

COMPENDIUM OF ENERGY EFFICIENCY POLICIES OF APEC ECONOMIES

ASIA PACIFIC ENERGY RESEARCH CENTRE

This report is posted on the website at
www.ieej.or.jp/aperc

2010

Published by

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April 2010

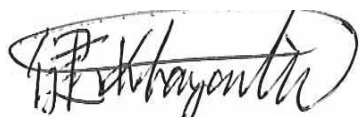
FOREWORD

According to the *Nine Energy Policies Imperatives* (G8 Summit, 2009), “There is no scenario for putting global energy consumption on a sustainable path that does not show a major contribution from energy efficiency—predominantly in end use.” Energy efficiency improvements will help APEC economies to chart new pathways for secure and sustainable development. Furthermore, the improvement of energy efficiency offers many cost-effective opportunities to achieve energy security, improve business productivity and mitigate greenhouse gas emissions.

At the 8th Meeting of APEC Energy Ministers in Darwin, Australia in May 2007, APEC Energy Ministers encouraged APEC economies to individually set goals and formulate action plans for improving energy efficiency on an overall and/or sector basis. As a result, in the Sydney Declaration of September 2007, APEC Leaders agreed to work towards achieving an APEC-wide regional aspirational goal of a reduction in energy intensity of at least 25% by 2030 (with 2005 as the base year). To this end, APEC economies were encouraged to set individual goals and action plans for improving energy efficiency, reflecting the individual circumstances of each economy.

The *Compendium of Energy Efficiency Policies of APEC Economies* is a publication intended to promote information sharing in the field of energy efficiency and energy conservation across the APEC economies under a common format. It contains energy efficiency policy information for all APEC economies (with the exception of Papua New Guinea) based on responses to a questionnaire.

We hope that this report helps to deepen mutual understanding among APEC economies on energy efficiency issues in the region.



Kenji Kobayashi
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March 2010

ACKNOWLEDGEMENTS

We would like to thank APEC member economies for their efforts in completing the questionnaire to ensure the accuracy and timeliness of the information reported. We also would like to thank members of the APEC Energy Working Group (EWG), Expert Group on Energy Efficiency and Conservation (EGEE&C), and APERC Advisory Board, along with numerous government officials, for their helpful information and comments.

The *Compendium of Energy Efficiency Policies of APEC Economies* could not have been accomplished without the contributions of many individuals and organisations. We would like to thank all those whose efforts made this publication possible, in particular those named below.

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AUSTRALIA

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. Overall Energy Efficiency Improvement Goals

Australia's proposed emissions trading scheme (the Carbon Pollution Reduction Scheme—CPRS) will establish a carbon pollution reduction goal. In addition, there are a number of complementary measures aimed at improving the energy efficiency of the economy.

1.2. Sectoral Energy Efficiency Improvement Goals

Australia has carbon pollution goals and, as such, there are no plans to implement sectoral targets.

1.3. Action Plans for Promoting Energy Efficiency

The National Strategy on Energy Efficiency (NSEE) is the overarching program of work for promoting energy efficiency in Australia. Details can be found at www.coag.gov.au/coag_meeting_outcomes/2009-07-02/docs/Energy_efficiency_measures_table.pdf

a) Objectives

The NSEE is a coordinated, comprehensive approach to energy efficiency in Australia to accelerate energy efficiency efforts across all governments, and to help households and businesses reduce their energy costs. The NSEE addresses barriers that prevent the optimal uptake of energy efficient opportunities, such as split incentives and information failures.

The NSEE incorporates and builds on measures already agreed by the Council of Australian Governments (COAG) and the Ministerial Council on Energy through the National Framework on Energy Efficiency (NFEE). While the NSEE does not set any overall targets, it aims to accelerate energy efficiency efforts, streamline roles and responsibilities across levels of governments, and facilitate the adoption of more efficient and innovative practices by ensuring that businesses and households are able to make informed decisions about investments in energy efficiency.

b) Applicable sectors

The NSEE outlines detailed energy efficiency measures and plans to implement them under:

- Industry and business
- Skills and training
- Advice and education
- Data
- Electricity markets
- Appliances and equipment
- Transport
- Buildings standards
- Commercial building sector
- Residential building sector
- Government working in partnership and leading the way.

c) Outline

The NSEE was agreed to by the Council of Australian Governments in July 2009. It is a 10-year strategy to deliver a consistent and cooperative approach to energy efficiency. Measures include:

- Assistance to households to reduce energy use through the provision of information and advice, financial assistance and demonstration programs
- Assistance to business and industry to obtain the knowledge, skills and capacity to pursue cost effective energy efficiency opportunities
- Higher energy efficiency standards to increase the number of highly energy efficient homes and buildings, and the provision of a clear roadmap to assist Australia's residential and commercial building sector in adapting to these standards
- Consistent economy-wide energy efficiency standards for appliances and equipment and a process to enable industry to adjust to increasingly stringent standards over time
- Addressing potential regulatory impediments to the uptake of innovative demand-side initiatives and smart grid technologies
- Governments working in partnership to improve the energy efficiency of their own buildings and operations
- A detailed assessment of possible vehicle efficiency measures, such as CO₂ emission standards.

One of the measures under the NSEE is the Energy Efficiency Data Project (EEDP), which aims to improve the evidence base for the development and evaluation of policies for energy efficiency.

d) Financial resources and budget allocation

Funding of AUD 88.3 million over four years (2009-10 to 2013-14)

e) Method for monitoring and measuring effects of action plans

See answer for NFEE (below).

f) Expected results

The expected energy and greenhouse gas emissions savings for appliances and equipment to 2020 (under the E3 MEPS and labelling program) is outlined in the report *Prevention is Cheaper than Cure - Avoiding Carbon Emissions through Energy Efficiency - Projected Impacts of the Equipment Energy Efficiency Program to 2020*. The report is available at www.energyrating.gov.au/library/details200901-projected-impacts.html.

g) Future tasks

No information available

Previous action plans for promoting energy efficiency

The National Framework for Energy Efficiency (NFEE) was the previous arrangement for cooperation on energy efficiency actions in Australia. All NFEE projects and activities now form part of the NSEE.

a) Objectives

The NFEE aimed to take advantage of the economic potential associated with increased uptake of energy efficient technologies and processes to help improve Australia's energy efficiency performance to reduce energy demand and lower greenhouse gas emissions.

b) Applicable sectors

Stage One of the NFEE was adopted in 2004 and is still ongoing. It contains a comprehensive set of measures that cover the residential, commercial and industrial sectors. Stage Two of the NFEE commenced in July 2008.

c) Outline

Stage One of the NFEE consisted of nine policy packages including:

- *Residential buildings*: consistent economy-wide minimum energy efficiency design standards for new buildings and renovations and mandatory disclosure of the energy performance of homes for sale or lease
- *Commercial buildings*: consistent economy-wide minimum energy efficiency design standards for new and refurbished buildings and mandatory disclosure of the energy performance at the time of sale or lease
- *Commercial/industrial energy efficiency*: mandatory energy assessments and public reporting for large energy users (the Energy Efficiency Opportunities program) and coordinated training and accreditation for energy auditors and energy performance contractors
- *Government energy efficiency*: development of consistent standards for measuring and reporting on government energy efficiency programs, introduction of public annual reporting on energy use and progress towards targets by government agencies in all jurisdictions, and the development of best practice models for government agencies to implement energy efficiency programs
- *Appliance and equipment energy efficiency*: broadening the scope of the National Appliance and Equipment Energy Efficiency Program (NAEEEP) through the introduction of mandatory Minimum Energy Performance Standards (MEPS) and introducing new or more stringent MEPS for residential, commercial and industrial products
- *Trade and professional training and accreditation*: undertaking a coordinated effort to integrate energy efficiency concepts into training courses in key professions that influence energy efficiency outcomes, and development of training and accreditation courses for practising tradespersons
- *Commercial/industrial sector capacity building*: development of a coordinated program to generate examples of energy efficient equipment or processes in key industrial sectors and new or refurbished commercial buildings, link industry and government to key centres for energy efficiency research and development, and establish coordinated energy efficiency best practice networks
- *General consumer awareness*: provision of benchmark data on energy bills, development of a coordinated network to facilitate easy and timely access to information, targeted promotional campaigns and the integration of energy efficiency concepts into the school curriculum
- *Finance sector awareness*: raising awareness of the opportunities for and benefits of investment in energy efficiency and the provision of tools to assist in the valuation and risk assessment of proposals.

Stage Two of the NFEE added another five packages, including:

- Expanding and enhancing the Minimum Energy Performance Standards program
- The Heating, Ventilation and Air Conditioning (HVAC) high efficiency systems strategy
- The phase-out of inefficient incandescent lighting
- Government leadership through green leases
- Development of measures for an Australian hot water strategy, for later consideration.

Examples of action that has been taken under Stage Two include:

- *Appliances*: MEPS and energy labelling continued to be developed and implemented through the Equipment Energy Efficiency (E3) Program. There are also plans to implement Greenhouse and Energy Minimum Standards (GEMS). Around 40 new products have been identified to be targeted for inclusion under MEPS by 2010–11, including some types of home entertainment and office equipment.

- *Lighting*: The Government is phasing out inefficient incandescent light bulbs over a number of years through the Minimum Energy Performance Standards (MEPS). The phase-out commenced with the implementation of an import prohibition on inefficient, traditional pear shaped incandescent bulbs on 1 February 2009, followed by a sales ban in November 2009. MEPS for Compact Fluorescent Lamps (CFLs) were also introduced in November 2009 to ensure that only high quality CFLs can be sold in Australia.
- *Buildings*: Work has commenced on the setting of minimum energy efficiency standards for new commercial and residential buildings and an investigation into the mandatory disclosure of commercial and residential building energy efficiency. The NSEE builds upon this work to include a range of measures to promote greater energy efficiency in buildings.

d) Financial resources and budget allocation

The budget for the packages of work under the second stage of the NFEE was AUD 6.21 million for 2008–09 and AUD 9.96 million for 2009–10. Resourcing to implement the Stage Two measures are met separately by the relevant jurisdictions.

e) Method for monitoring and measuring effects of action plans

Surveys, statistic compilation, end-use information, monitoring and trend analysis are all undertaken, and databases are maintained to assist in program evaluation, meeting international reporting obligations and policy formation.

There are a number of agencies that are responsible for energy efficiency monitoring and reporting.

- The Australian Bureau of Statistics collects and publishes a wide range of energy use and related statistics.
- The Department of Resources, Energy and Tourism (RET) administers the Energy Efficiency Opportunities (EEO) program under which companies report a range of energy use and energy efficiency information to the government.
- RET commissions work on industrial energy intensity (undertaken by the Australian Bureau of Agricultural and Resource Economics—ABARE). The most recent report is ‘End use energy intensity in the Australian economy’ published in 2009. ABARE also prepares the ‘Australian Energy Statistics’ on behalf of RET.
- The Department of Climate Change and Energy Efficiency (DCCEE), on behalf of the E3 Program, monitors and reports information through its ‘Energy Use in the Australian Residential Sector 1986–2020’ report. The report is the second economy-wide baseline study on residential energy use. It includes private residential dwellings, both those that are separate, such as single detached family homes, and attached, such as townhouses or apartments. The modelling incorporates Australian energy policy programs in place or finalised by mid-2007.
- DCCEE is responsible for the analysis of the projected effects of the Equipment Energy Efficiency Program over the period 2000–2020. Results have been published in the report: ‘Prevention is Cheaper than Cure—Avoiding Carbon Emissions through Energy Efficiency, Projected Impacts of the Equipment Energy Efficiency Program to 2020’.
- DCCEE also administers the National Greenhouse and Energy Reporting Scheme (NGERS). NGERS commenced in 2009–10. It will be mandatory for all companies that use more than 0.1 petajoules a year to report on their energy consumption and greenhouse gas emissions.

f) Expected results

See answer for Energy Efficiency Opportunities (below).

g) Future tasks

The National Strategy for Energy Efficiency (NSEE) provides specific actions for promoting energy efficiency (see above) over the coming years.

1.4. Institutional Structure**a) Name of organisation**

The Australian Constitution divides legislative powers between the federal and state governments. As such, policy responsibility for energy efficiency actions varies between the levels of government.

At the federal level, direct responsibility for energy efficiency is split between two departments. RET is responsible for policy and programs pertaining to industrial energy efficiency. DCCEE is responsible for other sectors including residential and commercial energy efficiency. A number of other government agencies have sectoral interests in energy efficiency including the Department of Infrastructure, Transport, Regional Development and Local Government (DITRD LG) and the Department of Innovation, Industry, Science and Research (DIISR). Activities at the federal level are synergised through the usual channels that facilitate liaison between relevant departments and ministers. The NSEE is the main mechanism for coordinating energy efficiency policy, with reports on the progress of activities being provided to COAG by the Senior Officials Group on Energy Efficiency (SOG-EE).

At the state/territory level, there is a range of institutional structures. The following agencies are responsible for energy efficiency:

- New South Wales: Department of Environment, Climate Change and Water
- Northern Territory: Department of Resources - Primary Industry, Fisheries and Resources
- Queensland: Department of Employment, Economic Development and Innovation—Mines and Energy—Office of Clean Energy
- South Australia: Department for Transport, Energy and Infrastructure and the Essential Services Commission of South Australia
- Tasmania: Department of Infrastructure, Energy and Resources
- Victoria: Department of Primary Industries, Sustainability Victoria and the Essential Services Commission
- Western Australia: Office of Energy.

The Ministerial Council on Energy is comprised of all federal and state and territory energy ministers. A subcommittee of officials, the energy efficiency working group, facilitates inter-jurisdictional cooperation on energy efficiency.

b) Status of organisation

All agencies report to the relevant federal or state government minister.

c) Roles and responsibilities

Vary across departments.

d) Covered sectors

All sectors of the economy are covered.

e) Established date

No information available

f) Number of staff members

No information available

1.5. Information Dissemination, Awareness-raising and Capacity-building

a) Information collection and dissemination

A wide range of information is readily available to Australian energy consumers. For example, the Energy Efficiency Exchange (EEX) website developed under the NFEE is a public source of information on industrial energy efficiency. There are also a number of websites containing information on ways to improve residential and building energy efficiency. For the transport sector, the Green Vehicle Guide provides model specific information on the emissions performance and fuel consumption of all vehicles produced since 2004.

b) Awareness-raising

There is no economy-wide general energy efficiency awareness-raising program, although awareness campaigns may be undertaken with specific initiatives such as the phasing out of inefficient incandescent lighting. Some states have awareness-raising campaigns.

c) Capacity-building

A Long-Term Training Strategy for the Development of Energy Efficiency Assessment Skills is being developed under the NFEE, which has proposed options to address skills shortages of energy efficiency assessors and auditors. Measures are being developed to assist in the supply of energy efficiency audit and advisory services in the short to medium term.

A transitional plumber training program is also being developed and delivered in support of the phase-out of greenhouse intensive water heaters under the NFEE.

The NSEE outlines plans to develop a National Energy Efficiency Skills Initiative (NEESI). The NEESI will build on the existing processes under the NFEE to ensure that Australia will have the skills and knowledge required to move to a low-carbon economy.

The Energy Efficiency Opportunities program engages in significant capacity building activities that reach companies using 45 per cent of Australia's energy end use and a range of energy services providers, providing advice, producing guidance materials, case studies, and holding annual workshops.

1.6. Research and Development in Energy Efficiency and Conservation

In general, Australia has a technology-neutral approach to research and development funding. Researchers with energy efficiency related projects must compete with other projects for funding. However, there are a number of programs that encourage research and development in energy efficiency.

The Australian government has allocated AUD 240 million over four years to establish *Clean Business Australia*, which will support a range of activities aimed at improving energy and water efficiency and increasing sustainability, with a focus on productivity and innovation. This program is administered by the Australian Government Department of Innovation, Industry, Science and Research and is comprised of three elements—climate ready, retooling for climate change and the green building fund.

The *Clean Business Australia—Climate Ready* program allocates grants ranging between AUD 50 000 to AUD 5 000 000 to small and medium-sized Australian businesses to undertake research and development, proof of concept and early-stage commercialisation projects in order to develop new technologies and services responding to climate change. A total of AUD 75 million in grants has been allocated. It is anticipated that the resulting research and development will lead to improved water recycling, waste recovery, reduced energy consumption, improved information systems and green building materials.

The *Clean Business Australia—Retooling for Climate Change* program is designed to support small and medium-sized Australian manufacturers to reduce their environmental footprint by improving the energy and/or water efficiency of one or more production processes. Grants

ranging between AUD 10 000 to AUD 500 000 to cover a maximum of half the project cost totalling AUD 75 million are expected to be allocated over four years commencing 2008-09. It is expected that this investment will result in improved efficiency in manufacturing processes leading to reduced energy and water consumption and associated greenhouse gas production.

The *Clean Business Australia—Green Building Fund* aims to support owners of commercial office buildings in retrofitting existing buildings to improve energy efficiency and reduce greenhouse gas emissions. Grants are allocated through two activity streams. Stream A allocates grants ranging between AUD 50 000 to AUD 500 000 to cover a maximum of half the project cost to assist owners of existing commercial buildings in retrofitting their buildings. Stream B allocates grants of up to AUD 200 000 for up to 50% of project costs to industry associations to develop the knowledge, skills and capacity of those who operate commercial buildings, improve energy efficiency, and reduce greenhouse gas emissions. A total of AUD 90 million has been allocated to the program.

The Australian Government's *Green Car Innovation Fund* is also administered by the Australian Government Department of Innovation, Industry, Science and Research. The fund is designed to encourage the Australian automotive industry to develop and manufacture low-emission vehicles. The fund of AUD 1.3 billion allocated over ten years starting 2009–10 is provided to industry on a one dollar to three dollar basis, that is, industry must provide three dollars for every dollar provided by the government.

Research on energy efficiency is a major component for energy efficiency improvement in Australia and is carried out through federal and state government networks. Funding mechanisms and involvement with the private sector are conducted on a need-only basis. States and territories also have a number of demonstration programs for business and energy efficiency.

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS

2.1. Government Laws, Decrees, Acts

a) Name

Energy Efficiency Opportunities Act 2006 (EEO)

b) Purpose

The EEO is designed to result in improved identification and uptake of cost effective energy efficiency opportunities, improved productivity and reduced greenhouse gas emissions, and greater scrutiny of energy use by large energy consumers.

c) Applicable sectors

The EEO applies to all large energy users across all sectors. This mainly covers the industry, transport and commercial sectors.

d) Outline

Participation in EEO is mandatory for all businesses that use more than 0.5 petajoules of energy a year (equivalent to the energy used by approximately 10 000 households). The businesses (more than 225 as at 1 March 2010) registered for the program account for more than 60% of the total energy use of business and around 45% of all energy end-use in Australia.

The businesses registered for the EEO are required to carry out a comprehensive and rigorous energy assessment to identify efficiency opportunities with up to a four year payback. There is a rolling five year assessment cycle. Companies are supported with advice, capacity building workshops and guidance materials.

They are then required to submit an annual report to RET and to the public that identifies and reports on their implementation of cost effective energy saving opportunities. A number of these reports have gained media attention, highlighting the scrutiny from the Australian public on business actions relating to climate change. Companies also make a more detailed report to the Government approximately every three years.

Financial resources and budget allocation

AUD 16.9 million was allocated to the program from 2004–05 to 2008–09.

e) Expected results

Abatement and energy efficiency improvements from the program are significant. In their first reports at the end of 2008, participants reported identifying a total of 67.7 petajoules of potential cost effective annual savings that would yield AUD 736 million in annual financial benefits, and emissions reductions of 6.4 million tonnes of CO₂ equivalent emissions per year. Companies reported that they have implemented or have planned implementation of opportunities to save 41.6 petajoules per year, valued at AUD 503 million each year, and reduce greenhouse gas emissions by 3.9 million tonnes per year (0.7% of Australia's total 2006-07 emissions). Of the remaining potential opportunities, companies were continuing to investigate 24.2 petajoules per year worth of savings. Assessments are continuing and significant further savings opportunities are being reported. See www.energyefficiencyopportunities.gov.au to download a copy of the *First Opportunities Report*.

2.2. Regulatory Measures

2.2.1. Minimum Energy Performance Standards and Labelling

a) Name

Mandatory Minimum Energy Performance Standards (MEPS) and Labelling

b) Purpose

To specify mandatory requirements for the minimum energy performance standards and energy labelling of appliances, including offences and penalties for non-compliance. Further information is available at www.energyrating.gov.au.

c) Applicable sectors

Appliances, lighting and equipment in the residential, commercial and industry sectors

d) Outline

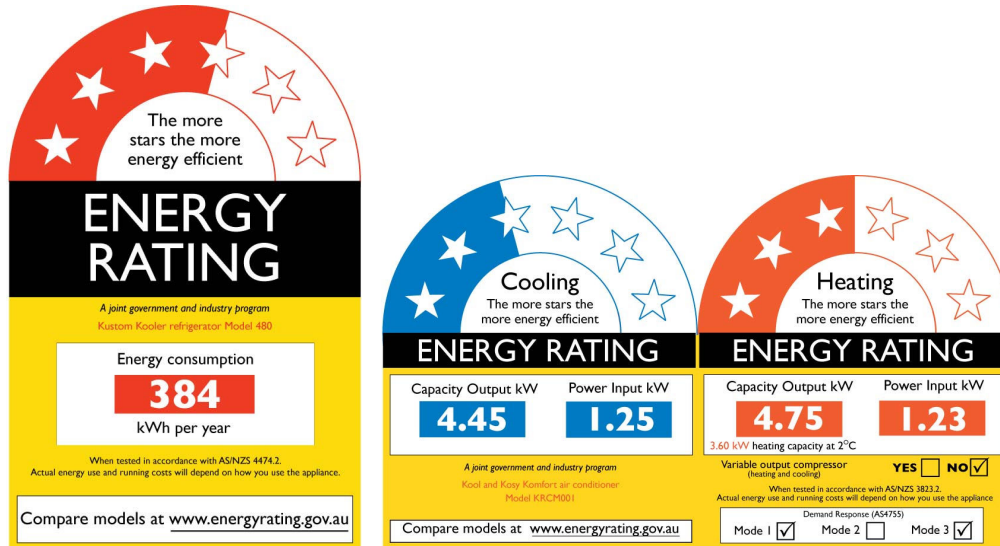
Mandatory MEPS and energy efficiency labelling are covered by the Equipment Energy Efficiency Program (E3), which is co-funded by the Australian Government, state and territory governments and the New Zealand Government. Products are included in the program based on whether the community would benefit from their regulation.

The establishment of MEPS and labelling requirements in Australia is a cooperative process between government and industry. Technical and economic analyses are undertaken in the development and negotiation of targets and timetables. MEPS, labelling and test method standards that are called up by regulation are Australian (in conjunction with New Zealand where appropriate) and are set to be the equivalent of world's best practice where possible.

The energy-rating label allows consumers to compare the energy efficiency of domestic appliances, thereby providing manufacturers with an incentive to continuously improve the energy performance of their appliances. The label has two main features. It rates the energy efficiency of an appliance on a scale of 1 to 10 stars or 1 to 6 stars (in half-star increments), the more stars the more efficient as it is compared with models of similar size and capacity. The label also displays an estimated energy consumption figure based on typical use of the appliance (usually kWh/year).

The star system is regularly re-graded to achieve a better spread in energy efficient products (taking into account improvements in energy efficiency that occur over time and to allow room for further improvement).

All manufacturers that produce or import appliances for the Australian market must submit their products to an approved testing agency.



Labelling is mandatory for the following electrical products offered for sale in Australia:

- Refrigerators and freezers
- Clothes washers
- Clothes dryers
- Dishwashers
- Air conditioners
- Televisions.

As of February 2010, the following products are also regulated on the basis of MEPS—this means that they have regulated minimum energy efficiency labels.

- Refrigerators and freezers (from 1 October 1999, revised 1 January 2005, revision proposed for 2010)
- Mains pressure electric storage water heaters (from 1 October 1999)
- Small mains pressure electric storage water heaters (<80L) and low pressure and heat exchanger types (from 1 October 2005)
- Three-phase electric motors (0.73kW to <185kW) (from 1 October 2001, revised April 2006)
- Single-phase air conditioners (from 1 October 2004, revised 1 April 2006 and 2007, revision proposed for 2010)
- Three-phase air conditioners up to 65kW cooling capacity (from 1 October 2001, revised 1 October 2007, revision proposed for 2010)
- Distribution transformers (from 1 October 2004)
- Ballasts for linear fluorescent lamps (from 1 March 2003). In addition to MEPS, ballasts also have to be marked with an energy efficiency index (EEI)
- Linear fluorescent lamps - from 550mm to 1500mm inclusive with a nominal lamp power >16W (from 1 October 2004)

- Commercial refrigeration (self-contained and remote systems) (from 1 October 2004)
- Incandescent lamps (from November 2009)
- Compact fluorescent lamps (from November 2009)
- External power supplies (from 1 December 2008)
- Set top boxes (from 1 December 2008)
- Televisions (from 1 October 2009)
- Commercial building chillers (from July 2009)
- Close control air conditioners (from July 2009)
- Transformers and electronic step-down converters for ELV lamps (proposed for October 2010).

2.2.2. Building Energy Codes

a) Name

Building Code of Australia (BCA)—Energy Efficiency Provisions

b) Purpose

The aim of the BCA—Energy Efficiency Provisions is to improve the energy efficiency of the design and construction of new buildings. The BCA Energy Efficiency Provisions project was endorsed under the NFEE. Details can be found at www.abcb.gov.au/.

c) Applicable sectors

Residential and commercial

d) Outline

Energy efficiency provisions for housing were first introduced in 2003 following an extensive consultation process. The provisions are produced and maintained by the Australian Building Codes Board (ABCB) on behalf of the Australian Government and state and territory governments (through COAG). The ‘deemed to satisfy’ provisions vary according to the climate zone in which the building will be located. The original provisions included: the ability of the roof, walls and floor to resist heat transfer; the resistance to heat flow and solar radiation of the glazing; the sealing of the house; the provision of air movement for free cooling, in terms of openings and breeze paths; and the insulation and sealing of air conditioning ductwork and hot water piping.

The provisions were developed to achieve a nominal level of energy efficiency equivalent to a 3.5 to 4 star rating under the Nationwide House Energy Rating Scheme (www.nathers.gov.au/). Following the implementation of the provisions, some states indicated that they wanted to increase the stringency of the provisions. As such, provisions were developed by the ABCB to increase the nominal level of energy efficiency equivalent to 5 stars under NATHERS. Enhanced housing provisions were introduced in 2006. The most significant changes were made to the provisions on building fabric and external glazing.

In April 2009, COAG requested that the ABCB develop more stringent provisions to allow for a 6 star home rating to be included in the 2010 BCA. The new proposals must be subject to a regulatory impact assessment (cost-benefit analysis) and be cost effective.

e) Financial resources and budget allocation

No information available

f) Expected results

No information available

2.2.3. Fuel Efficiency Standards

a) Name

Fuel consumption labelling standard (ADR81/02) and fuel consumption label

b) Purpose

Mandated fuel consumption labelling to enable new car purchasers to compare vehicles on a common basis and incorporate vehicle fuel use in their decision making. More information can be found at www.environment.gov.au/settlements/transport/fuelguide/label.html.

c) Applicable sectors

Transport

d) Outline

The fuel consumption labelling standard was introduced in 2004 (ADR81/01) and was subsequently updated in 2008 (ADR81/02). The standard requires all new vehicles up to 3.5 tonnes (which includes passenger cars, four wheel drive vehicles and light commercial vehicles) to display a model-specific removable fuel consumption label on the front windscreen.

The label indicates the fuel used (in litres) to travel 100 kilometres and the amount of CO₂ emissions (in grams) the vehicle emits for each kilometre travelled. The updated version of the label that took effect from October 2008 also displays figures for urban and extra-urban usage. The lower the numbers, the better the fuel efficiency and emissions of the vehicle.

Further measures are being developed under the NSEE.

e) Financial resources and budget allocation

No information available

f) Expected results

No information available

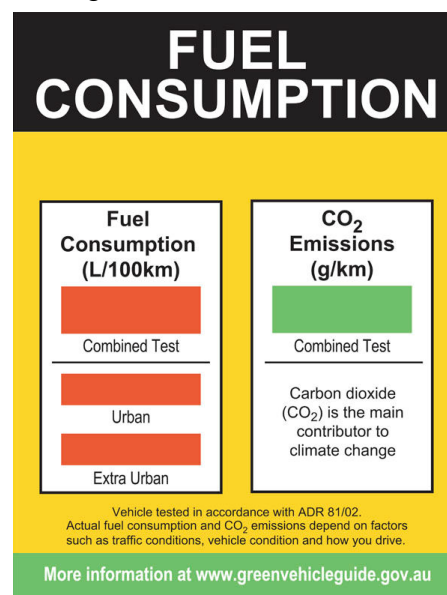
2.3. Voluntary Measures

Australia has a number of voluntary initiatives for improving energy efficiency. For example, the Australia Energy Star provides an international standard for energy efficient office equipment, including computers, printers and photocopiers, and home electronics, including televisions, audio products and DVD players. Products that display the Energy Star label have energy saving features enabled. See www.energystar.gov.au/ for more details.

In addition, the Australian Government and the Federal Chamber of Automotive Industries (FCAI) agreed to a voluntary average fuel consumption target in 2003. The aim of the target is to progressively improve fuel consumption of new passenger vehicles to average 6.8 litres per 100 kilometres by 2010 (around 162 grams CO₂ a kilometre). In 2005, the FCAI developed a new industry target of 222 grams CO₂ a kilometre by 2010. The revised target incorporates a broader range of vehicles—passenger, sports utility vehicles (SUVs), light trucks etc.—and fuels.

