by a specified amount, measuring progress using benchmarks;
- providing incentives such as taxes/subsidies and trading schemes; and,
- providing education and information, either through campaigns, or minimum standards to improve knowledge and understanding.

However, some interesting points to note are:-

- most agreements are voluntary;
- developed economies tended to use more financial incentives and agreements than developing economies;
- developing economies tended to use education and information tools; and
- the policies and programs are orientated towards providing a 'carrot' rather than using a 'stick' to drive improved energy efficiency.

Given the relatively recent implementation of many of these policies and program, the outputs and outcomes reported in the survey response focus upon participation in the program (eg application numbers, investment leveraged) and potential energy savings. Where benchmarks have been used to measure progress, and data collected

1 With the exception of Brunei Darussalam and Papua New Guinea, for whom no contact details were provided.

against these benchmarks, reporting shows that energy use has decreased, with a corresponding energy cost savings.

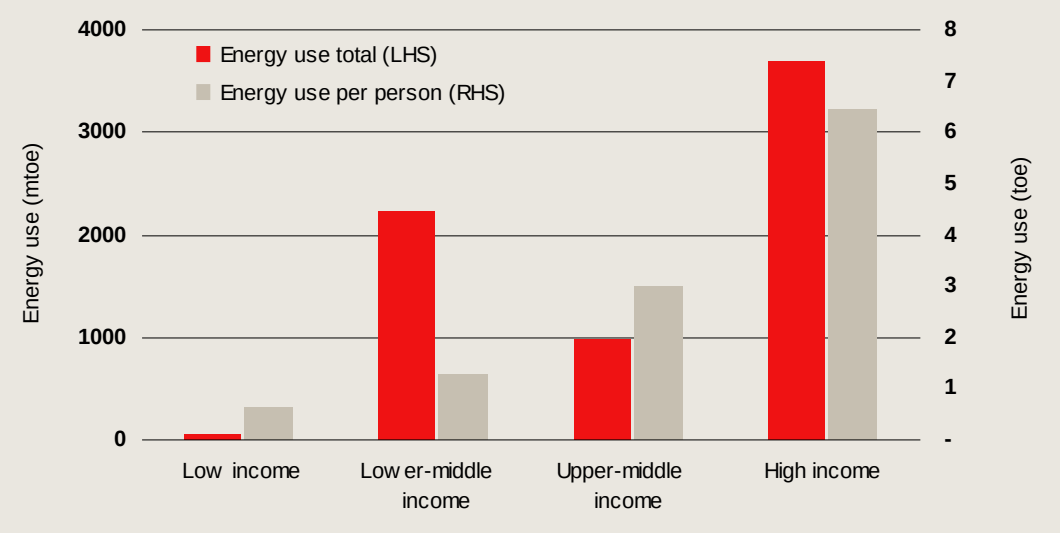
This study shows APEC economies are very busy implementing policies and programs to target energy efficiency. By sharing these experiences, APEC economies will be in a better position to learn from each other, and identify successful policy and program approaches.

1 Introduction

In light of the global issue of climate change and the need to reduce greenhouse gas (GHG) emissions, improved energy efficiency will play an important role in an economy's suite of policies to reduce emissions cost effectively.

Energy demand and use in any economy largely reflects their level of economic development and population. Chart 1.1 shows that the wealthiest economies are the largest consumers of energy. The disparity between developed and developing economies is further pronounced when comparing energy consumption per person.

1.1 **APEC energy consumption by income levels**

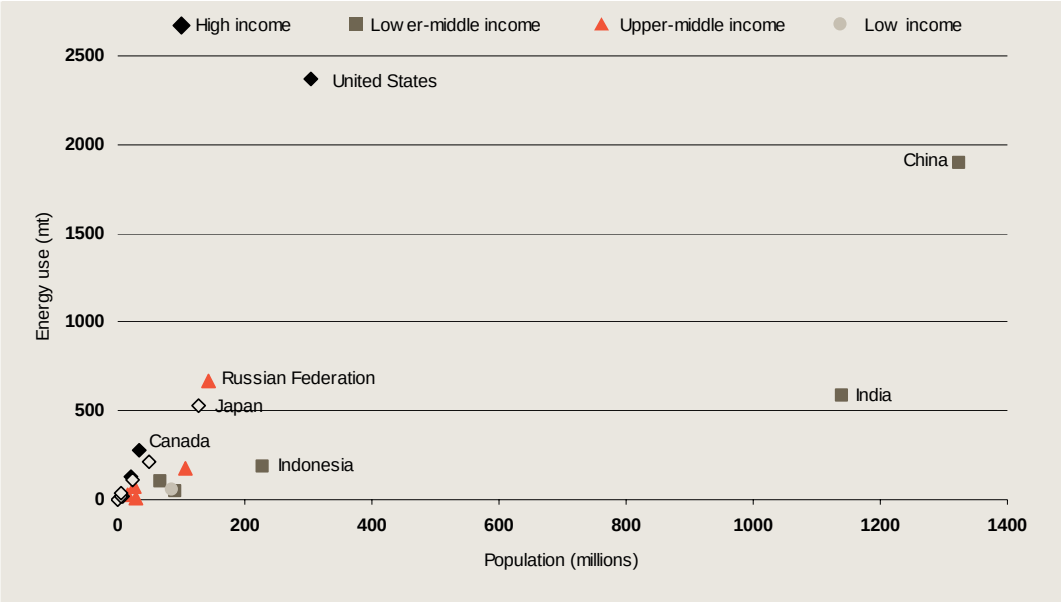


Note: Data not available for Papua New Guinea.

Data source: World Development Indicators, World Bank Group, annual updating — latest data available.

While developed economies, on a per person basis are the most prolific consumers of energy, the sheer magnitude of some developing economies' population makes these economies significant consumers of energy. Chart 1.2 shows the relationship between energy consumption and population for Asia-Pacific Economic Cooperation (APEC) member economies. India is also included, as it is a developing economy, and is expected to surpass China as the largest economy by 2030. With over 1.3 billion people, China is second only to the United States in total energy use.

1.2 APEC energy consumption and population

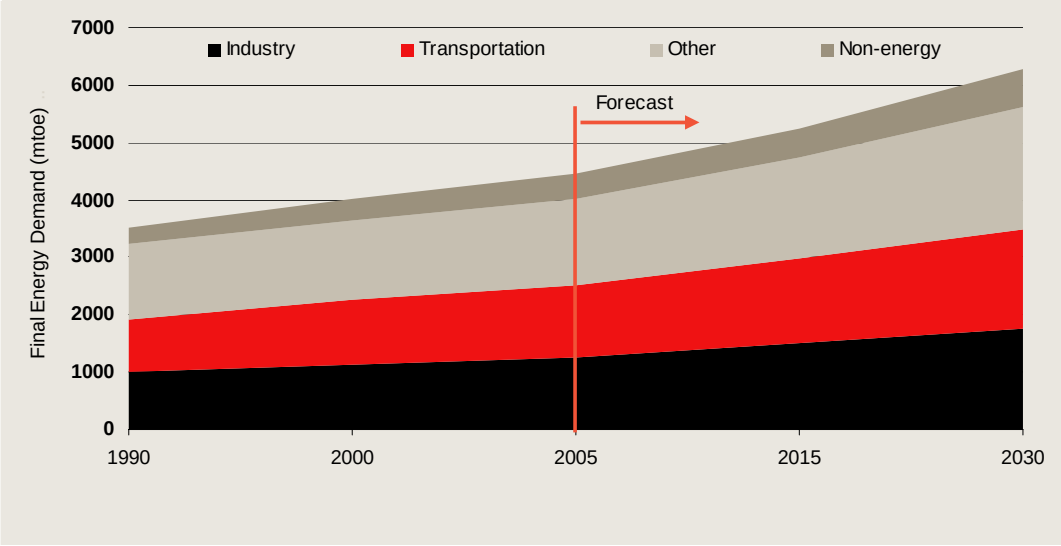


Note: Data not available for Papua New Guinea.

Data source: World development indicators, World Bank Group, annual updating — latest data available.

Increasing economic growth in developing economies and population growth across APEC are expected to drive growth in aggregate energy demand for the APEC region. According to forecasts made by the Asia Pacific Energy Research Centre (APERC) over the period 2005 to 2030, energy demand is expected to grow at 1.3 per cent per year. This is illustrated in chart 1.3 which shows the growth in energy demand from 1990-30 (forecast from 2005).

1.3 APEC final energy demand by sector



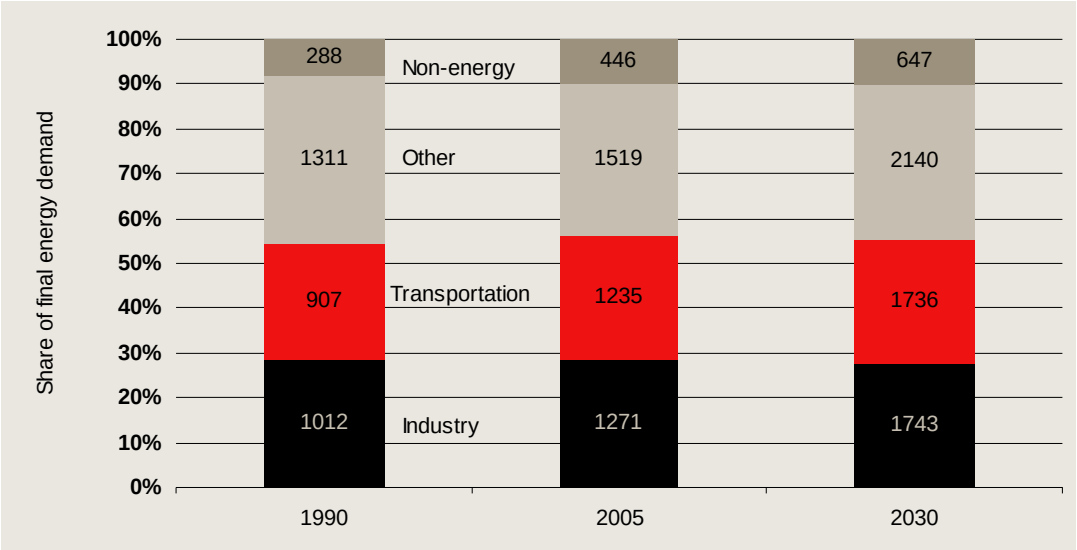
Data source: APERC (2009).

The contribution of the industrial sector to aggregate energy demand is expected to remain constant, with industrial energy demand expected to increase at 1.3 per cent

per year in line with aggregate energy demand growth. Similarly, the other components of final energy demand are also growing at a similar and constant rate.

Consequently, the contribution of the industrial sector to aggregate energy demand has remained steady at approximately 28 per cent despite increasing in absolute terms (see chart 1.4).

1.4 **APEC industry's share of final energy demand**



Data source: APERC (2009) estimates.

While consuming only 28 per cent of final energy demand, the industrial sector contributes considerably more to the economy. In 2005 the average industrial sector contribution to GDP across APEC economies was approximately 36.5 per cent (excluding Chinese Taipei) (Earth trends 2010, CIA 2010). This is higher than the world average for the same year, estimated at 27.9 per cent (Earth trends 2009).

It is expected that a number of developing economies will continue to expand their industrial energy use over the next two decades. In particular, China's industrial energy demand is expected to increase. Viet Nam; Singapore; Chile; Peru; and Malaysia are also rapidly increasingly their industrial capacities (APERC 2009). Changes to the industrial structure and efficiency improvements in the high energy-using developed economies are anticipated to counteract some of the increase in energy demand across the APEC region (APERC 2009).

At present, a small number of economies account for the majority of APEC's industrial energy use. In 2005, China; the United States; Russia; Japan; and Canada accounted for more than 80 per cent of APEC's industrial sector energy demand (APERC 2009). Over time, this 'gap' between high and low energy use economies is expected to narrow.

One key determinant of economy wide energy use as well as industrial energy use is the changing relative energy intensity levels brought about through, amongst other things, changes in economic and industrial structure (World Energy Council, 2008). One such example is the transitioning from higher to lower energy-intensive industries through a movement away from raw material products to low-intensity manufactured products (APERC 2009). Energy intensity in the APEC region over the forecast period is projected to decline from 216 toe/US$m GDP in 2005 to 134 toe/US$m GDP in 2030 (APERC 2009).

It is thought that energy saving policies, higher energy prices and a shift towards service and information based economies will drive the expected reduction in energy intensity (APERC 2009). However, it is uncertain to what degree this will reduce global industrial energy use and the extent to which high energy-intensive production will shift from APEC to non-APEC regions.

This report

This paper provides a succinct introduction to and summary of, the policies, programs and benchmarking tools implemented by APEC member economies to improve energy efficiency in the industrial sector. In communicating and sharing the activities being undertaken across APEC this paper hopes to facilitate a greater understanding of the tools available to reduce and monitor energy efficiency.

This report first identifies key concepts and issues in defining and measuring energy efficiency. Using the available literature and a survey of APEC economies a stocktake is conducted of the range of policies that are used to address energy efficiency objectives.

2 *Concepts and issues in defining energy efficiency*

In general, the debate around energy efficiency is often confused between energy efficiency and energy intensity. Energy intensity measures consider the amount of energy that is utilised per unit of output. An improvement in energy intensity is therefore a reduction in the amount of energy used to produce the same amount of output. Energy efficiency is sometimes defined as the converse to energy intensity; an increase in the amount of output achievable from the same amount of energy. However, energy efficiency is a much broader concept than energy intensity, covering issues such as the value of outputs and inputs, available sources of energy, as well as more social and environmental values that may be affected by energy use.

The subtle difference between these terms is best highlighted with an example. The energy intensity of the transport industry would be improved by shifting from the use of cars to public transport. While this would improve the energy intensity of the industry, it does not reflect any change in energy efficiency within the industry. An improvement in energy efficiency would be a reduction in the consumption of energy by a car (or any other mode of transport) through technological improvements. While this may also imply a reduction in the energy intensity of the industry, a reduction in energy intensity does not imply improvements in energy efficiency.

Energy efficiency can be defined as an economic concept. That is, we can view energy efficiency in the context of the cost of inputs as well as outputs, and determine whether the return from one use of the energy is as good as the return that would be earned if the energy was used for a different purpose. Energy efficiency requires the greatest valued output to be produced for the economic value of energy utilised.

Energy efficiency is a concept that needs to be considered at all points along the supply chain, and in consumption. At each point along this chain there are different factors interacting to influence the decision of what energy to use, and how much to consume. At all levels of energy efficiency, it is possible for:

- final consumers to be using energy efficiently while industry and the economy are not;
- industries to be energy efficient while the economy is not; and finally
- all economies to be independently energy efficient, while the global economy may not be.

So while the focus on this report is on energy efficiency within the industrial sector, achieving energy efficiency here does not imply energy efficiency at the consumer, economy or global level. There are factors beyond the influence of industry that may determine the effectiveness of industry's efforts to reduce energy consumption.

The discord between energy efficiency at different stages of along the value chain, and the factors interacting at each stage are discussed further in box 2.1.

2.1 At which point is energy efficiency measured?

Consumer level

Consumers at this level are provided with limited options for improving energy efficiency. The form of electricity generation (for example, coal, oil or gas) has already been determined, as well as the form of transportation fuel (for example, petrol, diesel or liquid natural gas - which is dictated by the technology used).

However consumers are able to alter energy use patterns such as switching off lights, purchasing low energy use small and medium appliances (kettles, air conditions, washing machines) as well as determining the level and mix of private and public transport they use.

They are also able to inform policy design and debate through their democratic vote.

Industry level

The level of industrial energy efficiency is heavily determined by factors such as:

- access to technology within the economy;
- energy sources that are available within the economy; and
- costs associated with changing the structure of the industrial sector of the economy.

The constraints placed on industry sectors within the economy mean that it is possible for each industry on its own to be energy efficient, providing the highest net value of energy use, and still be operating in an economy that is energy inefficient.

Economy level

The use of any type of energy has a cost associated with it. For imported energy units, this cost is the market price paid to import and utilise the energy (for example, import plus transport of coal and oil resources).

(Continued on next page)

2.1 **At which point is energy efficiency measured?** (continued)

For domestic energy supplies, this cost incorporates the costs of extraction, transportation and transformation, as well as consideration of the opportunity cost of using that energy to produce each type of output.

Global level

A fully energy efficient world market would see a transfer of energy technologies towards the source of energy resources, with a balancing of transport and logistics costs, as well as identification of demand locations for each energy type. The choices of energy sources to be exploited would be based on a global assessment of the costs (monetary and environmental) and benefits (production and development).

While global energy efficiency is a useful theoretical concept, there are many constraints placed on its achievement, including:

- evaluation difficulties;
- information uncertainty (true value of resources, location and usability); and
- financing difficulties across national borders.

Measuring and tracking energy efficiency

The purpose of quantifying energy efficiency throughout the economy is to facilitate the evaluation of the effectiveness of government policy initiatives, used to target better energy efficiency outcomes.

Targeting energy intensity

To improve energy efficiency it is necessary to be able to measure energy efficiency. This is difficult to do because, using the economic definition of energy efficiency, it is necessary to value not only the resources used and output produced, but environmental and social outcomes like economic development, the distribution of services, and the preservation of the environment. Although there are tools to value social and environmental assets, these methods are imperfect and can be subjective.

In the absence of full measures of energy efficiency, measures of energy intensity are the targets of reporting and benchmarking activities (EIA 2000). Data constraints are the main determinants of which benchmarks can be utilised.

There are three general types of energy intensity indicators available for assessment, each utilising different data sources, with application to different policy goals:

- **Macro-economic indicators** — addressing higher level measurement issues such as increased costs and benefits, as well as changing production scales and profiles.
- **Sectoral indicators** — reconciling energy efficiency with technical efficiency at the sectoral level, identifying improvement potentials.
- **Comparative economy indicators** — requiring comparative data options, including sectoral differences and resource availability constraints to highlight effects of policies.

Depending on the type of indicator chosen, as well as the final use of the indicator, different information and data requirements need to be met. General forms of information that are collected through energy intensity indicators, with an aim of tracking energy efficiency, include:

- total energy use by fuel source, both quantity and value;
- output by industry by quantity and value; and
- information on government based subsidies and taxes.

Without reliable data collection on the majority of these topics, developing a program to track and possibly benchmark energy efficiency is not possible.

Development and comparison of benchmarks

Benchmarking has become a key tool in the development of policy options to achieve energy efficiency. In general it facilitates tracing the progress of industries and economies against a nominated goal of efficient energy use, or a defined technologically efficient target. These benchmarking targets and goals of tracking progress through time are aimed at attempting to firstly determine the level of energy intensity and/or energy efficiency within an economy or industry, and secondly to identify which policies and actions are more effective at improving energy efficiency performance.

However, care must be taken when developing benchmarking and comparison based assessments, especially across industries and economies. Comparisons across industries are likely to raise a multitude of measurement issues related to the valuation of production outputs, the different types of technology available for use in each industry, regional and geographic issues as well as the potential for differential policy supports and drivers.

Measures of economy level energy efficiency will generally use measures of cross industry energy intensity as proxies for energy efficiency. These figures provide information on the level or value of the output produced for a given unit of energy used in each industry. Cross industry energy intensity measures need to be interpreted with caution when they are used as proxies for energy efficiency; an industry with a relatively high level of energy intensity is not necessarily exhibiting poor energy efficiency. In fact, an industry with relatively high energy intensity, such

as the steel industry, may be highly efficient, but with other sectors requiring relatively lower levels of energy in production, for example, the agricultural industry. These differences in energy intensity are driven by structural differences across the industries and highlight the difficulties in applying cross industry intensity comparisons.

Cross-economy comparisons of energy intensity — that is, matching energy intensity measures of the same industry across different economies — also have limitations in their ability to identify the most efficient uses of energy. These limitations stem from constraints upon the availability of domestic resources. For example, the quality of coal resources, or location of gas reserves, as well as the technological constraints across different economies. These limitations are important depending on whether economy level or global level energy efficiency is the target measure. As described earlier, it is possible for an economy to be using energy efficiently at the economic level (taking domestic resource and technical constraints into account) but at a global level be considered to be inefficient (given that globally, more efficient energy sources and technologies are potentially available).

This contrast highlights the complexity of assessing energy efficiency across economies. As economy level energy efficiency is usually the target measure for benchmarks, when conducting cross economy level assessments of energy efficiency and intensity a number of key elements need to be taken into account, including:

- domestic and imported resource availability;
- the structure of industries within economy;
- comparative advantages in different industries with different domestic resources; and,
- domestic policy goals, including, economic, social and environmental.

A higher level of energy intensity in one economy's industry compared with another is not a definitive conclusion of an economy's industry being less energy efficient. It has been noted that these international comparisons should not necessarily be seen as an end in themselves, but rather implemented in a useful manner that allows consideration of these economy specific factors. Without the identification of these economy specific factors, moves to identify sources of inefficiencies run the risk in targeting solutions that may be outside of the scope of energy efficiency policy (IEA, 2008). An example of this would be to try to force improvements in the energy intensity of rural electrification programs which may require a move from cheaply available, low quality energy sources, to more expensive energy sources. This would require consideration of social and political values in terms of rural electrification programs as well as energy efficiency programs.

Further difficulties in utilising benchmarks may arise when time series data is used to measure progress towards improving energy efficiency. High level energy intensity measures are highly susceptible to changes in economic structure, changes

in technology and changes in relative input and output prices. Such changes in prices, as well as changes in consumer preferences are likely to also be driving changes in output levels. If these factors are not considered carefully (and they usually can be identified to a certain degree) in time series assessments of energy intensity indicators, an inaccurate assessment of progress is likely to be arrived at.

A summary of the factors that need to be controlled for in developing a benchmark based framework to target and track energy efficiency can be concisely outlined.

- A definition of efficiency:
  - requires assessment at either the consumer, industry, economy or global level;
  - accounts for constraining factors such as access to technology, access to domestic resources and economic, social and environmental goals; and
  - accounts for the effects of comparative advantage including access to cheaper but less technologically efficient inputs for production of similar output components.
- Separation of effects (times series):
  - impacts of policy are not the only factors that may be altering an energy intensity indicator over time;
  - structural changes in the economy need also to be accounted for, for example, increases or decreases in the size of the industrial sector compared with other sectors or a shift in the economy from a high energy intensive industries to relatively low energy intensive industries; and
  - relative price changes must be accounted for when value indicators are utilised.
- Boundary definitions:
  - defining the analytical boundaries around upstream and downstream processes to ensure that measurements and comparisons are made with similar portions of the production process.
- Measures of production:
  - input and output measures depend on which portion of production is undertaken within the industry or economy, for example, highly energy intensive steel manufacturing, or labour intensive final fit out components.

3 A framework to assess policies and programs

Given the large diversity in economic development across the APEC region, and across the globe, it is unlikely that a single suite of policy options will be able to achieve energy efficiency in all economies. But in sharing experiences, a greater understanding of the broad spectrum of energy efficiency policies that are available will benefit the development of domestic and international policy options.

When attempting to compile an assessment across a number of different economies, especially a group as diverse as the APEC, a framework allows for a structured, systematic and consistent evaluation to be constructed, provided sufficient information is available across all economies. The diverse range of economic situations observed across the APEC region provides a number of advantages and disadvantages in developing such a framework. Firstly, such diverse situations require that the underlying economic conditions be taken into account when assessing all policies across all economies, ensuring that a single, catch all policy prescription or assessment is unlikely to be useful. Conversely, such diversity also allows for a broader assessment of what policy options are more likely to achieve results in different situations, due to a broad policy portfolio that is likely to have been implemented across the region.

Developing frameworks to assess policy responses across different economies also allows for a drawing out of pertinent questions that should be asked when designing, implementing and reviewing such policies. Such questions that can be outlined within the policy framework include:

- relative weight given to current energy demands and future environmental goals;
- methods to facilitate interaction between consumers, private and public sectors; and
- most effective types of policies to address different market failures, for example, information issues, financial market failures and price distortions.

Published frameworks

Evaluations of energy efficiency policies have been conducted by a number of international organisations such as the World Energy Council (WEC), the Organisation of Economic Co-operation and Development (OECD), the International Energy Agency (IEA), APERC as well as others (such as Galitsky, Price and Worrel 2004). A brief description of the frameworks employed in key studies follows below.

World Energy Council (2008)

This report evaluates the energy efficiency trends and policies of over 70 economies around the globe. The report focuses on the use and experience of five broad policy types used to improve energy efficiency throughout the economy (not just the industrial sector). These policy types being:

- mandatory energy audits;
- energy Service Companies (ESCOs);
- energy incentives for cars;
- energy efficiency obligations for energy utilities; and
- incentives for solar water heating.[2]

UNIDO (2006)

This study introduces an industrial standards policy framework to help standardise and promote industrial energy efficiency in developing and transition economies. The key elements of their framework identify the following policy types:

- target setting agreements (including benchmarking);
- energy management standards;
- system optimisation and capacity building;
- documenting for sustainability;
- recognition programs;
- fiscal policies; and
- carbon offset programs.

OECD and IEA (2003)

This study summarises the outcomes of an international workshop held in 2002. The workshop assessed the effectiveness of different policy tools to reduce GHG emissions from the industrial sectors of some 20 economies (mostly from the OECD as well as some economies from central and Eastern Europe. The report focuses on three policy instruments, but recognises several others (including: performance and technology based regulations and standards; research and development; and information based tools).

The three policy measures evaluated in the report are:

- voluntary approaches;

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2 Clearly, not all policy types are relevant for evaluating policies used in an economy's industrial sector.

- taxes; and
- trading.

Galitsky, Price and Worrell (2004)

The focus of this report is on energy efficient products and services available to industrial consumers (such as reports, guidebooks, fact sheets, demonstrations and benchmarks). Galitsky et al. provide an overview of the policies and programs for 12 industrialised nations and the European Union. Over 30 types of energy efficiency products, services and delivery channels are identified.

APERC (2003)

This report provides a systematic presentation of energy efficiency policies used in developing and transitional APEC economies. The report identifies the types of policies used to promote energy efficiency in the building, transport and industrial sectors. Energy efficiency programs specific to the industrial sectors include:

- minimum equipment efficiency standards;
- energy audits;
- voluntary agreements for raising energy efficiency; and
- demand side management efforts.

Clear from this brief review is the wide variance in the scope of the frameworks employed. The frameworks employed by WEC (2008) and OECD and IEA (2003) for example, adopt broad brushed approaches that allow for the assessment of energy efficiency programs across the economy. The focus of APERC (2003) on the other hand is much more narrowly defined about the industrial sector. Galitsky et al (2004) also focus on the industrial sector, but with even greater detail again.