A number of other projects have been developed with the support of the Australian government such as:

- WERS—Window Energy Rating Scheme



- EDG—Environmental Design Guides
- Building Design Association of Australia (BDAA) Marketing Sustainable Design Workshops
- Australian Council of Building Design Professions (BDP) Making Energy Pay
- Housing Industry Association (HIA) Greensmart Professional Accreditation Course
- Master Builders Association (MBA) Energy Wise—Dollar Wise Training Course
- Lighting Best Practice Project
- WELS—Water Efficiency Labelling and Standards.

For details see www.environment.gov.au/settlements/energyefficiency/buildings/practices.html

2.4. Financial Measures Taken by the Government

2.4.1. Tax Scheme

Expenditure on capital equipment, which may improve energy efficiency, is generally deductible under capital allowance provisions. Beyond this, there is currently no specific concession for energy efficiency.

2.4.2. Low-Interest Loans

No information available

2.4.3. Subsidies and Budgetary Measures

There are a number of subsidies and budgetary measures for energy efficiency improvement programs at the federal and state levels. One example is provided below.

a) Name

Household Renewable Energy Bonus Scheme

b) Purpose

The Household Renewable Energy Bonus Scheme will assist households save money on power bills and reduce their carbon emissions.

c) Applicable sectors

Residential

d) Outline

Under the scheme households will be able to receive AUD 1000 rebates for ceiling installation and solar hot water systems and AUD 600 rebates for heat pumps systems.

The Government intends that the insulation component of the renewable energy bonus scheme come into operation by 1 June.

e) Expected results

The Government's objective is to see insulation installed in up to 1.9 million homes by 2011, including those already installed under the preceding home insulation program.

2.4.4. Other Incentives

The Australian Government provides a number of rebates to improve energy efficiency in the agriculture, transport, residential, commercial, power and government sectors. For a detailed description of Australian rebates see: www.environment.gov.au/rebates/index.html.

2.5. Energy Pricing

The pricing mechanism for fuels and electricity in Australia is market-based—although some states apply retail price caps on social welfare grounds. The government's primary

mechanism to drive improvements in energy efficiency will be placing a price on carbon. The additional cost will flow through to energy prices and is expected to stimulate additional investment in energy efficiency.

2.6. Other Efforts for Energy Efficiency Improvements

2.6.1. Cooperation with Non-Government Organisations

The government cooperates with non-government organisations to stimulate energy efficiency improvements as appropriate.

2.6.2. Cooperation through Bilateral, Regional and Multilateral Schemes

The government cooperates with other economies through the Asia Pacific Partnership on Clean Development and Climate (APP). The APP brings together Australia, Canada, China, India, Japan, the Republic of Korea and the United States to address the challenges of climate change, energy security and air pollution in a way that encourages economic development and reduces poverty.

Relevant international standards are taken into account in the development of Australian MEPS.

2.6.3. Other Cooperation/Efforts for Energy Efficiency Improvements

Australia is a member of the International Energy Agency and is involved in various working groups, including the Energy Efficiency Working Party. It is also involved in discussions relating to better data collection and development of energy efficiency indicators.

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BRUNEI DARUSSALAM

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. Overall Energy Efficiency Improvement Goals

The overall energy efficiency goal of Brunei Darussalam is to reduce energy intensity by 25% in 2030 with 2005 as the base year. This goal would contribute to the APEC Leaders' 2007 Sydney Declaration to reduce the energy intensity of the APEC region by 25% overall in 2030 compared with 2005.

1.2. Sectoral Energy Efficiency Improvement Goals

Specific targets have been set for certain sectors, such as a 10% reduction in energy consumption targeted for government buildings, and a 10% improvement of thermal efficiency in the power generation sector.

1.3. Action Plans for Promoting Energy Efficiency

a) Name

Energy Efficiency and Conservation Strategic Plan

b) Objectives

To improve the energy efficiency and conservation of Brunei Darussalam by promoting and implementing energy efficiency and conservation practices and activities

c) Applicable sectors

Industry, transport, residential, commercial, electricity, and government

d) Outline

Industrial sector: promote the practices of energy audit, energy management, and the use of more efficient equipment and appliances.

Residential, commercial and government sectors: promote the practices of energy auditing and energy management, introduce energy efficiency labelling for electrical equipment and appliances, regulate operating hours for air conditioners in government buildings, introduce energy efficient building guidelines, hold continuous awareness campaigns, promote the use of energy efficient lighting and other energy efficient equipment and appliances and enhance energy efficiency education.

Transportation sector: promote techniques for energy-saving driving and introduce fuel efficiency labelling for vehicles.

Electricity sector: improve power generation thermal efficiency and minimum energy performance standards for new gas-fired power plants and improve efficiency of street lighting.

Government: regulate operating hours for air conditioners in government.

Others (education): encourage energy saving and conservation (EE&C) through energy education, incorporate energy education in curriculum syllabi, promote EE&C activities and dissemination of energy saving tips booklets to public and private agencies including schools.

e) Financial resources and budget allocation

No information available

f) Method for monitoring and measuring effects of action plans

The plan is monitored by the Energy Division, Prime Minister's Office with the assistance of the Department of Electrical Services through the compilation of energy statistics and audits.

There are also plans to introduce compulsory annual reporting on energy consumption for government ministries and departments.

g) Expected results

No information available

h) Future tasks

No information available

1.4. Institutional Structure

a) Name of organisation

Energy Efficiency and Conservation Unit, Energy Division, Prime Minister's Office

b) Status of organisation

Policymaker (government)

c) Roles and responsibilities

Plans, formulates and implements policies on energy efficiency and conservation issues

d) Covered sectors

Government, industry, transport, residential and commercial, power generation and education

e) Establishment date

24 May 2005

f) Number of staff members

Three core staff members with ancillary support from the Energy Division

1.5. Information Dissemination, Awareness-raising and Capacity-building

Information on energy efficiency and conservation is continuously disseminated through briefings and talks, seminars and workshops, booklets and posters, the official website and the media. This information and knowledge has permeated to all sectors and every level of society.

Awareness campaigns on energy efficiency and conservation have continuously been held as the Unit's own event or in support of other related areas.

Capacity building on energy efficiency and conservation has occurred through presentations by invited experts and the dissemination of knowledge through workshops and seminars. A group of government officers also participated in capacity building training in Japan as part of bilateral cooperation between both economies.

1.6. Research and Development in Energy Efficiency and Conservation

Research and development for energy efficiency and conservation projects in Brunei Darussalam are currently being planned by local tertiary institutions (University Brunei Darussalam and Institute Technology Brunei). These projects aim to research energy auditing, building guidelines and fuel labelling specific to the local conditions and context. These projects are currently under consideration by the relevant authorities for funding.

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS

2.1. Government Laws, Decrees, Acts

a) Name

Energy Efficiency and Conservation (EE&C) Act (to be effective in 2012 (tentative))

b) Purpose

To enforce the application of Energy Efficiency and Conservation to buildings and industries to ensure reduced energy consumption

c) Applicable sectors

Industry, commercial and transport

d) Outline

- 1) All power producers are required to submit an annual report on energy production and energy consumption information, and report on medium- and long-term plans for energy conservation improvements.
- 2) Owners of buildings and industries with power demand of more than 1 MVA are required to submit a report on energy consumption information, and report on medium- and long-term plans for energy conservation improvements.

Energy producers in 1) and consumers in 2) are encouraged to engage energy auditors for preparation of the annual report.

e) Financial resources and budget allocation

No information available

2.2. Regulatory Measures

No information available

2.3. Voluntary Measures

There are three major voluntary measures as follows:

a) Name

Brunei Darussalam Energy Efficient Building Guidelines (to be introduced in 2011)

b) Purpose

To provide guidelines for new buildings to incorporate energy efficient building envelope elements such as cooling, heating, lighting, ventilating, insulation, site orientation and design as well as the use of energy efficient materials.

c) Applicable sectors

New buildings

d) Outline

No information available

e) Financial resources and budget allocation

Funding for the necessary research to carry out the project is currently under consideration by the relevant authorities.

f) Expected results

These guidelines are expected to be mandatory and be incorporated into the current building code. Elements of energy efficiency and conservation are incorporated into the current building code developed under the Ministry of Development, which is mandatory in its usage and practice.

a) Name

Energy Efficiency Labelling scheme for electrical appliances and equipment

b) Purpose

The scheme aims to provide consumers with information on the energy efficiency of electrical appliances and equipment and thus encourage consumers to invest in energy efficient appliances and equipment.

c) Applicable sectors

The scheme applies to the commercial, residential and government sector

d) Outline

Energy efficient labelling will be used for air conditioners (inverter, non-inverter types, single-phase and three-phase). The standards for energy efficient labelling are based on similar standards in the region. The energy efficient labelling scheme will be expanded to other electrical appliances and equipment in the future.

e) Financial resources and budget allocation

Financial resources for the scheme are to be derived from the government

f) Expected results

The energy efficient label informs consumers of the energy efficiency of an electrical product. It is hoped that the labels will make consumers better-informed and encourage them to invest in energy efficient appliances and equipment.

a) Name

Energy Efficiency and Conservation Initiative Awards

b) Purpose

The award scheme was introduced in 2007 to highlight the examples of selected organisations in their initiatives and efforts to introduce and implement energy efficiency and conservation activities.

c) Applicable sectors

The scheme is applicable to the government, commercial and education sectors

d) Outline

Organisations are selected based on initiatives introduced within the organisation or on a wider scope. Achievements are highlighted and the selected organisations become examples for others to follow.

e) Financial resources and budget allocation

The awards given are financed by the government and supporting private organisations.

f) Expected results

The continued efforts of the selected organisations and the emulation of their efforts by similar aspiring organisations in their respective sectors.

2.4. Financial Measures Taken by the Government

Funding is provided by the government and the private sector, for the Energy Week annual event, EEC-related workshops and EEC initiative awards, for example.

2.5. Energy Pricing

Energy pricing is regulated by the government.

2.6. Other Efforts for Energy Efficiency Improvements

2.6.1. Cooperation with Non-Government Organisations

The private sector has made efforts to increase awareness of energy efficiency and conservation and implement its activities.

The government has supported these initiatives and has brought the private sector (the industry and commercial sector) together to participate in workshops, seminars and training sessions on energy efficiency and conservation practices, such as energy auditing and energy management. Energy audits have also been conducted on selected companies. Energy efficiency and conservation initiative awards are given to companies that have shown good examples and initiatives in the implementation of energy efficiency and conservation.

2.6.2. Cooperation through Bilateral, Regional and Multilateral Schemes

Brunei Darussalam is involved in regional programs for energy efficiency and conservation under ASEAN through the Promotion of Energy Efficiency and Conservation. Jointly organised by the ASEAN Centre for Energy and the Energy Conservation Centre, Japan, Brunei Darussalam has participated in the programs for Major Industry, Buildings and Energy Management since 2000.

Information sharing and knowledge gathering is also carried out by the APEC Energy Working Group and the East Asia Summit Energy Cooperation Task Force.

Bilaterally, Brunei Darussalam and Japan have conducted a human capacity building program on energy efficiency and conservation for Brunei officials in 2008 which resulted in intensive training and knowledge transfer related to EEC in Japan.

2.6.3. Other Cooperation/Efforts for Energy Efficiency Improvements

No information available

CANADA

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. Overall Energy Efficiency Improvement Goals

The separation of powers between the federal and provincial/territorial levels of government is an important consideration in Canada. Canada has no federal energy efficiency improvement target. Federal programs have quantitative objectives. There are many examples of collaboration with provincial/territorial energy efficiency programs.

Sub-federal governments have committed to achieving a 20% increase in energy efficiency by 2020 in their respective jurisdictions. These jurisdictions cover the entire economy. For more details, please see the following link: www.councilofthefederation.ca/pdfs/COMMUNIQUE_E_climate_change_July13_1clean.pdf.

1.2. Sectoral Energy Efficiency Improvement Goals

Not available

1.3. Action Plans for Promoting Energy Efficiency

a) Name

EcoENERGY Efficiency Initiative

b) Objectives

The ecoENERGY Efficiency Initiative, operated through Natural Resources Canada's Office of Energy Efficiency (OEE), provides a broad framework of programs through which energy conservation and energy efficiency are promoted in every sector of the Canadian economy. The ecoENERGY Efficiency suite of programs offers grants and incentives, tools, benchmarking and analysis, and training and awareness-building (for example, workshops, publications) to support energy efficiency improvements in industry, transportation and the built environment. In addition to coordination of the ecoENERGY Efficiency Initiative, the OEE is mandated to strengthen and expand Canada's commitment to energy efficiency to further support the Government of Canada's policy objectives and programs.

Complementary energy efficiency actions are undertaken at federal and provincial/territorial levels. A framework for energy efficiency action by all levels of government was endorsed in 2007 by Canada's Council of Energy Ministers, representing all federal, provincial and territorial jurisdictions. The document, *Moving Forward on Energy Efficiency in Canada: A Foundation for Action*, provides a menu of key policy instruments and tools available to all jurisdictions to allow them to meet their own policy objectives.

c) Objectives

Industry, transportation, residential, commercial

d) Outline

The four-year ecoENERGY Efficiency Initiative was introduced in 2007 to help Canadians use energy more efficiently, boost renewable energy supplies and develop cleaner energy technologies. Based on recent announcements, the ecoENERGY Efficiency Initiative includes:

- ecoENERGY Retrofit (CDN 805 million) encourages retrofitting by homeowners, small and medium-sized businesses, public institutions and industrial facilities by providing financial support and authoritative information
- ecoENERGY for Buildings and Houses (CDN 60 million) encourages construction and operation of more energy-efficient buildings and houses using complementary activities such as rating, labelling, training and other tools to raise awareness

- ecoENERGY for Industry (CDN 18 million) promotes energy-saving investments and exchange of best-practices information within Canada's industrial sector
- ecoENERGY for Fleets (CDN 22 million) reduces on-road fleet vehicle fuel-use and its associated costs, air pollutants and GHG emissions through training, education, and sharing of best practices
- ecoENERGY for Personal Vehicles (CDN 21 million) provides information on buying, driving and maintaining vehicles to reduce fuel consumption and GHG emissions
- ecoENERGY for Equipment (CDN 32 million) builds on existing initiatives to help Canadians make energy-efficient choices when buying, selling or manufacturing energy-using equipment.

Existing regulations will be made more stringent, new regulations will be developed and compliance will be enforced. The program also supports promotional labelling programs, such as ENERGY STAR®, to ensure continuing efficiency improvements in energy-using products for sale in the Canadian market. A regulatory agenda under the authority of the Energy Efficiency Act will introduce or raise energy efficiency standards for a wide range of energy-using products. As a result, regulations will soon cover products accounting for 80% of the energy used in homes and businesses. For more information on all the ecoENERGY Efficiency initiatives, see <http://ecoAction.gc.ca>.

e) Financial regulations and budget allocation

Between 2007 and 2011, total allocations to the ecoENERGY Efficiency suite of programs will be CDN 960 million. For financial allocations to the ecoENERGY suite of initiatives, see A Climate Change Plan for the Purposes of the Kyoto Protocol Implementation Act at www.ec.gc.ca/doc/ed-es/p_124/CC-Plan-2008_eng.pdf and the 2009 Federal Budget at www.budget.gc.ca/2009/home-accueil-eng.asp.

f) Monitoring

Program departments are responsible for monitoring and reporting on their individual programs. Natural Resources Canada's efforts are compiled into the Report to Parliament under the Energy Efficiency Act, which is tabled annually in Parliament by the Government of Canada. The Office of Energy Efficiency also produces a publically available report on Energy Efficiency Trends in Canada (and its companion document, Energy Use Data Handbook).

g) Expected results

The benefits of this action plan are estimated in terms of emissions reductions in A Climate Change Plan for the Purposes of the Kyoto Protocol Implementation Act, which is available at www.ec.gc.ca/doc/ed-es/p_124/CC-Plan-2008_eng.pdf. Product efficiency standards and labelling is expected to reduce emissions by over four million tonnes (CO₂-eq) in 2012, retrofits of buildings, homes and industry by more than three million tonnes, and various other efficiency-based emission reductions contribute to the total expected reductions.¹

1.4. Institutional Structure

1.4.1. Office of Energy Efficiency, Natural Resources Canada

a) Status of organisation

Governmental organisation (policymaker and regulator)

b) Roles and responsibilities

The Office of Energy Efficiency (OEE), Canada's centre of excellence for energy

¹ The entire set of mitigation programs described in the action plan is estimated to provide a total reduction of 56 million tonnes in 2012.

conservation, energy efficiency and alternative fuels information, plays a dynamic leadership role in helping Canadians save millions of dollars in energy costs while contributing to a healthier environment. One of the key tasks of the OEE is managing the Government of Canada's ecoENERGY Efficiency Initiative, with its programs to reduce energy use in buildings and houses, industry, personal vehicles and fleets. Homeowners and owners of small and medium-sized organisations can also apply for grants and financial incentives for retrofits.

The OEE provides practical energy conservation advice to consumers, businesses and institutions, and has links to hundreds of related sites around the world. Informing key decision-makers in government, industry and the non-profit sector about Canada's energy conservation and energy efficiency efforts is a major focus of the OEE.

With the assistance of the National Advisory Council on Energy Efficiency, the OEE is also charged with identifying opportunities for new and heightened energy efficiency measures. As well, it keeps Canadians abreast of developments in technology that can conserve fossil fuels or support the transition to less carbon-intensive energy sources, including renewable energy. The OEE also engages in dialogue and collaborative action on energy efficiency with Canada's provinces and territories.

c) Covered sectors

Industry, transport, residential, commercial, equipment and consumer products

d) Established date

April 1998

e) Number of staff members

Approximately 275

1.4.2. Regional and local institutions

Canada is a federation comprised of a federal government and 13 sub-federal entities. These sub-federal entities are active in the field of energy efficiency and have organisational structures of their own. Many energy utilities are also active in provincial/territorial policy and programming. Information on provincial/territorial incentives is provided by the OEE Directory of Energy Efficiency and Alternative Energy Programs in Canada: http://oeenrncan.gc.ca/corporate/statistics/neud/dpa/policy_e/programs.cfm?attr=0.

1.4.3. Coordination

In Canada, the separation of powers means that all levels of government exercise some jurisdiction in the area of energy use. As such, coordination is a key aspect of federal energy efficiency policy. Coordination among the federal level and sub-federal entities is ensured through annual meetings of the Council of Energy Ministers and regular meetings of the Assistant Deputy Ministers' Steering Committee on Energy Efficiency. This process seeks to generate a complementary agenda for energy efficiency in which Ministers continue to develop real and sustainable energy solutions in their own jurisdictions and collaborate on cross-cutting initiatives that require a more integrated approach.

1.5. Information Dissemination, Awareness-raising and Capacity-building

a) Information collection and dissemination

Information dissemination is the responsibility of individual program departments, which cooperate with stakeholders in government, industry, and civil society. Comprehensive information on OEE programs and related energy efficiency issues is available on the OEE website at <http://oeenrncan.gc.ca/english/>.

b) Awareness-raising

Specific awareness-raising programs are included in the ecoENERGY Efficiency Initiative:

- ecoENERGY for Equipment supports the energy labelling of a wide range of consumer goods. EnerGuide labels rate and summarise the energy efficiency of major household electrical appliances and heating, ventilating and air-conditioning (HVAC) equipment. The EnerGuide label shows how much energy major appliances use so that consumers can easily compare models of the same size and class. The ENERGY STAR® symbol identifies the most energy-efficient products in their class. Products that carry the ENERGY STAR® symbol meet premium levels of energy efficiency—most are 10% to 50% more efficient than the minimum regulated standard.
- ecoENERGY for Personal Vehicles provides Canadian motorists with helpful tips on buying, driving and maintaining their vehicles to reduce fuel consumption and greenhouse gas emissions.
- ecoENERGY for Fleets provides information to fleet operators on energy-efficient practices that can reduce fuel consumption and emissions. FleetSmart is a component of this program, offering free practical advice on how energy-efficient vehicles and business practices can reduce fleet operating costs, improve productivity and increase competitiveness.

c) Capacity-building

EcoENERGY for Buildings and Houses includes a focus on providing home builders with the specific energy efficiency training required to certify an R-2000 home or affix an EnerGuide rating label. The R-2000 Standard includes requirements related to energy efficiency, indoor air quality and the use of environmentally responsible products and materials. It does not specify exactly how a house must be built, but rather, sets criteria for building performance that allow designers and builders to choose the most effective and economical way to build in their given context.

Through ecoENERGY for Industry, the OEE offers a range of energy efficiency workshops to representatives from industrial, commercial and institutional organisations from across Canada. The Dollars to \$ense workshops are designed to educate participants on how to lower operating and production costs, improve competitiveness, reduce greenhouse gas emissions, increase operational efficiency and create a better work environment.

The ecoENERGY for Fleets SmartDriver program is designed to promote energy efficiency as a cost-effective and responsible way to reduce costs and the environmental impact of fleet operations. The training module offers fleet managers information on energy efficiency in all aspects of their fleet, including maintenance, operations and driving. An information toolkit, case studies and fleet profiles as well as workshops and technical demonstrations are provided. SmartDriver courses are also available for forestry truck drivers, motor coach drivers, and transit and school bus drivers.

EcoENERGY for Personal Vehicles offers driver education materials on fuel-efficient driving techniques. A number of driving schools throughout Canada are registered to deliver the 'Auto\$mart' driver education program.

1.6. Research and Development in Energy Efficiency and Conservation

1.6.1. Policy: CanmetENERGY

a) Level

Economy-wide (federal)

b) Responsible department

CanmetENERGY, Natural Resources Canada

c) Applicable sectors

Buildings and communities, industry, transportation

d) Outline

Natural Resources Canada's energy efficiency technology activities are guided by CanmetENERGY. CanmetENERGY manages science and technology programs and services, supports the development of energy policy, codes and regulations, and works with partners to develop more energy efficient and cleaner technologies. Its goal is to ensure that Canada is at the leading edge of clean energy technologies to reduce air and greenhouse gas emissions, and provide a sustainable energy future. See the CanmetENERGY website at <http://canmetenergy-canmetenergie.nrcan-rncan.gc.ca/eng/index.html>.

Efforts at CanmetENERGY include research, development and demonstration of energy efficient technologies in buildings and communities, industry and transportation.

- 1) Buildings and Communities—Net zero buildings and communities, modelling and simulation software tools, advanced heating, ventilation, air conditioning and refrigeration technologies. For more information, see the website: http://canmetenergy-canmetenergie.nrcan-rncan.gc.ca/eng/buildings_communities.html.
- 2) Industry— Includes knowledge and new technological tools such as industrial energy systems and industrial systems optimisation. For more information, see the website: http://canmetenergy-canmetenergie.nrcan-rncan.gc.ca/eng/industrial_processes.html.
- 3) Transportation—Includes advanced fuels, hybrid and electric vehicles, hydrogen and fuel cells. For more information, see the website: <http://canmetenergy-canmetenergie.nrcan-rncan.gc.ca/eng/transportation.html>.

e) Financial resources and budget allocation

Energy efficiency science and technology (S&T) expenditures were CDN 98.9 million for the 2007–08 fiscal year. For more information on S&T expenditures, see the annual Report to Parliament under the Energy Efficiency Act.

1.6.2. Program: ecoENERGY Technology Initiative**a) Level**

Economy-wide (federal)

b) Responsible department

Natural Resources Canada's Office of Energy Research and Development (OERD) is the Government of Canada's coordinator of energy research and development activities. OERD is responsible for the ecoENERGY Technology Initiative which support the energy-related R&D activities of federal departments, including CanmetENERGY at Natural Resources Canada.

c) Objectives and period

The ecoENERGY Technology Initiative is a CDN 230 million investment over five years in S&T by the Government of Canada to accelerate the development and market readiness of technology solutions in clean energy. The Initiative is a component of ecoACTION, the government's actions towards clean air and greenhouse gas emission reductions. It will help in the search for long-term solutions to reducing and eliminating air pollutants from energy production and use. See www.ecoaction.gc.ca/ecoenergy-ecoenergie/technology-technologie-eng.cfm.

d) Applicable sectors

Industry, transport, residential and commercial

e) Financial resources and budget allocation

CDN 230 million

f) Expected results

Technology funding is being provided to projects for energy efficient buildings and industry, as well as clean-coal, carbon sequestration, and new end-use technologies such as hydrogen and fuel cells. The Initiative will also develop technologies for producing and using renewable energy from clean sources such as wind, solar, tidal, and biomass. For more information, see www.nrcan.gc.ca/eneene/science/index-eng.php.

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS**2.1. Government Laws, Decrees, Acts****2.1.1. Energy Efficiency Act****a) Level**

Economy-wide (federal)

b) Purpose

The goal of the Energy Efficiency Act is to improve the efficiency of energy-using products and promote the use of alternative energy sources. The Energy Efficiency Act includes and enforces regulations on performance and labelling requirements for energy-using products that are imported into Canada or shipped across provincial borders for the purpose of sale or lease.

c) Applicable sectors

Equipment and consumer products

d) Outline

Canada's Energy Efficiency Act came into force in 1992, giving the Government of Canada the authority to make and enforce standards for the performance of energy-using products that are imported to Canada or that are manufactured in Canada and shipped across provincial or territorial borders. The Act also gives the federal government the authority to set labelling requirements for these products so consumers can compare the energy efficiency of various models of the same product. The first set of regulations, based on standards and testing methods developed by the Canadian Standards Association, came into effect in 1995. These regulations applied to a variety of products, primarily major appliances such as dishwashers, water heaters, refrigerators, freezers and clothes washers and dryers. The Act has been amended a number of times for several purposes: to include more products in the regulations, to tighten the standards as energy-efficiency technologies improved and to adjust labelling requirements.

2.1.2. Canadian Environmental Protection Act**a) Level**

Economy-wide (federal)

b) Purpose

Pollution prevention

c) Applicable sectors

All sectors

d) Outline

The Canadian Environmental Protection Act (CEPA) came into force in 2000. CEPA is an important part of Canada's federal environmental legislation that makes pollution prevention the cornerstone of efforts to reduce toxic substances in the environment. The Government of

Canada is developing new fuel efficiency regulations under CEPA to reduce greenhouse gas emissions in the automotive sector.

2.2. Regulatory Measures

2.2.1. Minimum Energy Performance Standards and Labelling

a) Level

Economy-wide (federal)

b) Purpose

To improve the energy efficiency of energy-using products

c) Applicable sectors

Equipment and energy-consuming products

d) Outline

Regulations under the Energy Efficiency Act set minimum energy-performance levels for a number of energy-using products such as appliances, lighting, and heating and air-conditioning. New MEPS for general service lamps are expected to eliminate common incandescent lamps from the market in 2012 and reduce energy consumption of general service lamps by about 30%.² Electric motors are also required to perform at a minimum efficiency level that varies according to the power of the motor.³ Current efforts to broaden and strengthen the Act mean that products accounting for 80% of the energy used in homes and businesses will soon be regulated. The set of planned new regulations will address about 20 currently unregulated products such as commercial clothes washers and boilers, and will tighten requirements for 10 products such as residential dishwashers and dehumidifiers. Stricter regulations mean that, over time, inefficient products will disappear from the market, leaving only the best-performing items.

Amendments will also improve product labelling so consumers have the latest information on the most energy-efficient products on the market. Canada's EnerGuide label is used to indicate the energy performance of a wide array of products, from residential appliances, to vehicles and entire houses. It is mandatory for many electrical appliances and the amendments to the Energy Efficiency Act extend the labelling requirement to cover common lamp types as well.

The test procedures used to determine labelling information and compliance with MEPS are developed by the Canadian Standards Association. Canada works with the United States to develop common test procedures.⁴

e) Financial resources and budget allocation

A new regulatory agenda for energy efficiency standards has received funding under the ecoENERGY Efficiency Initiative of CDN 32 million.

f) Expected results

Improvements in the performance of energy-using products in Canada

2.2.2. Model National Energy Code for Buildings

a) Level

Economy-wide (federal)

² Gazette (2009a).

³ OEE (2009b).

⁴ OEE (2009c).

b) Purpose

The Model National Building Code has been established as a complement to provincial/territorial building codes and to provide a baseline for new energy-efficient building design. The Model National Energy Code for Buildings contains cost-effective minimum requirements for energy efficiency in new buildings in Canada.

c) Applicable sectors

The Code applies to all buildings, other than houses of three storeys or less, and to additions of more than 10 square metres to these buildings.

d) Outline

In Canada, building regulation is a provincial and territorial responsibility. The provinces and territories have recognised that an economy-wide 'model' building code adapted to particular provincial or territorial circumstances is a better approach than a series of unrelated codes. The Model National Energy Code for Buildings (MNECB) was released in 1997 with cost-effective minimum standards for energy efficiency in new buildings. In February 2007 the Canadian Commission on Building and Fire Codes agreed to update the MNECB as a progeny companion document to the National Building Code. This work is being undertaken with the financial and technical support of Natural Resources Canada. For more information see <http://oee.nrcan.gc.ca/commercial/newbuildings/update.cfm?attr=0>.

e) Financial resources and budget allocation

Funding for this initiative is provided through the ecoENERGY for Buildings and Houses program.

f) Expected results

Increase in the energy efficiency of new buildings

2.2.3. Fuel Consumption Regulations**a) Level**

Economy-wide (federal)

b) Purpose

To reduce GHG emissions and fuel consumption of motor vehicles

c) Applicable sectors

Transportation

d) Outline

The Government of Canada has announced that under the Canadian Environmental Protection Act, new fuel consumption regulations will be undertaken to reduce greenhouse gas emissions in the automotive sector starting in the 2011 model year. These standards will be equivalent to those announced by the United States in 2009.⁵ Consultations on fuel consumption regulations have been undertaken with the automotive industry, environmental NGOs, provinces and territories, and other stakeholders.

e) Financial resources and budget allocation

CDN 3 million

f) Expected results

Reduced fuel consumption in the automotive sector

⁵ Gazette (2009b).