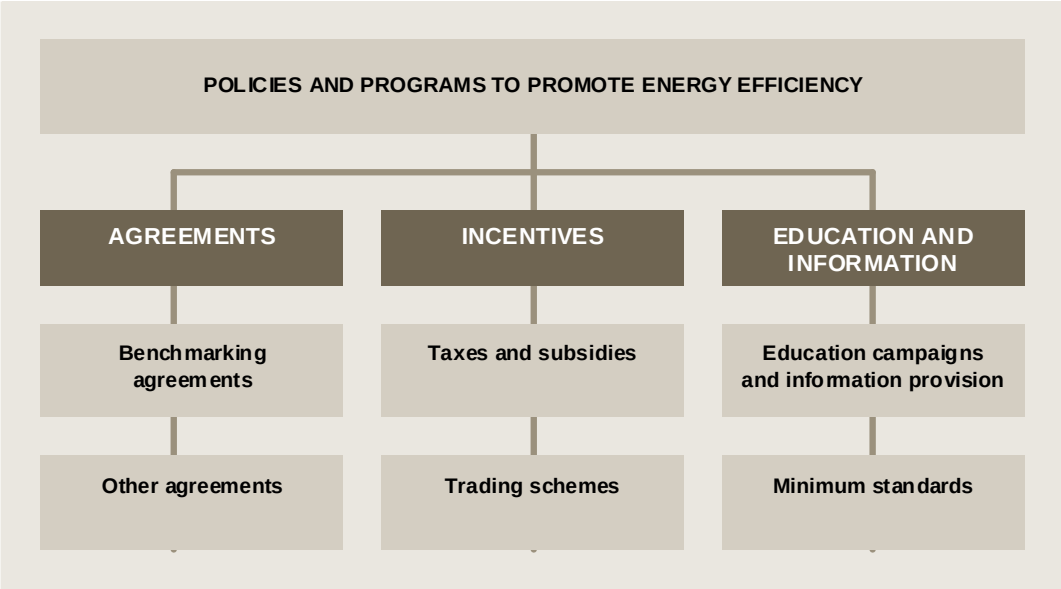
That said, while the scope of the above frameworks does vary quite substantially, there is also some overlap.

More recent studies by IEA (2009) and WEC (2009) have taken a step forward towards developing frameworks to assess policies and programs on energy use across countries. These frameworks attempt to compare between policies and identify best practices.

A framework to categorise policies

Using the insights from the above studies, a framework has been developed here to categorise the policies and programs used by APEC economies to promote energy efficiency in the industrial sector. The framework identifies a total six policy 'types' within three broad policy 'umbrellas' (see chart 3.1). Each policy type is described in more detail below.

3.1 Energy efficiency polices in APEC industrial sectors



Data source: The CIE.

Voluntary and negotiated agreements

Increasingly, negotiated agreements are being utilised as an alternative to taxes and other more conventional regulations. Driven in-part by concerns about the impact such instruments might have on the competitiveness of domestic industries, governments are more frequently involving industry partners when developing emission mitigation policies for the industrial sector (OECD and IEA 2003). Negotiated agreements can provide a low cost means of achieving an environmental outcome, without necessarily compromising on economic efficiency.

Often agreements are defined around achieving a particular benchmark but they can also be defined around other outcomes. The sections below discuss both types of negotiated agreements.

Benchmarking agreements

Benchmarking provides a means to compare the energy efficiency of a company or industrial facility to that of other, similar, companies and facilities, or to an international best practice. Benchmarking can compare plants, processes or systems (UNIDO 2006).

Effective benchmarking or target setting programs are usually premised around an agreed long term performance target (UNIDO 2006). Typically, the agreement is premised by the findings of an assessment of a facility's energy efficiency potential, and may be reached either voluntary or regulatory means. Failure to fulfil the agreement may result in a penalty (such as government regulation and fines).

A benchmarking program requires the ability to monitor and assess performance. This may require regular audits and assessments to obtain the required data necessary to verify a facility's progress.

Notably, benchmarking programs are increasingly popular instruments. Benchmarking is inherently flexible, and schemas can vary significantly in their design (OECD and IEA 2003). For instance, the design of the program might be differentiated on the grounds of:

- stringency;
- enforcement and applicable penalties/sanctions for non-compliance;
- the choice of indicator/measure;
- coverage;
- the length of the agreement;
- complementarity with other programs;
- monitoring obligations; and
- stakeholder engagement.

The design of the program may have significant consequences for the administration and transaction costs associated with the scheme — and who bares those costs (OECD and IEA 2003).

Other types of agreements

Other agreements can be developed by industry partnerships. These agreements do not focus on targets for reduction of emissions or energy efficiency but provide a forum for discussion of related issues and to develop a coordinated industry response and work with government to meet their needs (OECD and IEA 2003). Sometimes these partnerships facilitate information flow and transfer of knowledge (best practice) within industry as well as promotion of energy efficient practices. Other agreements include participation of government and industry to provide training and run pilot projects of new technologies (Galitsky et al. 2004).

Incentives

Incentive mechanisms may be either direct or indirect. Examples of direct mechanisms are trading schemes such as ESCOs and white certificate programs. These mechanisms directly engage the stakeholder with the scheme. Indirect incentive mechanisms on the other hand may either raise or lower the net cost of an activity, to either encourage or discourage its undertaking.

Trading schemes

Demand side management policies use trading schemes to promote reduction of GHG emissions, usage of renewable energy sources and/or energy efficiency. The trading schemes can have energy efficiency as the primary goal or as a secondary outcome that is achieved while pursuing an environmental objective.

In the case of GHG emissions trading scheme companies which can reduce emissions cheaply will do so and be rewarded by selling their emissions permits or credits. Companies that buy those credits will be paying a charge for emitting GHG emissions. In this instrument energy efficiency is not the goal but a secondary outcome. Companies are provided with an economic incentive to take actions for reducing pollution. As a result of this, they may invest in more energy efficient technologies or to invest in renewable and cleaner technologies.

In the case of energy efficiency certificates there is an energy savings target. In the case of renewable energy certificates the primary objective is the development and diffusion of renewable energy sources and the reduction of GHG emissions is a secondary outcome. For example, companies that generate their own electricity get issued a certificate that can be sold in the market for profit.

Financial instruments

Financial incentive policies may take on a variety of forms. In principal these instruments are designed to either add to the cost of consuming energy — thereby providing an incentive to reduce energy consumption — or reduce the cost of energy efficiency investments. In either case, both encourage greater energy efficiency. Table 3.2 provides a snapshot of the types of instruments that may fall into this category.

3.2 **Examples of financial instruments**

Instruments that reduce the cost of energy efficiency investments to suppliers and users	***Instruments that increase the cost of energy consumption***
Investment subsidies	Emissions taxes
Grants	Energy taxes
Tax deductions and rebates	Financial penalties and fines
Subsidies for energy audits	
Soft loans/energy efficiency loans	
Innovative funding mechanisms	

Sources: UNIDO (2008) and WEC (2008).

Financial incentive schemes — particularly those which *subsidise* investment — are popular tools to promote energy efficiency. However, subsidy schemes do encounter some pitfalls which should be recognised. WEC (2008) draw on ex-post evaluations of subsidy schemes to highlight a number of key concerns. They found that often

subsidy schemes would attract participants who would have carried out the investment *without* the subsidy in place (the free rider problem). In other cases, procedures for grants were often too bureaucratic, too complex, involved lengthy delays and high transaction costs that discouraged participation. UNIDO (2008, p. 25) takes this point one step further. They write:

> Due to the problems with free-riders, prohibitively high transaction costs or complex and long procedures to process forms, international best practice is to restrict such grants or subsides to certain types of investment, such as a selected list of equipment with a long payback time but high efficiency gains, or to investments of a certain size or level of cost-effectiveness.

Because of concerns about the impact on the competitiveness of domestic industries, taxes are generally a less popular instrument. Where taxes have been implemented however, it is often done as part of a 'green tax reform' (OECD and IEA 2003). The revenues raised from environmental taxes — such as a tax on GHG emissions — can be used to replace those raised from more distortionary taxes elsewhere in the economy.

Other incentives

Another way to get the private sector engaged in improving energy efficiency is based on rewards to good performance or actions taken to achieve it in future. Governments can utilise an awards scheme where a logo or certificate is given for boosting corporate reputation. Corporate environmental credentials are becoming increasingly regarded by consumers as awareness on climate change and other environmental issues grows.

Education and information

A lack of information and information asymmetries are often cited as one of the most significant barriers to investing in energy efficiency — if not *the* most significant barrier. This final policy umbrella considers those policy types which directly address this issue. This may either be achieved by making available relevant and appropriate information; or by eliminating the need for that information, and introducing a set of minimum requirements.

Information and education campaigns

While broad brushed education campaigns can be effective in disseminating information, they are a blunt instrument. Government's can provide missing information in the form of fact sheets, reports and workshops; or alternatively in a more hands on manner through direct training and education programs.

At a more micro level, energy audits — either voluntary, subsidised or mandatory — can provide significant and detailed information about energy use and opportunities

for improving energy efficiency. Additionally, energy audits do not only create awareness among those functionally involved in the management of energy but they also justify the necessity for the implementation of energy efficiency activities (WEC 2008).

Minimum standards

Investing in energy efficiency requires technical and specific information. The lack of necessary information, and the prohibitive costs involved in acquiring that information, can deter potentially financially advantageous investments. Rather than provide this missing information per se, minimum standards provide an alternative method to overcoming information gaps.

Minimum performance standards (and other 'hard' regulations) are usually introduced when it is recognised that market failures would not allow economic instruments alone to reach an environmental objective (WEC 2008). Minimum standards set at an 'appropriate' level of energy use that should be met by certain products or industrial process.

Research and development on energy efficient technologies

A way of overcoming information barriers to identify and implement energy efficient technologies is to set up institutions dedicated to R&D of alternative energy sources, provide technical advice on implementation of energy efficiency regulation and to coordinate actions taken in compliance with multiple energy efficiency initiatives at various levels, international, national, regional, local.

4 *Survey of policies and programs on industry energy efficiency in APEC economies*

In developing an accurate and up-to-date stocktake of APEC economies' approach to energy efficiency in the industrial sector, initial research has been supplemented through a survey of APEC member economies. A survey was prepared and sent to each APEC member economy to update a synopsis of information collated on their energy efficiency policies, programs and benchmarking instruments (see appendix A). Particular attention was given to the role of benchmarking and the use of indicators to assess energy efficiency in the industrial sector. Nine economies responded to the survey: Australia; Canada; Chile; Hong Kong, China; Japan; New Zealand; Singapore; Chinese Taipei; and the United States.

Using the previously outlined framework the CIE classified and summarised member economies' survey response and other available sources of information.[3] Our analysis focuses on the following key areas:

- the different approaches used by APEC member economies to promote energy efficiency in the industrial sector;
- benchmarking techniques used by APEC members; and
- outputs and evaluation of policies and programs in measuring and promoting energy efficiency.

Approaches to promote energy efficiency

Most APEC economies use a combination of policy approaches and instruments from voluntary/negotiated agreements, financial and other incentives, and education and information products and services (see table 4.1).

Only four economies — Australia; Canada; Japan; and the United States - have policies and programs that include all three types of policies in the framework (agreements, incentives and information) (see table 4.2). These economies also employ the spectrum of instruments, using over ten different policies and programs to target energy efficiency.

[3] There is no information at all on Brunei Darussalam; Papua New Guinea; Peru; or Russia.

4.1 Instruments for promoting and measuring energy efficiency in the industrial sector of APEC economies

Instrument	*AUS*	*CDA*	*CHL*	*PRC*	*HKC*	*INA*	*JPN*	*ROK*	*MAS*	*MEX*	*NZ*	*RP*	*SIN*	*CT*	*THA*	*US*	*VN*	*Total*
Benchmarking	✓	✓		✓			✓									✓		5
Other agreements	✓	✓					✓									✓		4
Tax deduction and rebate					✓	✓	✓	✓	✓	✓				✓	✓	✓[a]		9
Investment subsidies		✓	✓		✓			✓	✓		✓		✓	✓	✓	✓		10
Grant	✓										✓		✓			✓		4
Energy audit subsidies	✓	✓	✓		✓		✓	✓	✓		✓	✓	✓			✓		11
Soft Loans	✓		✓			✓	✓	✓			✓			✓	✓	✓		9
Other funding mechanisms																		
Emission taxes																		
Energy taxes																		
Penalties and fines	✓				✓													2
Trade schemes	✓[a]	✓[b]					✓	✓			✓					✓[a]		6
Rewards (publicity, certification, etc)	✓						✓						✓			✓		4
Fact sheets, newsletters, best-practice manuals, reports and workshops	✓	✓	✓			✓	✓		✓		✓		✓	✓		✓		10
Training and education programs	✓	✓					✓				✓			✓		✓		6
Free energy audits	✓	✓				✓	✓							✓		✓		6
Minimum standards	✓			✓	✓[b]			✓						✓		✓	✓	7
R&D energy efficiency		✓					✓	✓								✓		4

[a] At state level only.

[b] Not yet enacted.

Note: No information available for Brunei Darussalam; Papua New Guinea; Peru; or Russia. See glossary for economy abbreviations.

Sources: The CIE, WEC (2008); IEA (2008) and Galintsky et al. (2004).

4.2 Policy types implemented in APEC economies to promote and measure energy efficiency

Instrument	*AUS*	*CDA*	*CHL*	*PRC*	*HKC*	*INA*	*JPN*	*ROK*	*MAS*	*MEX*	*NZ*	*RP*	*SIN*	*CT*	*THA*	*US*	*VN*	*Total*	*Out of 21 economies*
Agreements	✓	✓		✓			✓									✓		5	24
Incentives	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		15	71
Education & information	✓	✓	✓	✓	✓[b]	✓	✓	✓	✓		✓		✓	✓		✓	✓	14	67

[a] At state level only.

[b] Not yet enacted.

Note: No information available for Brunei Darussalam; Papua New Guinea; Peru; or Russia. See glossary for economy abbreviations.

Source: The CIE.

Developing economies on the other hand, tend to use education and information, and incentives as their policy tool for addressing energy efficiency and avoid instruments that require greater institutional infrastructure such as energy/emission taxes, trade schemes, research and development, and benchmarking.

Voluntary agreements

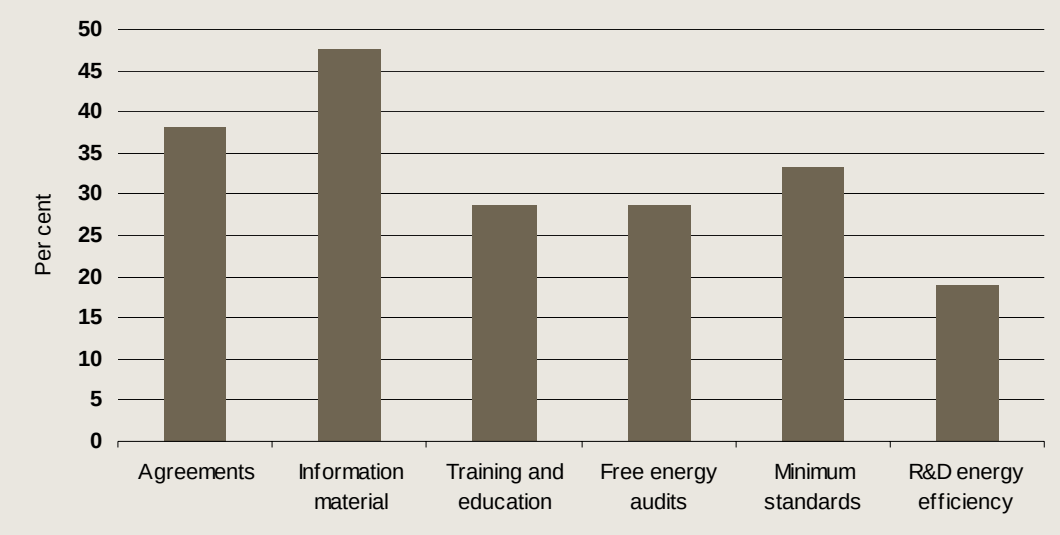
When agreements are formed they are typically done so on a voluntary basis. There are some cases where the program or policy includes mandatory actions such as compliance with minimum standards. The implication of a voluntary approach is that targeted sectors can prepare for future regulation and government can promote energy efficient practices without the typical compliance burdens of a mandatory approach. On the other hand, mandatory approaches allow for reaching a larger number of stakeholders in a shorter period of time which facilitates quicker results in terms of achieving the initiative's objective.

Voluntary agreements are common in Australia; Canada; Japan; China; and the United States and are mainly based on supporting the conduction of energy audits so a baseline for performance is set and opportunities for improvements are planned. Although this allows for tracking individual performance per facility, comparisons and aggregated results for the whole sector are not easy.

Education and information

Education and information instruments are widely used by APEC economies. Fourteen economies — two thirds of the APEC region — have implemented a combination of instruments of this type. Fact sheets, newsletters, best-practice manuals, reports and workshops are the most popular instrument for this type of policy, used by around half of the economies (see chart 4.3). Minimum standards on energy performance are applied in Australia; China; Korea; Chinese Taipei; the United States; and Viet Nam. Hong Kong, China has designed such standards but they are yet to be enacted.

4.3 **Policy instruments used: Agreements and education/information**



Data sources: The CIE survey; WEC (2008); IEA (2008) and Galintsky et al. (2004).

Incentives

Incentives instruments are the most common approach employed; fifteen APEC economies, around 70 per cent of the region, currently have programs that include some sort of financial or reputation stimulus. Tax deduction or rebate, subsidies for energy audits or for investment and soft loans are the most used (see chart 4.4). Financial support varies from economy to economy; funding for as much as 50 per cent of the energy audit cost is available in New Zealand through their Energy Efficiency and Conservation Scheme. 70 per cent is provided in Chile and likewise in Korea, where up to 70 per cent of the investment cost as per their energy rationalisation plan.

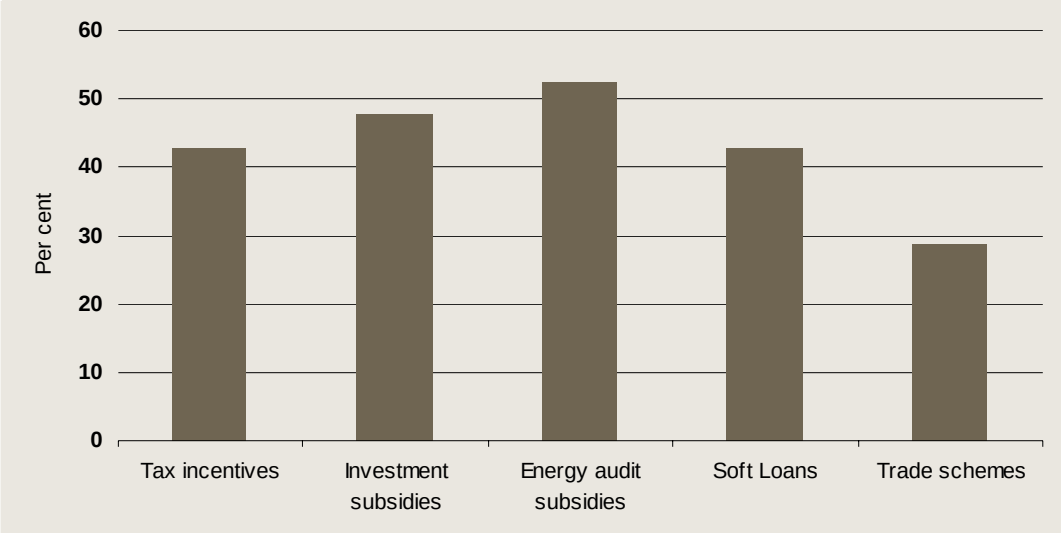
Financial incentives have proved to be effective in engaging the private sector in energy efficiency programs and in delivering energy savings. Most of the case studies documented in member economies' survey response include elements of this.

Not all investment incentives are as effective or efficient as other. WEC (2008) points to some of the drawbacks from investment subsidies:

- free riders;
- small energy consumers are not aware or eligible for them;
- procedures for grant application are costly; and
- subsidies can lead to an increase in cost of the equipment and to the deployment of equipment with a poor quality.

It also notes that subsidies can lower energy prices which can provide a disincentive for energy efficiency investments.

4.4 Policy instruments used: Incentives policies and programs



Data sources: The CIE survey; WEC (2008); IEA (2008) and Galintsky et al. (2004).

Tax incentives used by APEC economies exhibit a positive approach of rewarding pro energy efficiency and environmentally friendly actions rather than applying penalties for polluting. No policies based on emission taxes or energy taxes were found.

Fiscal incentives are used in, Hong Kong, China; Indonesia; Japan; Malaysia; Mexico; Korea; Chinese Taipei; Thailand; and the United States. Approaches can vary in their application.

- The Hong Kong, China program encourages businesses to use environment-friendly equipment by reducing the depreciation period of environment-friendly installations mainly ancillary to buildings from 25 to 5 years starting from 2008-09.
- In Malaysia the instrument relates to exemptions of import taxes for renewable energy equipment or energy efficient consumption goods.
- In Chinese Taipei large energy users receive tax deductions for purchasing highly efficient equipment and technology.
- Similarly, under the Energy Policy Act in the United States a tax credit or reduction (30 per cent for qualified fuel cells, 10 per cent for micro turbines, and 30 per cent for solar energy equipment) applies for those who invest in cleaner and more efficient energy use.

Tax incentives are considered less costly, more effective and are more suited to developed economies than subsidies (WEC 2008). Subsidies need to be well targeted to only reach stakeholders that would not investment if the financial support was not provided. Subsidies also require greater specification about the investments they will be used for such as a selected list of equipment, renewable energy, co-generation or innovative technologies.

OECD (2003) examined the issues related to the design of effective policies to address GHG emissions. It analyses the experiences in OECD countries with voluntary agreements, trading schemes and taxes. The effectiveness of the policy depends on the mix of instruments that sends the right signals to emitters and targets different stakeholders. Based on the experience of European countries, voluntary agreements are usually employed as a complement to other instruments. Taxes and trade schemes can work in parallel to target different stakeholders within a sector or complement each other to hit the same target.

A suite of policies and programs may be best placed to deliver energy savings. Furthermore, appropriate price signals to energy consumers are necessary for policies and programs on energy efficiency to be successful. But in any case, the mix of policy instruments will vary from economy to economy to reflect the particular context.

Benchmarking techniques

In collecting and collating information on benchmarks implemented, information on just a handful of economies' benchmarking tools was found. (see table 4.5). These benchmarks generally relate to energy intensity indicators on energy usage per unit of output, energy consumption and energy savings (rate or amount).

Information from our survey and previous studies shows that at least six economies have implemented voluntary agreements between government and industry where energy audits are conducted to establish the baseline for energy efficiency performance. Reporting, monitoring and assessment against the baseline or benchmark allows for measuring the improvements per facility rather than per sector or economywide performance. In some agreements firms are required to report energy consumption and energy usage improvement each year. However there is no detailed information on the data collected, if this is a rate or a value, or the indicators produced with the data.

Japan, in its survey response, described the benchmarking task that industry needs to undertake under the Energy Conservation Law. Energy intensity is defined by a committee.

> Indicators are established for companies to benchmark their energy efficiency level against others within the same sub-sector, and medium- and long-term targets are set (to be achieved around 2015-20). Currently, each factory and workplace is required to achieve annually on average 1 per cent reduction or more in energy intensity. The revision adds benchmarking indicators and associated targets to the above in certain sub-sectors: iron and steel, cement, and electricity suppliers. Targets are set at the energy efficiency level of the best performing companies (top 10-20 per cent) in each sub-sector based on the average value and standard deviation. Companies covered by the scheme must submit yearly reports on the status of the benchmarking indicator, in addition to the ratio of energy intensity reduction and on the implementation of an energy management system.

4.5 Survey responses on benchmarking and successful case studies

Data collected	*Data available*	*Data analysis*	*Data for industry*	*Bench-marking*	*Successful case studies*
Australia					
Sectoral energy usage	Electronically (some excel)	Sectoral annual energy intensity analysis	Public in general	No	Nine for EEO program, five in the NT and two in Tasmania
Chile					
In process on energy consumption	Yearly energy Balance	Under development	Under develop-ment	Under development	Not applicable
Hong Kong, China					
Energy end use data. 4 sectors, Residential, Commercial, Industrial and Transport	Published in 'Hong Kong Energy End-use Data', available online or downloading in PDF format	Energy end-use data under each sector classified by fuel types.	provided when requested at a cost	The indicators are measured in the unit of energy consumed per unit floor area each year except for vehicles which are measured in the unit of litres/100 km.	Not applicable
New Zealand					
					In the 4 years since the Business Technology programme commenced $3 million of grant funding has been invested into 85 projects. These projects have: ▪ Leveraged over $14 million of business investment ▪ Saved over 280 000 tonnes CO2 (full life cycle of 15 years) ▪ Saved over $4.5 million in energy spend (accumulated total). ▪ The cost of carbon abatement for projects starts as low as $1/tonne CO2.
Singapore					
Under development	None	None	None	Under development	Five cases, two industrial sector, two building sector and one public sector (building)

(Continued on next page)

4.5 **Survey responses on benchmarking and successful case studies** (continued)

Data collected	*Data available*	*Data analysis*	*Data for industry*	*Bench-marking*	*Successful case studies*
Chinese Taipei					
Annual data on energy usage by large users. Data collected per operation, sector and economy levels.	No. Confidential.	Energy consumption analysis, industrial energy intensity. Manufacturing and economy wide energy usage.	Energy usage reports are made available through statistical reports, pamphlets for promoting energy conservation and professional forums and workshops	Yes. Unit energy use. Energy use per unit of output	One incentive program to save energy through discounts in the electricity bill resulted in 2 590 MWh saved and about 1 650 thousand tonnes of CO2 reduction. Energy audits and advice on energy saving opportunities resulted in 203 300 KLOE of energy savings.
United States					
Energy uses and costs by sector and subsector	Publically available by region and sector in excel, hard copy and downloadable formats. Publically available data is aggregated to at least the subsector to protect proprietary energy data.	Data analysis is undertaken to prepare projections of energy use by sector, subsector, for up to 25 years into the future..	The publically available data.	Data on energy use per value of shipment or per unit of output in the industrial sector is provided to facilitate bench-marking.	Frito-Lay, the maker of chips and other products produces its own electricity with a combined heat and water turbine (fuelled by gas). The new plant takes the facility off the electric grid, reducing GHG emissions and generating 4.6 MW of electricity Food Lion LLC, one of the US's largest supermarket chains has 805 of its stores with an ENERGY STAR rating, Since 2000, Food Lion LLC has reduced energy consumption by more than 2.5 trillion BTUs and saved US$ 55 million in utility costs.

Source: The CIE.

Chinese Taipei reported that collection of annual data on energy usage by large users (whose electric demand are greater than 800kW) will take place. Large users have to report energy usage on an annual basis including type and amount of energy. The data, which will be collected per operation, sector and economy levels, is confidential and protected by the Energy Management Law. Data analysis on energy consumption, usage and intensity is intended.

Hong Kong, China collects energy end-use data for four sectors — residential, commercial, industrial and transport — and undertakes analysis per fuel type, which is published and downloadable from the internet in pfd format. It utilises indicators of unit of energy consumed per unit floor area per year except for vehicles which are measured in the unit of litres per 100 km.

Singapore requires recipients of funding for energy efficient technologies to report performance and improvements based on the International Performance Measurement and Verification Protocol or other equivalent international guidelines and codes. Such guidelines present four options for measurement and verification of energy savings. The measurements could be made by electrical energy meter readings or utility bills data for engineering simulations. Again indicators are based on energy intensity and savings.

Australia makes available online annual data on energy usage per sector and conducts analysis in energy intensity.