2.3. Voluntary Measures

2.3.1. Canadian Industry Program for Energy Conservation (CIPEC)

a) Level

Economy-wide (federal)

b) Purpose

The Canadian Industry Program for Energy Conservation (CIPEC) represents a collaboration between government and private industry to improve Canada's industrial energy efficiency.

c) Applicable sectors

Industry

d) Outline

CIPEC is a voluntary partnership between the Government of Canada and industry that brings together industry associations and companies representing more than 98% of all industrial energy use in Canada. Since 1975, CIPEC has been helping companies cut costs and increase profits by providing information and tools to improve energy efficiency. Current activities include:

- Incentives for industrial energy assessments (studies)
- Dollars to \$ense energy management workshops
- Employee Awareness Programs
- Information on innovative financing and accelerated capital cost allowances for energy efficient and alternative energy systems
- Benchmarking information, case studies, technical guides and the twice-monthly newsletter 'Heads Up CIPEC'
- Boiler Efficiency Calculator to quickly analyse the efficiency of boiler operations
- Energy Management Services Directory that helps companies locate contractors.

Through CIPEC, the mining, manufacturing and construction sectors have voluntarily met and exceeded annual targets to reduce their energy intensity (that is, energy use per unit of output). Upstream oil and gas companies have implemented projects to reduce GHG emissions by millions of tonnes and electrical utilities have dramatically increased their alternative energy production.

e) Financial resources and budget allocation

Funding for this initiative is provided through the ecoENERGY for Industry program (CDN 18 million over four years).

f) Expected results

Improvements to energy efficiency in the industrial sector

2.3.2. Building Certification

a) Level

Economy-wide (federal)

b) Purpose

To promote energy efficient technologies and building practices

c) Applicable sectors

Residential

d) Outline

The R-2000 Standard represents a joint effort between OEE and the Canadian building industry. To receive R-2000 certification, homes must meet an energy consumption standard and incorporate certain energy efficient technologies. Builders can be trained and licensed to build to the R-2000 standard. R-2000 homes are expected to reduce energy costs and provide greater occupant comfort.⁶ As an additional benefit, the Canadian Mortgage Housing Corporation offers mortgage assistance to buyers of R-2000 homes.⁷

The OEE is also developing a system to benchmark energy consumption by commercial and institutional buildings. This system is scheduled to launch in 2012/2013 and efforts are being made to harmonise this system with existing, non-governmental building certification programs, such as LEED®.⁸

e) Financial resources and budget allocation

No information available

f) Expected results

Greater use of energy efficient technologies and practices in new homes

2.4. Financial Measures Taken by the Government**2.4.1. Tax Scheme***Accelerated Capital Cost Allowance for Clean Energy Generation***a) Level**

Economy-wide (federal)

b) Purpose

Encouraging investment in energy efficient and alternative energy technologies, in order to contribute to reductions in GHG emissions, improvements in air quality and diversification of the energy supply

c) Application sectors

Industry

d) Outline

A 50% accelerated capital cost allowance (CCA) is provided under Class 43.2 of Schedule II to the Income Tax Regulations for specified energy generation equipment. Eligible equipment must generate either 1) heat for use in an industrial process, or 2) electricity, by:

- Using a renewable energy source (for example, wind, solar, small hydro)
- Using waste fuel (for example, landfill gas, manure, wood waste) or
- Making efficient use of fossil fuels (for example, high efficiency cogeneration systems).

Class 43.2 was introduced in 2005 and is currently available for assets acquired on or after 23 February 2005 and before 2012. For assets acquired before 23 February 2005, accelerated CCA is provided under Class 43.1 (30%). The eligibility criteria for these classes are generally the same except that cogeneration systems that use fossil fuels must meet a higher efficiency standard for Class 43.2 than that for Class 43.1. Systems that only meet the lower efficiency standard continue to be eligible for Class 43.1.

In 2007, the Government of Canada extended the eligibility of the CAA to an emerging

⁶ OEE (2009d).

⁷ CMHC (2009).

⁸ OEE (2009e).

source of renewable energy—wave and tidal energy—and to a broader range of applications involving active solar heating, photovoltaics, stationary fuel cells, production of biogas from organic waste, and pulp and paper waste fuels. Eligibility for Class 43.2 was also extended to assets acquired before 2020.

Budget 2008 expanded the accelerated capital cost allowance for clean-energy generation equipment to additional applications involving ground-source heat pump and waste-to-energy systems.

e) Expected results

Improvements to energy efficiency in the industrial sector

2.4.2. Low-Interest Loans

a) Level

Sub-federal (provinces/territories)

b) Purpose

To support energy efficiency investment

c) Applicable sectors

Industry (including agriculture), transport, residential, commercial, power and public sectors

d) Outline

Examples include:

- Yukon Residential Energy Management Program and Home Repair program:
www.esc.gov.yk.ca/energy_efficiency.html
- Manitoba PowerSmart Residential Loan program:
www.hydro.mb.ca/your_home/residential_loan.shtml
- New Brunswick Existing Homes Energy Efficiency Upgrades program:
www.energycynb.ca/enb/1610/Existing-Homes-Energy-Efficiency-Upgrades-Program#incentives.

e) Expected results

Improved energy efficiency in the residential sector

2.4.3. Subsidies and Budgetary Measures

ecoENERGY Retrofit

a) Level

Economy-wide (federal) and sub-federal (provincial/territorial)

b) Purpose

Natural Resources Canada's ecoENERGY Retrofit program provides financial support to homeowners, small and medium-sized businesses, public institutions and industrial facilities to help them implement energy saving retrofits that reduce energy-related GHGs and air pollution. Provinces and territories have complementary programs that offer matching incentives.

c) Applicable sectors

Industrial, residential, commercial

d) Outline

For more information, see <http://oee.nrcan.gc.ca/corporate/retrofit-summary.cfm>.

e) Financial resources and budget allocation

CDN 675 million in addition to provincial/territorial funds

f) Expected results

Approximately 340 000 homes will be retrofitted through the Retrofit-Homes program, generating an expected savings of 0.9 million tonnes GHGs (low-end expectation). The Retrofit—Small and Medium-sized Organizations program is expected to generate 0.4 million tonnes of GHG savings.

2.4.4. Other Incentives

Provinces and territories offer a variety of incentives in their respective jurisdictions.

a) Level

Sub-federal level (provinces and territories)

b) Applicable sectors

All sectors

c) Outline

A range of program incentives are offered by federal, provincial and territorial governments and utilities. For more information on provincial/territorial incentives, consult the OEE Directory of Energy Efficiency and Alternative Energy Programs in Canada http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/policy_e/programs.cfm?attr=0.

d) Expected results

Increase in energy efficiency and reduction in greenhouse gas emissions

2.5. Energy Pricing

Market-based

2.6. Other Efforts for Energy Efficiency Improvements**2.6.1. Cooperation with Non-Government Organisations**

Office of Energy Efficiency programs cooperate with numerous interested partners, including NGOs (for example, ecoENERGY for Personal Vehicles support of pilot driver education program with New Brunswick Lung Association).

2.6.2. Cooperation through Bilateral, Regional and Multilateral Schemes

Canada continues to participate with the United States and Mexico to promote the harmonisation of energy efficiency test methods, mutual recognition of conformity assessment systems for energy efficiency standards, and cooperation on trilateral energy efficiency labelling programs.

Canada is a member of the International Energy Agency, supporting its activities and participating in its Energy Efficiency Working Party. Canada is also a member of the International Partnership for Energy Efficiency Cooperation.

2.6.3. Other Cooperation/Efforts for Energy Efficiency Improvements

Public-private partnerships are commonly used to support a broad range of energy efficiency investment, especially in the public sector, such as through the Federal Buildings Initiative (FBI). The FBI offers services and products to help simplify and remove much of the risk of implementing a retrofit project. Partnerships are also used extensively during the technology development and demonstration process, such as through Canadian Mortgage and Housing Corporation (CMHC) initiatives. Regular cooperation occurs through the partnerships and demonstration projects between CMHC and financial institutions.

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CHILE

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. Overall Energy Efficiency Improvement Goals

During the first quarter of 2010 the Chilean Government will publish the Action Plan on Energy Efficiency 2010–2020, which will contain overall and sectoral goals.

1.2. Sectoral Energy Efficiency Improvement Goals

See answer for 1.1.

1.3. Action Plans for Promoting Energy Efficiency

Chile has a number of government institutions working to achieve increased energy efficiency. The body directly responsible for promoting, developing and implementing energy efficiency policy and programs is the National Energy Efficiency Program (Programa País de Eficiencia Energética, or PPEE), a program of the National Energy Commission (Comisión Nacional de Energía, or CNE). Furthermore, Chile has significant policy and program development related to energy efficiency that takes place within other government agencies responsible for transport, housing, economic development and technology transfer.

One of the most important policies on energy efficiency is the government's recently approved institutional structure involving the creation of a Ministry of Energy, an entity that will centralise the functions of developing, proposing and evaluating public policies in this area, including the definition of objectives, regulatory framework and strategies to be applied, as well as the development of public policy instruments. As a part of the creation of the new Ministry, the government will create the Chilean Energy Efficiency Agency (Agencia Chilena de Eficiencia Energética, or ACHEE), a public-private organisation in charge of the implementation of the energy efficiency programs.

1.3.1 Energy Efficiency Monitoring and Reporting

The National Energy Commission (CNE) publishes the National Energy Balance annually, as well as aggregate and sectoral energy intensity data. Universidad de Chile, by means of the Programa de Estudios e Investigaciones en Energía (PRIEN), conducts decomposition analysis to distinguish structural and activity changes in energy intensity.

The Studies Area of the National Energy Commission is responsible for gathering the information necessary to elaborate the energy balances.

1.4. Institutional Structure

1.4.1 Central Institutional Structure

a) Name of organisation

National Energy Efficiency Program (Programa País de Eficiencia Energética or PPEE)

b) Status of organisation

Policymaker and program implementer

c) Roles and responsibilities

Promote energy efficiency and constitute themselves as a technical organisation

d) Covered sectors

Industry (including mining), transport, residential, commercial, construction, public sector (including government) and education

e) Date of establishment

2005

f) Number of staff members

45

g) Description of PPEE

PPEE is part of the National Energy Commission, which is the Government's energy regulating institution. PPEE coordinates energy efficiency actions with a number of public and private institutions and organisations, including the Superintendence of Electricity and Fuels (for the labelling program), Ministry of Housing, Public Works, Health and Education (for energy efficiency in construction), mining, retail, food, etc. companies organised in roundtables, etc. PPEE's advisory committee is formed by public and private entities, where initiatives are discussed and coordinated.

The mission of the PPEE is to consolidate energy efficiency as source of energy that contributes to Chile's sustainable energy development.

The strategic objectives of the PPEE are to:

- 1) establish the institutional foundations and regulatory framework for energy efficiency
- 2) develop incentives and support tools for energy efficiency
- 3) develop useful and accessible information for making public and private decisions, as well as collective and individual ones
- 4) position and introduce energy efficiency in all levels of training, both formal and informal
- 5) take advantage of international experiences and instruments to accelerate the development of energy efficiency and measure the reduction in generated emissions
- 6) strengthen institutional management through process quality.

1.4.2 Regional or Local Institutional Structure**a) Name of organisation**

Regional Working Tables

b) Status of organisation

These are public-private advisory committees for the implementation of PPEE's regional projects. Currently, there are regional working tables in six out of the 15 administrative regions of the economy.

c) Roles and responsibilities

Disseminate and promote the efficient use of energy at the local level

d) Covered sectors

Industry, residential, commercial, construction, public sector (including government) and education

e) Starting date

2007

f) Number of staff members

One central coordinator, plus five in regions

1.5. Information Dissemination, Awareness-raising and Capacity-building

a) Information collection and dissemination

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 label is currently applied to five lines of products in Chile (incandescent and compact fluorescent light bulbs; and one- and two-door refrigerators), 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.

b) Awareness-raising

Since 2007, Chile has carried out four communication campaigns aimed at residential users, involving television, billboards and newspapers. The total cost for all three campaigns was approximately USD 4.5 million.⁹

c) Capacity-building

There are numerous opportunities for training energy efficiency and related professionals, including courses offered in 19 universities, and two engineering associations with sub-groups focused on energy.

1.6. Research and Development in Energy Efficiency and Conservation

There are no specific policies on energy efficiency research, development and demonstration.

There are energy efficiency research, development and demonstration programs but not at the government level; this level is in academia.

There are several universities that have carried out studies related to energy efficiency. However, there is only one University that has a program working on energy issues with a special emphasis on energy efficiency - University of Chile's Energy Studies and Research Program (Programa de Estudios e Investigaciones en Energía, or PRIEN). The other universities are Universidad Técnica Federico Santa María; Universidad de Santiago; Universidad Católica de Santiago; and Universidad Católica de Valparaíso.

The applicable sectors are industry (particularly mining), agriculture, transport, residential, commercial, power, government, etc.

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS

2.1. Government Laws, Decrees, Acts

In 2008, a bill was presented to the Chilean Parliament to create the Ministry of Energy, which was finally approved and signed by the President in November 2009. The aims of the new ministry include the strengthening of policy development, techno-economic regulation, as well as the energy efficiency of the economy.

The new ministry will centralise the functions of developing, proposing and evaluating public policies, including the definition of objectives, regulatory frameworks and strategies to be applied, as well as the development of public policy instruments.

2.2. Regulatory Measures

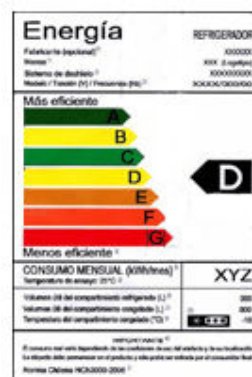
2.2.1. Mandatory Labelling

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 products in Chile

⁹Exchange rate: USD1 = CLP500.

(incandescent and compact fluorescent light bulbs, and one- and two-door refrigerators) 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:

- Freezers
- Refrigerators
- Refrigerators-freezers
- Single-phase induction motors
- Three-phase induction motors
- Single-capped fluorescent lamps
- Double-capped fluorescent lamps
- Air conditioners
- Standby in microwave ovens
- Metal halide lamps.



2.2.2. Minimum Energy Performance Standards

Chile is in the process of developing a strategy to establish MEPS, following the recent approval of the law that creates the Ministry of Energy, which establishes the faculty of the Minister to dictate MEPS. The first MEPS under development are for light bulbs.

The institution of MEPS to cover both residential products, such as the ones already labelled and planned for labelling, as well as a suite of commercial and industrial products would be enormously effective in reducing energy use and electricity demand in Chile.

2.2.3. Minimum Thermal Standards

a) Name

Minimum Thermal Standard for Residential Buildings

b) Purpose

To improve the energy efficiency of residential buildings

c) Applicable sectors

Construction

d) Outline

In 2000, the Ministry of Housing and Urbanism (Minvu) began a process to establish a Minimum Thermal Standard for Residential Buildings. This process consists of three milestones, two of which have been achieved:

- *Thermal Regulation for Roofs*: This regulation went into effect in March 2000 and includes minimum transmittance and thermal resistance requirements.
- *Building Envelope Regulation*: This went into effect in January 2007 and applies to the entire building envelope including roof, walls, ventilated floor and windows.
- *Maximum energy demand regulation for housing*: This is under development, and is aimed at regulating the maximum energy demand of a housing unit, which is understood as a system rather than the sum of different construction elements.

e) Financial resources and budget allocation

No information available

f) Expected results

No information available

g) Other regulatory measures

No information available

2.3. Voluntary Measures**a) Name**

Mining Roundtable on Energy Efficiency (MMEE)

b) Level

Economy-wide

c) Purpose

The promotion of energy efficiency research; dissemination of results coming out of energy efficiency projects in the mining sector; evaluation of energy efficiency pilot projects; fostering technology development and innovation in energy efficiency for the mining sector and fostering an energy efficiency culture within the mining companies that are members of the roundtable.

d) Applicable Sectors

Mining sector

e) Outline

Started in 2007

f) Financial resources and budget allocation

No information available

g) Expected results

Demonstrate the reduction of 500 000 GJ of energy and improve workers' energy efficiency technical capacity.

h) Description

MMEE consists of a voluntary affiliation by the 14 largest mining companies in the economy* in addition to other participants, such as the Chilean Chapter of the International Copper Association (Procobre), Mining Council, PPEE and Mining Ministry.

*Anglo American, Antofagasta Minerals, Barrick, BHP Billiton Base Metals, Pacific Steel Company (CAP), CODELCO, Collahuasi, ENAMI, Los Pelambres Mining, Freeport, McMoran Copper & Gold, Polpaico Cement, Soquimich, Xstrata Copper and Bio Bio Cement.

i) Other voluntary measures

There are several other sectoral roundtables already established, all of them are conducting studies to determine consumption characteristics and are working on publications with energy efficiency recommendations for their members. These industrial sector roundtables are: retail, food processing, chemical, graphic and metal-mechanic.

2.4. Financial Measures Taken by the Government**2.4.1. Tax Scheme**

Chile does not provide any tax scheme for energy efficiency improvements.

2.4.2. Low-interest Loans**a) Name**

National Economic Development Agency (CORFO) Energy Efficiency Credit

b) Purpose

This credit finances investments with a value up to UF¹⁰ 25 000 (USD 890 000) and enables companies to finance needed 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.

c) Applicable sectors

Included are companies that produce goods and services with annual revenue up to the equivalent of UF 1 million (excluding value-added tax), which equals about USD 39 million. The credit is available for companies in a variety of sectors, such as industry, agriculture, mining, fishing, tourism and healthcare, among others.

d) Outline

No information available

e) Financial resources and budget allocation

No information available

f) Expected results

No information available

2.4.3. Subsidies and Budgetary Measures**a) Name**

Subsidy on Electric Motors

b) Purpose

The replacement of 700 motors in 2009 and 4673 in 2010

c) Applicable sectors

Industry (including mining)

d) Outline

No information available

e) Financial resources and budget allocation

USD 1 million

f) Expected results

This program is expected to improve the energy efficiency of motors between 1 and 10 horsepower by up to 12%

a) Name

Energy Efficiency Pre-investment Program

b) Purpose

Energy efficiency studies geared towards optimising consumption. There is a consultancy subsidy available for energy efficiency audits, plans for implementing energy efficiency

¹⁰The Unidad de Fomento (UF) is a unit of account that is used in Chile. The exchange rate between the UF and the Chilean peso (CLP) is constantly adjusted to inflation so that the real value of the Unidad de Fomento remains constant.

measures, and development of an investment project that can be presented to financing providers.

c) Applicable sectors

Companies that produce goods and services with annual revenue up to the equivalent of UF 1 million (excluding value-added tax) or about USD 39 million. The credit is available for companies from a number of sectors, such as industry, agriculture, mining, fishing, tourism and healthcare, among others.

d) Outline

No information available

e) Financial resources and budget allocation

Up to 70% of the total cost of the consultancy, to a maximum of CLP 6 million (equivalent to USD 11 200)

f) Expected results

Expected results not available

a) Name

National Light Bulb Replacement Program

b) Purpose

The replacement of 2.9 million incandescent lamps with compact fluorescent light bulbs (CFLs)

c) Applicable sectors

Residential (low-income homes)

d) Outline

This includes subsidies for 2008 and 2009

e) Financial resources and budget allocation

The financial resource for this program was equivalent to USD 8.8 million for both years.

f) Expected results

Energy savings of 806 GWh in four years for both programs

a) Name

National Truck Replacement Program

b) Purpose

Replace 500 trucks that are older than 25 years during 2009–10 (225 in 2009 and 275 in 2010) with new and efficient ones that fulfil the EURO III or EPA 98 standards.

c) Applicable sectors

Transport

d) Outline

No information available

e) Financial resources and budget allocation

The financial resource for this program was equivalent to USD 4 million in 2009.

f) Expected results

No information available

2.4.4. Other Incentives

Information not available

2.5. Energy Pricing

There is a government-regulated pricing mechanism for small clients. The price of electricity for regulated consumers is set by the regulator (National Energy Commission), who calculates the cost of production for the generation utilities and the added value for distribution utilities. This regulation applies to customers with power demand below 2 MW. Above that, customers are free to sign contracts directly with the generation utilities.

For residential users of electricity, there is an overcharge for the consumption in winter that goes above the summer consumption.

2.6. Other Efforts for Energy Efficiency Improvements**2.6.1. Cooperation with Non-Government Organisations**

There are a number of NGOs that provide feedback to PPEE. A study of the economy-wide energy efficiency potential was financed by NGOs.

2.6.2. Cooperation through Bilateral, Regional and Multilateral Schemes

Chile participates in COPANT for the harmonisation of energy efficiency standards, and is participating in the design of the ISO 50.001 standard.

2.6.3. Other Cooperation/Efforts for Energy Efficiency Improvements**2.6.3.1. Cooperation Agreements**

In 2005 the governments of Chile and Germany signed a cooperation agreement for EUR 2 million to support activities through the German Cooperation Agency (GTZ). Energy efficiency is supported by the financing of studies and the hiring of energy experts to work specifically in the fields of construction and industry. This agreement expires in December 2010.

In addition, Chile has signed several non-binding cooperation agreements with institutions from different economies, which include some kind of assistance on energy efficiency. These include:

- Memorandum of understanding between the State of California and Chile (June 2008)
- Memorandum of understanding between the Minister of Commerce, Industry and Tourism of Spain and the Minister President of the National Energy Commission (October 2008)
- Memorandum of understanding between the Department of Energy of the United States of America and the National Energy Commission on cooperation in clean and efficient energy technologies
- Memorandum of cooperation on energy issues between Portugal and Chile (December 2009).

2.6.3.2. Energy Efficiency Awards

The National Energy Efficiency Program (PPEE) of the National Energy Commission (CNE) has implemented the Energy Efficiency Award as an incentive to improve energy efficiency management in public enterprises. This award is given as an initiative of the Production and Commerce Confederation (CPC) which is working with PPEE for the recognition of the energy efficiency efforts in both industry and commercial sectors.

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CHINA

INTRODUCTION

For the 30 years from 1978 to 2008, the average annual growth rate of primary energy consumption in China was 5.5%, and the average annual growth rate of Gross Domestic Product (GDP) was 9.8%, as the goal of quadrupling GDP was achieved with the support of a doubling of energy consumption.

China's government has paid unprecedented attention to energy conservation efforts. According to the economy's basic policy, the resource-saving target was set so that during the period of the 11th Five-year Plan the unit GDP energy consumption would be reduced by about 20%. In order to accomplish the goal of energy conservation, China's government established a series of policy, legal and economic measures. Progress has been made towards achieving the 20% energy intensity reduction target, having achieved reductions of 1.79% in 2006, 4.04% in 2007, 4.59% in 2008 and 3.35% in the first half of 2009, for a total reduction of more than 13% so far.

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. Overall Energy Efficiency Improvement Goals

China has a long history of pursuing energy efficiency and conservation. Having recognised the threat to energy security, sustainable economic growth, and the environment that is posed by rapid energy demand growth, China has made energy efficiency and conservation its highest priority energy strategy. Since issuing the Medium- and Long-term Plan for Energy Conservation in 2004, several important high-level actions have been taken to put China on a path towards less energy-intensive development. More recently, in the 11th Five-year Plan (2006–10), a 20% reduction in energy consumption per unit of GDP by 2010 from the 2005 level was set as an obligatory target. This is the equivalent of reducing energy consumption from 1.22 tonnes to 0.98 tonnes of coal per CNY 10 000 of GDP.

1.2. Sectoral Energy Efficiency Improvement Goals

The most important feature of China's strategy to improve energy intensity is the creation of a chain of responsibility that reaches all the way from the economy-wide target down to the shares of the target that must be achieved at the local level. All provinces (along with municipalities and autonomous regions) have specified overall goals. The provincial goals of reduction in local energy consumption per unit of GDP by 2010 from the 2005 level are as follows:

Table 1: Provincial energy efficiency improvement goals in China from 2005 to 2010

Province/City	Anhui	Beijing	Chongqin	Fujian	Gansu	Guangdong	Guanxi
Goal	20%	20%	20%	16%	20%	16%	15%
Province/City	Guizhou	Hainan	Hebei	Henan	Helongjiang	Hubei	Hunan
Goal	20%	12%	20%	20%	20%	20%	20%
Province/City	Inner Mongolia	Jiangsu	Jiangxi	Jilin	Liaoning	Ningxia	Qinghai
Goal	22 %	20%	20%	22%	20%	20%	17%
Province/City	Shaanxi	Shandong	Shanghai	Shanxi	Sichuan	Tianjin	Xinjiang
Goal	20%	22%	20%	22%	20%	20%	20%
Province/City	Xizang	Yunnan	Zhejiang				
Goal	n/a	17%	20%				

Source: State Council document, 2006, No. 94

According to the opinion of the Ministry of Housing and Urban Rural Development (MOHURD, formerly the Ministry of Construction) on the implementation of 'State Council's decision on strengthening energy conservation' in September 2006, an energy savings goal of 110 million tonnes of coal equivalent (tce) (77 million tonnes of oil equivalent (Mtoe)) in building energy consumption from 2005 to 2010 has been issued.

1.3. Action Plans for Promoting Energy Efficiency

A comprehensive work plan of energy conservation and emission reduction was issued in June 2007 to promote energy efficiency in China.

a) Objectives

The plan aims to stress the importance of leadership and coordination mechanisms for energy conservation and emission reduction, define the goals and tasks of energy conservation and emission reduction, clarify responsibilities and to propose general requirements.

b) Applicable sectors

It contains a comprehensive set of measures that cover all sectors, such as industry (including agriculture), transport, residential, commercial, power, government, etc.

c) Outline

The plan focuses on promotion of industrial structural adjustment and elimination of outdated production through a series of policies. It also launched actions such as 'ten key energy conservation projects' and the '1000-enterprises implementation plan of energy conservation action' to promote the progress of energy conservation technology and to transform energy conservation projects. Furthermore, it aims to increase fund support and promote energy conservation through economic instruments and so on. This plan was issued in June 2007, consisting of 45 measure packages.

d) Financial resources and budget allocation

The central government arranges energy conservation funds and lends the provincial and local municipal governments finance to improve their energy conservation investment, forming a mechanism of investment with a persistent effect. In 2007, the central government arranged USD 3.4 billion for supporting energy conservation and emission reduction and in 2008 it allocated USD 3.9 billion, which includes more than USD 2.27 billion for supporting energy conservation.

e) Method for monitoring and measuring effects of action plans

China has set up an energy conservation and emission reduction leadership group chaired by Premier Wen Jiabao. The Chinese Government assigned energy conservation goals to local governments and major enterprises, as a 'one-vote veto' assessment for their performance. The assessment was based on the 'Energy Conservation and Emission Reduction Statistics and Monitor Evaluation System and Method', and the evaluation results provide important insights for government officials and enterprise leaders. The local government will be commended and rewarded if their assessment level for the completion is met or surpassed. Conversely, local governments whose assessment level is an incomplete grade cannot participate in the annual awards or receive an honorary title and so on. New high energy consuming projects in these regions cannot be approved. Provincial leaders must make a written report to the State Council and indicate a deadline for correction measures. The National Development and Reform Commission is responsible for monitoring and reporting such cases.

Statistics departments at all government levels are to develop an improved energy statistics system. Key energy-consuming entities must contract energy managers and provide annual reports on EE&C activities.

A comprehensive evaluation of target realisation for provincial governments is carried out every year by the central government, which is helpful to understand the local energy conservation situation, identify problems and promote energy conservation efforts.

f) Expected results

The expected results include establishing the energy conservation supervision agency, increasing energy conservation efforts based on laws and regulations, and introducing administrative measures, economic incentives, capacity building, and so on. This is expected to promote the realisation of energy conservation goals.

g) Future tasks

China will likely introduce a goal for further reduction in energy consumption per unit of GDP by 2015 compared to 2010.

1.4. Institutional Structure

The Chinese National People's Congress (NPC) is the highest organisation of state power in China. The outline of the 11th Five-year Plan was approved at the 10th NPC and with it the 20% reduction target that now underlies China's drive for energy efficiency and conservation. But, the actual drafting and implementation of the 11th Five-year Plan for economic and social development is tasked to the administrative organisation of the government, the State Council. On issues of energy efficiency and conservation, the National Development and Reform Commission (NDRC) plays a crucial role in both the design and the execution of policies. The State Council has designated the NDRC as the lead agency in charge of completing all regulations necessary for achieving the 20% target and overseeing their implementation.

China's government set up a 'National leading group for climate change and energy conservation and emission reduction' in June 2007, which is responsible for all coordinating work for energy conservation in China. The Resource Conservation and Environmental Protection Department of National Development and Reform Commission (NDRC) are organisations specialising in day-to-day efforts for energy efficiency improvement.

a) Name of organisation

Resource Conservation and Environmental Protection Department of National Development and Reform Commission (NDRC)

b) Status of organisation

Policymaker

c) Roles and responsibilities

The NDRC, formerly the State Planning Commission and State Development Planning Commission, is a macroeconomic management agency under the State Council in China, which has broad administrative and planning control over the Chinese economy. Since 2008, the Commission has been headed by Zhang Ping. The functions of the NDRC are to study and formulate policies for economic and social development, maintain the balance of economic development, and guide the restructuring of China's economic system. The NDRC has 28 functional departments, bureaus, and offices with an authorised staff of 890 civil servants.