In the United States, the large industry program, Industrial Technologies Program (ITP) and its many subprograms have been set the benchmark of reducing the industrial sector's energy intensity by 25 per cent in 10 years, and cutting industrial carbon dioxide emissions to half their 2009 levels by 2030. To facilitate the measurement of this, baseline data, as well as annual data on energy use are collected. While participation is voluntary those companies that have committed are required to submit savings results. This facilitates annual tracking of the impact of ITP-supported technologies.

In New Zealand no actual benchmarking of energy efficiency is conducted by government agencies (in the sense of assessing and comparing against standards). Studies are however conducted of energy efficiency levels and changes in energy efficiency over time (for example, the statutorily required reporting on energy efficiency performance against targets from national level energy efficiency strategies that is conducted using Divisia Decomposition methodologies).

Outputs and evaluation of policies and programs on energy efficiency

Information on the impact of the policies and programs is relatively limited due to the fact that many of the activities have been implemented relatively recently.

Furthermore, data collection and evaluation is not necessarily a part of every program, meaning that there will be some programs for which it will be difficult to report on their impact.

Reporting of outputs and outcomes through the survey showed that economies are collecting information on:

- the number of applications received for investment funding or its approval;
- the production of material, performance of activities and creation of spaces for informing industry on energy efficient practices;
- potential savings, in terms of energy, emissions, or costs; and
- publicly expressed commitment by and industry sector of improving energy usage through more efficient and environmentally friendly practices.

Several economies also report actual reductions in energy consumption, emissions and cost savings. (See appendix B for outcomes of specific policies and programs for each economy.) For example, New Zealand reported that as part of its Energy Efficiency and Conservation Authority (EECA) business program they have recorded:

- NZ$ 106.5 million in energy savings;
- 9.9 PJ in energy demand reduction;
- 0.75 Mt GHG avoided; and
- 0.12 PJ increase in use of wood energy.

Programs in Australia have resulted in identification and implementation of energy saving opportunities. Australia has documented nine successful case studies under the Energy Efficiency Opportunities (EEO) program, detailing some of the processes used, and opportunities being identified and implemented. Outcomes reported refer to energy intensity improvement in various industrial businesses and reduction of GHG emissions. This program combines elements of benchmarking with energy audits, information on case studies, newsletters, reports and workshops, compliance milestones, penalties and fines. There are five other cases documented from the Northern Territory and two in Tasmania. Elements of the programs in the Northern Territory and Tasmania also include energy audits and incentives.

Australia's survey response mentioned the extension in regulation as an outcome of various policies and programs implemented. It is difficult to assess whether or not more regulation is a positive outcome in and of itself.

Singapore has achieved S$2.11 million worth of energy savings from retrofitting and installing more efficient cooling systems in one public sector building, two facilities in the industrial sector, and another two facilities in the building sector. The objective of the program is to encourage companies to carry out detailed studies on their energy consumption and identify potential areas for energy efficiency improvement.

The program is based on co-funding of energy audits. However there is no indication of the per cent of total facilities that could be realistically targeted. It is hard to independently assess to what extent the objective of the program has been achieved but it is clear that the financial support provided was the base for improvements in energy use.

Chinese Taipei has reported energy savings and a reduction in GHG emissions as a result of the financial incentives and energy audits performed under the Energy Management Law. Industrial sector energy intensity decreased by 3.06 per cent in 2006.

These case studies of improved energy efficiency suggest that energy audits and financial support seem to be effective instruments for individual facilities to plan and implement new technologies and to save energy. This helps them to reduce production cost but also contributes to national and sectoral goals on energy efficiency and reduction of carbon emissions.

Evaluations

Few comprehensive evaluations of specific programs and policies have been undertaken. However, for several of the United States' programs, assessment forms part of the design of the program. The Save Energy Now program, which uses recognition and reward tools to encourage the reduction of energy intensity, conducts assessments. Depending on the outcome of these assessments, different awards are conferred, reflecting the magnitude of the plants' energy savings. Similarly, the Energy Star program (also in the United States) relies on the performance in an assessment of energy reduction for the conferring of an energy star rating.

Australia has reported that evaluations of several programs will take place in 2010 and 2011. The initiatives put forward in APEC economies relate mainly to incentives and education and information policies. Outcomes relating to capacity building through training and information sharing may not be evident until several years after implementation. Also outcomes from agreements and incentives will take some time to appear but may be easier to observe.

Although measures for monitoring and assessing energy intensity are available and used by various economies, more accurate benchmarking needs to be further developed. Basic data collection for such indicators or benchmarks is yet to be developed. Singapore and Chile for example reported the collection of data and indicators for benchmarking purposes is still under development.

Key points from the survey exercise

In concluding this studying the key points from the survey exercise are set out below:

- Most APEC economies have implemented a combination of policy approaches and instruments from agreements, financial and other incentives, and education and information products and services.
- The initiatives combine objectives of reducing GHG emissions and saving energy. Some of the initiatives have set a quantitative target for the whole economy or sector.
- Overall, energy efficiency policies and programs tend to be based on voluntary engagement by industry. Both voluntary and mandatory approaches have their advantages and disadvantages.
- Incentive instruments are the most common approach; 15 APEC economies - around 70 per cent of the region — currently have programs that include some sort of financial or reputation stimulus.
- Education and information instruments are also widely used by APEC economies. Fourteen economies have implemented a combination of elements of this type.
- Only a few surveys mention specific benchmarking tools or activities. Benchmarks generally relate to energy intensity indicators on energy usage per unit of output, energy consumption and energy savings rate or amount.
- Many of the policies have been recently implemented and there are no outputs or evaluations yet. Several economies reported that evaluations will take place in 2010 and 2011.
- The case studies of successful policies and programs suggest that energy audits are an effective instrument, along with using benchmarks, for businesses to plan and implement new technologies.
- Because of the limited survey responses received, it is not clear that there is one specific type of policy or combination of instruments that delivers energy efficiency.
- Other elements of policies and programs need to be looked at to evaluate how effective they are or could be and what is the net result for an economy. This is to assess costs and benefits of the various actions and compare them, to consider the trade-offs between achievement of environmental goals and other economic or social objectives and to take into account the specific context in which a policy is implemented.
- Although measures for monitoring and assessing energy intensity are available and used by various economies, more accurate benchmarking needs to be further developed. Basic data collection for such indicators or benchmarks is yet under development in some APEC economies.

Appendices

A Survey template

Dear Stakeholder,

The Centre for International Economics (CIE) is an economics consultancy group specialising in the economic analysis of domestic, or in economy, and international issues, including policies on energy efficiency in various sectors, climate change policy and analysis as well as more general economic analyses in the Asia-Pacific and Americas regions.

The APEC Energy Efficiency Indicators Workshop held in 2005, identified:

> The importance of energy efficiency indicators as fundamental tools for understanding the outcomes of various policy options for measuring the impact and effects of energy policies, and for attempting to make cross sector and cross country comparisons.

The CIE has been commissioned by the APEC to undertake a survey and update of policies and programs being utilised to promote and measure energy efficiency in the industrial sector (specifically manufacturing) that are currently being implemented in APEC economies. Specifically, the objectives of the project are to:

- understand the full range of policies and programs for improving energy efficiency in the industrial sector in APEC economies;
- understand industrial sector benchmarking tools;
- identify successful policy and program approaches; and
- assess the usefulness of currently available indicators for measuring progress in these policies and programs.

The final report will be completed in January 2010 and then presented to APEC in due course. The report aspires to collate up-to-date policies implemented across APEC economies that target energy efficiency in the manufacturing sector. It will also provide information on the characteristics of those policies that are considered to be most effective in promoting energy efficiency. Finally, the report will provide an overview of methodologies and issues associated with the choice of benchmarking tools can be used to track and compare progress in energy efficiency across time, manufacturing industries and countries.

In distributing this survey, the CIE is requesting assistance in collating and updating policies and programs that are being implemented in Australia, to promote, encourage and measure/track energy efficiency changes over time and across industries. Specifically, the information we are looking for includes:

- an outline of those policies that are targeting energy efficiency in the manufacturing sector;

- any data collection requirements that are included in the policies including those at an economywide level; and
- what, if any, forms of benchmarking or analysis of this data is undertaken.

The CIE has conducted an initial review of implemented policies. We understand that this list may be somewhat out of date or that some features may not have been reported in full. Therefore, we would like you to fill in as many gaps in this review as possible.

Attached to this letter is the survey that outlines the specific information that we are looking for. The first section requests information on current legislation and enacted polices. Included are table templates to be filled out for each policy.

There are three template versions:

- the first is an example template with explanations of the information we are seeking;
- the second set of tables contains the policy information that the CIE has collected — please correct and update this information as required; and
- the third set of tables is blank for you to fill out for polices that the CIE has not yet covered — please copy the template for each new policy.

The second section covers general data collection questions to gain more information on the collection and reporting that are being undertaken with respect to energy use and energy efficiency.

Finally, we are collecting information on possibly case studies to include in the final report as 'box inserts'. Please feel free to provide information on policies that are considered to be successful, or those that have provided valuable learning experiences.

It would also be appreciated if the survey respondent can complete their contact details if any follow-up or clarification is required.

Policy specific questions

Name of legislation/policy	
General objective	For example, reduction in GHG's, reduction in energy intensity of production, reduce energy waste in production
Enacted?	Is the policy implemented through legislation, or is it a policy statement of intent that is not yet binding?
Sector targeted:	For example, manufacturing, transport, building
Voluntary/Mandatory:	For example, are all new buildings required to meet standards (mandatory)? Or can they adopt to participate in audits (voluntary)
Instruments utilised: for example investment subsidies, energy audits	There are a large number of instruments that may be utilised for example: ▪ Tax deductions or rebates ▪ Investment subsidies ▪ Grant ▪ Energy audit subsidies ▪ Soft Loans ▪ Funding mechanisms ▪ Emission taxes ▪ Energy taxes ▪ Penalties and fines ▪ Trade schemes ▪ Rewards (publicity, certification, etc) ▪ Fact sheets, newsletters, best-practice manuals, reports and workshops ▪ Training and education programs ▪ Energy audits ▪ Minimum standards
Benchmarking tools used	Is there are requirement to report against a published benchmark? What is this benchmark?
Outcomes	What success has the policy achieved in terms of response, reduction in energy use, general perception of the policies
Evaluations	What formal reporting mechanisms are included at a policy level, if any?
Comments	Any comments on the policy and its application that have not been covered above.

Is there an overall energy efficiency target included in the policy? If yes, what is it?
This question is attempting to differentiate between guidance policies that outline best practice options to industries, compared with policies that outline a target and allow industry to determine the methods to reach this target.

What obligations are companies under in terms of reporting activities under the policy?
This question is determining if and how companies and organisations respond to the policy, if they are required to report outcomes, or comply with construction or operating requirements

General economywide data collection and benchmarking activities

Is data collected on energy usage within the economy? If yes, then what form is the data collected in? For example, by building, by operation, sector wide, or economy level estimates?

This question is trying to ascertain if data is available for use as benchmarking or reporting in any form, and to understand the nature of the information available to determine how it could be utilised.

Is this data publicly available? If yes, at what level e.g. geographic, industry sector or economy? And in what form, for example excel, hard copy, downloadable, or purchased?

This question is determining what ability general researchers and companies have to investigate and track the energy efficiency and energy use data themselves

What, if any, type of data analysis is conducted? For example, collated to measure overall sector energy usage?

This question is ascertaining whether some level of analysis is being undertaken already, that could possibly be utilised in a large cross economy data base, or whether further analysis would be required

Is the data reported back to industry? If yes, in what form, for example, industry based reports, cleaned data, meetings or forums?

This question is determining the level of feed back to industry and the options given to industry to consider and analyse data that has been collected

Are benchmarks of energy efficiency of energy use compiled, in any form such as economy, or industry wide levels? If yes, then what types of benchmarks are reported?

The objective of this question is to gain an understanding of the level of benchmarking and measurement that is being undertaken within APEC economies. Benchmarks may be considered to be measures of energy intensity, per unit of output or inputs over time.

Case study successes or learning experiences

Have there been any standout successes or learning experiences in implementing energy efficiency policies that could be outlined in a specific case study in the report?
Throughout the report, The CIE will be outlining the characteristics of policies that are more likely to have successful outcomes. These case studies will attempt to look at a broad range of experiences in policy roll out, information provision, regulation and monitoring of policy requirements as well as data collection issues. *Please feel free to provide as much information or supporting documentation on such experiences as you need.*

Contact details for survey respondent

Contact details

Details
Name
Title
Organisation
Email
Telephone number

B Policies and programs to promote and measure energy efficiency in the industrial sector in APEC economies

Through our desktop study and survey of APEC delegates, information on the programs, policies and benchmarking tools of APEC member economies has been collected and collated.

Information was collected on each program/policy/initiative, including:

- the objective or target of the activity;
- the policy approach taken;
- instrument for implementation used;
- the sectors covered;
- benchmarking/reporting, monitoring and assessment tools used;
- output/outcomes from the activity;
- any evaluations; and
- with other comments sought.

The information for each APEC member economy is presented in table B.1 (in alphabetical order).

B.1 **Inventory programs and policies**

Name of the policy, program, agency or initiative	*Objective target*	*Policy approach*	*Instrument*	*Sectors covered*	*Benchmarking/ reporting, monitoring and assessment tools*	*Output/outcomes*	*Evaluations*	*Comments*
Australia								
Energy Efficiency Opportunities program	Identification and up-take of cost-effective energy efficiency opportunities, improved productivity and reduction of greenhouse gases	Mandatory		Large energy users in transport, manufacturing, mining, refining and commercial sectors	Energy efficiency assessment result needs to be reported to government including the response to identified opportunities for improving energy efficiency.	Companies in the program have identified 30-50 energy saving opportunities per site. One company identified an opportunity for saving up to 1.2 million and reduces GHG emissions by 30 k tonnes /year. Another company will implement an opportunity that saves $300 k a year	N/A	Energy Efficiency Opportunities Act 2006. Mandatory for corporations that use more than 0.5 peta-joules of energy per year.
National Framework for Energy Efficiency	Increase the uptake of energy efficient technologies and processes across the Australian economy	Combined		All in the economy. Commercial/industrial energy efficiency, Appliance & equipment energy efficiency, trade and professional training & accreditation, commercial/industrial sector capacity building,	NA. Report on the energy efficiency assessment result and disclosure of energy efficiency performance for office buildings with greater than 2000 m2 floor space.	The NFEE has achieved several outcomes including the enactment of the EEO legislation, expansion of the MEPS program and the expansion of buildings regulations.	N/A	The NFEE was agreed by the Ministerial Council on Energy in December 2004. Several measures have been enacted through legislation such as through Minimum Energy Performance Standards (MEPS), building regulations and through the EEO Program

(Continued on next page)

B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
National Strategy on Energy Efficiency (NSEE)	To accelerate energy efficiency efforts, streamline roles and responsibilities across levels of governments, and to help households and businesses prepare for the introduction of an emissions trading scheme.	Combined	Penalties and fines, training and education programs, minimum standards, an Energy Efficiency Exchange website, demonstration and collation of best-practice information, low-interest loans.	Households, business, buildings, government and transport	N/A	Expansion of MEPS and building regulations	N/A	In July 2009, the NSEE was agreed by the Council of Australian Governments (COAG), which comprises the Commonwealth and all state and territory governments. Many of the elements are currently policies of intent but several measures have been enacted through legislation such as through Minimum Energy Performance Standards (MEPS), building regulations and through EEO Act (see separate entry).
CleanBiz Tasmania	Assist Tasmanian enterprises reduce operating costs and environmental impacts by encouraging more resource efficient practice	Voluntary	Energy audits, advise on accessing government grants, tools to monitor progress on resource efficiency, network with other like-minded enterprises and resource efficiency experts to gain valuable contacts and knowledge.	Manufacturing	Baseline assessment. Energy usage and GHG emissions per unit of production. Participants are required to provide reports (via case studies) on projects under the program.	More than 70 Tasmanian enterprises have now registered with the program. In 2007-08, 15 CleanBiz members received grant funding. The expected resource savings\ were 15 000 of gigajoules energy and 16 megalitres of water and 12 000 tonnes in avoided greenhouse gases and around 4 260 tonnes in avoided waste to landfill.		

(Continued on next page)

B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	*Objective target*	*Policy approach*	*Instrument*	*Sectors covered*	*Benchmarking/ reporting, monitoring and assessment tools*	*Output/outcomes*	*Evaluations*	*Comments*
Energy Efficiency best practice program	Improvement of Energy efficiency using tools and goals of benchmarking and best practice in both sector and cross-sector		Training and education programs, fact sheets, reports and workshops, benchmarking	Industrial: So far involved are bread baking, vehicle fleet management, aluminium, beverage and container manufacturing, wine making, dairy processing, resource processing and pulp and paper				
Sustainable Energy Development Authority (SEDA)	To reduce the level of GHG in the state by promoting investment in the commercialisation and use of sustainable energy technologies		Energy savings manual, energy management guide, software	Industrial				
SEDA energy smart business program	Partnership with businesses to focus on energy efficiency		Technical advice, training, reward (logo), best-practice manual, fact sheets	Business		170 businesses in NSW are now saving over A$12.9 million per year		
Enterprise energy audit programme	To encourage energy audits by subsidising 50 per cent of their value	Voluntary	Energy audit subsidies	Industrial		1 200 firms participated. Recommendations were made for improvements of lighting systems in almost 75% of the audits, of air conditioning in 45%, of water heating in 35% and of industrial equipment in 34%. 80% of the recommendations were actually installed.		1991-97. Demanded 4 million over 7 years

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
Australian Energy News	To promote innovation and greater efficiency in the energy sector and in energy end-use	Voluntary	Newsletter	Industrial		12 000 readership. 90% believe information was needed.		
ecoBiz Northern Territory	Identification and up-take of cost-effective energy efficiency opportunities, improved productivity and reduction of greenhouse gases	Voluntary	Energy audits, fact sheets, workshops, reports, accreditation and recognition, grants	Small and Medium Enterprises of all sectors in all parts of the Northern Territory	Two sets of audits are conducted. The first to ascertain a business' current consumption and waste production and identify opportunities for savings. The second is to measure savings after implementation of recommendations.	The first 16 businesses who progressed through the Program are expected to save 550 tonnes of CO2 per year. Businesses have welcomed the program.		
Smart Energy Savings Program (Queensland)	Increase the adoption of energy efficient technologies and practices by business. Improve business competitiveness by reducing energy costs. Reduce growth in Queensland's electricity demand. Reduce greenhouse gas emissions from Queensland's commercial and industrial sectors.	Mandatory for some energy consumers	Benchmark agreement. Energy audits and plan for improvement according to a public commitment made by the business	Queensland businesses that have sites that consume between 100 and 500 TJ per financial year	Mandatory reporting for businesses who consume between 100 and 500 TJ per financial year.	Currently 17 participating businesses. Too early to assess outcomes, as the 2009-10 financial year is the 'verification year' for establishing baseline energy consumption.		*Clean Energy Act 2008*
ClimateSmart Business Service (Queensland)	Assist Queensland's small to medium size enterprises (SMEs) reduce their emissions and prepare for the introduction of a national emissions trading scheme.	Voluntary	Information and assessment tools, economic modelling tools, energy saving tools, educational material, workshops and seminars, awards program	SMEs	N/A	N/A. This will be implemented over four years, commencing in July 2010.	N/A	Government Policy. Pending approvals, this will commence in July 2010.

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	*Objective / target*	*Policy approach*	*Instrument*	*Sectors covered*	*Benchmarking / Reporting, Monitoring and Assessment tools*	*Outputs / Outcomes*	*Evaluations*	*Comments*
ecoBiz Program (Queensland)	Support businesses identify efficiencies in energy, water, waste and materials for economic and environmental benefits	Voluntary	Government rebates, energy audits, publicity, fact sheets and a 'tool box' (work book) to assist with auditing and establishing baseline consumption information.	All types of businesses	N/A	Annual environmental and economic benefits to all 43 ecoBiz Partners total: 34 686 079 MJ reduction in energy use; 23,106 tonnes of CO2-e reduction in greenhouse gas emissions; and $1.38 million reduction in energy usage costs.	N/A	
Queensland Sustainable Energy Innovation Fund (QSEIF)	QSEIF assists Queensland based organisations to develop innovative technologies that reduce consumption of fossil fuels, water or greenhouse gas emissions.	Voluntary	Funding grant	All sectors	N/A	Operating on an annual budget of $1.03 million, QSEIF achieves average greenhouse gas emission savings of 17 850 tonnes per year per project. To date, 77 projects have been funded. The QSEIF have also leveraged significant private venture capital funding and other support.	N/A	
ClimateSmart Business Clusters (Queensland)	Disseminate training and information to groups of businesses to implement specific resource efficiencies.	Voluntary	Grants of up to $10 000 per cluster, training and information provision	Any group of businesses can organise themselves into a 'cluster'	N/A	The Department of Environment and Resource Management called for expressions of interest in this program. This process closed in November 2009. The government expects that more than 400 companies will take part in the program, leading to significant benefits.		

(Continued on next page)

B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
Queensland Water and Energy Sustainable Technology Network (QWESTNet)	The Queensland Water and Energy Sustainable Technologies Network connects Queensland businesses with sustainable technology users and retailers	Voluntary	Information provision, stakeholder networking		N/A	QWESTNet forums have been successful in brokering energy efficient technology development, encouraging partnerships, increasing sales growth and encouraging change in resource efficiency practices. QWESTNet has also bolstered uptake of other government initiatives such as ecoBiz and QSEIF.		
Energy Utilities-demand management and energy efficiency	To encourage energy conservation/efficiency and develop energy management strategies	Voluntary	Videos and pamphlets on climate change, energy conservation promotional campaigns, energy management seminars and consumer advice and conservation leaflets					
Greenhouse Challenge	Voluntary agreement between industry and government to reduce GHG. Identify, monitor, manage and report GHG emissions.	Voluntary	Workbooks and information, training and technical expertise provided, web-based tools (calculators, templates, etc). Public awareness and recognition to members.	Industrial		Coverage of 100% of aluminium and cement producers, 98% of electricity generation and distribution, 98% of oil and gas extraction. 23.5 Mt CO2 abatement is achieved annually; 16% more than what have been occurred without the program		

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	*Objective target*	*Policy approach*	*Instrument*	*Sectors covered*	*Benchmarking/ reporting, monitoring and assessment tools*	*Output/outcomes*	*Evaluations*	*Comments*
Australian Industry Greenhouse Network	Partnership agreement between industry and government to discuss on the development and implementation of government policy	Voluntary	Other agreements					
Renewable energy certificates scheme			Trade scheme					
Canada								
ecoENERGY	To improve industrial energy intensity and reduce energy-related industrial greenhouse gases and air pollution.	Voluntary		Industry	Companies are encouraged to set target, track ad report performance on energy use.	For the 2007-08 fiscal year: Delivery of Dollars to $ense energy management workshops for 1 290 industrial participants; Initiated six studies on process integration, computational fluid dynamic, combustion and energy performance contacting; Welcomed 156 new members to the CIPEC Leaders network, which has over 1 600 members and held 59 network meetings; and Published a new Pulp & Paper Benchmarking study.	An evaluation study was conducted for the Dollars to $ense workshops in 2006 and Benchmarking work in 2007	
ecoENERGY retrofit incentive	To stimulate energy-saving upgrades through federal funding for retrofitting of buildings up to 20 000 sm. Expects to reduce energy use in 12.7 Gj and 1.0 MT of GHG	Voluntary	Investment subsidies	homes, industry, businesses and public institutions				

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
EcoEnergy efficiency initiative	To encourage Canadian businesses to make their commercial and institutional buildings and industries more energy efficient.	Voluntary	Financial incentives. Investment subsidies	Industry (less than 500 employees)		For the 2007-08 fiscal year, energy savings from all aspects of the ecoENERGY retrofit program converted to annual emissions reductions of between 1.0 and 1.1 megatonnes of greenhouse gas and related Criteria Air Contaminants emissions.		Program funding was announced on January 21, 2007, and launched on 1 April, 2007.
Office of Energy R&D (funding arm) and CanmetENERGY (performing arm)	Energy research, development and demonstration (RD&D) to support the development and deployment of cutting-edge clean energy innovations to improve energy efficiency, reduce GHG and other emissions, and support the development of energy policy, codes and regulations.		RD&D for energy efficiency; provision of, information, advice, funding, analytical software tools, databases, publications; Canada's knowledge centre for scientific expertise on clean energy technologies	Industrial (broad based - includes manufacturing, processing, construction, transportation, power generation)				
Canadian Industry Program for Energy Conservation (CIPEC)	To help Canadian industry use energy-efficiency investments to improve competitiveness and to contribute to Canada's climate change goals	Voluntary		Industrial	Output ratios	Participation: 43 trade associations and company groups representing more than 5 000 companies and over 95% secondary industrial energy and use involved in CIPEC. 323 companies signed up as innovators. 25 000 people attended the awareness events.		

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
Natural Resources Canada	Primary agency responsible for energy policy formulation and implementation	Combined	Financial support for advanced technology programs (R&D), some in partnership with industry	Industrial				Works with cement and concrete, mining research, heavy oil, fuel cells, petroleum, catalysis, hybrid systems and renewable energy organisation on their specific needs
Centre for research in cleaner manufacturing	To help develop policy for guiding innovation in cleaner processes		R&D	Industrial				
Industrial process Integration Program	Supports the use of process integration in various industries			Industrial				
Industrial research assistance program	Helps companies identify and adopt technology solutions		Energy audits?	Industrial				
Industry energy research and development program	Technology development of energy efficient processes, products, systems and equipment in partnership with industry			Industrial				
Industry heat management research program	Helps develop and disseminate knowledge and technology that reduce GHG emissions.			Industrial				
Office of energy efficiency (OEE)	To strengthen and expand Canada's commitment to energy efficiency for addressing challenges in climate change	Combined	Information, financial incentives, manuals, training material, reports, workshops, newsletters and guides	Industrial				

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
Industrial Energy Innovators (through OEE)	Company level voluntary agreements between industry and government	Voluntary		Industrial				
Environment Canada's environment technology verification program	Technology transfer assistance through the independent verification of new industry energy efficiency technology		Validation and independent verification of performance claims of technology	Industrial				
CANMET energy technology centre	Energy science and technology arm for energy sector. Supports development of cutting-edge energy innovations to reduce GHG emissions. To develop energy-efficient, alternative energy and advanced hydrocarbon technologies.		R&D energy efficiency, information, advice, funding, software, publications	Industrial				Works in partnership with industry and all major stakeholders in the Canadian energy and R&D sectors
Chile								
Energy-Efficiency Program (PPEE, by its acronym in Spanish)	To consolidate energy efficiency as source of energy that contributes to Chile's sustainable energy development	Combined	Fact sheets, reports and workshops. Financial incentives and subsidies	Housing, transport, manufacturing, mining and the public sector				Programs within the Program: Thermal Reconditioning of Existing Households, Motros changing programme, energy efficiency for municipal streetlight programmes

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
National Economic Development Agency's Energy Efficiency Credit	To finance investments in projects for optimising energy use. This instrument is aimed at investments in machinery and equipment; execution of construction, facilities and civil works; engineering and assembly services; or other services that companies require in order to engage in productive activities. This also includes working capital related to such investments	Voluntary	Soft loans up to US$5m for investments in EE measures	Companies that produce goods and services with annual revenue up to the equivalent of 1 million UF (excluding value-added tax), which equals to US$39m approx. The credit is available for companies from a variety of sectors, such as industry, agriculture, mining, fishing, tourism and healthcare, among others	N/A	N/A	N/A	This credit finances investments with a value up to 25 thousand UF (US$890.00) and enables companies to finance needed investments in projects for optimizing energy use. This instrument is aimed at investments in machinery and equipment; execution of construction, facilities and civil works; engineering and assembly services; or other services that companies require in order to engage in productive activities. This also includes working capital related to such investments