The Resource Conservation and Environmental Protection Department of the NDRC is specifically responsible for energy conservation. It aims to promote the strategy of sustainable development and undertake comprehensive coordination of energy conservation and emission reduction; it also organises the formulation and coordinates the implementation of plans and policy measures for recycling economy, energy and resource conservation and comprehensive utilisation, etc.

d) Covered sectors

All sectors of the economy are covered

e) Established date

The Resource Conservation and Environmental Protection Department of the NDRC was established in 2003

f) Number of staff members

There are currently about 45 staff members in the agency

1.5. Information Dissemination, Awareness-raising and Capacity-building**a) Information collection and dissemination**

A wide range of information is readily available to Chinese energy consumers. For example, China established a dependent and authoritative non-profit Energy Conservation Information Dissemination Centre, which was replaced by the National Energy Conservation Centre following an organisational adjustment in 2009. The centre made use of market mechanisms to bring China's energy conservation information dissemination in line with international practices, and transform the mechanism from management to service to serve the whole society. A number of dissemination activities were adopted including meetings, media, exhibitions, websites, and so on. In addition, there are more than 20 journals related to the energy conservation field in China to improve information dissemination.

b) Awareness-raising

China has organised economy-wide actions for energy conservation and emission reduction through 17 government departments, covering nine special actions. China's government also runs its 'energy conservation awareness week' every year, carried out 'energy conservation and emission reduction, actions by all people' through CCTV and a series of awareness activities, enhanced the public consciousness about energy conservation and environmental issues. At present, energy conservation and emission reduction have already become hot topics that have the attention of society collectively.

c) Capacity-building

The government of China organises energy management training in key energy-consuming enterprises, such as for energy auditing, energy planning, energy measurement and statistics, and so on. China has developed a series of energy conservation standards, strengthening the standard basis. Energy consumption statistics and indicators are more accurate than before, and enterprises are improving their energy consumption measuring devices. All of these efforts have made the foundation of energy conservation more solid.

1.6. Research and Development in Energy Efficiency and Conservation

The energy conservation technology policy of China has been the specific policy for energy efficiency research and development and demonstration in the economy, which was the responsibility of the Ministry of Science and Technology. Through progress in energy conservation technology, the policy aims to promote the building of a conservation-oriented industrial structure, product structure and consumption structure, and provide a basic guide for the development of a long-term plan and annual plans for various localities and industries in regard to technological innovation and scientific research in the field of energy conservation.

There are a number of programs that encourage research and development in energy efficiency, such as the 'State Key Basic Research Program', 'National Science and Technology Support Program', the 'High-tech Development Projects', and so on. There are a number of major energy conservation technology and emission reduction projects underway to overcome a number of key common problems. China's government has arranged more than USD 10 billion to support hundreds of research projects and topics concerning energy

conservation, new energy, recycling, clean production, pollution control, climate change technology development, demonstration and extension during the period of the 11th Five-year Plan. China increased support for research on energy conservation, emission reduction, and climate change, and achieved important results.

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS

2.1. Government laws, decrees, acts

a) Name

Energy Conservation Law of the People's Republic of China

b) Purpose

The law was designed to promote overall social energy conservation and improve energy efficiency and environmental protection. It also mandates the comprehensive and sustainable development of the economic society.

c) Applicable sectors

The law applies to all sectors, including industry, transport, residential, commercial, power, government, etc.

d) Outline

The 'Energy Conservation Law of the People's Republic of China' was enacted in 1997 and amended in 2007. On 1 April 2008, the newly revised 'Energy Conservation Law of the People's Republic of China' formally went into effect. It improved the basic system of energy conservation and established basic system requirements for energy conservation management. It also reflected the organic combination of the market and the government; focused on using the market mechanism while strengthening government regulation; and paid attention to the use of the economic instruments and market economy rules, through taxation, pricing, credit, government procurement policies to encourage and guide energy conservation. The new 'energy conservation law' added content about construction, transportation and public energy conservation. Detailed information can be found at www.secidc.org.cn.

e) Financial resources and budget allocation

No information available

f) Expected results

The energy conservation and emission reduction targets of the 11th Five-year Plan, from a legal standpoint, were expected to be completed on time. Also, the Law is conducive to long-term development.

2.2. Regulatory Measures

China has special regulatory provisions concerning the government sector. The 'Energy conservation regulations for state-funded institutions' are designed to promote energy conservation by public institutions in China, focusing on improved energy efficiency. Public institutions can play an exemplary role in energy conservation. The document calls for state-funded institutions to show leadership by taking an active role in energy management and implementing technically feasible and economically reasonable measures to reduce consumption. Enforcement responsibilities are given to the Government Offices Administration (GOA) at all levels of government down to the county level.

The 'Energy conservation regulations for state-funded institutions' formally went into effect on 1 October 2008. The state-funded institutions referred to are the government, institutions and organisations that are all or partially state-funded. The regulations include specific requests regarding planning, management, measures, monitoring and protection of energy

conservation in public institutions. The head of this state-funded institution has overall responsibility for energy conservation. This law clearly strengthens the guiding role of the energy conservation plan. There are eight basic management systems for the major problems existing now. Procedures are set forth for conducting energy audits. Specific actions are also prescribed, such as reducing standby consumption of office equipment, utilising natural lighting, and using 'intelligent' elevator controls. The act authorises criticism and/or punishment for noncompliance. Detailed information can be found at www.secidc.org.cn.

2.2.1. Minimum Energy Performance Standards and Labelling

a) Name

Minimum energy performance standards (MEPS) for high energy consuming products

b) Purpose

The energy efficiency standards are the policy basis for the control of energy consumption from the source.

c) Applicable sectors

Industry

d) Outline

Since 2007, 46 efficiency standards have been set by the Standardization Administration of the People's Republic of China, most of which formally went into effect on 1 June 2008, including 36 mandatory energy efficiency standards. There are 22 MEPS for high energy consuming products, which connect with 22 kinds of high energy consuming products in the thermal power, steel, nonferrous metals, building materials and petrochemical industries.

In addition, China uses an 'Energy efficiency labelling management approach' which is designed to enhance the interaction of producers and consumers, and guide consumers to purchase energy-efficient products, while promoting producers to use energy-efficient technologies. It applies to the residential, commercial, and industry sectors. On 1 March 2005, the 'Energy efficiency labelling management approach' went into effect, and the first product labelling catalogue was issued, which covered refrigerators and room air conditioners. China has put out four lists of product catalogues for labelling as of October 2008.

Catalogue No. 1 was implemented on 1 March 2005, and covered refrigerators and room air conditioners. Catalogue No. 2 was implemented on 1 March 2007, which covered washing machines and unit air conditioners. Catalogue No. 3 was implemented on 1 June 2008, and covered fluorescent lights, high-pressure sodium lamps, motors, chillers, domestic gas burning instantaneous water heaters and gas burning water heaters. Catalogue No. 4 was implemented on 1 March 2009, and covered speed-controlled air conditioners, multi-connected air conditioner units, household cookers, computer displays and copiers.

In addition to the MEPS for high-energy consuming products, China has 11 energy efficiency standards for end-use products in the residential, commercial, and industry sectors. Their purpose is to encourage manufacturers to improve the energy efficiency of products, which would be useful to reduce the energy consumption of end-use products. Their standard numbers are GB20665-2006, GB18613-2006, GB20943-2007, GB19762-2007, GB21454-2008, GB21455-2008, GB21456-2008, GB21518-2008, GB21519-2008, GB21520-2008, and GB21521-2008. They apply to end-use products, such as, room air conditioners, water heaters, household cookers, computer displays, copiers and so on, and they provide energy efficiency limits, grades and results of energy-saving evaluations. These standards are expected to help reduce the energy consumption of end-use products. For example, the average thermal efficiency of gas-burning water heaters would increase 4% to 10% after the implementation of the standard on energy efficiency rating and energy efficiency limit of domestic gas burning instantaneous water heaters and gas burning water heaters, which is

expected to result in savings of 560 billion litres of gas and emissions reductions of 305 400 tonnes CO₂ before 2010.

2.2.2. Building Energy Codes

a) Name

Energy conservation regulations for civil buildings

b) Purpose

The regulations aim to strengthen the energy conservation management of civil buildings, improve energy efficiency and reduce energy consumption in civil buildings, including residential units, offices, and so on.

c) Applicable sectors

Residential and commercial

d) Outline

On 1 October 2008, the 'Energy conservation regulations for civil buildings' came into force, there are a total of six chapters and 45 terms including general principles, new building energy efficiency, existing building energy efficiency, operation of building energy systems, and legal liability supplements.

The construction administration department has authority for preparing building energy conservation plans at all levels of government down to the county level. Energy consumption standards for civil buildings are called for and governments are required to set aside funds for energy conservation improvements. All actors in the construction process are required to ensure compliance with the energy standards for civil buildings. The regulations also require specific measures in new construction, such as the installation of unit-level heat metering in residential buildings and the use of energy saving lamps. Energy efficiency retrofits are required to be implemented 'step by step systematically in accordance with actual conditions'. Building owners are required to operate buildings in a manner consistent with energy conservation goals. Penalties for non-compliance are specified. Detailed information can be found at www.secidc.org.cn.

2.2.3. Fuel Efficiency Standards

a) Name

Vehicle fuel economy standards

b) Purpose

To require passenger vehicles and light-duty cargo vehicles to meet efficiency standards which vary according to the vehicle's weight

c) Applicable sectors

Transport

d) Outline

There are five vehicle fuel economy standards providing fuel consumption limits and test methods for different types of vehicles, in which the standards for three-wheeled vehicles, low-speed trucks, and light commercial vehicles are mandatory. The standard numbers are GB21377-2008, GB21378-2008, GB/T4352-2007, GB/T4353-2007, and GB20997-2007 respectively.

e) Financial resources and budget allocation

No information available

f) Expected results

Reduction in the total fuel consumption of light commercial vehicles by 10%

2.3. Voluntary Measures

China has a number of voluntary initiatives for improving energy efficiency, such as the certification of energy-efficient products, energy conservation basic standards, and energy audits that are discussed below.

2.3.1. Certification for Energy-Efficient Products**a) Name**

Certification for energy-efficient products

b) Purpose

The certification for energy-efficient products aims to continually aid improvements in energy efficiency and environmental protection and to assist social and economic sustainable development in order to harmonise social values and economic benefits by stimulating technical development in industry, increasing public awareness of resource consumption and environment protection and ultimately increasing the market share of energy-efficient products.

c) Applicable sectors

Industry (including agriculture), transport, residential, commercial, power, and government

d) Outline

Certification for energy-efficient products is a voluntary program aiming to save energy and reduce emissions through stimulating manufacturers to produce more resource efficient products and helping consumers to make more sustainable purchase decisions. In 1998, the Certification Centre for Energy Conservation Products (CCECP) started to run the energy conservation certification program with residential refrigerators. This soon expanded to more than 90 product categories covering appliances, lighting, electronic, office equipment, industrial products, water-saving products, and environmental-friendly products.

e) Financial resources and budget allocation

Primarily from the private sector (enterprises)

f) Expected results

To help encourage consumers to use energy-efficient products as well as encourage the promotion of energy-efficient products and technological progress

2.3.2. Energy Conservation Basic Standards**a) Name**

Energy conservation basic standards

b) Purpose

The energy conservation basic standards cover energy measurement, energy consumption calculation, economic operation and so on, helping to set a technological foundation for energy measurement and unify energy consumption calculation and equipment operating efficiency.

c) Applicable sectors

Industry

d) Outline

Since 2006, there have been eight energy conservation basic standards issued in China, which provided for the management of energy measurement, methods of energy consumption calculation, and economical operation of equipment and energy systems, etc. Their standard numbers are GB/T20901-2007, GB/T20902-2007, GB/T21368-2008, GB/T21367-2008, GB/T17954-2007, GB/T12497-2006, GB/T12723-2008, and GB/T2589-2008.

e) Financial resources and budget allocation

Primarily from the private sector (enterprises)

f) Expected results

To set a technological foundation for energy measurement, unified energy consumption calculation and equipment operating efficiency, and so on

2.3.3. Energy Audits**a) Name**

Energy Audits

b) Purpose

Energy audits of enterprises help diagnose the state of energy consumption, identify problems, analyse the energy conservation potential and also make suggestions that could help enterprises improve energy efficiency.

c) Applicable sectors

Industry (including agriculture), transport, residential, commercial, power, government, and so on

d) Outline

Since 2006, 1000 key energy consuming enterprises in China went through the activities of energy audits, the annual comprehensive consumption per unit of which is more than 0.18 million tce. In some provinces, such as Shandong Province, there were more than 1000 enterprises whose annual comprehensive consumption per unit was more than 0.016 million tce. Also, 103 key energy consuming enterprises carried out energy audits.

e) Financial resources and budget allocation

Financial support comes from the government and private sectors.

f) Expected results

The energy audit is an energy management measure that could help enterprises to discover problems and improve their energy efficiency.

2.4. Financial Measures Taken by the Government**2.4.1. Tax Scheme**

There are a number of preferential tax policies related to energy conservation in China, such as corporate income tax relief, capital gains tax relief, export tax rebates, refined oil tax, and others. One example is provided below.

a) Name

Energy-efficient or water-saving equipment directory of corporate income tax concessions (2008)

b) Purpose

To reduce corporate income tax for enterprises that purchase and use energy-efficient devices and equipment, thereby guiding and encouraging the promotion of these as well as

stimulating technological innovation and energy efficiency improvement.

c) Applicable sectors

Industry (including agriculture), transport, commercial, and power

d) Outline

The 'directory' has been in effect since 1 January 2008. Enterprises that purchased and used the energy-efficient equipment listed in the directory are eligible for preferential tax benefits. Of total investment, 10% is set aside for corporate income tax credits. Corporate tax losses can be carried forward for a maximum of five years.

e) Financial resources and budget allocation

Government-sponsored scheme

f) Expected results

To benefit the promotion of energy-efficient products, stimulate technological innovation, and improve energy efficiency

2.4.2. Low-Interest Loans

a) Name

Low-interest loans for the national debt projects

b) Purpose

To stimulate the flow of social capital to enterprises with less financial resources, so enterprises can get loans at below-market interest rates and improve their borrowing capacity in the credit market. This would increase the inputs of other social funds for energy efficiency improvement projects.

c) Applicable sectors

Industry (including agriculture), transport, residential, commercial, power, and so on

d) Outline

Since 1999, China's government has arranged a certain amount of funds for enterprises to reduce the interest rate on loans for technological upgrading (including energy conservation). This increases the inputs of other social funds for energy efficiency improvement projects. According to preliminary statistics, every USD 1 in funds from the economy's debt can drive USD 10 in social investment, and USD 6 in bank loans. In 2006, the investment for energy efficiency technological transformation of enterprises driven by state funds totalled about USD 10 million.

e) Financial resources and budget allocation

Government-sponsored

f) Expected results

To help stimulate the investment of social funds for energy efficiency improvement projects, and to promote the energy efficiency improvement of enterprises

2.4.3. Subsidies and Budgetary Measures

a) Name

Interim measures for financial incentive funds for energy efficiency technological transformation projects

b) Purpose

To encourage and motivate enterprises to invest in energy conservation technological

transformation, to promote the implementation of key energy conservation projects, and to facilitate achievement of the energy conservation goal of the 11th Five-year Plan

c) Applicable sectors

Industry (including agriculture), transport, residential, commercial, power, government, and so on

d) Outline

Financial incentive funds are given to enterprises that would achieve annual energy savings of more than 10 000 tce through energy efficiency technology transformation in the top ten key energy efficiency projects. Energy conservation funds are used as an incentive for the enterprises undertaking the projects, with the amount of funding linked with the amount of energy savings. The standard for funds is based on the energy savings, with about USD 30 per unit tce in the eastern area and about USD 37 per unit tce in the western area of China. The interim measures were implemented in August 2007.

e) Financial resources and budget allocation

Government-sponsored

f) Expected results

To ensure the actual energy savings of energy efficiency technological transformation projects, improve efficiency in the use of funds, and stimulate energy efficiency improvement

2.4.4. Other Incentives

a) Name

Subsidy to public for energy efficiency products program

b) Purpose

The implementation of the program aims to effectively expand domestic demand in China, especially consumer demand, and promote stable and rapid economic development. It can significantly improve the energy efficiency of end-use products, and promote the energy conservation and emission reduction.

c) Applicable sectors

Residential and commercial

d) Outline

The 'Subsidy to public for energy efficiency products' program refers to financial subsidies for energy efficiency products whose energy efficiency level is up to first or second grade in the top ten categories, such as air conditioners, refrigerators, flat-panel TVs, washing machines and so on. The standards for subsidies are based on the price gap between energy efficiency products and general products. For example, the subsidy for room air conditioners at the second grade of energy efficiency level is about USD 44-96 per unit, and for the first grade about USD 74-125 per unit. The program has been running since May 2009.

e) Financial resources and budget allocation

Government-sponsored

f) Expected results

The implementation of the program is expected to increase demand by USD 60-75 billion each year. It would increase market share of energy efficient products 10-20 percentage points, to 30%, and may save more than 75 billion kWh of electricity each year, in addition to the emission reduction of 75 million tonnes CO₂.

2.5. Energy Pricing

The pricing mechanism for coal, crude oil, and natural gas in China has been largely market-oriented, while the electricity price is controlled by the government according to an electricity pricing management system. Under the implementation of a fuel tax policy, the new refined oil pricing mechanism is clear, which is indirectly controlled by the international market. The government is working to provide a stronger signal for energy conservation through energy prices. The primary mechanism to drive improvements in energy efficiency in China is placing a price on electricity, such as different electricity prices, peak-valley prices, time-sharing of the prices, and so on. Different electricity pricing policies are implemented to limit the industrial development of high energy-consuming, high-pollution, and outdated process equipment - i.e. to implement a normal price to encourage development of allowable enterprises and to implement higher prices for restricted or outdated enterprises. This policy can promote industrial adjustment and stimulate the energy efficiency technological transformation in energy-consuming enterprises through the price leverage.

Furthermore, price incentives have been introduced to encourage electricity production from biomass energy, wind energy, solar energy, and so on. Provisional measures on urban heating price control were issued to promote payment for unit of heat, rather than fixed or no-fee services, in the centralised heating system.

2.6. Other Efforts for Energy Efficiency Improvements

2.6.1. Cooperation with Non-Government Organisations

China's government cooperates with non-government organisations to stimulate energy efficiency improvements as appropriate.

For example, WWF China, which is the first international conservation organisation invited to work in China, has about four energy efficiency improvement programs: 1) Low Carbon City Initiative in China—LCCI will explore low carbon development models in different cities, working to improve energy efficiency in the industry, building and transportation sectors. It is also addressing the development of renewable energy and ensures that other cities in China can learn from successful experiences and replicate them; 2) Business engagement; 3) Climate change post-Kyoto negotiations; and 4) '20 ways to 20%'.

2.6.2. Cooperation through Bilateral, Regional and Multilateral Schemes

China's government cooperates with other economies through bilateral, regional and multilateral schemes for energy efficiency improvements, such as the United States, Japan, Korea, the European Union and so on. At present, China has established bilateral cooperation mechanisms with 36 economies and regions, and is involved in multilateral energy cooperation mechanisms in 22 international organisations and international conferences.

For example, a China-US strategic economic dialogue was initiated in September 2006 by China's President Hu Jintao and former U.S. President George W. Bush, which is one of the highest levels among the China-US consultative mechanism (there are more than 20 now). The dialogue is hosted twice a year, alternately in China and the United States. In June 2008, China and the United States held the fourth strategic economic dialogue in Washington, and signed the 'Decade Cooperation Framework Agreement in Energy and Environment', which determined to start the cooperation in five priority areas, covering electricity, clean water, clean transportation, clean air, and forest and wetland protection.

2.6.3. Other Cooperation/Efforts for Energy Efficiency Improvement

China has other cooperative arrangements with international organisations for energy efficiency improvement in addition to APEC, such as the Asian Development Bank, the World Bank and so on.

For example, 'the World Bank and the Global Environment Facility China Energy Conservation Project' is a significant international cooperation project since 1997, which is

jointly organised and implemented by China's government (NDRC), the World Bank and the Global Environment Facility in the areas of energy conservation and greenhouse gases emission mitigation. The project was implemented in two phases. The main project was to build a model of energy service companies (referred to as EMCOs), to build a model of 'energy management contract' mechanism based on the market economy system in China, and it also aimed to establish an energy conservation information dissemination centre. In the second phase, the main project was to set up the technical support for EMCOs and technical institutions, to establish an energy service industry committee. A commercial loan guarantee funds will be established, and the loan guarantee plan for EMCOs will be implemented to improve the opportunities for commercial loans for EMCOs.

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HONG KONG, CHINA

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. Overall Energy Efficiency Improvement Goals

Reduction of energy intensity by 25% by 2030 from 2005 levels

1.2. Sectoral Energy Efficiency Improvement Goals

Not applicable

1.3. Action Plans for Promoting Energy Efficiency

Since the adoption of the Sydney Declaration, the Hong Kong, China (HKC) Government has been stepping up efforts in energy efficiency and conservation monitoring and reporting by means of an end-use energy database¹¹. Action plans include:

- The promotion of building energy efficiency through legislation for mandatory implementation of Building Energy Codes, and the provision of subsidies under Building Energy Efficiency Funding Schemes
- The implementation of the first phase of the Mandatory Energy Efficiency Labelling Scheme and a move to legislate amendments for rolling out the second phase of the scheme
- The provision of incentives in the post 2008 Scheme of Control Agreements with power companies to encourage investment in renewable energy facilities and enhance energy efficiency
- To enhance utilisation of landfill gas for town gas production
- To implement a district cooling system at the Kai Tak Development to supply chilled water to buildings in the new development area for centralised air-conditioning
- To promote environmental protection and energy conservation in government buildings through setting targets in various environmental aspects of new government buildings and through identifying demonstration projects
- To promote environmental protection and energy conservation in government buildings through setting targets in various environmental aspects of new government buildings and through identifying demonstration projects to promote the replacement of incandescent light bulbs by compact fluorescent lamps through various means, including consultation on progressively restricting the sales of incandescent light bulbs.

1.4. Institutional Structure

a) Name of organisation

Energy Efficiency Office (EEO) of Electrical and Mechanical Services Department under the directive of the Environment Bureau (ENB) which is the energy policy maker

b) Status of organisation

ENB as the policy maker and EEO as the regulator and implementer

c) Roles and responsibilities

The government (ENB and EEO/EMSD) is responsible for promoting energy efficiency both within the government and in the community as a whole. The government works with professional bodies, tertiary institutes, related industries and the general public to promote energy efficiency in the community through voluntary and mandatory programs.

¹¹HKEEUD (2009).

d) Covered sectors

Public and private sectors

e) Established date

ENB was established in 2007 and EEO was established in 1994

f) Number of staff members

There are 46 employees of EEO

1.5. Information Dissemination, Awareness-raising and Capacity-building**a) Information collection and dissemination**

For major energy efficiency policies, public consultation and business impact assessments may be conducted. Information is mainly disseminated through the media and via press releases and websites.

b) Awareness-raising

HKC organise and/or participate in various exhibitions, seminars, and workshops to promote energy efficiency within various sectors. There are also websites to promote energy efficiency and renewable energy.

Technical information related to energy efficient products is promoted and disseminated through publication of information leaflets and technical guidelines, and posting the information for the public via dedicated websites—HK EE Net (<http://ee.emsd.gov.hk>), HK RE Net (<http://re.emsd.gov.hk>) and HK GBT Net (<http://gbtech.emsd.gov>)—and media programs.

HKC also launch publicity programs and campaigns to promote awareness of energy efficiency in particular regarding specific measures (e.g., Energy Efficiency Labelling Scheme, Building Energy Efficiency Funding Schemes, etc.).

c) Capacity-building

Capacity-building is achieved by organising strategic and specific briefings, presentations and workshops for industry and the general public. Professional bodies and educational institutions are also involved in sharing experience and providing training to build up the necessary capacity in the concerned sectoral areas.

1.6. Research and Development in Energy Efficiency and Conservation

In order to evaluate and review the application of new energy efficiency and conservation technologies, the HKC government promotes applied research and development activities including energy efficiency projects through university research grants and dedicated technology funds. Examples of projects include:

- Installation of Energy Efficiency and Conservation Technologies in Government Facilities for Application Studies
- Energy efficiency demonstration projects
- Projects funded by the Innovation and Technology Fund, Environment and Conservation Fund and General Research Fund.

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS**2.1. Government Laws, Decrees, Acts:****a) Name**

- 1) Energy Efficiency (Labelling of Products) Ordinance (Chapter 598)

- 2) Building (Energy Efficiency) Regulation (Chapter 123M).

b) Purpose

- 1) To facilitate the choice of energy efficient appliances and raise public awareness on energy saving in electrical appliances
- 2) To regulate the design and construction of external walls and roofs of buildings in order to achieve an appropriate overall thermal transfer value such that the energy consumption of commercial buildings and hotels can be controlled.

c) Applicable sectors

- 1) All sectors
- 2) Commercial buildings and hotels.

d) Outline

- 1) The Energy Efficiency (Labelling of Products) Ordinance, enacted on 9 May 2008, provides the basis for implementation of the Mandatory Energy Efficiency Labelling Scheme. The scheme requires that the energy label be shown on prescribed products to inform consumers of the products' energy performance. The first phase covers room air conditioners, refrigerating appliances and compact fluorescent lamps. There are plans to include washing machines and dehumidifiers in the second phase of the scheme.
- 2) The Building (Energy Efficiency) Regulation, enacted in 1995, regulates the design and construction of external walls and roofs of buildings to have a suitable overall thermal transfer value such that the energy consumption of commercial buildings and hotels can be controlled and thus the emission of greenhouse gases from power generation can be reduced.

e) Financial resources and budget allocation

No information available

f) Expected results

- 1) Products with lower energy efficiency to be driven out by market forces
- 2) Commercial buildings and hotels achieve better energy performance in overall thermal transfer requirements.

2.2. Regulatory Measures

See 2.1. (d)

2.3. Voluntary Measures

a) Name

- 1) Voluntary Energy Efficiency Labelling Scheme
- 2) Scheme for Wider Use of Fresh Water in Evaporating Cooling Towers for Energy-efficient Air Conditioning Systems
- 3) HK Energy Efficiency Registration Scheme for Buildings (HKEERSB)¹².

b) Purpose

See 2.1. (d)

c) Applicable sectors

All sectors

¹²www.emsd.gov.hk/emsd/eng/pee/eersb.shtml.

d) Outline

- 1) EMSD operates a voluntary Energy Efficiency Labelling Scheme for appliances and equipment used at home and at the office as well as for vehicles to make it easier for the public to choose energy efficient products. The scheme aims to save energy by informing potential customers of a product's energy performance, which enables buyers to take these factors into consideration when making their purchasing decision. The scheme now covers 18 types of household appliances and office equipment. Ten of these types are electrical appliances including refrigerators (voluntary scheme), washing machines, non-integrated type compact fluorescent lamps, dehumidifiers, electric clothes dryers, room coolers (voluntary scheme), electric storage water heaters, television sets, electric rice-cookers, and electronic ballasts. The seven types of office equipment include photocopiers, fax machines, multifunction devices, laser printers, LCD monitors, computers and hot and cold bottled water dispensers. There is one type of gas appliance (domestic gas instantaneous water heaters). The scheme has also been extended to cover petrol passenger cars. With the full implementation of the Energy Efficiency (Labelling of Products) Ordinance on 9 November 2009, the Voluntary Energy Efficiency Labelling Scheme for room coolers (voluntary scheme) and household refrigeration appliances (voluntary scheme) will cover only those products not regulated under the ordinance. Details can be found at: www.emsd.gov.hk/emsd/eng/pee/eels_vlntry.shtml.
- 2) The 'Pilot Scheme for Wider Use of Fresh Water in Evaporative Cooling Towers for Energy-efficient Air Conditioning Systems' was launched in 2000 to promote the wider use of energy-efficient water-cooled air conditioning (WACS) and facilitate the territory-wide implementation of WACS.
- 3) Over the years, the number of designated areas of the scheme has been expanded to 95. In November 2009, the scheme covered about 75% of the non-residential floor area of HKC. The scheme has been operating on a standing status from June 2008 and was re-titled as 'Scheme for Wider Use of Fresh Water in Evaporative Cooling Towers for Energy-efficient Air Conditioning Systems'.
- 4) The HKEERSB was launched in October 1998 to promote the application of the Building Energy Codes (BECs). The set of five codes cover lighting, air conditioning, electrical, lift and escalator installations, and stipulate the minimum energy performance standards of these installations. Adoption of the BECs is at the discretion of the designer. Designers, architects, building developers, property management agencies and so on can submit relevant details of their building for assessment of compliance with the BEC. The Scheme requires the certification of this information by a Registered Professional Engineer of the relevant discipline under the Engineers Registration Ordinance. A registration certificate will be issued to a building that successfully meets the individual BEC standards. In addition, a registered building can also use the Scheme's 'Energy Efficient Building Logo' on related documents to publicise the achievement on energy efficiency. As at November 2009, 2550 registration certificates were issued to 1080 building venues involving 2712 installations.

e) Financial resources and budget allocation

No information available

f) Expected results

- 1) To enable consumers to make a better choice when purchasing energy efficient appliances and reduce energy consumption
- 2) To save energy consumption in air conditioning systems in non-residential buildings

- 3) To enhance building energy efficiency.

2.4. Financial Measures Taken by the Government

2.4.1. Tax Scheme

For energy saving and conservation in the building sector, the Financial Secretary announced in the 2008-09 Budget Speech that the depreciation period for building service installations registered under the HKEERSB and renewable energy installations would be reduced from 25 years to 5 years.

2.4.2. Low-Interest Loans

a) Name

Building Safety Loan Scheme

b) Purpose

To provide loans to individual owners of all types of private buildings to carry out maintenance work for improving energy efficiency among other things

c) Applicable sectors

Industrial, residential and commercial buildings

d) Financial resources and budget allocation

No information available

e) Expected results

Energy saving and promoting energy efficiency

2.4.3. Subsidies and Budgetary Measures

a) Name

Buildings Energy Efficiency Funding Schemes (BEEFS)¹³ and budgetary allocation for energy efficiency improvement work at government facilities and venues

b) Purpose

For energy saving and conservation and to reduce CO₂ emissions

c) Applicable sectors

Residential, commercial, industrial and government

d) Outline

BEEFS were launched in April 2009 to subsidise owners of residential, commercial and industrial buildings to conduct energy-cum-carbon audits and energy efficiency projects in private buildings. Resources have been allocated in the 2009-10 budgets to carry out minor work for improving the energy efficiency of government buildings and public facilities.

e) Financial resources and budget allocation

BEEFS—HKD 450 million

Energy improvement projects in government buildings—HKD 130 million

f) Expected results

To promote energy saving and conservation in buildings

2.4.4. Other Incentives

No information available

¹³Energy Wits, Issue No. 15 (May 2009), p. 2.

2.5. Energy Pricing

No information available

2.6. Other Efforts for Energy Efficiency Improvements

2.6.1. Cooperation with Non-Government Organisations

The government cooperates with the professional sector and non-government organisations on the promotion of energy efficiency and conservation.

2.6.2. Cooperation through Bilateral, Regional and Multilateral Schemes

To maintain close collaboration with the Chinese government to harmonise the adoption of appropriate energy efficiency standards and approaches.

2.6.3. Other Cooperation/Efforts for Energy Efficiency Improvements

There are some efforts for energy efficiency improvements:

- 1) To extend the coverage of the energy efficient public transport system, in particular the mass transit railway network and high-speed train system
- 2) To implement measures to promote wider adoption of electric vehicles
- 3) For the government to lead by example in implementing energy efficiency demonstration projects to showcase energy efficient designs and emerging technologies, and to adopt advanced energy saving products such as LED traffic lights
- 4) To mandate that government capital works projects and minor works projects incorporate various energy efficiency features into the projects
- 5) The Hong Kong Green Building Council (HKGBC), which was established in November 2009 to advance green building initiatives in HKC, is a professional organisation driving the promotion and creation of green, energy efficient buildings and standards throughout HKC and seeking to engage the community, industry and government in creating a more sustainable environment.

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- HKEERSB, *Hong Kong Energy Efficiency Registration Scheme for Buildings*, issued by the Energy Efficiency Office of Electrical and Mechanical Services Department, www.emsd.gov.hk/emsd/e_download/pee/hkeersb2007.pdf.
- Energy Wits, Issue No. 15 (May 2009), *Buildings Energy Efficiency Funding Schemes*, issued by Energy Efficiency Office of Electrical and Mechanical Services Department, www.emsd.gov.hk/emsd/e_download/pee/Energy_Wits_15.pdf.

INDONESIA

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. Overall Energy Efficiency Improvement Goals

- The National Energy Conservation Master Plan (2005)—RIKEN (Rencana Induk Konservasi Energi Nasional) states that Indonesia's goal is to decrease energy intensity by around 1% per year on average until 2025.
- The National Energy Management Blueprint—PEN (2006)¹⁴ explains that the goal of RIKEN is to realise Indonesia's energy saving potential through energy efficiency and conservation (EE&C) measures, and thus avoid wasteful energy use in Indonesia. Energy use is projected to increase rapidly under a base case to 41% of total primary energy supply (TPES) in 2025, without RIKEN.
- The National Energy Policy (2006)¹⁵ states that Indonesia's goal is to achieve energy elasticity of less than 1 in 2025. Note: energy elasticity is defined, in this case, as the rate of change of total primary energy supply, over the rate of change of GDP.

1.2. Sectoral Energy Efficiency Improvement Goals

RIKEN identified sectoral energy saving potential as follows:

- Industry sector (for select industries)—15% to 30%
- Commercial building sector—electricity savings of 25%
- Residential sector—10% to 30%.

1.3. Action Plans for Promoting Energy Efficiency

a) Objectives

The principle objective of Indonesia's energy conservation program is 'to conserve natural energy resources and increase resilience in energy supply to support sustainable development'.¹⁶

b) Applicable sectors

Industry, commercial buildings and households, as well as buildings and vehicles of government departments and agencies, regional governments, and state-owned enterprises (SOE)

c) Outline

Energy programs:

- *Mandatory energy conservation of government office buildings:* Government departments and agencies and regional governments are mandated to implement best-practice energy saving measures as explained in the government's guidelines and directives on energy saving in government buildings, and are mandated to report their monthly energy use in buildings to the National Team on Energy and Water Efficiency every six-months.¹⁷
- *State-owned energy service company (ESCO):* The state-owned ESCO (established in 1986) is expected to take a leading role in providing energy conservation related services, particularly to industry. The government expects its ESCO to maintain

¹⁴ Ministry of Energy and Mineral Resources (2005), Blueprint Pengelolaan Energi Nasional (PEN) 2006-2025, in accordance with Presidential Regulation No. 5/2006 regarding National Energy Policy.

¹⁵ Presidential Regulation No.5/2006 regarding National Energy Policy.

¹⁶ Chapter 2, Article 2 – Presidential Decree (KEPRES) No. 43/1991 regarding Energy Conservation.

¹⁷ Presidential Decree No. 2/2008 on Energy and Water Efficiency.

forefront expertise in the field of energy efficiency and conservation in Indonesia, and to encourage a greater role for private-sector ESCOs in the future.¹⁸

- *Public—Private Partnership Program on Energy Conservation*: The Partnership Program on Energy Conservation is a government-funded energy audit program that is available to industries and commercial buildings. Participating industries and commercial buildings are required to implement the recommended energy saving measures identified in the energy audit.
- The *Energy Conservation Clearinghouse* was created for the purpose of data and information exchange on energy efficiency and conservation, particularly for the industry sector and commercial buildings.
- *Energy benchmark and best practice guide* for specific industrial energy use, and energy use in commercial buildings.
- *Energy Labelling*

Indonesia's energy labelling program began in 1999. A dual energy rating system was considered for electrical appliances, initially for refrigerators. The energy labelling system design shows: (1) information about the kWh per year energy consumption of a product and its relative position on a line from the lowest to highest case of kWh per year of similar products in the market (Indonesia), and (2) an energy consumption star rating—of four stars—that shows the product's energy efficiency rank, relative to similar products in the market (Indonesia) at the time of assessment.¹⁹



This energy labelling system was discontinued, however, to be replaced by a new energy labelling system and design.

A new energy labelling system is currently being developed. The design will provide information on: (1) the absolute energy efficiency or performance of a product; and (2) an energy efficiency star rating of four stars. The star rating is to be assigned by an independent and accredited test facility that tested the product. The new energy label design is shown (right). It shows an example for the case of an energy label for compact fluorescent lamps—CFLs; the energy label provides information on the lumens produced per watt.



- *BRESL*: To remove barriers in implementing energy standards and labelling (ES&L), Indonesia is currently participating in a UNDP-GEF project: Barrier removal to the cost effective development and implementation of energy efficiency standards and labelling project—BRESL. The program involves six developing economies of Asia. BRESL has five major programs in promoting ES&L. The programs are: (1) policy making, (2) capacity building, (3) manufacture support, (4) regional cooperation, and

¹⁸DJLPE (2009).

¹⁹CLASP (2008).

(5) pilot projects.²⁰

- *Energy efficient lighting program in the residential sector*: The lighting program in the residential sector is primarily demand-side management (DSM), in addition to energy savings. There are two lighting programs. They are: (1) the Caring Program (Program Perduli)—a program of the state owned electricity company—PLN and (2) Brightness Program (Program Terang)—a government program. The programs provide subsidised, and in certain cases, free CFLs to eligible households.
- *Energy Awards*: Indonesia is an active participant in the ASEAN Energy Award program, specifically the Best Practice Competition for Energy Efficient Buildings and Best Practice Competition for Energy Management in Buildings and Industries. Indonesia has won several awards in these programs.

d) Financial resources and budget allocation

An annual government budget is allocated for energy conservation programs and R&D. The government budget for the Energy Conservation Partnership Program—energy audit was USD 400 000 in FY2009.

e) Method for monitoring and measuring effects of action plans

Energy consumption data is obtained on a regular basis by the Central Statistical Agency—BPS. Moreover, the government has specific programs for data collecting. Data on energy intensity is collected through programs such as the partnership program organised by the Directorate General of Electricity and Energy Utilization. As at 2009, around 292 industries and commercial buildings had been audited in the program. Data on energy use in buildings of government departments and agencies and regional governments is obtained regularly. Voluntary reporting within the activities of the Energy Conservation Clearinghouse provides further information and data on the effect of measures.

f) Expected results

Indonesia's energy conservation program expects to realise the potential energy savings identified in RIKEN, which was based on energy efficiency studies and energy audits.

g) Future tasks

On 16 November 2009, the government issued Governmental Regulation No. 70/2009 regarding Energy Conservation. It is the implementing legislation on energy conservation with regard to the Energy Law. The Governmental Regulation No. 70/2009 calls for:

- Drafting and adoption of a new National Energy Conservation Master Plan—RIKEN (Rencana Induk Konservasi Energi Nasional), which is to be updated every five years, or annually, as required
- Mandatory assignment of an energy manager, to implement energy auditing, and energy conservation program for users of final energy of more than 6000 tonnes of oil equivalent
- Voluntary energy efficiency standards and energy labelling
- Implementing government incentives, which includes tax exemption and fiscal incentives on imports of energy saving equipment and appliances, and special low interest rates on investments in energy conservation
- Implement government disincentives for non-compliance parties that include written notices to comply, public announcements of non-compliance, monetary fines, and reductions of energy supply.

²⁰Han Wei, UNDP-GEF (2009).

1.4. Institutional Structure

Under the Energy Law, energy policies are formulated by the National Energy Council—DEN (Dewan Energy Nasional), established in 2008. DEN consists of stakeholders of energy that includes seven ministers and high-rank government officials, and eight stakeholder members from industry, academia, technology experts, representative of environmental concerns, and consumers.

Presidential Decree No. 43/1991 mandates relevant government departments and agencies to coordinate in issuing government rulings and to develop programs within their respective jurisdictions and regulatory roles²¹. Ministerial coordination is relevant in the implementation of incentives and disincentives for energy conservation.

The Ministry of Energy and Mineral Resources is responsible for implementing energy efficiency and conservation programs. The regional governments are responsible for implementing energy efficiency/conservation programs within their jurisdiction in the regions.

a) Name of organisation

Ministry of Energy and Mineral Resources (MEMR), Directorate General of Electricity and Energy Utilization (DGEEU), Directorate of New Renewable Energy and Energy Conservation, and the Sub-Directorate of Energy Conservation

The following refers to the Sub-Directorate of Energy Conservation:

b) Status of organisation

Government

c) Role and responsibility

To develop energy conservation programs and to implement energy conservation

d) Covered sectors

Industry, transport, commercial sector, and the residential sector

e) Established dates

The Directorate General of Electricity and Energy Utilization, formerly the Directorate General of Power, and its Sub-Directorates, was established in 1978

f) Number of staff

The Sub-Directorate of Energy Conservation has about 12 permanent government officials and administrative staff members

1.5. Information Dissemination, Awareness-raising and Capacity-building

a) Information collection and dissemination

The Clearing House of Energy Conservation (CHEC) is the centre for data and information related to energy efficiency and conservation activities. However the operation of the CHEC is still inadequate because of limited capacity. The Government of Indonesia, assisted by Danida, are cooperating with the CHEC.

b) Awareness-raising

The 'National Energy Efficiency Movement' implemented by the Ministry of Energy and Mineral Resources promotes energy conservation awareness through seminars and workshops, talk shows, public advertisements, brochures and leaflets; it is directed to households, specific industries and transport. The state-owned electricity company PLN

²¹ Presidential Decree (KEPRES) No. 43/1991 on Energy Conservation.

promotes energy conservation in electricity use. Other institutions that promote awareness include the Agency for the Assessment and Application of Technology (BPPT).

c) Capacity-building

Formal training of energy managers and the accreditation of energy managers is being developed. Training is given to government officials responsible for mandatory energy savings and reporting of energy use in government office buildings. Voluntary capacity building on energy efficiency in industry and commercial buildings is being implemented. The Centre of Education and Training on Electricity and Renewable Energy within the Ministry of Energy and Mineral Resources actively organises training related to energy efficiency and conservation activities. The centre is also responsible for training energy managers and energy auditors.

1.6. Research and Development in Energy Efficiency and Conservation

The Agency for Assessment and Application of Technology (BPPT) had developed an energy audit mobile unit, for energy auditing and assessment of energy efficiency in industrial energy use and energy use in commercial buildings. The Centre of Education and Training on Electricity and Renewable Energy conducts testing of compact fluorescent lamps.

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS

2.1. Government Laws, Decrees, Acts

a) Name

Republic of Indonesia, Law No. 30/2007 regarding Energy (The Energy Law)

b) Purpose

The Energy Law is the legally binding legislation on energy, including energy conservation.

c) Applicable sectors

All sectors of the economy, government departments and agencies, and regional governments

d) Outline

The Energy Law outlines the economy's philosophy on the management of energy resources, the environment and energy, energy conservation, energy pricing, international cooperation, institutional aspects with regard to formulation of energy policy, business in energy, and rights and responsibilities.

e) Financial resources and budget allocation

Sourced from the Government budget

f) Expected results

Under Energy Law No. 30/2007, Indonesia will draft a new National Energy Policy and a new National Energy Conservation Master Plan (RIKEN) and implement measures under Governmental Regulation No. 70/2009 regarding Energy Conservation.

2.2. Regulatory Measures

On 16 November 2009, the government issued Governmental Regulation (*Peraturan Pemerintah*) No. 70/2009 on Energy Conservation, as called for by the Energy Law.

Regulatory measures addressed included:

- the formulation of a National Energy Conservation Master Plan (RIKEN, *Rencana Induk Konservasi Energi Nasional*), which is to be updated every five years, or annually, as required

- the mandatory assignment of an energy manager, energy auditing, and the implementation of an energy conservation program for users of final energy of 6000 toe (tonnes of oil equivalent) or more
- mandatory energy-efficiency standards and energy labelling
- the implementation of government incentives, including tax exemptions and fiscal incentives for imports of energy-saving equipment and appliances, and special low interest rates for investments in energy conservation
- the implementation of government disincentives, including written notices to comply, public announcements of noncompliance, monetary fines, and reductions in energy supply for noncompliance.

At the time of writing, the government was drafting specific rulings and regulatory frameworks to implement Governmental Regulation No. 70/2009 regarding Energy Conservation in Indonesia.

Regulations on energy conservation that were issued prior to the Energy Law that may still apply or provisionally apply include:

- Presidential Instruction No. 9/1982 on Energy Conservation (in government departments and agencies, and state owned enterprise office buildings and official vehicles).
- Presidential Decree No. 43/1991 on Energy Conservation.
This Presidential Decree calls for inter-ministerial coordination on policies and programs on energy conservation that includes, policy on investment, funding of energy conservation programs and pricing of energy in relation to achieving energy conservation goals. The contents of this regulation appear in Government Regulation No. 70/2009.
- Ministerial Decree No. 100.k/48/M.PE/1995 National Energy Conservation Master Plan (RIKEN) and revision in 2005. RIKEN was revised in 2005. RIKEN is an economy-wide plan on energy conservation.
- Ministerial Decree No. 0002/2004 regarding Development Policy on Renewable Energy and Energy Conservation - *The Green Energy Policy*. The Green Energy Policy is an economy-wide policy.
 - Presidential Instruction No. 10/2005 regarding Energy Saving (for government and regional government office buildings).
 - Ministerial Regulation No. 0031/2005 regarding Process of Energy Saving, which is the guidelines of implementation of Presidential Instruction No. 10/2005.
- Presidential Regulation No. 5/2006 regarding National Energy Policy.
- Blueprint National Energy Management 2008 – (Blueprint Pengelolaan Energi Nasional – Blueprint PEN) revises the National Energy Policy of Presidential Regulation No. 5/2006. Blueprint PEN elaborates on the energy policy, including on energy conservation.
- Presidential Instruction No. 2/2008 regarding Conservation of Energy and Water as revised version of Presidential Decree No. 10/2005 on Energy Efficiency. Under the Instruction, government agencies should report energy and water use twice a year.

2.2.1. Minimum Energy Performance Standards and Labelling

a) Name

Indonesia has some minimum energy performance standards (MEPS) for electrical appliances based on the Standar Nasional Indonesia (SNI) and other technical standards on energy performance testing standards (EPTS) for electrical appliances.

b) Purpose

To specify the general requirements for energy labelling and to improve energy efficiency and conservation

c) Applicable sectors

Appliances, lighting and equipment

Table 2: MEPS and EPTS

	Product	EPTS
1.	Ballast (magnetic)	SNI IEC 60929-2009
2.	Fluorescent lamps	SNI IEC 60901-2009
3.	Incandescent lamps	SNI IEC 60432-1-2009
4.	Room air conditioners—split type	ISO 5151
5.	Room air conditioners—window	ISO 5151
6.	Household refrigerators	SNI IEC 15502-2009
7.	Clothes washers	SNI IEC 60456-2009
8.	Electric irons	SNI IEC 60311-2009
9.	Vacuum cleaner	SNI IEC 60312-2009

d) Outline

SNI is drafted and registered under the strict system and guidelines of the National Standardization Agency (Badan Standardisasi Nasional—BSN). Additional energy standards on electrical appliances are being developed.

2.2.2. Building Energy Codes

Government Regulation No. 36/2005 explains that under Law No. 28/2002 on Buildings all buildings must comply with existing standards. Indonesia has four energy standards (SNI) for buildings, the standards cover: (1) the building envelope, (2) air conditioning, (3) lighting, and (4) building energy auditing. Energy building standards have yet to be mandated. However, voluntarily energy conservation and efficiency measures in commercial buildings are widely implemented.

a) Name

SNI for buildings

b) Purpose

To improve energy efficiency performance of existing and new buildings and structures

c) Applicable sectors

Residential and commercial

d) Outline

The standards outline:

- *building envelope*: design criteria, design procedures, energy conservation
- *air conditioning systems*: technical calculation, selection, measurement and assessment, energy conservation
- *lighting systems*: lighting guidelines for optimal and efficient operation
- *energy audit procedure*: energy audit procedures for offices, hotels, shopping centres, hospitals, apartments and residences.

The standards also provide recommendations that take into account productivity, comfort and cost.

Table 3: SNI for Buildings

1.	SNI 03-6389-2000	Energy conservation for building envelope of building structures (<i>Konservasi energy selubung bangunan pada bangunan gedung</i>)
2.	SNI 03-6390-2000	Energy conservation for air conditioning systems in building structures (<i>Konservasi energy system tata udara pada bangunan gedung</i>)
3.	SNI 03-6197-2000	Energy conservation for lighting systems in building structures (<i>Konservasi energy system pencahayaan pada bangunan gedung</i>)
4.	SNI 03-6196-2000	Energy auditing procedure for building structures (<i>Prosedur audit energy pada bangunan gedung</i>)

e) Financial resources and budget allocation

Funding from the Government budget and international donor agencies

f) Expected results

The construction of more efficient buildings and improved efficiency of existing buildings (through retrofit)

2.2.3. Fuel Efficiency Standards

Indonesia currently does not have minimum fuel efficiency standards; however, fuel efficiency standards are expected to be implemented in the near future, as they were confirmed at COP-15 in December 2009.

Current emissions standards are equivalent to Euro II, implemented in 2006. Indonesia expects to advance to Euro IV-equivalent emission standards by 2012. The state-owned oil company Pertamina is working on plans to upgrade their refineries to produce Euro IV compliant gasoline. The refinery upgrading projects are expected to be completed during 2014-16.

2.3. Voluntary Measures

Voluntary energy savings and conservation measures are being implemented by industry and commercial buildings that involve commercial financing. This implementation had involved energy intensive industries such as the fertiliser, cement, pulp and paper and steel industries. Commercial buildings have implemented various EE&C measures including installation of automated building energy management.

2.4. Financial Measures Taken by the Government**2.4.1. Tax Scheme**

The government currently does not have a tax scheme, such as tax deductions, in relation to investments in energy efficiency and conservation.

2.4.2. Low-Interest Loans

The government currently does not have low-interest loans for investments in energy efficiency and conservation measures, devices and equipment to reduce and conserve energy use.

2.4.3. Subsidies and Budgetary Measures

Government subsidies and budgetary measures are provided for energy conservation programs such as the (1) partnership program on energy conservation in energy auditing, (2) the lighting program—for eligible households in relation to demand-side management (DSM) programs and saving energy, (3) BRESL, and (4) other programs such as for information dissemination.

2.4.4. Other Incentives

In accordance with the action plan (Governmental Regulation No. 70/2009), the government is expected to introduce government incentives that include tax exemption and fiscal incentives on imports of energy saving equipment and appliances, and special low interest rates on investments in energy conservation in the near future.

2.5. Energy Pricing

The government seeks to gradually remove energy subsidies. However, substantial government subsidies continue to be applied with regard to: lower octane gasoline (RON 88 octane), which is the gasoline grade most consumed in Indonesia; diesel fuel for transport; kerosene for households, as the government is expanding the kerosene-to-LPG conversion program in households; and subsidies to certain classes of electricity of low capacity supply contracts in households and small businesses, this group constitute a large share of electricity demand. Direct government subsidies on fuels could total more than USD 6 billion, in 2010.

2.6. Other Efforts for Energy Efficiency Improvements

2.6.1. Cooperation with Non-Government Organisations

Non-government organisations (NGOs) are actively involved in the development of energy efficiency actions that could be considered as contributing to the general conservation of fossil energy use.

2.6.2. Cooperation through Bilateral, Regional and Multilateral Schemes

Examples of notable ongoing cooperation in energy efficiency and conservation are: (1) Indonesia-JICA (Japan): Study on Energy Conservation and Efficiency Improvement in the Republic of Indonesia; (2) Indonesia—Denmark: Energy Efficiency in Industrial, Commercial, and Public Sector (EINCOPS); (3) Indonesia—UNDP/GEF: Barrier Removal to the Cost-Effective Development and Implementation of Energy Efficiency Standards and Labelling (BRESL); (4) Indonesia—the Netherlands: Energy Efficiency Improvement in Industry; (5) Indonesia—ASEAN: Promotion of Energy Efficiency and Conservation; (6) Indonesia-UNIDO: Promoting Energy Efficiency in the Industries through System Optimization and Energy Management Standard.

2.6.3. Other Cooperation/Efforts for Energy Efficiency Improvements

Indonesia is considering hosting the APEC—Energy Working Group (EWG) Peer Review on Energy Efficiency.

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JAPAN

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. Overall Energy Efficiency Improvement Goals

a) Key indicator

Energy intensity—total primary energy supply (TPES)/GDP

b) Goals

Reduce energy intensity by 30%

c) Base year

2003

d) Goal year

2030

e) Description

Within Japan's May 2006 National Energy Strategy, the Energy Conservation Frontrunner Plan reinforces the economy's strategy to reduce petroleum consumption. Setting a target to improve energy efficiency by 30% relative to 2003 by 2030, the Japanese Government pledges to establish a state-of-the-art energy supply-demand structure within a market of high prices that the government expects to endure for the medium to long term. Beyond a sustained promotion of energy efficiency, the Japanese government pledges to optimise energy use by reducing oil dependence through energy intensity improvements in the oil-intensive transport sector. The Energy Conservation Frontrunner Plan sets a strategy to achieve this energy efficiency target, through strategic planning in both the medium and long term. It establishes a plan to develop energy conservation technology and to develop and disseminate a benchmarking approach, so that the energy conservation effect can be quantitatively verified. For more details see: Energy Conservation Frontrunner Plan by Ministry of Economy, Trade and Industry (METI) at www.nedo.go.jp/informations/other/190423_1/190423_1.html.

1.2. Sectoral Energy Efficiency Improvement Goals

a) Sector

Power (Federation of Electric Power Companies)

b) Goals

Reducing CO₂ emissions intensity (emissions per unit of user-end electricity) by an average of approximately 20% (0.34kg-CO₂/kWh)

c) Base year

FY1990

d) Goal year

FY2008-2012 (average over five years)

e) Description

On 17 December 1996, the Keidanren Voluntary Action Plan on the Environment was presented. Goals of voluntary action plans such as a CO₂ unit goal and energy efficiency goal are individually formulated in 36 industries (represented by 137 organisations) in industrial, commercial, transportation and energy-conversion sectors. For details see: Environmental Action Plan by The Federation of Electric Power Companies of Japan at www.fepec.or.jp/english/library/environmental_action_plan/index.html.

a) Sector

Industry (Petroleum Association of Japan)

b) Goals

Improve energy efficiency by 13%

c) Base year

FY1990

d) Goal year

FY2008-2012 (average over five years)

e) Description

On 17 December 1996, the Keidanren Voluntary Action Plan on the Environment was presented. Goals of voluntary action plans such as CO₂ unit goal and energy efficiency goal are individually formulated in 36 industries (represented by 137 organisations) in the industrial, commercial, transportation and energy-conversion sectors. For details see: Global Environmental Voluntary Action Plan by Petroleum Association of Japan at www.paj.gr.jp/paj_info/topics/2009/20090120.html (Japanese only).

a) Sector

Industry (Japan Iron and Steel Federation)

b) Goals

Improve energy efficiency by 10%

c) Base year

FY1990

d) Goal year

FY2008-2012 (average over five years)

e) Description

On 17 December 1996, the Keidanren Voluntary Action Plan on the Environment was presented. Goals of voluntary action plans such as CO₂ unit goal and energy efficiency goal are individually formulated in 36 industries (represented by 137 organisations) in industrial, commercial, transportation and energy-conversion sectors. For details see: Voluntary Action Plan by Japan Iron and Steel Federation at www.jisf.or.jp/en/activity/warm/commit/index.html.

a) Sector

Industry (Japan Cement Association)

b) Goals

Improve energy efficiency by 3.8%

c) Base year

FY1990

d) Goal year

FY2008-2012 (average over five years)

e) Description

On 17 December 1996, the Keidanren Voluntary Action Plan on the Environment was presented. Goals of voluntary action plans such as CO₂ unit goal and energy efficiency goal are individually formulated in 36 industries (represented by 137 organisations) in industrial, commercial, transportation and energy-conversion sectors. For details see: Voluntary Action Plan by Japan Cement Association at www.jcassoc.or.jp/cement/1jpn/jg1a.html (Japanese only).

a) Sector

Industry (Japan Chemical Industry Association)

b) Goals

Improve energy efficiency by 20%

c) Base year

FY1990

d) Goal year

FY2008-2012 (average over five years)

e) Description

On December 17, 1996, the Keidanren Voluntary Action Plan on the Environment was presented. Goals of voluntary action plans such as CO₂ unit goal and energy efficiency goal are individually formulated in 36 industries (represented by 137 organisations) in industrial, commercial, transportation and energy-conversion sectors. For details see: Voluntary Action Plan by Japan Chemical Industry Association at www.nikkakyo.org/upload/2314_3011.pdf (Japanese only).

a) Sector

Industry (Japan Paper Association)

b) Goals

Improve energy efficiency by 20%

c) Base year

FY1990

d) Goal year

FY2008-2012 (average over five years)

e) Description

On 17 December 1996, the Keidanren Voluntary Action Plan on the Environment was presented. Goals of voluntary action plans such as CO₂ unit goal and energy efficiency goal are individually formulated in 36 industries (represented by 137 organisations) in industrial, commercial, transportation and energy-conversion sectors. For details see: Voluntary Action Plan by Japan Paper Association at www.jpa.gr.jp/file/topics/20090318110739-1.pdf (Japanese only).

1.3. Action Plans for Promoting Energy Efficiency**a) Name**

New National Energy Strategy

b) Objectives

- Establishment of energy security measures that Japanese citizens can trust and rely on
- Establishment of the foundation for sustainable development through a comprehensive approach to energy issues and environmental issues
- Commitment to assist Asian and world economies in addressing energy problems.

c) Applicable sectors

All relevant sectors

d) Outlines

The 'New National Energy Strategy' is composed of various energy-related action plans to achieve the objectives. Detailed information in Japanese can be found at www.enecho.meti.go.jp/topics/energy-strategy/index.htm. Among these the following is closely related to the promotion of energy efficiency.

1) Energy Conservation Frontrunner Plan:

A positive cycle between the innovation in energy conservation technology and the reforms of the social system to actively use the results of such innovations will be established through:

- Formulation of an energy conservation technology strategy that clearly indicates the technical sectors in which a cross-sectoral and mid- to long-term breakthrough is required
- Preparation of pace-setting standards for various sectors, and selectively strengthen support for those who meet the standards
- Development of a business value assessment method with which companies engaged in energy conservation investment are evaluated by the market (investors)
- Medium- and long-term examinations of the efforts necessary to establish energy efficient social systems or urban structures.

2) Transport Energy for the Next Generation Plan:

The necessary environment will be prepared in order to establish a highly efficient transport infrastructure that can respond flexibly to changes in the energy market (e.g., demand-supply pressure in the oil market) through:

- Establishment of new fuel efficiency standards that promote fuel efficiency in passenger vehicles, and examination of the octane value improvement of regular gasoline
- Re-examination of the upper blending limit regulation of oxygenated compounds (including ethanol), improvement in the biomass derived fuel supply infrastructure, and facilitation of the use of diesel cars that have exhaust gas performance equal to gasoline cars
- Promotion of production and supply of new fuels such as biomass derived fuels (including bioethanol) and improvement of economic efficiency by promoting the development of high-efficiency ethanol production technology and GTL (Gas to Liquid) technology
- Promotion and dissemination of electric vehicles and fuel cell vehicles, facilitation of technical development of next-generation batteries and fuel cell vehicles including hydrogen storage technology, and promotion of the development and practical application of next-generation vehicles.