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B.1 **Inventory programs and policies** (Continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
Round tables on Energy Efficiency	Promotion of Energy Efficiency Research, dissemination of results coming out of Energy Efficiency Projects in the respective sector. Evaluation of energy efficiency pilot projects, foster technology development and innovation in energy efficiency for the given sector and foster an energy efficiency culture within the companies that are members of the Roundtable.	Voluntary	Education and information	Industrial and commercial sectors	N/A	N/A	N/A	The Mining Roundtable on EE has set a voluntary target of demonstrating the reduction of 500 000 GJ of energy and improve workers' energy efficiency technical capacity
Mandatory labelling		Mandatory	Labelling	Domestic appliances (lamps, refrigerators)				Chile has a product labelling program that leverages the European comparative labelling scheme, which breaks all similar models of a product into one of seven efficiency categories, A (most efficient) through G (least efficient). This has been applied to five product in Chile (Incandescent and compact fluorescent lightbulbs; and one and two-door refrigerators),

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
Mandatory labelling (continued)								with another five to six planned in 2009-10. Products covered are mostly for residential applications, with future coverage aimed at residential to small commercial applications
Subsidy on energy efficient electric motors	Market penetration for energy efficient electric motors by replacing 700 motors in the year 2009 and 4 673 in 2010	Voluntary	Subsidy / rebates for EE motors up to 10HP to make them available at the same price as standard motors. There is a US$1 million fund for this subsidy.	Industrial (Motors)	N/A	N/A	N/A	
Technical assistance in motor driven systems	Improving the EE in motor systems by providing technical assistance to operators	Voluntary	Technical assistance (Instrument in development	Industrial sector	To be defined	N/A	N/A	
Energy Efficiency Pre-investment Program	Energy efficiency studies geared towards optimising consumption. Consultancy subsidy for: energy efficiency audits; plan for implementing energy efficiency measures; developing an investment project that can be presented to financing providers	Voluntary	Subsidy for energy audits for up to 70% of the total cost of the consultancy, with a maximum of CLP 6 million, which equals US$11 200 approximately	Companies that produce goods and services with annual revenue up to the equivalent of 1 million UF (excluding value-added tax), which equals about US$39 million. The credit is available for companies from a variety of sectors, such as industry, agriculture, mining, fishing, tourism and healthcare, among others	None, there will be an obligatory standard form to document the results by the end of 2009	200 energy audits, not completely evaluated in terms of energy due to deficits in the reporting mechanism		Subsidies for audits (70% up to US$ 10 000), soft loans (up to US$5m for investments, US$1m for environment)

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B.1 **Inventory programs and policies** (Continued)

Name of the policy, program, agency or initiative	*Objective target*	*Policy approach*	*Instrument*	*Sectors covered*	*Benchmarking/ reporting, monitoring and assessment tools*	*Output/outcomes*	*Evaluations*	*Comments*
China								
Energy saving policy reflected in various laws and regulations	To improve energy management, especially to promote and raise awareness of the need for saving energy, and to encourage the use of renewable energy.			All economy				
Program of Unit GDP consumption evaluation system	To assess energy savings		Benchmarking agreements		Based on a 100 mark system to measure achievement of energy savings target. Marks under 60 indicate failure.	1 000 enterprises were evaluated in 2008 of which 92% completed the annual energy-saving goal.		
Energy conservation and emissions reduction policy (component of national energy standards)	Save energy and reduce carbon emissions	Mandatory	Minimum Standards	Several. One set of standards applies specifically to high energy consumption production units of power generation, steel, nonferrous metal, construction materials and petrochemical industries				
11th Plan (2006-2010)	20% intensity decrease							
Hong Kong, China								
Buildings Energy Efficiency Funding Schemes	To carry out energy-cum-carbon audits to review the use of energy and quantify the greenhouse gas (GHG) emissions and to identify opportunities for enhancements of energy efficiency and	Voluntary	Energy audit subsidies (not exceed 50% of the expenditures. Energy efficiency project subsidies (not exceed 50% of the expenditures	Residential, commercial and industrial buildings	Guidelines issued by the local Authorities	Up to end November 2009, 149 funding applications, amounting to HK$30.4m have been approved. The total saving in electricity consumption of the 149 approved		

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
Buildings Energy Efficiency Funding Schemes (continued)	conservation and reductions in the level of GHG emissions arising from building operations. to carry out alteration, addition or improvement works to upgrade the energy efficiency performance of building services installations for communal use of the buildings					applications is estimated at 20.8 million kWh per year, which is expected to lead to a reduction of 14 600 tonnes of carbon emission.		
Tax incentives for environment-friendly installations mainly ancillary to buildings	To encourage businesses to use environment-friendly equipment, the depreciation periods of environment-friendly installations mainly ancillary to buildings are shortened from the usual 25 years to 5 years starting from 2008-09.	Voluntary	Tax incentives	Buildings	Building services installations registered under the Hong Kong Energy Efficiency Registration Scheme for Buildings administered by the Electrical and Mechanical Services Department of Hong Kong SAR Government			
Mandatory implementation of the Building Energy Codes	To improve the energy efficiency performance of new and existing buildings by mandating compliance with the Building Energy Codes, which specify the minimum energy efficiency standards for key building services installations.	Mandatory	Minimum standards and penalties for non-compliance (if enacted)	New and existing buildings in both private and public sectors	Building Energy Codes published by the Electrical and Mechanical Services Department of Hong Kong SAR Government.	It is estimated that for new buildings, the implementation of the proposal will result in energy saving of 2.8 billion kWh in the first decade, which will help reduce carbon dioxide emissions of 1.96 million tonnes.		

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	*Objective target*	*Policy approach*	*Instrument*	*Sectors covered*	*Benchmarking/ reporting, monitoring and assessment tools*	*Output/outcomes*	*Evaluations*	*Comments*
Indonesia								
Energy conservation plan	To reduce energy intensity by 1 per cent per year	Combined	Training and education programs, energy audits, tax deduction and soft loans	Industrial				Energy efficiency presidential instruction has been replaced by energy savings presidential instruction. Energy efficiency managed in terms of savings 100% subsidy for audits
Presidential decree (05/2006) on National energy policy	Reduce energy elasticity of GDP to less than 1 by 2025		Energy audits					
Japan								
Energy conservation law	To manage energy consumption effectively. Companies to improve energy efficiency	Mandatory		Industry, Transport, Residential(appliances) & Commercial	Intensity as defined by the committee. Indicators are established for companies to benchmark their energy efficiency level against others within the same sub-sector, and medium- and long-term targets are set (to be achieved around 2015-20). Currently, each factory and workplace is required to achieve annually on average 1 % reduction or more in energy intensity. The revision adds benchmarking indicators and associated targets to the above in certain sub-sectors: iron and steel, cement, and			Passed in 1979, revised in 1993 and 1998, 2002, 2005, and 2008.

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	*Objective target*	*Policy approach*	*Instrument*	*Sectors covered*	*Benchmarking/ reporting, monitoring and assessment tools*	*Output/outcomes*	*Evaluations*	*Comments*
Energy conservation law (continued)					electricity suppliers. Targets are set at the energy efficiency level of the best performing companies (top 10–20%) in each sub-sector based on the average value and standard deviation. Companies covered by the scheme must submit yearly reports on the status of the benchmarking indicator, in addition to the ratio of energy intensity reduction and on the implementation of an energy management system.			
Energy conservation assistance law	To assist business who voluntarily undertake rationalisation of energy use or utilisation of recycled resources, using very low interest rates, bonds and tax exemption	Voluntary	Soft loans and tax exemptions	Industrial				
Energy conservation centre			Energy audits, information, rewards, training.	Industrial		About 5 600 assessments have been done nation-wide		
The Japan Federation of Economic Organisation's Voluntary Action Plan on the Environment	Industries establish quantitative targets for adopted measures in an Action Plan which is public and reviewed	Voluntary	Agreements with industry, newsletter	Industrial	Input ratios	Japan mining industry association decided that by 2010 the non-ferrous metal industry will reduce its energy input per unit of output by 12% from 1990. the Japan		Includes 36 industries (also non-manufacturing such as transport, distribution) and 137 organisations

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
The Japan Federation of Economic Organisation's Voluntary Action Plan on the Environment (continued)						Chemical Industry Association is aiming to reduce the industry's energy output to 90% of 1990 level by 2010		
National institute of advanced industrial science and technology		Voluntary	R&D energy efficiency, information, advice, funding, publications	Industrial				Research organisation that comprises 15 research institutes. Cooperates with industrial, academic and governmental organisations
Designated energy management factories	Reduce domestic consumption by at least 1% annually on average for operations.	Mandatory	Training, standards, mandatory reporting and fines and public disclosure for failure to comply	Industrial				Standards applying to businesses with annual consumption equivalent to at least 3 000 kiloliter of crude oil or annual electricity consumption of at least 12 GWh. About 3 500 factories included
Medium-sized designated energy management factories	Reduce domestic consumption by at least 1% annually on average for operations.	Mandatory	Training, standards, mandatory reporting and fines and public disclosure for failure to comply	Industrial. Steel, paper and pulp and non-ferrous metal industries to be checked				Standards applying to businesses with annual consumption equivalent to at least 1 500 kiloliter of crude oil or annual electricity consumption of at least 6 GWh. About 90 000 medium-sized factories included
Institute of Applied energy	To collect information on energy issues, to review and analyse energy and energy technologies, to inform policy, to		R&D energy efficiency	Industrial				Independent and non-profit research institute focusing on energy issues

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	*Objective target*	*Policy approach*	*Instrument*	*Sectors covered*	*Benchmarking/ reporting, monitoring and assessment tools*	*Output/outcomes*	*Evaluations*	*Comments*
Institute of Applied energy (continued)	study and evaluate future energy systems and to encourage communication among stakeholders							
New energy and industrial technology development organisation	To develop and promote new energy and energy conservation technologies, to manage industrial technology research and development projects, restructuring Japan's domestic coal mining industry		Information, research grants for research on energy efficiency	Industrial				
Other financial mechanisms	To encourage energy efficiency	Voluntary	Soft loans for NGOs, for local governmental energy-saving demonstration projects, for businesses that have implemented energy saving efforts or engaged for energy efficiency technology	Industrial				
Korea								
Green growth initiative.	To improve energy efficiency and reduce energy consumption		Investment subsidies, trading schemes, minimum standards, R&D energy efficiency	Industrial, transport, buildings				The government will allow market mechanisms to determine energy prices and promote energy conservation standards
Energy efficiency initiative	To improve energy efficiency by 11.3 per cent by 2012, compared with 2007	Combined	Incentives for investment in energy efficiency. Minimum standards	Buildings, 'companies'				It will be effective until 2012

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B.1 **Inventory programs and policies** (Continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
Third energy rationalisation plan 2005-07	Reduce primary energy consumption in 2008 by 7% (18.8Mtoe)		Subsidies for audits (80%), Investment subsidies (70%), Soft loans, tax credits or deductions (10%)					
Malaysia								
Efficient management of electrical energy regulations	All targeted users will be required to engage a registered electrical energy manager responsible for analysing the consumption of electrical energy and advise on measures for more efficient use of it, as well as monitoring the actions taken	Mandatory		Electricity users who consume 3GWh or more electricity over a period of six months				This regulation is under the Electricity Supply Act. Not in place yet.
Energy Efficiency Action Plan	To provide strategic direction for energy efficiency development in the economy in the support of sustainable energy development			Industrial, and commercial and residential buildings				Ready by the end of 2009
Energy Efficiency and Conservation Guidelines Part 1	Improve energy utilisation and to save energy through encouraging industries to adopt energy efficiency practices and to manage and improve their energy utilisation and environmental management.	Voluntary	Guidelines, best-practice manuals	Industrial; glass, cement, rubber, pulp and paper iron and steel, ceramic, oleochemical, plastic, wood/timber, and textiles				Launched in 2007
Various fiscal incentives in 2009 Budget	To further support the energy efficiency development		Exemptions of import taxes for renewable energy equipment or energy efficient consumption goods					

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	*Objective target*	*Policy approach*	*Instrument*	*Sectors covered*	*Benchmarking/ reporting, monitoring and assessment tools*	*Output/outcomes*	*Evaluations*	*Comments*
Malaysian industrial energy efficiency improvement project (MIEEIP) (2000-06)			Subsidies for audits (50%), investment subsidies, tax credits or deductions, accelerated depreciation, tax reduction					
Mexico								
Law for the Sustainable Use of Energy Energy program 2001-06	Achieve national energy savings of 2.5%, final consumption		Tax credit or deduction					
New Zealand								
NZEECS	Agency for and delivery of energy efficiency and conservation. Targets are: 30 PJ of savings in non-transport energy per year by 2025, 9.5 PJ of additional direct use of renewable energy per year by 2025, and 20 PJ of energy savings in the transport sector by 2015. Overall 20% improvement in energy efficiency		Subsidies for audits (50%), Investment subsidies (40%), soft loans	All		It is expected a reduction of 5-6 Mt of carbon per year compared with business-as-usual scenario		Strategies are developed based on cost-benefit analysis and programme driven approach for setting targets and forecasting outcomes