3) New Energy Innovation Plan:

Introduction and application of New Energy—solar, wind-power, biomass—will be enhanced according to the attribute and growth stage of each energy source and technology through:

- Proactive introduction of new energy related facilities in public establishments, application of the RPS (Renewables Portfolio Standard) law, and provision of market expansion support mechanisms such as subsidy and taxation systems
- Strategic and intensive promotion of technological development and experimental proof for innovative technologies that are being prepared for launch (for example, solar batteries made of new materials, secondary cells to control wind power output fluctuation, fuel cells to realise a hydrogen-using society)
- Formation of a substantial industrial structure for the new energy industry by developing a group of solar energy generation industries as well as a group of fuel cell and secondary cell industries, and promotion of regional businesses based on the local production and local consumption of wind power and biomass
- Construction of next-generation energy parks where people can view, touch and understand the new energy supply and use formats such as new energy
- Strategic development of critical technologies that support the new energy economy (for example, high efficiency production technology of bioethanol, next-generation secondary cells, inexpensive fuel cells) using super combustion and energy storing as key technologies
- Development and dissemination of innovative technologies that promote the intensive use of energy which include the effective use of fossil fuels
- Enhancement of support for new energy venture businesses that challenge innovative technologies.

4) Asia Energy and Environment Cooperation Strategy:

Development and implementation of energy-environment cooperation programs including the energy conservation sector in order to establish symbiosis with Asian economies. The program covers the following activities:

- Promotion of Energy Conservation based on the ‘Asia Energy Conservation Program’
- New Energy Cooperation in Asia
- Dissemination of clean use, production and safety technologies of coal in Asia
- Building the stockpiling system in Asia
- Promotion of regional cooperation on nuclear power in Asia
- Formulation of the ‘Energy Technology Strategy’: determine the technological challenges that should be met by 2030, while keeping in mind the mode of technology that would be required from a super long term perspective (i.e., 2050, 2100), and present a development strategy in the form of a roadmap (refer to Q1.6a: Cool Earth Energy Innovative Technology Plan).

e) Financial resources and budget allocation

The ‘New National Energy Strategy’ should be implemented under the cooperation of three bodies, a powerful leading company, a tough and efficient government that supports company activities, and an economy with a profound understanding of energy issues, with their relevant resources. The government will carry out environmental improvements for realising such ties between the three bodies.

f) Method for monitoring and measuring effects of action plans

Each project conducted under the 'New National Energy Strategy' is evaluated annually by a responsible division in ANRE/METI to confirm the progress of the project and adjust, if necessary, the resources for the project. The contents of the 'New National Energy Strategy' require constant review based on the progress of the activities and the changes in market environment and, furthermore, the result of internal and external considerations related to the reduction of greenhouse gas emissions. In conjunction with the triennial revision of the 'Basic Energy Plan' based on the Basic Energy Policy Act, while revising the medium- and long-term energy supply and demand outlook, respective policies will be evaluated and reviewed constantly to confirm the appropriateness of the direction indicated by the 'New National Energy Strategy'.

g) Expected results

The following five specific targets have been set as common long-term goals to be attained jointly by the government and private entities.

- *Target of energy conservation*: at least another 30% improvement of efficiency will be attained by 2030
- *Target of reducing oil dependence*: the ratio will be reduced to less than 40% by 2030
- *Target of reducing oil dependence in the transport sector*: the percentage will be reduced to around 80% by 2030
- *Target for nuclear power generation*: the ratio of nuclear power to total power production will be maintained or increased to 30-40% or more up to 2030 or later
- *Target of overseas natural resources development*: oil volume ratio of exploration and development by Japanese companies will be increased to around 40% by 2030.

h) Future tasks

See (f), above

1.4. Institutional Structure

Continuous information exchange for necessary coordination is conducted among relevant divisions of energy-related ministries as follows.

a) Name

Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry (ANRE/METI)

b) Status of organisation

Policymaker, regulator, implementer

c) Roles and responsibilities

Policymaker, regulator, implementer

d) Covered sectors

Energy matters in general

e) Established data

No information available

f) Number of staff members

No information available

a) Name

Ministry of Land, Infrastructure, Transport and Tourism (MIT)

b) Status of organisation

Policymaker, regulator, implementer

c) Roles and responsibilities

Policymaker, regulator, implementer

d) Covered sectors

Transport, building

e) Established date

No information available

f) Number of staff members

No information available

1.5. Information Dissemination, Awareness-raising and Capacity-building**a) Information collection and dissemination**

Relevant information is available from websites of ANRE/METI, the Energy Conservation Center, Japan (ECCJ) and major industrial associations.

b) Awareness-raising

Relevant information is available from websites of ANRE/METI, the Energy Conservation Center, Japan (ECCJ) and major industrial associations.

c) Capacity-building

The Energy Conservation Center, Japan (ECCJ) has been providing a training course for energy managers who will be in charge of the management of energy (heat, electricity) at large energy-using businesses.

1.6. Research and Development in Energy Efficiency and Conservation**1.6.1. Policies on Energy Efficiency Research, Development and Demonstrations****a) Level of government**

Central government

b) Name of policy

Cool Earth-Innovative Energy Technology Program

c) Responsible department/agency

Ministry of Economy, Trade and Industry (METI)

d) Applicable sectors

All relevant sectors

e) Financial resources (total amount, unit USD)

21 categories of technology were selected as innovative energy technologies and JPY 73 billion (approximately USD 826 million) in the 2008 fiscal year was allocated for R&D investment.

f) Outputs

Relevant R&D reports of the 21 categories of technology will be published and uploaded to the websites of the responsible organisations.

g) Outcomes

R&D results of the 21 categories of technology are expected to contribute to achieving a 50% reduction in CO₂ emissions throughout the world by 2050.

h) Description

The development of innovative technology is essential in achieving the long-term target of halving global greenhouse gas emissions by 2050 from the current levels under Cool Earth 50, proposed in May 2007. Based on awareness of this issue, an investigative commission comprising key intellectual figures, organised under Akira Amari, Minister of Economy, Trade and Industry, announced the Cool Earth-Innovative Energy Technology Program. The commission selected 21 innovative technologies whose development and deployment should be prioritised to achieve the target. Detailed information can be accessed at www.meti.go.jp/english/newtopics/data/nBackIssue20080305_04.html.

1.6.2. Programs on Energy Efficiency Research, Development and Demonstrations**a) Level of government**

Central government

b) Name of program

Several R&D programs have been conducted based on the 'Cool Earth-Innovative Energy Technology Program' by relevant organisations.

c) Responsible department/agency

METI and other relevant ministries, New Energy and Industrial Technology Development Organization (NEDO), National Institute of Advanced Industrial Science and Technology (AIST), relevant companies and universities/colleges.

d) Objectives and period

Each project has its own objective and R&D period.

e) Applicable sectors

All relevant sectors in the 21 categories

f) Financial resources (total amount, unit USD)

A certain portion of these projects is funded by METI or relevant ministries

g) Outputs

Relevant R&D reports of the 21 categories of technology will be published and uploaded to websites of the responsible organisations.

1.6.3. Research, Development and Demonstration as a Driver for Continuous Energy Efficiency Improvement

Each project conducted under the 'Cool Earth-Innovative Energy Technology Program' is evaluated annually by a responsible division in METI to confirm the progress of the project and adjust, if necessary, the priorities, modalities and resources for the project.

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS**2.1. Government laws, decrees, acts****a) Name**

Law Concerning the Rational Use of Energy (Energy Conservation Law)

b) Level

Central

c) Purpose

The law was enacted in 1979 to ensure effective use of fuel resources in response to the economic and social environments surrounding energy issues and to promote rational use of energy by industries, business establishments and others.

d) Applicable sectors

Industry, transport, residential, commercial

e) Outline

See 2.2 below

2.2. Regulatory Measures

To ensure effective use of fuel resources in response to the economic and social environments surrounding energy issues and to promote rational use of energy by industries, business establishments and others, a number of programs have been implemented.

2.2.1. Business Energy Reporting

Business organisations (manufacturers, service companies, etc.) of which the energy usage in each fiscal year amounts to 1500 kilolitres (crude oil equivalent) or more are obliged to report annually on the amounts of energy they actually consume, to prepare and submit medium-term (3–5 year) plans for the rational use of energy, and to assign responsible persons for energy management. The measure aims to reduce business energy consumption intensities by 1% or more a year on average over the medium term.

2.2.2. Minimum Energy Performance Standards (MEPS) and Labelling**a) Name**

Top Runner Program

b) Purpose

To improve energy efficiency of machinery and equipment

c) Applicable sectors

Machinery and equipment

d) Outline

The Top Runner Program sets target standard values for energy using machinery and equipment, calling for manufacturers and importers to be obliged to enhance the energy efficiency of their products. Manufacturers are obliged to exceed a weighted average value for all their products per category for each predetermined target year. This is one way of setting energy efficiency target values for machinery and equipment and is based on the concept that ‘manufacturers should produce/import products that have better energy efficiency performance than all the products in the same category currently available on the market’.

The following 21 categories of products are designated in the program as of 2007: passenger vehicles, freight vehicles, air conditioners, electric refrigerators, electric freezers, electric rice cookers, microwave ovens, fluorescent lights, electric toilet seats, TV sets, video cassette recorders, DVD recorders, computers, magnetic disk units, copying machines, space heaters, gas cooking appliances, gas water heaters, oil water heaters, vending machines, and transformers. Detailed information can be found at www.eccj.or.jp/top_runner/index.html.

e) Financial resources and budget allocation

No information available

f) Expected results

No information available

a) Name

Energy Conservation Labelling Program

b) Purpose

To provide consumers with energy efficiency information

c) Applicable sectors

Machinery and equipment

d) Outline

The Energy Conservation Labelling Program was introduced to provide consumers with necessary information concerning the energy efficiency performance of products covered by the Top Runner Program. The labels affixed to products indicate the achievement ratio of the energy conservation standards in question. The scope of products under the system has been expanded, and currently 16 categories of products are subject to the labelling. Another labelling program also applies to retailers - a uniform label indicates a multi-step rating of energy performance based on the estimated annual power consumption and the achievement ratio of the energy conservation standards. Currently, three categories of products (air conditioners, TV sets and refrigerators) are covered by this program.

e) Financial resources and budget allocation

No information available

f) Expected results

No information available

2.2.3. Building energy codes

Construction business organisations are obliged, when they construct, extend, reconstruct or repair a large house or building with floor area of 2000 square metres or more, to report their energy conservation measures to the relevant authority beforehand and periodically (every three years) report on the state of maintenance of the house or building.

2.2.4. Transport

Transport business organisations (freight transport companies, passenger service companies, consignors) that are larger than a certain size (for example, freight transport companies with 200 trucks or more) are obliged to prepare and submit energy conservation plans as well as an annual report on their energy consumption amounts and other related matters. The measure was introduced in 2006 to expand the energy conservation activities in the transport section.

2.3. Voluntary Measures**a) Name**

Keidanren Voluntary Action Plan

b) Level

Not applicable

c) Purpose

On 17 December 1996, the Keidanren Voluntary Action Plan on the Environment was presented. Goals of voluntary action plans such as the CO₂ unit goal and energy efficiency goal are individually formulated in 36 industries (represented by 137 organisations) in

industrial, commercial, transportation and energy-conversion sectors. (See section 1.2.).

d) Applicable sectors

Not applicable

e) Outline

The Keidanren Voluntary Action Plan set a goal of reducing average CO₂ emissions from targeted businesses in fiscal 2008–12 to below fiscal 1990 levels. The plan also set different goals according to business types, and it encourages voluntary actions by different industries. Today, 60 industrial organisations and companies are participating in the plan.

METI has implemented a follow-up to the implementation of the action plan by industry. To ensure the achievement of the target set by the action plan, monitoring is undertaken for each business category and has been implemented since fiscal 1998. There were 39 targeted business categories in FY 2008 under the administrative jurisdiction of METI. Of those, 28 categories are in the industry and energy conversion sector, and 11 categories are in the commercial sector. Detailed information in Japanese can be found at www.keidanren.or.jp/japanese/policy/vape/index.html.

f) Financial resources and budget allocation

No information available

g) Expected Results

No information available

2.4. Financial Measures Taken by the Government

2.4.1. Tax Scheme

a) Name

1) *Tax scheme to promote investments in structural reforms of energy supply and demand*

This tax scheme is available for businesses (industrial and commercial sectors) that acquire the specified energy conservation equipment (for example, highly efficient air-conditioning systems, high insulation window facilities, and light-emitting diodes) for which a special depreciation (an additional 30% of the equipment acquisition cost) will be applied. For small and medium-sized businesses, a tax deduction (7% of the equipment acquisition cost) is available instead of the special depreciation. This tax scheme was introduced to promote investment in the installation of equipment that facilitates the rational use of energy resources in the reform of the energy demand-supply structure.

2) *Vehicle greening tax scheme*

The vehicle greening tax scheme is composed of the following taxation measures for automobiles:

- Reductions of automobile taxes based on emission levels and fuel efficiency
- Imposition of heavy taxes on automobiles that have been used for several years since they received their new car registration and are becoming harmful to the environment
- Reductions in automobile acquisition taxes based on the emission levels and fuel efficiency.

In FY2008 and FY2009, the following tax benefits will be granted.

- For automobiles that have achieved a fuel efficiency target of 15% or higher

(target year: FY2010) and have achieved emission reductions of 75% or more over the FY2005 level, the automobile tax is reduced by 25% and JPY 150 000 is deducted from the acquisition price in the calculation of automobile acquisition tax

- Similarly, for automobiles that have achieved a fuel efficiency target of 25% or higher (target year: FY2010) and have achieved emission reductions of 75% or more over the FY2005 level, the automobile tax is reduced by 50% and JPY 300 000 is deducted from the acquisition price in the calculation of automobile acquisition tax
- For heavy vehicles, those that have achieved the FY2015 target level and conform to the FY2009 emission control are granted a 2% reduction in the automobile acquisition tax
- Among clean diesel vehicles, those that conform to the FY2009 emission control and have been placed on the market ahead of the start of enforcement of the emission control are granted a 1% reduction in automobile acquisition tax.

a) Name

A tax scheme to promote investment for housing renovation to improve energy efficiency

b) Level

Central

c) Purpose

To promote investments and various efforts aimed at realising energy conservation in response to the economic and social environments surrounding energy issues and to further promote rational use of energy by relevant sectors.

d) Applicable sectors

Industry, transport, residential, commercial

e) Outline

When renovating a house with improvement of energy efficiency at a certain level (thermal insulation of windows as an essential condition plus thermal insulation of floorings, walls and ceilings, or installation of solar photovoltaic facilities), 10% of the renovation cost (maximum amount of the cost: JPY 2 million or JPY 3 million when installing solar photovoltaic facilities) will be deducted from that year's income tax.

f) Financial resources and budget allocation

No information available

g) Expected Results

No information available

2.4.2. Low-Interest Loans

a) Name

Environment and Energy Measures Loans

b) Level

Central

c) Purpose

To provide low-interest loan to small and medium-sized businesses planning to install energy

conservation equipment or designated pollution control equipment.

d) Applicable sectors

Industry

e) Outline

Low-interest loans to a maximum amount of JPY 270 million are provided to small and medium-sized scale businesses planning to install high-efficiency energy conservation equipment at their facilities.

f) Financial resources and budget allocation

No information available

g) Expected Results

No information available

2.4.3. Subsidies and Budgetary Measures

a) Name

1) *Support for introduction of energy conservation equipment:*

Subsidies are available to businesses (all sectors) for the introduction cost of facilities and related equipment (for example, high-performance industrial furnaces, and waste heat utilisation systems), which are to have high energy conservation efficiency, and of which the cost effectiveness is considered reasonable. Subsidy rates are: (a) one-third for a project to be implemented by a single company (JPY 500 million ceiling, while large-scale work is offered up to JPY 1.5 billion); (b) one-half for a project to be implemented by multiple companies working cooperatively (JPY1.5 billion ceiling). Budget allocation is JPY 35.7 billion (for fiscal 2008).

2) *Support for promotion of the dissemination of high-efficiency water heaters:*

Subsidies are available to the household and commercial sectors for the introduction of high-efficiency water heaters which are recognised as being very energy-efficient (e.g. CO₂ refrigerant heat pump-type water heaters, latent heat recovery-type water heaters) to reduce initial costs and boost demand, thereby promoting efforts for energy conservation in such sectors. Budget allocation is JPY 16.7 billion together with '3' below (for fiscal 2008).

3) *Support for promotion of dissemination of high-efficiency air conditioners:*

Subsidies are available to the household and commercial sectors for the introduction of high-efficiency air conditioners that are recognised as being very energy-efficient to reduce initial costs and boost demand, thereby promoting efforts for energy conservation in such sectors. Budget allocation is JPY 16.7 billion together with '2' above (for fiscal 2008).

4) *Support for high-efficiency houses and buildings (project to promote introduction of high-efficiency energy systems in houses and buildings):*

Subsidies are available to the household and commercial sectors for the introduction of high-efficiency energy systems for residential and non-residential buildings, and to collect and publicise information on the systems' energy-efficiency and cost-effectiveness, thereby raising public awareness of energy-efficient residential and non-residential buildings and achieving great strides in energy conservation for buildings. Subsidy rate is one-third of the cost as the maximum. Budget allocation is JPY 7.4 billion (for fiscal 2008).

5) *Support for promotion of dissemination of ESCO business:*

Subsidy to small and medium-sized businesses to provide support for their energy-conservation projects to be conducted by using energy service companies (so-called ESCOs) which provide comprehensive energy-conservation services. Half of the cost of an energy-conservation project (up to JPY 30 million) would be covered by the subsidy scheme. Free audits for SMEs are also provided to assess the possibility of enhancement of energy efficiency at their facilities. Budget allocation is JPY 1.1 billion (for fiscal 2008).

6) *Support for dissemination and promotion of solar photovoltaic equipment:*

Subsidy to the household sector for the introduction of solar photovoltaic equipment for residential houses and buildings, for which JPY 70 000 per kW is subsidised under the scheme for installation of such equipment. This scheme is revitalised to accelerate dissemination of solar photovoltaic equipment for residential houses and buildings. Budget allocation is JPY 9.0 billion (for fiscal 2008).

7) *Promotion of development of energy conservation technology:*

The Energy Conservation Technology Strategy was formulated as a medium- and long-term strategy for the year 2030 in order to further promote the development of energy-conservation technology with collaborative efforts among various entities towards technology development through the fusion of various essential technologies, thereby creating synergetic effects. This technology development strategy established five priority areas from medium and long-term perspective, namely 'technology for hyper-combustion systems', 'technology for use of energy beyond the space and time', 'technology for creating energy-efficient information-oriented living environments', 'technology for establishing an advanced transportation society', and 'next-generation energy-efficient devices'. The energy conservation technology development program provides financial support in an intensive fashion for the purpose of supporting technology development projects in accordance with the Energy Conservation Technology Strategy, thereby promoting the development of energy-conservation technology in an efficient and effective manner. Budget allocation is JPY 6.9 billion (for fiscal 2008).

8) *Support for dissemination and promotion of eco-driving:*

Budgetary measures support organisations in the transportation sector to conduct activities for dissemination and promotion of eco-drive via leaflets, websites, driving lessons and lectures, and so on. This scheme aims at promoting eco-driving as an economy-wide movement through the concerted efforts of the related government agencies and organisations.

b) Level

Central

c) Purpose

To promote investments and various efforts aimed at realising energy conservation in response to the economic and social environments surrounding energy issues and to further promote rational use of energy by relevant sectors.

d) Applicable sectors

Industry, transport, residential, commercial

e) Outline

See above

f) Financial resources and budget allocation

See above

g) Expected results

No information available

2.4.4. Other Incentives**a) Name**

Support for promotion of dissemination of ESCO business

b) Level

Central

c) Purpose

To promote investments and various efforts aimed at realising energy conservation in response to the economic and social environments surrounding energy issues and to further promote rational use of energy by relevant sectors.

d) Applicable sectors

Industry, transport, residential, commercial

e) Outline

See information in 2.4.3

f) Financial resources and budget allocation

See information in 2.4.3

g) Expected Results

No information available

2.5. Energy Pricing**Outline of electricity prices:**

USD 0.176 per kWh (for residential sector) and USD 0.116 per kWh (for business sector)—averages in 2007.

As for customers in the contract category of 50 kW or larger, their electricity rates are decided freely between the customer and suppliers. As for customers in the contract category of less than 50 kW, it is necessary to receive ‘approval’ of the central government to raise their electricity rates, and submit ‘notification’ to the central government to reduce their electricity rates. Moreover, the ‘fuel cost adjustment system’ is introduced to reflect fossil fuel price fluctuations in electricity rates. While promoting demand levelling by discounting the electricity rates during slow demand hours and periods with ‘optional time-of-use lighting services’, the electricity usage is divided into three tiers by the ‘three-tier rate system’, and energy conservation is promoted by imposing higher rates on customers of large usage.

Outline of gasoline prices:

USD 1.375 per litre—as of December 2007.

Gasoline prices are decided by the oil price (A) that is decided by the price components other than taxes such as crude oil prices and refining and distribution costs, the petroleum tax and coal tax (B = JPY2.04), the gasoline tax (C = JPY53.8) and the tax on transactions of gas oil (D = KPY32.1).

- Gasoline = (A + B + C) x 1.05*
- Gas oil = (A + B) X 1.05 +D

- Kerosene = (A + B) x 1.05

*Consumption tax = 5%

2.6. Other Efforts for Energy Efficiency Improvements

2.6.1. Cooperation with Non-Government Organisations

Information not applicable

2.6.2. Cooperation through Bilateral, Regional and Multilateral Schemes

Information not applicable

2.6.3. Other Cooperation/Efforts for Energy Efficiency Improvements

Information not applicable

KOREA

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. Overall Energy Efficiency Improvement Goals

The National Energy Basic Plan (2008–2030), announced in September 2008, stipulates that Korea will reduce its energy intensity to 0.185 TPES/GDP (tonnes of oil equivalent per thousand USD) in 2030 from 0.341 TPES/GDP in 2006. The improvement in 2030 from the 2007 base year is 46%, which is the equivalent to an annual improvement of 2% on average.

1.2. Sectoral Energy Efficiency Improvement Goals

Following the overall energy efficiency improvement goal, the government set sectoral energy efficiency improvement goals for 2030 with a 2007 base year as follows:

- *Industry sector*: reduction in energy use of 16.7 million tonnes of oil equivalent (Mtoe) (12.5% reduction from BAU scenario)
- *Transport sector*: reduction in energy use of 7.0 Mtoe (15.1% reduction from BAU scenario)
- *Residential and commercial sector*: reduction in energy use of 12.0 Mtoe (20.3% reduction from BAU) scenario)
- *Public sector and others*: reduction in energy use of 1.9 Mtoe (31.5% reduction from BAU scenario).

1.3. Action Plans for Promoting Energy Efficiency

The 4th Rational Energy Utilization Basic Plan (2008–2012), or Energy Efficiency Initiative, is the latest action plan for promoting energy efficiency. It is part of the National Energy Basic Plan (2008–2030), which is expected to result in a 46% improvement in energy efficiency by 2030.

a) Objectives

The 4th Rational Energy Utilization Basic Plan aims for an 11.3% improvement in energy efficiency by 2012, compared with 2007. The average improvement rate of primary energy use is 2.3% per year during the period of the plan.

b) Applicable sectors

Industry, transportation, residential and commercial, public and others

c) Outline

The Energy Efficiency Initiative or Energy Efficiency Action Plan was approved at the 17th meeting of the National Energy Conservation Committee, presided over by Prime Minister Han Seung Soo. The plan is designed to cope with high global oil prices and climate change and improve the trade balance. Under this action plan, sectoral energy saving programs have been implemented using various incentives and regulation policies such as, financing, tax reduction, R&D subsidy, certification, etc. The incentives provided by the governments include those for companies that invest in energy efficiency, the phase-out of incandescent lamps by 2013, and the implementation of a program modelled after the Japanese Top Runner Program to complement the current Energy Efficiency Label and Standard Program.

Furthermore, the government will take the following steps:

- The government will invest KRW 1.2 trillion (about USD 930 million) in seven core technologies—building energy management systems, electric power IT, energy storage, green vehicles, LEDs, technologies to improve energy efficiency of the most energy intensive appliances, and green home appliances

- Increase the average fuel economy of automobiles by 16.5% by 2012
- Increase the maximum floor area ratio by 6% for buildings with the highest level of energy efficiency (grade 1)
- Will give preference to models with the grade 1 energy efficiency label and to products that deliver less than 1 watt of standby power when purchasing appliances for use in government buildings
- To encourage businesses to improve energy efficiency, the government will divide businesses into four categories depending on how much energy they consume. Specific measures such as negotiated and voluntary agreements will be made for each category.

d) Financial resources and budget allocation

The government has allocated USD 18.3 billion for the 4th Rational Energy Utilization Basic Plan (2008–2012), including USD 6.2 billion for the Rational Energy Utilization and USD 12.1 billion for the Land and Transport Infrastructure plans. The budget for Rational Energy Utilization includes government special accounts, electric power infrastructure funds, and so on. The plan promotes tax reduction in investment in industry and commercial buildings (20% reduction from the corporate or individual income taxes for the installation of specified energy efficiency facilities).

e) Method for monitoring and measuring effects of action plans

MKE (Ministry of Knowledge Economy) and KEMCO (Korea Energy Management Corporation) are responsible for monitoring and reporting on their individual programs, which are conducted through the activities of energy efficiency program evaluation, statistics (information gathering), benchmarking, etc. Monitoring projects usually have relied on R&D budgets from MKE to some extent. These efforts are compiled into the Report to National Energy Saving Promotion Committee. The latest report was submitted to the 16th National Energy Saving Promotion Committee (available only in Korean).

f) Expected results

Savings of 34.2 Mtoe of TPES in 2012 (USD 10.3 billion in energy imports, which amounted to 1.2% of GDP in 2007)

g) Future tasks

Included is the establishment of an annual comprehensive action plan integrating regional energy efficiency schemes. The Government is also looking to enhance the reporting scheme for individual and sectoral energy consumption either statistically or using a sample survey.

1.4. Institutional Structure

a) Name of organisation

MKE, KEMCO and MLTM (Ministry of Land, Transport and Marine) are responsible for energy efficiency improvement in Korea

b) Status of organisation

MKE and MLTM are policymakers, while KEMCO is a policy implementer

c) Roles and responsibilities

Overall energy efficiency policy is driven by MKE. Energy saving activities in industrial and building sectors is managed by MKE, while construction-related work for energy efficiency in the transport and building sectors is managed by MLTM. The Prime Minister has coordinated overall economy-wide energy efficiency programs through the National Energy Saving Promotion Committee. KEMCO's role is to improve energy efficiency, diffuse renewable energy, and reduce greenhouse gases. For this purpose, KEMCO implements

various projects aimed at rationalising energy use. KEMCO has eight regional energy/climate change centres, and four subsidiary branches.

Local governments have promoted energy efficiency by setting up the regional energy basic plans for a five-year period. Regional energy efficiency programs can be partially supported by MKE, especially focusing on public sector innovation and demonstrations for energy efficiency.

KEMCO's regional centres have cooperated with regional NGOs and research institutes to implement regional energy efficiency activities based on the plan.

More information on KEMCO can be seen at the websites
www.kemco.or.kr/new_eng/pg01/pg01050000.asp and
www.kemco.or.kr/new_eng/pg01/pg01060000.asp.

d) Covered sectors

Industry (including agriculture), transport, residential and commercial, and public and others

e) Established date

MKE was established in 2008 through merging the Ministry of Commerce, Industry, and Energy (MOCIE) with elements of the Ministry of Information and Communications, the Ministry of Science and Technology, and the Ministry of Finance and Economy, with the aim of creating an enhanced government instrument capable of meeting new challenges of the 21st century.

KEMCO was established in 1979.

f) Number of staff members

KEMCO had 475 staff members in 2008.

1.5. Information Dissemination, Awareness-raising and Capacity-building

a) Information dissemination

A wide range of information is readily available to Korean energy consumers. For example, the purchase of energy efficiency products is generally promoted through the internet by providing energy efficiency and related cost saving information. For public institutions including government, mandatory procurement guidelines for purchasing energy efficiency products has been applied.

b) Awareness-raising

Awareness campaigns have been undertaken with specific initiatives such as energy saving campaigns (Heating 2018 in winter, Energy Minus Love Plus in summer), National Energy Efficiency Awards, designation of November as Energy Saving Month, as well as public relations (PR) through the media (television, radio), a prize contest for PR materials (poster, catch phrases), an economy-wide exhibition (Korea Energy Show) and mobile exhibitions, and early education in elementary and middle school.

c) Capacity-building

Capacity building programs have been undertaken such as training energy managers (appointed in the high energy-consuming industries or buildings above 2000 toe per annum), training operators for boilers and pressure vessels, education for regional energy planning officials and training courses for energy auditors.

1.6. Research and Development in Energy Efficiency and Conservation

Technological innovations, adoption of new energy technologies and the diffusion of existing highly efficient energy technology play important roles in achieving the overall energy efficiency improvement goal in Korea. In May 2006, the government announced the Basic

Scheme for National Energy Resource Technology Development (2006–2015), which includes promotion of research and development in energy efficiency and conservation.

Reinforcing the support for technological innovation in the energy sector is also one of the key elements of the National Energy Basic Plan (2008–2030). In the industrial sector, Korea will increase its support for R&D to improve the energy efficiency of industrial equipment and facility upgrades, and provide support for companies that invest in energy efficiency.

The Korea Institute of Energy and Resources Technology Evaluation and Planning (KETEP) was established in December 2007, with a key mission of advancing energy technology R&D in Korea. Their main function is to support MKE in formulating energy technology policies. As energy efficiency technology is a KETEP focus, the Energy Efficiency R&D Program has been undertaken by KETEP with the objective of securing additional energy saving potential of 5% of TPES during the period 2006–15. Financial support for this program was USD 117 million in 2007, where government funding was USD 79 million.

The seven Runner Programs that focus on typical energy consuming end-use devices have been prioritised in energy efficiency R&D. Seven objects identified for R&D that cover about 41% of total final energy consumption include super boilers, premium electric motors, HVACs, industrial furnaces, dryers, lighting and home appliances. Individual R&D projects are generally undertaken in cooperation with enterprises, and R&D subsidies can be provided in part for the required total investment.

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENT

2.1. Government Laws, Decrees, Acts

a) Name

Rational Energy Utilization Act (REUA)

b) Purpose

REUA is designed to result in sustainable development of the economy by stabilising energy demand and supply, increasing rational and efficient energy use, and reducing environmental damage caused by energy consumption.

c) Applicable sectors

REUA applies to all energy end use sectors

d) Outline

In the wake of the second oil shock in 1979, the Ministry of Energy and Resources was established to exclusively administer the planning and enforcement of energy policies (it was later incorporated into the Ministry of Trade, Industry and Energy). In the following year, REUA was promulgated in an attempt to ensure energy security and promote energy efficiency and conservation.

Article 1 of REUA stipulates the purpose of the act, namely, to contribute to the sound development of the economy and the promotion of welfare by realising the stability of demand and supply of energy, increasing the rational and efficient use of energy, and reducing the environmental damage caused by the consumption of energy.

REUA is comprised of the following chapters; General Provisions, Policy and Plan on Energy, Rationalization of Energy Utilization, Development of Energy Technology, Control over Heat-Using Machinery and Materials, Korea Energy Management Corporation, Korea Heat Management and Execution Association, Supplementary Provisions, and Penal Provisions.

Since its enactment, REUA has been amended several times, the latest amendment was passed in February 2008. The full text is available at the website, www.unescap.org/esd/energy/publications/compend/ceccpart4chapter8.htm.

e) Financial resources and budget allocation

About USD 750 million was provided in 2008 by the rational energy utilisation special accounts.

2.2. Regulatory measures

2.2.1. Minimum Energy Performance Standards (MEPS) and Labelling

a) Name

Energy Efficiency Standards and Labelling Program

b) Purpose

The purpose of the Energy Efficiency Labelling program is to save energy by enabling consumers to identify high-efficiency, energy saving type products easily, and thus encourage manufacturers (importers) to produce (import) and sell these products from the beginning stage, through indicating the energy efficiency grade from the 1st to 5th grade. The minimum energy performance standard is to prohibit low efficiency products from spreading, and to promote the manufacturers' technical development by setting up and controlling the minimum required efficiency standard.

c) Applicable sectors

Appliances, lighting and equipment in the residential, commercial and industry sectors

d) Outline

The Energy Efficiency Labelling and Standard Program enables consumers to identify highly energy-efficient products easily by mandatory indication of the energy efficiency grade, mandatory reporting and applying MEPS.

Energy consumption efficiency grade labels are based on five grades, with 1st grade products having the best energy-saving quality. A 1st grade product saves 30%–40% more energy than a 5th grade product. To enhance the energy consumption efficiency grade, MKE and KEMCO make a constant effort to analyse each product's market state and skill standardisation, and they have been continuously upgrading the standard. If the standard is strengthened, different grades can be seen even among the same products.

The MEPS is the minimum energy efficiency standard suggested by the Government. It bans the production and sale of low energy-efficient products that fall below the MEPS. Those that fail to reach the MEPS are not allowed to be manufactured and sold. MEPS is applied to 22 items. In case of a violation, a fine up to USD 16 000 is issued.



Detailed information is available at www.kemco.or.kr/new_eng/pg02/pg02100200_2.asp.

e) Financial resources and budget allocation

No information available

f) Expected results

No information available

2.2.2. Building Energy Codes

a) Name

Energy saving design criteria for buildings

b) Purpose

The aim of energy saving design criteria for buildings is to improve the energy efficiency of the design and construction of new buildings.

c) Applicable sectors

Residential and commercial

d) Outline

By encouraging low energy consumption-type buildings from the design stage, the increase in demand for energy in the building sector is expected to be suppressed.

MLTM developed building energy codes: local government building officials execute the codes as part of the building permitting process for new buildings. The property owner must fill out an energy saving worksheet and submit it to local government offices to obtain a building permit.

The submission of energy saving plans has become mandatory for buildings bigger than certain sizes to reinforce insulation, increase the supply of high-efficiency and new/renewable energy facilities, and promote the energy saving mindset among owners of buildings being constructed.

More information can be obtained at the following websites:

www.kemco.or.kr/new_eng/pg02/pg02010200.asp;

www.energycodes.gov/implement/pdfs/CountryReport_Korea.pdf

e) Financial resources and budget allocation

No information available

f) Expected results

No information available

2.2.3. Fuel Efficiency Standards

a) Name

Average energy consumption efficiency system

b) Purpose

This is a system for managing the fuel efficiency of domestic passenger cars through the average fuel efficiency calculated by dividing the sum of fuel efficiencies of passenger cars sold during the previous year by each car manufacturer by the quantity sold.

c) Applicable sectors

Transport

d) Outline

If a car manufacturer's average fuel efficiency does not satisfy the limit set by the government, it may order the improvement of fuel efficiency by a certain period. If the improvement order is not performed, a corresponding announcement may be published through the press.

Average fuel efficiency criteria:

- 1) By 2011—1600cc or less displacement : 12.4 km/l, more than 1600cc displacement; 9.6 km/l
- 2) From 2012—1600cc or less displacement: 14.5 km/l, more than 1600cc displacement; 11.2 km/l

More information can be found at www.kemco.or.kr/new_eng/pg02/pg02030200.asp.

e) Financial resources and budget allocation

No information available

f) Expected results

No information available

2.2.4. Energy Auditing

a) Name

Not applicable

b) Purpose

To improve the efficiency of energy use of businesses using large amounts of energy

c) Applicable sectors

Industry and commercial

d) Outline

In Korea, energy auditing started in 1990 as a voluntary program. In 2007, the government made energy auditing mandatory to improve the efficiency of energy use of businesses using large amounts of energy in response to the implementation of the UN Convention on Climate Change and the Kyoto Protocol, aiming to reinforce the foundation for energy saving and reducing greenhouse gas emissions in consideration of persistently high international oil prices.

Accordingly, businesses using large amounts of energy (annual energy use of 2000 toe or more) are required to conduct an energy audit every five years.

Energy auditing determines a business's energy use status across all energy-using facilities in the energy supply, transportation, and use sectors, identifies factors causing losses, and suggests the optimum improvement scheme for energy saving. The subjects of support in the form of subsidy of energy audit costs are limited to small and medium-sized businesses using less than 5000 toe of energy per year; the amount of the audit cost subsidy shall be determined and announced by the Minister of Knowledge Economy at the beginning of each year.

More information can be obtained at the following website;
www.kemco.or.kr/new_eng/pg02/pg02060000.asp.

2.3. Voluntary measures

There are many voluntary measures in place. The following are the main voluntary measures. Voluntary measures that are not described here include certification for high efficiency products, eco-driving, no car once a week, demand-side management by energy suppliers, community energy supply systems, etc.

2.3.1. Voluntary Agreement (VA)

a) Name

The voluntary agreement (VA) system

b) Purpose

The VA system is a non-regulatory measure wherein businesses or business groups producing, supplying or consuming energy conclude agreements with the government. Businesses establish energy saving and/or greenhouse gas emission reduction goals. Then they present implementation schedules and methods, and execute them accordingly.

The government provides support in the form of funds and tax incentives, while dedicated organisations like KEMCO provide guidance and evaluation of implementation plans as well as perform monitoring and evaluation to achieve the goals in collaboration with businesses.

For details see the following website.

http://www.kemco.or.kr/new_eng/pg02/pg02090100.asp.

c) Applicable sectors

Industry and commercial

d) Outline

Businesses using larger amounts of energy (at least 2000 toe of energy annually; note, however, that the subjects are limited to businesses using at least 500 toe of fuel annually) are subject to the VA. The industrial sector includes power generation companies in addition to general manufacturing businesses. Maintenance of agreements is effective for five years from the year of execution. The subjects of agreements are determined based on the amounts of energy used in the year immediately prior to the year of execution. The changed amounts of energy used after the agreement are determined regardless of the management group criteria, based on the amounts of energy used or whether the agreements are maintained (the management group criteria determined at the times of the agreements are to be maintained during the terms of the agreements).

2.3.2. Building Energy Efficiency Rating**a) Name**

Building certification system

b) Purpose

The purpose of the building certification system is to provide objective information regarding buildings' energy performance such as energy consumption, carbon dioxide emissions, and energy saving rates to the benefit of all parties related to the buildings such as construction project implementers, project owners, managing entities, and building users.

c) Applicable sectors

Commercial

d) Outline

Buildings subject to the certification system are apartments of 18 or more units. Upon the application by construction implementers of these buildings (contractors, implementers, etc.), preliminary certification is given before completion based on the result of evaluation performed through design drawings, etc. Final certification of the energy efficiency grade of the applicant buildings is provided at the time of completion based on the result of the final evaluation made using the final design drawing and field surveys.

2.3.3. ESCO (Energy Saving Company)**a) Name**

Energy Saving Company

b) Purpose

The purpose of legislative measure for ESCO is to encourage investments in energy saving facilities through professional companies that provide a broad range of comprehensive energy saving solutions to energy users, with investment cost covered by energy bill reductions.

c) Applicable sectors

Industrial and commercial

d) Outline

ESCO is a system that will enable energy users wishing to replace or supplement existing energy-using facilities to invest through energy service companies. The legal grounds for energy service companies were established through the Energy Use Rationalization Act in 1991. Energy service companies have been registered and operated since 1992.

The scope of projects to be implemented include:

- 1) Projects related to energy saving-type facilities investments
- 2) Management/service projects for energy saving of energy using facilities
- 3) Projects related to energy saving such as energy management, diagnosis, etc.

More information can be obtained at the following website; www.kemco.or.kr/new_eng/pg02/pg02070000.asp.

2.4. Financial Measures Taken by the Government**2.4.1. Tax scheme****a) Name**

Tax Reduction and Exemption Act (by National Tax Service)

b) Purpose

Tax incentives are provided by the government for energy efficiency investments based on the Tax Reduction and Exemption Act of the National Tax Service. The purpose of these tax incentives is to strengthen the competitiveness of business enterprises through promoting investment in energy saving facilities.

c) Applicable sectors

Industry and building (commercial)

d) Outline

If any domestic person invests in the installation of specified energy efficiency facilities, 20% of the relevant investment amount shall be deducted from their income tax or corporate tax. This scheme started in 1982, and has been applied temporarily during designated time periods. Current terms of the tax credit are valid until 2009. For details see www.kemco.or.kr/new_eng/pg02/pg02080000.asp.

2.4.2. Low-interest loans**a) Name**

Rational Energy Utilization Fund (1980)

b) Purpose

To strengthen the competitiveness of business enterprises through promoting investment in energy saving facilities

c) Applicable sectors

Industry and commercial building

d) Outline

Since 1980, the government has provided long-term low-interest loans for energy efficiency and conservation investments, along with tax incentives. KEMCO is in charge of operation and monitoring. The rate of the loans is 3.0% per year, as of the first quarter of 2009, which might be lower than the market loan base rate of 2.75% per year. More information is available at the following website: www.kemco.or.kr/new_eng/pg02/pg02080000.asp.

e) Financial resources and budget allocation

USD 0.5 billion is allocated for the fund from a government financial source named Special Accounts for Rational Energy Utilization.

f) Expected results

No information available

2.4.3. Subsidies and Budgetary Measures**a) Name**

Energy Efficiency Rebate Program for Electricity End-Use

b) Purpose

The Energy Efficiency Rebate Program for Electricity End-Use seeks to promote retrofitting for high-efficient products that have been designated for six items, i.e. lighting, electric motors, vending machines, inverters, transformers, and pumps.

c) Applicable sectors

Industry, residential, commercial (electric power use)

d) Outline

The rebate program was started in 1995 by Korea Electric Power Corporation (KEPCO). The program has been supported by the Electric Power Industry Infrastructure Fund since 2002.

e) Financial resources and budget allocation

The amount of the Fund was USD 5 million in 2008. The fund has been raised from a 3.7% obligatory charge in the electricity bill of all customers.

2.4.4. Other Incentives**a) Name**

Light passenger car incentives

b) Purpose

To promote low energy consuming lightweight passenger cars

c) Applicable sectors

Transport

d) Outline

Several incentives such as tax exemptions for purchasing, registration and acquisition, 50% discounts on parking fees and tolls and congestion charges are provided.

2.5. Energy Pricing

The consumer price of oil products is determined by market-based pricing systems, but major parts of that price are taxes. Prices of electricity, city gas and thermal energy supply can be

controlled by the government by adjusting the corporate investment maintenance ratio that is required by each tariff structure.

Currently, cumulative electricity pricing according to the amount of use has been applied to the residential sector. However, total balanced development of the energy efficiency pricing structure for energy use or GHG emission impacts would be courageous work, because restructuring the energy pricing system can be a heavy and difficult process in regard to social acceptance. Therefore, until now, subsidies and tax incentives have been urged to promote consumer behaviour for energy efficiency.

2.6. Other Efforts for Energy Efficiency Improvements

2.6.1. Cooperation with Non-Government Organisations

Energy efficiency campaign programs, which require the participation of the private sector, have been performed in cooperation with NGOs. NGOs act as a representative voice of the attitude or behaviour regarding citizens' energy efficiency.

2.6.2. Cooperation through Bilateral, Regional and Multilateral Schemes

Korea has been actively participating in international cooperation activities such as IEA 4E, APP BATF, APEC EGEE&C, and so on, to develop policies to enhance energy efficiency in the facilities and equipment sectors and to strengthen international cooperation systems.

IEA 4E (Implementing Agreement on Efficient Electrical End-Use Equipment) is one of the execution agreements of IEA (International Energy Agency), which seeks to promote the adjustment and development of policies of various economies through collaborative research and forums, etc., aimed at enhancing machine efficiency.

APP (Asia-Pacific Partnership on Clean Development and Climate) is a partnership of seven Asia Pacific economies regarding clean development and climate, including Korea, United States, Japan, China, India, Australia, and Canada. Among the task forces under APP, the APP BATF (building, electric home appliance T/F) chaired by Korea is initially implementing 49 international projects including the harmonisation of test procedures for motor systems among the seven economies for five years beginning over the period 2007–11.

EGEE&C (Expert Group on Energy Efficiency and Conservation) is one of the expert groups under the EWG (Energy Working Group), which targets energy saving as well as the development of energy efficiency policies and technologies. Established in 2002 to exchange information on energy efficiency standards and labelling systems, it is operated using funds shared by all the economies (Korea paid USD 10 000 in 2007).

2.6.3. Other Cooperation/Efforts for Energy Efficiency Improvement

Other efforts for energy efficiency improvement include 'Low-income energy efficiency' (USD 10 million in 2008), 'no car once a week in the public sector' (as for 2008, passenger cars were permitted only every other day), 'central bus-only lanes in metropolitan areas (Bus Rapid Transit)' and 'bus-only highway lane', etc.

MALAYSIA

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. Overall Energy Efficiency Improvement Goals

The Malaysian Government have implemented a number of programs to utilise energy efficiently including the Eighth Malaysia Plan (2001-2005) aimed at further strengthening the Utilisation Objective of Malaysia's Energy Policy (1979), which sought "to promote the efficient utilization of energy and the elimination of wasteful and non-productive patterns of energy consumption". To speed up the implementation of energy efficiency and conservation initiatives, the Ministry of Energy, Green Technology and Water is preparing an Energy Efficiency Master Plan setting clear goals and targets to coordinate and implement programs in a systematic and holistic manner. The Master Plan is scheduled for completion in June 2010.

1.2. Sectoral Energy Efficiency Improvement Goals

The National Energy Efficiency Master Plan will be focused on the industrial, commercial and building sectors.

1.3. Action Plans for Promoting Energy Efficiency

The Ninth Malaysia Plan (2006–2010) has outlined strategies for promoting energy efficiency improvement. Greater emphasis will be placed on energy efficiency under the Tenth Malaysia Plan (2011-2015).

a) Objectives

The primary objective of the energy efficiency programs set out in the Ninth Malaysia Plan is to ensure the security of energy supply, enhance economic growth through efficient energy management and mitigate the negative impact of energy activities on the environment.

b) Applicable sectors

Industry, commercial, residential and government buildings

c) Outline

- 1) Enforce the Efficient Management of Electricity Energy Regulation 2008 to ensure more efficient use of electricity among large users
- 2) Incorporate the Code of Practice on Energy Efficiency and Use of Renewable Energy for Non-Residential Buildings (MS1525:2007) into the Uniform Building By-Laws (UBBL)
- 3) Promote the use of highly energy-efficient appliances and equipment
- 4) Develop local expertise in the manufacture of energy-efficient appliances and equipment
- 5) Improve energy efficiency in government buildings
- 6) Develop human capacity in the area of energy efficiency.

d) Financial resources and budget allocation

Under the Ninth Malaysia Plan, MYR 19.3 million is allocated to implement the stipulated actions.

e) Method for monitoring and measuring effects of action plans

Progress and achievement is monitored through an outcome-based assessment method. The assessment report is prepared twice (at the middle of the Plan and at the end of Plan period). The reports will be submitted to the Economic Planning Unit of the Prime Minister's Department.

f) Expected results**Industry**

- *The Efficient Management of Electrical Energy Regulation 2008, under the Electricity Supply Act.* Under the regulation, all installations that consume 3 million kWh or more of electricity over a period of six months will be required to engage an electrical energy manager who shall, among others, be responsible for analysing the total consumption of electrical energy, to advise on the development and implementation of measures to ensure efficient management of electrical energy as well as to monitor the effectiveness of the measures taken.
- *The Energy Efficiency and Conservation Guidelines Part 1: Electrical Energy-use Equipment.* The guidelines encourage industries to adopt energy efficiency practices as well as manage and improve their energy utilisation and environmental management. The guidelines, covering a number of commonly-used equipment such as fans, motors, pumps, chillers, transformers and air-compressors, also highlight best practices in selection and design with standard efficiency values as well as best practices in operation, monitoring and maintenance of the equipment.
- *The Industrial Energy Audit Guidelines.* The guidelines are prepared based on 54 energy audits in eight energy-intensive industrial sub-sectors, namely iron and steel, cement, wood, food, glass, pulp and paper, ceramics and rubber that were carried out under the Malaysian Industrial Energy Efficiency Improvement Project (MIEEIP).
- *Energy-use benchmarks* for eight energy-intensive industrial sub-sectors, namely iron and steel, cement, wood, food, glass, pulp and paper, ceramics and rubber.

Commercial

- *Energy efficiency requirements under MS1525*, which is the Code of Practice on the Use of Renewable Energy and Energy Efficiency in Non-Residential Buildings, will be incorporated in the amendments to the Uniform Building By-Laws (UBBL). Once the UBBL is enforced, all non-residential buildings will have to comply with the UBBL energy efficiency requirements.
- *10% reduction of electricity use in all government buildings.* The Ministry of Energy, Green Technology and Water is conducting energy audits in the top seven energy users in the government sector to estimate the real saving potential and to formulate a plan to achieve the stipulated target.
- *Showcase of Low Energy Office (LEO) and Zero Energy Office (ZEO) buildings* to promote energy efficiency in buildings through demonstration. The first LEO building of the Ministry of Energy, Green Technology and Water was built in 2004 and the Green Energy Office of Pusat Tenaga Malaysia was built in 2008.

Residential

- *Dissemination of information and awareness* to create a voluntary behavioural shift of residential energy users.
- *Voluntary energy performance labelling* of refrigerators and promotion on the sale of energy-efficient refrigerators and efficient lighting.

g) Future tasks

Enhance the legal framework for energy efficiency improvement and draw up a comprehensive plan to promote energy efficiency improvement holistically.

1.4. Institutional Structure**a) Name of organisation**

The key Malaysian government ministries and agencies involved in energy efficiency improvement are the Energy Unit of Economic Planning Unit (EPU) of the Prime Minister's

Office, the Ministry of Energy, Green Technology and Water (MEGTW), the Energy Commission (EC) and Pusat Tenaga Malaysia (PTM) or the Malaysia Energy Centre.

b) Status of organisation

All agencies perform their duties for the central government.

c) Roles and responsibilities

The role of MEGTW is to formulate energy efficiency policy, in coordination with the EPU. The EPU provides the general direction and strategies and determines the level of implementation. The EC is the regulatory agency for the electricity and piped gas supply industry. The Commission's main tasks are to provide technical and performance regulation for the electricity and piped gas supply industry, as the safety regulator for electricity and piped gas and to advise the Minister on all matters relating to electricity and piped gas supply including energy efficiency and renewable energy issues. PTM is an independent not-for-profit company for the development and coordination of energy research. The aim of PTM is to be the focal point on energy implementation and catalyst for linkages with universities, research institutions, industry, and domestic and international energy organisations.

d) Covered sectors

Industry, commercial, residential and government sectors

e) Established date

MEGTW was established in April 2009, following the reshuffle of the Malaysian Cabinet. Formerly, the Ministry was known as the Ministry of Energy, Water and Communications in 2004 and the Ministry of Energy, Communications & Multimedia in 1998. The EC was established in 2001, replacing the Department of Electricity and Gas Supply (DEGS), and PTM was established in 1997.

f) Number of staff

The MEGTW has five officers to handle renewable energy and energy efficiency, the EC has four staff members to handle energy efficiency matters, and PTM has a staff of 60 for energy research work and energy efficiency promotion activities.

1.5. Information Dissemination, Awareness-raising and Capacity-building

A large number of information dissemination seminars and workshops have been held for energy users by organisations involved in promoting energy efficiency, for example, PTM and the Centre for Education, Training, and Research in Energy Efficiency and Renewable Energy (CETREE), which is located in the Universiti Sains Malaysia.

1.6. Research and Development in Energy Efficiency and Conservation

Technical research on energy efficiency and conservation are conducted mainly by government-sponsored universities. The research work is funded by the Government through the Ministry of Science, Technology and Innovation. Non-technical research and development work is carried out by PTM and CETREE.

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS

2.1. Government Laws, Decrees, Acts

a) Name

Electricity Supply Act 1990 and the Electricity Supply Act (Amended) 2001 or Act A1116

b) Purpose

The main purpose of the act is to regulate the electricity supply industry. Act A1116 also has provisions on the efficient use of electricity.

c) Applicable sectors

All electricity users are bound under the act.

d) Outline

The act has the following provisions for the efficient use of electricity:

- Section 23A: The Minister may, from time to time, prescribe the standards, specifications, practices and measures to be adopted and any other matters in regard to the efficient use of electricity.
- Section 23B: No person shall use or operate any installation unless the installation meets such requirements as may be prescribed in regard to the efficient use of electricity.
- Section 23C: No person shall manufacture, import, sell or offer for sale or lease any equipment unless the equipment meets such requirements as may be prescribed in regard to the efficient use of electricity.

e) Financial resources and budget allocation

The main financial resource is the fee collected from the licensees of the act.

f) Expected results

Electricity savings and better electrical load management

2.2. Regulatory Measures**a) Name**

Efficient Management of Electrical Energy Regulations 2008

b) Purpose

To promote efficient use of electrical energy through a better energy planning and management system

c) Applicable sectors

Industry and commercial

d) Outline

The Efficient Management of Electrical Energy Regulations 2008 was gazetted on 15 December 2008, and required any installation with total electricity consumption of 3 million kWh or more over six consecutive months to appoint electrical energy managers and implement efficient electrical energy management.

e) Financial resources and budget allocation

No information available

f) Expected results

No information available

2.3. Voluntary Measures

The Code of Practice on the Use of Renewable Energy and Energy Efficiency in Non-Residential Buildings (MS1525:2007) is a code that provides design recommendations for the energy efficiency of non-residential buildings. It provides criteria and minimum standards for energy efficiency in the design of new buildings, retrofitting of existing buildings and methods for determining compliance with these standards. MS1525:2007 is incorporated in the Green Building Index Malaysia (GBI Malaysia).

GBI Malaysia is a profession-driven initiative to lead the Malaysian property industry towards becoming more environment-friendly. The energy efficiency of a building is one of the criteria for the green building index certification.

The High-Efficiency Motor (HEM) program is a voluntary program to promote increased use of high-efficiency motors in Malaysia. The Energy-Efficient Refrigerator (EER) and Labeling Program is a voluntary program to promote energy-efficient refrigerators by introducing labels showing the energy use of appliances.

The Energy Efficiency and Conservation Guidelines Part 1: Electrical Energy-use Equipment is to encourage industries to adopt energy efficiency practices as well as manage and improve their energy use. The Guidelines, covering commonly-used equipment such as fans, motors, pumps, chillers, transformers and air-compressors, also highlight the best practices in selection and design with standard efficiency values as well as best practices in operation, monitoring and maintenance of the equipment.

2.4. Financial Measures Taken by the Government

2.4.1. Tax Scheme

The tax scheme for energy efficiency improvements is as follows:

Companies providing services for energy efficiency improvement are eligible for:

- Pioneer status with an income tax exemption of 100% of statutory income for 10 years or
- An investment tax allowance of 100% on the qualifying capital expenditure incurred within a period of five years. The allowance is to be set off against 100% of the statutory income for each year of assessment and
- An import duty and sales tax exemption on energy-efficient equipment that is not produced locally and a sales tax exemption on the purchase of equipment from local manufacturers
- Companies that make capital expenditures to improve their energy consumption are eligible for:
 - An investment tax allowance of 100% of the qualifying capital expenditure incurred within 5 years. The allowance is to be set off against 100% of the statutory income for each year of assessment and
 - An import duty and sales tax exemption on energy-efficient equipment that is not produced locally and a sales tax exemption on the purchase of equipment from local manufacturers.

Companies that import energy efficient products are eligible for:

- An exemption of import duty and sales tax on energy-efficient equipment such as high-efficiency motors and insulation materials for importers, including authorised agents, approved by the Energy Commission
- A sales tax exemption is given on the purchase of locally manufactured energy-efficient household appliances such as refrigerators, air conditioners, lighting, fans and televisions.

Owners of buildings with a Green Building Index Certificate are eligible for:

- A tax exemption equivalent to 100% of the capital expenditure incurred to obtain the GBI certificate. The exemption is allowed to be set off against 100% of the statutory income for each year of assessment. New buildings and retrofitted buildings are eligible for this incentive.

Buyers of buildings and residential properties awarded GBI certificates from real property developers are eligible for:

- A stamp duty exemption on instruments of transfer of ownership of such buildings. The amount of the stamp duty exemption is based on the additional cost incurred to obtain the GBI certificate.

2.4.2. Low Interest Loans

a) Name

Green Technology Fund (issued at the Federal Government level)

b) Purpose

To promote green technology adoption

c) Applicable sectors

Industry and commercial

d) Outline

The fund provides soft loans to companies that supply or use green technology. For suppliers, the maximum financing is MYR 50 million and for consumer companies MYR 10 million. The Government provides an interest rate subsidy of 2% of the loans procured. The Government also provides a guarantee of 60% of the loan amount, with the remaining 40% guaranteed by banking institutions. Loan applications can be made through the National Green Technology Centre.

e) Financial resources and budget allocation

MYR 1.5 billion

f) Expected results

About 140 companies are expected to benefit from this fund and this will spur green technology development, especially market creation and penetration of green technology in the economy.

2.5. Energy Pricing

Energy prices are regulated by the Government and are heavily subsidised. Under the Ninth Malaysia Plan, the Government has stated the policy to review the energy pricing structure to closely reflect market prices. As such, the Government took steps to gradually reduce subsidies on energy prices. Oil products prices, gas prices for the primer and non-primer sectors and electricity tariffs have been reviewed to reflect market prices.

2.6. Other Efforts for Energy Efficiency Improvements

2.6.1. Cooperation with Non-Government Organisations

The government has developed cooperation with non-government organisations such as the Federation of Malaysian Consumers Associations and the Water and Energy Consumer Association of Malaysia to promote energy efficiency activities. The promotion activities are mainly in the form of campaigns, workshops, seminars and publication of energy efficiency related materials.

2.6.2. Cooperation through Bilateral, Regional and Multilateral Schemes

Malaysia is actively involved in regional and multilateral schemes on energy efficiency improvements. Malaysia and other South East Asia economies under the Association of South East Asian Nations (ASEAN) have agreed to improve energy efficiency through the ASEAN Plan of Action for Energy Cooperation (APAEC). The current APAEC (2004-2009) has outlined strategies such as ASEAN energy standards and labelling, promotion of Energy Services Companies (ESCOs), information sharing and capacity building to improve energy efficiency in the ASEAN region. In the East Asia Summit (EAS), of which Malaysia is a member, the members have agreed to work together to improve energy efficiency in the EAS

region. As a member of the United Nations, Malaysia hosted the Malaysian Industrial Energy Efficiency Improvement Project (MIEEIP) with assistance and co-funding from the United Nations Development Program (UNDP) and Global Environment Facility (GEF). The MIEEIP aimed to address barriers to energy efficiency and energy conservation in the Malaysian industrial sector.