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
Energy Efficiency and Conservation Authority- Business programme	More energy efficient and competitive businesses reducing their operating costs, using more renewable energy, emitting less carbon dioxide and creating more jobs	Voluntary	Supporting industry associations; Allocating grants for energy audits; Allocating grants for new and emerging technologies; Providing demonstrations, case studies, feasibility studies and training; Loans for public sector organisations; advice.	EECA's business programme covers all sectors of the economy, including small and medium businesses, large business and the Government sector. There are also initiatives aimed at specific sectors.	Energy audits and improvement implementation Energy use indicators to tourism industry	$106.5 million energy savings 9.9 PJ in energy demand reduction 0.75 Mt greenhouse gas emissions avoided 0.12 PJ increase in use of wood energy	EECA's contribution is evaluated through audits of the energy efficiency gains leveraged through this program.	http://www.eecabusiness.govt.nz/
Peru								
Law on energy rational use and efficiency (2000) Regulatory and Institutional Marc Consolidation for Efficient Energy Use and Sustainable Services								Includes the 'Monitoring and Evaluation System of the Energy Service Market' and 'Stock-up and Information Diffusion System'
The Philippines								
Republic Act 7638 National Energy Efficiency and Conservation program	Saving 150Mtoe (2005-14)		Subsidies for audits Plans to develop benchmark energy use in government buildings as well as inventory of accredited testing laboratories to encourage private use					

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	*Objective target*	*Policy approach*	*Instrument*	*Sectors covered*	*Benchmarking/ reporting, monitoring and assessment tools*	*Output/outcomes*	*Evaluations*	*Comments*
Philippine Energy Efficiency Project (PEEP), SWITCH Movement79	First phase of the project is "Energy Efficient Lighting System"			Lighting				Other components of the project include: government retrofit, public lighting retrofit, expansion of energy efficiency labelling, lamp waste facility, super ESCO, green building initiatives and communication and social mobilisation
Russia								
Russia's Energy Strategy (2003)	Energy intensity reduction by 26–27% in 2010 and 45–55% in 2020							
Federal Law on 'Energy efficiency' (1996)								
Draft Federal program 'Energy efficient economy'	Savings of 35 mtce (2007-10) and 100Mtce (2011-15)							
Singapore								
Grant for Energy Efficient Technologies (GREET)	To encourage owners and operators of industrial facilities to invest in energy efficient technologies or equipment	Voluntary	Investment subsidies	Industry	Report on actual savings. Energy intensity indicators per unit of output	N/A	N/A	Implemented since end of 2008. Funding of up to 50%, capped at SPD 2m per project. Only projects with payback period greater than 3 years, less than 7 years. Recipients of funding need to report against a measurement and verification plan after completion of project, and every 18 months for the next three years

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
Energy efficiency improvement assistance scheme (EASe)	EASe is a co-funding scheme administered by the National Environment Agency (NEA) to encourage companies in the manufacturing and building sectors to carry out detailed studies on their energy consumption, also known as energy appraisals, and identify potential areas for energy efficiency improvement.	Voluntary	Energy audit subsidies	Building and Manufacturing	N/A	As of end Nov 09, 161 projects have been approved. These comprise 47 manufacturing facilities and 114 buildings. There are listed 5 projects, two of industry, two of building and one of a public sector facility. Case studies report energy savings in excess of 5 800 MWh and over S$2m.	N/A	Implemented since 2005. Subsidies for up to 50 per cent of the audit costs, up to S$200 000 per facility/building.
Singapore Certified energy Manager (SCEM) Training Grant	To develop local expertise and capability in professional energy management. The scheme is targeted at engineers who manage manufacturing facilities and buildings and provide energy services or engineering consulting services.	Voluntary	Grants for training programs	Industry and building	N/A	As of end of Nov 09, 272 applications have been approved	N/A	Implemented since 2008. The Training Grant substantially funds the SCEM training cost at the Professional Level. Qualifying candidates need only pay S$900 upfront for the full 144-hour professional level SCEM Programme.

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
Energy Efficiency National Partnership Programme	To help companies improve their energy efficiency by encouraging them to put in place energy efficiency programmes at the organisational level to reduce energy wastage and improve energy efficiency. This in turn will enhance their long-term business competitiveness and reduce their carbon footprint.	Voluntary	Rewards (annual awards ceremony). Best-practice sharing, learning network	Industry	N/A	N/A. Recently launched	N/A	
Accelerated depreciation allowance scheme	To encourage companies to replace old, energy-consuming equipment with more energy efficient ones and to invest in energy-saving equipment.	Voluntary	Investment subsidies	Industry and building	N/A	N/A	N/A	The capital expenditure on the qualifying energy efficient or energy-saving equipment can be written off in 1 year instead of three.
Design for energy Efficiency (DfF)	Helping companies to incorporate efficiency considerations during the conceptual design phase of a new facility	Voluntary	Incentives for investment. Grants	Industry. Large consumers of energy	N/A	N/A	N/A	Implemented in mid 2008. The maximum amount of funding is 80% of the qualifying costs or S$600 000, whichever is lower.
Chinese Taipei								
Energy efficiency and conservation program (2006-10)	28% deduction in the energy intensity of the GDP by 2020 (16% by 2010)		Investment subsidies					

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
Energy management Law	To serve the purpose of upgrading energy management aimed at rational and efficient utilisation of energy	Mandatory	Provide tax deductions for purchasing high efficient equipment and technology, low interest loan policy for installing energy conservation equipment, training and education programs, minimum standards, best-practice manuals, and free energy audit to Large Energy Users	Large Energy Users whose electric demand are greater than 800kW for all sectors. There are 4 500 Large Energy Users for all sectors. The Large Energy Users for industrial sector are 3 247 companies in 2009.	Statistics and Regression Analysis. Energy intensity indicators. The Large Energy Users whose electric demand are greater than 800kW, have to set up their annual energy consumption, report their efficiency of major equipment, specific energy consumption per unit product, and energy conservation plans to the Central Government by the end of January every year.	The National Energy Intensity decreased by 1.62%. Energy Intensity for Industrial Sector decreased by an average of 3.06%	N/A	First enacted in 1980, and finally revised in July, 2009
Thailand								
Energy conservation promotion Act 1992			Investment subsidies, soft loans, tax reduction					
Energy conservation program (2005-11)	Target of energy savings of 20% focusing mainly on energy saving promotion in the industrial and transport sectors							
United States								
Office of industrial technologies within Dept of Energy.	To develop and deliver advanced technologies that increase energy efficiency, improve environmental performance and boost productivity	Voluntary	Assistance, information, training, databases, research, financial assistance	Industrial				

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
Industries of the Future Program	National laboratories and institutions provide technology R&D and development support		Best-practice manuals, technology demonstration and validation, fact sheets, software, training, cost sharing funding of R&D projects	Waste intensive industries: agriculture, aluminium, chemicals, forest products, glass, metal, casting, mining, petroleum and steel				
Best Practices Program	To help industry identify energy and process efficiency opportunities	Voluntary	Information, technical assistance, demonstration of emerging technologies, newsletters, energy audits subsidies, best-practice manuals	Industrial				
Industrial Assessment Centres	Teams of engineering faculties and students from universities conduct free comprehensive energy audits or industrial assessments	Voluntary	Energy audits and recommendations, information, reports and database	Industrial. Small to medium sized companies		Over 8 000 audits and assessments performed since 1978		
EPA's energy star for industry	Voluntary partnership program between government and industry for increasing energy efficiency	Voluntary	Share of information, energy performance indicator tools. ENERGY STAR logo and awards	Industrial	Plant energy performance indicators (EPI)	In 2009, 53 plants scored within the top 25% of energy efficiency within their industry to receive the ENERGY STAR bronze	Rating is constructed by EPA based upon building data. Reduced energy use must then be demonstrated to achieve an energy performance rating of 75 or better (the benchmark for efficiency).	www.energystar.gov/index.cfm?c=manuf_res.pt_manuf
Allied partnerships	Voluntary partnership program between government and industry for increasing energy efficiency	Voluntary	Best-practice manuals, conferences, training, workshops	Manufacturers, associations, service and equipment providers, utilities and other organisations				

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
Small Business Administration	To support investments in energy efficiency technologies for small businesses	Voluntary	Loan guaranty program	Industrial. Small business				
State programs. The California Public Interest Energy Research,	To assist businesses in assessing or financing energy-efficient process technology or buildings	Voluntary	Financial support, grants, soft loans, R&D funding, training, tax incentive programs	Industrial				
Energy Policy Act (2005), National Energy Policy (2001)	Promotion of energy technologies that encourage cleaner and more efficient energy use, modernisation of energy infrastructure.	Voluntary	Energy management and performance standards, voluntary commitments to reduce industrial energy intensity, labelling requirements	Industrial companies				Tax credit or reduction (30% for qualified fuel cells, 10% for micro turbines, 30% for solar energy equipment), subsidies for audits, Soft loans (through Loan Guarantee Program)
Energy Policy Act (2005): Energy Independence and Security Act (2007)	Promotion of energy technologies that encourage cleaner and more efficient energy use	Voluntary	RD&D, tools, assessments, to increase energy efficiency in energy-intensive industries; industrial research and assessment centres at institutions of higher learning; recoverable waste energy inventory program, grant program, and "clean energy centres;" voluntary national program for sharing information on potential to save energy in data centres and equipment.	Industrial companies	EISA Section 452 calls for development of specifications, measurements, best practices, and benchmarks that enable data centre operators to make more informed decisions about the energy efficiency and costs of data centres. It allows for creation of separate specifications, measurements, and benchmarks based on data centre size and function, as well as other appropriate characteristics.			EISA directs designation of a respected IT industry organization to consult with and to coordinate the program. DOE and EPA have worked successfully with multiple organizations.

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B.1 **Inventory programs and policies** (Continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
Industrial Technologies Program (ITP), U.S. Department of Energy	Significantly reduce the intensity of energy use and GHG emissions in the U.S. industrial sector by accelerating R&D of advanced technologies and deploying best practices.	Voluntary	Assistance, information, training, databases, research, financial assistance; Grants; Energy assessment subsidies; Rewards (publicity, certification, etc); Fact sheets, newsletters, best-practice manuals, reports and workshops; Training and education programs; Software decision tools; Partnership programs; Energy audits	Industry	Best Practices Scorecard for benchmarking industrial energy management now in Beta test in connection with Superior Energy Performance group working on standards and certification; impacts of emerging ITP-supported technologies tracked annually	Program-wide in 2007: 734 trillion Btu saved; $6.73 billion in cost savings 1976 through 2007: 8 500 trillion Btu saved; $67.75 billion in cost savings; 189 million tons of CO2 emissions avoided	Reporting required from companies receiving assessments and from Save Energy Now LEADER companies; impacts of ITP-supported technologies in the marketplace tracked annually	For more information, see: www.eere.energy.gov/industry/
Industrial Assessment Centers [Subprogram of Industrial Technologies Program]	Teams of engineering students led by a specially trained and certified faculty member conduct free energy assessments for small to mid-sized industrial facilities.	Voluntary	Energy assessment and recommendations, information, reports, and on-line database	Small to medium sized manufacturing companies To be eligible for an IAC assessment, a manufacturing plant typically meets the following criteria: ▪ Within Standard Industrial Codes (SIC) 20-39. ▪ Within 150 miles of a host campus. ▪ Gross annual sales below $100 million. ▪ Fewer than 500 employees at the plant site. Annual energy bills more than $100 000 and less than $2m.	Assessments and recommended improvements, database of 14 400 past assessments	Total potential annual savings from 2006-08 assessments valued at more than $200 million; implementation rates average slightly less than 40% of potential savings Through 2007, 2 745 students have graduated from the IAC program More than 250 students in program at any given time, with over 100 graduating each year; nearly 60% working in energy related positions today	Over 14,400 assessments performed since 1978 315 assessments completed in 2009	For more information, see: www.eere.energy.gov/industry/bestpractices/iacs.html

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B.1 **Inventory programs and policies** (continued)

Name of the policy, program, agency or initiative	***Objective target***	***Policy approach***	***Instrument***	***Sectors covered***	***Benchmarking/ reporting, monitoring and assessment tools***	***Output/outcomes***	***Evaluations***	***Comments***
Save Energy Now, a subprogram of the Industrial Technologies Program	The Save Energy Now subprogram seeks to drive a 25% reduction in industrial energy intensity in ten years. It delivers a portfolio of resources to help manufacturers understand how energy is used in their facilities, identify energy-saving opportunities, and select the most cost-effective options to reduce energy intensity and carbon emissions.	Voluntary	ITP uses information resources, technical assistance, newsletters, energy assessments, best-practice manuals, software tools, training, and recognition activities:	All U.S. manufacturing facilities with an emphasis on large-energy users and energy-intensive manufacturing sectors	Best Practices Scorecard for benchmarking industrial energy management now in Beta test in connection with Superior Energy Performance group working on standards and certification.	Provided energy assessments to 878 industrial plants from 2006 to February 2010. Of the 793 plants reporting, the following opportunities for potential savings have been identified: 130.6 trillion Btu of total site energy use or 152.6 trillion Btu of total source energy use; Over $1 124.8 million worth of potential energy costs; 9.638 million metric tons of potential carbon dioxide emissions, which is equivalent to taking 1,840,072 cars off the road. 42 manufacturers have taken the Save Energy Now LEADER pledge as of February 2010; 28 organizations have signed on as *Save Energy Now: ALLY organizations*	Awards and public recognition are given to plants in two categories: Energy Champions: Plants achieving more than 250 000 MMBtu in total energy savings or more than 15% total energy savings Energy Savers: Plants achieving more than 75 000 MMBtu in total energy savings or more than 7.5% total energy savings.	For more information, see: www.eere.energy.gov/industry/saveenergynow/ www.eere.energy.gov/industry/bestpractices/index.html
Viet Nam								
National Energy Efficiency program	3-5% energy savings for 2006–10 and 5-8% for 2011–15		Minimum energy performance standards, mandatory labelling					

Note: No data available for Papua New Guinea

Source: The CIE.

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