2.6.3. Other Cooperation/Efforts for Energy Efficiency Improvements

No information available

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MEXICO

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. Overall Energy Efficiency Improvement Goals

a) Key indicator

Savings in electrical power consumption

b) Goals

To reduce electrical power consumption

c) Base year

2006: 21 685 GWh

d) Goal year

2012: 43 416 GWh

1.2. Sectoral Energy Efficiency Improvement Goals

a) Sector

The following goals cover several sectors—residential/commercial, public, industrial, transport—Daylight Saving Time, Energy Efficiency Standards Program, Energy Saving Program for the Federal Public Administration, CFL Massive Substitution Program, and The Electric Power Saving Trust Fund (FIDE) Programs.

b) Goals

There are different goals for each program for 2012

- Daylight Saving Time Program (1 363 GWh)
- Energy Efficiency Standards Program (17 850 GWh)
- Energy Saving Program for the Federal Public Administration (221 GWh)
- The Electric Power Saving Trust Fund (FIDE's) Program (4 414 GWh).

c) Base year

2007

d) Goal year

2012

1.3. Action Plans for Promoting Energy Efficiency

a) Name

Energy Efficiency, Renewable Energies and Biofuels

b) Objectives

To promote energy efficient use and production

c) Applicable sectors

Residential, municipal, industrial, commercial and services, government (entities and dependencies)

d) Outline

Strategy III.1.1—to propose financial policies and mechanisms to accelerate the adoption of energy efficient technologies in public and private sectors

Strategy III.1.2—to drive optimisation in the supply and use of energy from entities and organisations that make up the Federal Public Administration

Strategy III.1.3—to extend coordinated actions among public, social and private sectors, to encourage the efficient use of energy in the population

Strategy III.1.4—to promote the reduction of energy consumption in residential and commercial buildings

Strategy III.1.5—to promote the efficient generation of electricity through self supply and cogeneration

Strategy III.1.6—to integrate public policy proposals to boost the potential of efficient cogeneration

Strategy III.1.7—to promote a series of regulations that allows the Regulatory Energy Commission (CRE) to broaden and strengthen its regulatory powers in regulating and promoting efficient cogeneration

Strategy III.1.8—to support research activities related to increasing efficiency in generation activities, distribution and electrical energy consumption.

e) Financial resources and budget allocation

The National Commission for the Efficient Use of Energy (CONUEE) budget (formerly CONAE) is allocated by the Ministry of Finance and Public Credit (SHCP) and the Budget of PAESE (Programa de Ahorro de Energía en el Sector Eléctrico / Energy Savings Program for the Electric Sector), the Program of Integral Systematic Saving (ASI-Fipaterm) and The Electric Power Saving Trust Fund (FIDE) Programs with some contributions of the Federal Electricity Commission (CFE).

f) Method for monitoring and measuring the effects of action plans

The monitoring of results is conducted either every six months or annually and they are reported in the following documents: Activities Report of the Ministry of Energy, Government Report, Sectoral Prospectives, and National Energy Balance.

g) Expected results

43 416 GWh of electricity savings

h) Future tasks

Goals are expected to be achieved by 2012

1.4. Institutional Structure

1.4.1. Central Institutional Structure

a) Name of organisation

The organisation in Mexico in charge of energy efficiency programs is the National Commission for the Efficient Use of Energy—CONUEE (formerly CONAE) which is a decentralised administrative agency of the Ministry of Energy (Sener), with technical and operative autonomy. It aims to promote energy efficiency and establish itself as a technical body, in terms of sustainable energy use.

Within the current framework, energy efficiency means all actions leading to an economically viable reduction of the quantity of energy required to satisfy energy needs of the services and goods demanded by society, ensuring an equal or higher quality level, as well as a decrease in the negative environmental impacts resulting from the generation, distribution and consumption of energy. This includes the replacement of non-renewable sources for renewable sources.

Responsibilities of CONUEE are:

- Regulations
- Public policies for sustainable use of energy
- Promotion and dissemination
- Information and evaluation.

b) Status of organisation

Policymaker, regulator and implementation entity

c) Roles and responsibilities

Promote energy efficiency and conduct themselves like an organisation of technical character.

d) Covered sectors

Industry, transport, residential, commercial and services, power, government

e) Established date

CONUEE was created from the entry into force of the Law for Sustainable Use of Energy, published on 28 November 2008, which states that all human and material resources of the National Commission for Energy Saving (CONAE) shall be allocated to this new commission.

f) Number of staff members

86 employees

1.4.2. Activities for Energy Efficiency Improvement

a) Normalisation (standardisation)

Standards on energy efficiency have been the most effective mechanism to save energy in Mexico, given that annually more than eight million systems, equipment and products are traded and have to comply with the standard. The 18 energy efficiency standards (Official Mexican Standards – NOMs) in 2006 were estimated to generate energy savings of up to 16 065 GWh.

The activities for the standardisation are:

- 1) Elaborating on and updating Energy Efficiency Standards or Official Mexican Standards (NOMs)
- 2) Evaluating conformity, jointly with certification organisations, verification units and research laboratories.

b) Technical assistance

- 1) Elaborating on energy diagnoses and studies
- 2) Attention to specialised technical consultations of public, private and social sectors.

c) Promotion and dissemination

- 1) Organisation of regional, economy-wide and international events
- 2) Elaborating on and disseminating technical studies and documents: disseminating scientific publications, results of studies and projects that promote sustainable use of energy
- 3) Coordinating committees and working groups specialised in the development of projects of energy saving and renewable energy
- 4) Providing technical assistance on sustainable use of energy to the agencies of the Federal Public Administration, as well as to state governments and municipalities that request it, and the signing of agreements to that effect

- 5) Participating in the dissemination of information between government and social sectors.

d) Design and development of programs

Operation of the Commission's main programs:

- 1) Normalisation (standardisation)
- 2) Federal Public Administration
- 3) Efficient industry
- 4) Residential, commercial and services
- 5) Promotion and dissemination
- 6) Efficient transport.

1.4.3. Regional or Local Institutional Structure

a) Name of organisation

Mexico has established a National Network of Energy State Commissions (RENACE) to streamline state and federal efforts to achieve energy sustainability of the economy. RENACE contributes to building a sustainable energy policy at a federal and local level, through the development of projects and programs related to energy sustainability and conservation. RENACE also promotes the creation of information systems and an information network in most states.

b) Status of organisation

Policymaker, regulator and implementer

c) Roles and responsibilities

To achieve the combined efforts of the states with the federal government to ensure energy sustainability of the economy

d) Covered sectors

Industrial, commercial and services, residential, transport, government

e) Established date

2008

f) Number of staff

The personnel depends on each State Commission

1.5. Information Dissemination, Awareness-Raising and Capacity-Building

a) Information collection and dissemination

The monitoring of results is conducted every six months or annually and they are reported in the following documents:

- Activities Report of the Ministry of Energy
- Government Report
- Sectoral Perspectives
- National Energy Balance.

b) Awareness-raising

Electrical Energy Savings of 19 774 GWh by 2008 (Energy Efficiency Standards, Industrial, Commercial and Public Sector, Daylight Saving Time and Residential Sector)

c) Capacity-building

No information available

1.6. Research and Development in Energy Efficiency and Conservation

The main goals of the Hydrocarbon Sectoral Funds are scientific research and applied technology for the exploration, operation and refinement of hydrocarbons, like production of basic petrochemicals, as well as the adoption, innovation, assimilation, technological development and training of specialised human resources in the aforementioned issues.

The resources of the Sectoral Fund for Energy Sustainability will be allocated for the financing of projects whose main objectives are scientific research and applied technology for renewable energy sources, energy efficiency, use of clean technologies, diversification of primary sources of energy, as well as the adoption, innovation, assimilation and technological development in the indicated matters.

Both funds will receive resources from the annual payment of duty for scientific and technological research on energy to which Pemex Exploration and Production (PEP) is subject and which in 2012 will reach a rate of 0.65 percent of the annual crude oil and natural resources. For 2008, the Income Law considers an amount of MXN 1100 million, 55 percent of which will be allocated to the Sectoral Fund of Hydrocarbons; 10 percent to the Sectoral Fund for Sustainable Energy and 35 percent to the Scientific Research and Technological Development Fund of the Mexican Petroleum Institute (IMP).

The Sectoral Funds will contribute to the development and technological innovation of two main priorities: to ensure the energy supply and the care of the climate change.

a) Level of government (central/regional)

Central and regional

b) Name of policy

Sectoral Funds of Hydrocarbons and Energy Sustainability

c) Responsible department/agency

Ministry of Energy (Sener) – Science and Technology National Council (CONACYT)

d) Applicable sectors

Industry, transport, commercial and services, power, government

e) Financial resources

USD 100 million in 2008

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS**2.1. Government Laws, Decrees, Acts****a) Name**

LASE—Ley para el Aprovechamiento Sustentable de la Energía (Law for Sustainable Use of Energy)

b) Purpose

To promote sustainable use of energy through optimising its use in all processes and activities from holding to consumption

c) Applicable sectors

Industry, transport, residential, commercial, power, government

d) Outline

Created in November 2008

e) Financial resources and budget allocation

The financial resources are outlined in the Federal Expenditure Budget (Presupuesto de Egresos de la Federación—PEF) 2008

f) Expected results

The Mexican government expects to carry out the Sectoral Program and the National Program of Energy Sustainability.

2.2. Regulatory Measures**2.2.1. Minimum Energy Performance Standards (MEPS) and Labelling****a) Name**

Energy Efficiency Standards

b) Purpose

Create standards to effectively contribute to the saving and efficient use of energy

c) Applicable sectors

Industry, residential, commercial and services, government

d) Outline

Mexico's mandate for Energy Efficiency Standards comes from a generic law, the Ley Federal sobre Metrología y Normalización (Federal Metric and Standardisation Law) of 16 July 1992, which defines the Normas Oficiales Mexicanas—NOM (Official Mexican Standards). The NOMs are enacted by the Federal Secretariats, according to their areas of competence. In the case of energy efficiency, it is the Ministry of Energy, through the National Commission for the Efficient Use of Energy—CONUEE (formerly CONAE), that enacts the mandatory standards.



Mexico first adopted energy standards in 1995 and has since established standards for 18 products. Many of these standards are modelled on those of the United States, but have been adapted to local situations and experience from their own programs.

Table 4. Official Mexican Standards (NOMs) for energy efficiency

Norm Code	Product
NOM-011-ENER-2006	Central air conditioners (packaged terminal)
NOM-011-ENER-2006	Central air conditioners (split type)
NOM-017-ENER/SCFI-2008	CFLs
NOM-005-ENER-2000	Clothes washers
NOM-015-ENER-2002	Freezers
NOM-009-ENER-1995	Insulation (thermal)
NOM-013-ENER-2004	Lighting systems (external)
NOM-007-ENER-2004	Lighting systems (indoor)
NOM-014-ENER-2004	Motors (single-phase induction)
NOM-016-ENER-2002	Motors (three-phase induction)
NOM-004-ENER-2008	Pumps (centrifugal)
NOM-006-ENER-1995	Pumps (deep well)

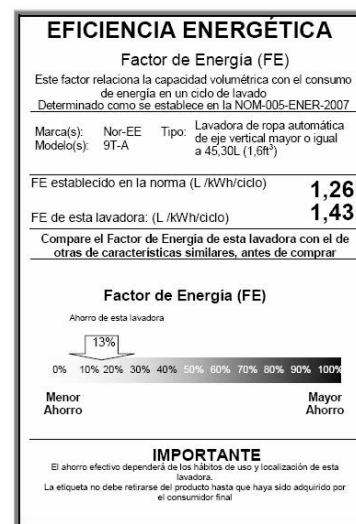
NOM-010-ENER-2004	Pumps (submersible)
NOM-001-ENER-2000	Pumps (vertical)
NOM-021-ENER/SCFI-2008	Room air conditioners (packaged terminal)
NOM-021-ENER/SCFI-2008	Room air conditioners (window)
NOM-015-ENER-2002	Refrigerators
NOM-015-ENER-2002	Refrigerator-freezers
NOM-022-ENER/SCFI/ECOL-2000	Refrigerators (commercial)
NOM-003-ENER-2000	Water heaters (gas)

Source: Ministry of Economy, Mexico. (www.economia-noms.gob.mx)

Under Mexican law and as an element of the standards, CONUEE also implements a mandatory comparative labelling program for room and central air conditioners, refrigerators and/or refrigerator-freezers, clothes washers, centrifugal residential pumps, gas water heaters, commercial refrigeration, and non-residential building envelopes.

Labelling is mandatory for the following electrical products offered for sale in Mexico:

- Central air conditioners (packaged terminal)
- Central air conditioners (split type)
- Clothes washers
- Freezers
- Pumps (centrifugal)
- Room air conditioners (packaged terminal)
- Room air conditioners (window)
- Refrigerators
- Refrigerator-freezers
- Refrigerators (commercial)
- Water heaters (gas).



e) Financial resources and budget allocation

For 2009, the budget considered was MXN 10 million (USD 0.76 million).²²

f) Expected results

From 17 850 GWh (2007) to 28 414 GWh (2012)

2.3. Voluntary Measures

2.3.1 Mexican Standards (NMX)

The Ley Federal sobre Metrología y Normalización (Federal Metric and Standardisation Law) of 16 July 1992, defines the voluntary standards called Normas Mexicanas—NMX (Mexican Standards). In Mexico, the Asociación de Normalización y Certificación—ANCE (Standardization and Certification Association) is in charge of elaborating the NMX related to the electric sector. It can also certify other sectors and has its own laboratory for conducting various standardised test procedures.

Mexican Standards are voluntary; however, if an Official Mexican Standard (NOM) makes reference to one or more Mexican Standards (NMX), the product must comply with the

²² At average currency of 2009: USD1= MXN13.

requirements on those Standards, as well.

2.3.2 The Electrical Power Saving Trust Fund (FIDE) Label

Mexico has the Sello FIDE, a voluntary energy efficiency endorsement seal given by the Electric Power Saving Trust Fund (FIDE) since mid-1995. Manufacturers have to submit certified test results on their products to confirm that they cover the Sello FIDE requirements. The product is selected and tested by a certified laboratory to verify manufacturer claims. If approved, manufacturers pay for certification and sign an agreement stipulating length of validity of the Sello FIDE endorsement, how it can be displayed, renovation and cancellation of certification, etc. Manufacturers can then display the Sello FIDE on their products. FIDE advertises the Sello FIDE in order to entice consumers to look for it when purchasing electrical equipment.



a) Name

Responsible Energy Users Registry (Registro de Usuarios Energéticamente Responsables)

b) Level

Central, regional and local

c) Purpose

To develop a registry

d) Applicable sectors

Industry, transport, commercial and services

2.4. Financial Measures Taken by the Government

2.4.1. Tax Scheme

Information not available

2.4.2. Low-Interest Loans

a) Name

Electric Sectoral Energy Saving Program (PAESE), Integral Systematic Saving Program (ASI-Fipaterm), The Electrical Power Saving Trust Fund (FIDE) and Shared Risk Trust Fund (FIRCO).

b) Purpose

To promote energy-efficiency improvement programs in Mexico.

c) Applicable sectors

Industry (including agriculture), transport, residential, commercial and services, power, government

d) Outline

According to PROSENER (Sectoral Energy Program 2007-2012)

e) Financial resources and budget allocation

The budget provides its own resources, having CFE as sponsor (only for FIDE, PAESE and ASI-Fipaterm).

f) Expected results

Differs according to each entity and trust

2.5. Energy Pricing

The prices and tariffs of electricity, natural gas and liquefied natural gas are regulated by the Energy Regulation Commission (CRE).

2.6. Other Efforts for Energy Efficiency Improvements

2.6.1. Cooperation with Non-Government Organisations

The Mexican Government cooperates with non-government organisations (NGOs) to stimulate energy efficiency; some of these organisms are listed below:

- Asociación de Empresas para el Ahorro de Energía en la Edificación
- Asociación de Técnicos y Profesionistas en Aplicación Energética, A.C.
- Asociación Nacional de Energía Solar
- Centro Mexicano de Derecho Ambiental
- Centro Mexicano para la Producción más Limpia
- Comisión de Estudios del Sector Privado para el Desarrollo Sustentable (CESPEDES)
- Foro para el Desarrollo Sustentable, A.C.
- Fundación México – Estados Unidos para la Ciencia (FUMEC)
- Fundación para el Desarrollo Sustentable, A.C.
- Greenpeace – México
- Grupo de Estudios Ambientales
- Presencia Ciudadana
- Transición Energética
- Fundación Mario Molina.

2.6.2. Cooperation through Bilateral, Regional and Multilateral Schemes

The Mexican Government cooperates through bilateral schemes with European economies. In Europe, Mexico has bilateral cooperation with Germany through the German Technical Cooperation (GTZ) for the promotion of renewable energies and energy efficiency, and recently with the Netherlands through the ‘Understanding Memorandum’ for bilateral cooperation in energy matters.

The Mexican Government is also involved in multilateral schemes such as the North American Energy Working Group (NAEWG) consisting of Canada, United States and Mexico, for fostering communication and cooperation among the governments and energy sectors of the three economies; enhancing North American energy trade, development, and interconnections; and promoting regional integration and increase energy security for the people of North America.

In the Asia-Pacific region, Mexico has multilateral schemes with member economies of the Asia-Pacific Economic Cooperation (APEC) region, and participates actively in the Energy Working Group (EWG) of APEC.

2.6.3. Other Cooperation/Efforts for Energy Efficiency Improvements

Mexico is a non-member of the International Energy Agency (IEA); however, the economy has active participation to pool resources and to foster the research, development and deployment of particular technologies through the IEA’s legal contract—Implementing Agreements—or Energy Technology Agreements) and a system of standard rules and regulations. Mexico participates in nine IEA Implementing Agreements (IA): Clean Coal Sciences; Energy Technology Data Exchange (ETDE); Geothermal Energy; Multiphase Flow Science; Ocean Energy Systems; Photovoltaic Power Systems; Solar Heating and Cooling; SolarPACES; and Wind Energy Systems.

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NEW ZEALAND

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. Overall Energy Efficiency Improvement Goals

The programs contained in the New Zealand Energy Efficiency and Conservation Strategy (NZECS) are expected to support the attainment of the following goals²³:

- Savings of 30 petajoules (PJ) in non-transport energy by 2025
- 9.5 PJ of additional direct use renewable energy a year by 2025
- Savings of 20 PJ in the transport sector by 2015
- 90% of total electricity generation from renewable sources by 2025.

In addition, the Government has agreed in principle under the NZECS to halve the 2007 per-capita greenhouse gas emissions in the transport sector.

1.2. Sectoral Energy Efficiency Improvement Goals

A number of sector-specific goals are in place to help achieve the overall energy efficiency improvement goals set out in the NZECS.

Table 5. Sector goals

Sector	Goals					Base year
	PJ	CO ₂	Energy savings (NZD)	Other	Goal year	
Households	3.45	0.67 Mt	2012: 47m year 2025: 110m a year	NZD 97 million health benefits	2025	
Products/ Equipment	14.5	2.81 Mt	230m a year		2025	
Industry (including renewable energy promotion)	2012: 2.4 2025: 10.5	2009: 0.0014 Mt 2012: 0.272 Mt 2025: 0.6 Mt			2025	
Commercial buildings	1.0	0.194 Mt a year			2025	
Transport	175.1 – represented by 4.826 million litres of fuel	2025: 11.8 Mt 2040: reduce per capita GHG in transport by 50%	333m by 2033 from vehicle fuel economy		2025	2007
Power generation				90% renewable electricity generation	2025	
Government				Six lead core public service agencies to be carbon neutral, the other 28 major agencies on the way to carbon neutrality	mid-2012	2007

1.3. Action Plans for Promoting Energy Efficiency

The New Zealand Energy Efficiency and Conservation Strategy (NZECS) is the main program of work for promoting energy efficiency in New Zealand. The strategy can be accessed at www.eeca.govt.nz/sites/all/files/nzeecs-07.pdf.

a) Objectives

The NZECS provides government leadership for the energy sector to respond to the challenges of energy security and climate change. It establishes the action plan for energy efficiency and conservation actions in New Zealand to support the increased uptake of energy efficiency and renewable energy. The strategy also assigns responsibility for the delivery of

²³New Zealand government (2007).

each action to a central or local government agency. The overarching goals of the strategy are listed in section 1.1.

b) Applicable sectors

Transport, residential, business, renewable electricity and government

c) Outline

The NZEECS was completed as a requirement of the Energy Efficiency and Conservation Act 2000 and released in October 2007. The NZEECS replaced the inaugural National Energy Efficiency and Conservation Strategy released in 2001. The Strategy is written as a companion document to the New Zealand Energy Strategy (NZES) and sets out the government's detailed policies and actions on energy efficiency, energy conservation and renewable energy. It gives effect to the energy efficiency, energy conservation and renewable energy objectives set out in the NZES.

The aims for New Zealand, set out in the NZEECS, were:

- Warm, dry, healthy homes, improved air quality and reduced energy costs through:
 - Insulation
 - Energy efficiency
 - Clean heat retrofits or upgrades
 - Minimum energy performance standards (MEPS) and ENERGY STAR™ labelling for an increased number of product categories.
- To make businesses more energy efficient and competitive by using more renewable energy and emitting less carbon dioxide through:
 - Expanding the Emprove and Energy Intensive Business programmes
 - Implementing energy efficiency training for workers
 - Expanding the woody biomass programme
 - Measuring the potential for energy efficiency improvements in the rural sector
 - Increasing the uptake of energy efficiency measures in the rural sector.
- To increase the overall energy use and greenhouse gas emissions from New Zealand's transport system by:
 - Reducing the per capita transport greenhouse gas emissions
 - To widely deploy electric vehicles
 - To cut kilometres travelled by single occupancy vehicles
 - To increase the use of biofuel capable and electric cars
 - To investigate options for improving New Zealand's North Island main trunk line.
- To improve New Zealand's efficient and renewable electricity system by:
 - Having 90 percent of electricity generated from renewable sources by 2025.
- For Government to lead the way through:
 - Public sector carbon neutrality
 - Reducing fleet emissions
 - Reducing energy use per employee in core public sector buildings
 - Cutting workplace travel by core public service departments
 - Providing support to local government in delivering NZES and NZEECS programs.

The NZES and NZEECS are now being updated. The Minister of Energy and Resources announced his intention to update these strategies in February 2009 and August 2009,

respectively. A draft of the updated New Zealand Energy Strategy and the New Zealand Energy Efficiency and Conservation Strategy will be released for public consultation in 2010.

d) Financial resources and budget allocation

Actions in the NZEECS are funded by a range of sources, including the government, private sector, voluntary sector and individuals. In 2007, an initial outlay of NZD 184 million over five years was devoted to the strategy. This figure is revised annually and includes the operating costs of the Energy Efficiency and Conservation Authority (EECA).

e) Method for monitoring and measuring effects of action plans

The Minister of Energy and Resources is accountable for the overall performance of the strategy. The Ministry of Economic Development (MED) reports progress on the implementation of the strategy to the Minister as published annual progress reports. All agencies involved in the implementation of the strategy are accountable for monitoring and report to MED on the impacts of their programs and the contribution to overall strategy objectives.

f) Expected results

To achieve the goals outlined in sections 1.1 and 1.2

g) Future tasks

The strategy is amplified in EECA's Statement of Intent and Annual Reports.

1.4. Institutional Structure

a) Name of organisation

Energy Efficiency and Conservation Authority (EECA)

b) Status of organisation

EECA is a Crown entity, established under the Energy Efficiency and Conservation Act 2000 and subject to the Crown Entities Act 2004. EECA is governed by a Chairman and seven Board members who report to the Minister of Energy and Resources. EECA acts as a policy maker, regulator, program funder and implementer.

c) Roles and responsibilities

EECA is the main agency responsible for helping deliver the government's energy efficiency agenda. Its function is to encourage, promote and support energy efficiency, energy conservation and the use of renewable energy sources in New Zealand.

d) Covered sectors

Industry, commercial buildings, agriculture, transport (fuels), households, products and equipment, research and promotion, monitoring and reporting of energy efficiency/renewable energy data

e) Established date

2000 as part of the Energy Efficiency and Conservation Act 2000

f) Number of staff members

As at 1 July 2009, EECA had 110 full time equivalents (FTEs).

EECA works closely with government operational and policy agencies to help them design; implement; and monitor policies related to energy efficiency.

The Ministry of Economic Development (MED) has primary responsibility for providing energy policy advice to the Minister of Energy and Resources. It is also responsible for monitoring EECA and ensuring integration between EECA and the Electricity Commission in delivering energy efficiency programs.

The Ministry of Transport and the New Zealand Transportation Agency are responsible for most transport-related energy efficiency initiatives with the exception of vehicle fuel consumption labels. EECA has a Letter of Understanding with the New Zealand Transportation Agency regarding the management of fuel consumption information.

Statistics New Zealand is responsible for the compilation of energy statistics. The Energy Domain Plan is a joint initiative between Statistics New Zealand, MED and EECA to assess the state of energy data and identify initiatives to help fill in information gaps.

The Electricity Commission's role is to oversee and regulate New Zealand's electricity industry and markets. It promotes and facilitates electricity efficiency and conversion in the areas of lighting, industry (electric motors and compressed air) and commercial buildings. The Electricity Commission has a Memorandum of Understanding with EECA to demarcate responsibilities and minimise duplication. In 2009, the Minister of Energy and Resources indicated that the electricity efficiency functions of the Electricity Commission would transfer to the EECA in 2010.

Other agencies that share responsibility for energy efficiency include the Ministry of Agriculture and Forestry (renewable fuels, industry); Department of Building and Housing (Building Code); Ministry for the Environment (clean heat grants to improve air quality); Ministry of Health (ENERGYWISE™ homes); Housing New Zealand Corporation (state housing improvement programs); Standards New Zealand (for energy efficiency in products/equipment); and the Ministry of Foreign Affairs and Trade (WTO, mutual recognition arrangements, APEC forums, etc.). The New Zealand government also works closely with the Australian Government on product and appliance standards and labelling.

There are 12 regional government authorities (called regional councils) in New Zealand. Each regional council is required to produce a 'regional policy statement' that covers all natural resources, including energy. The NZEECS must be taken into consideration in the preparation of the regional policy statements. Land transportation strategies must also be consistent with the NZEECS. Four regional councils have chosen to produce separate energy action plans in addition to their policy statements. Regional councils are granted low interest loans for energy efficiency improvements under the Crown Loan Scheme. EECA also collaborates with regional authorities on many regional energy efficiency projects. Government actions are coordinated through the Senior Energy Official Group and Energy Data Analysis and Coordination Group.

1.5. Information Dissemination, Awareness-raising and Capacity-building

a) Information collection and dissemination

The New Zealand Government conducts monthly surveys to monitor the public's awareness, willingness and commitment to energy efficiency. Brand association and energy use behaviour change is also monitored. Survey results are published on a monthly and quarterly basis. The business sector also publishes case studies to promote energy technologies and behaviour change in industry.

b) Awareness-raising

Information about energy efficiency is provided to New Zealanders through a number of channels. The main mechanisms include:

- An integrated strategy of marketing and communications which has three distinct actions:
 - An integrated brand architecture and the formation of a clear brand management strategy
 - An integrated marketing and communications budget
 - The consolidation of EECA's websites from seven to three integrated websites.

- The 'Energy Spot', a series of one minute television programs giving New Zealanders practical, useful tips to make the most of the energy used in homes, businesses and vehicles
- The Right Light website (www.rightlight.govt.nz) provides facts about energy efficient lighting including information about available technologies and choice, electricity savings, safety and design and application. Interactive tools allow consumers to evaluate the cost and potential electricity savings of energy efficient lighting in homes and businesses
- Product and appliance labelling programmes including vehicle fuel economy labelling and Energy Star™
- The biennial AA ENERGYWISE™ rally, aimed at raising awareness of energy efficiency practices in driving and transportation—www.aaenergywiserally.org.nz/
- EECA Awards that celebrate and promote energy efficiency practices in communities, businesses and industry—www.eeca.govt.nz/node/1243
- The EECA News Magazine that is distributed to stakeholders—www.eeca.govt.nz/about-eeeca/news-and-events/news
- A range of marketing and advertising campaigns for print, radio and television.

c) Capacity-building

EECA has worked with the Solar Industries Association (SIA) to assist with training and accreditation of solar installers. Training is now carried out through New Zealand polytechnics and the SIA is a stand-alone organisation.

EECA has contracted the Association of Building Sustainability Assessors (ABSA) to provide assessor training and accreditation services for the voluntary home energy rating scheme.

Under the Warm Up New Zealand: Heat Smart programme (WUNZ:HS), service providers are required to provide proof that they have the internal capacity and capability to deliver the program to the standard required. Applicants were assessed on that criterion by an independent assessment panel.

EECA supports the Insulation Association of New Zealand (IAONZ) which is developing a training module for members' installers.

The Energy Management Association New Zealand (EMANZ) is an industry association of energy management experts including energy auditors, energy managers and suppliers of energy efficiency products and services. EECA supports EMANZ in appointing an Executive Officer and developing a self-sustaining business model over three years. The Electricity Commission also supports EMANZ to administer its Compressed Air Systems auditor scheme.

The Tertiary Education Commission is delivering a three-year program to develop a comprehensive set of energy management qualifications or competency standards at a trade, technical or tertiary level in New Zealand. The Sustainable Energy in the Domestic and Commercial Environment (SEDCE) programme focuses on training and qualification development in the wider commercial sector. The SEDCE will identify skills and develop qualifications through the use of Industry Training Organisations.

1.6. Research and Development in Energy Efficiency and Conservation

New Zealand uses international research on energy efficiency and conservation while carrying out its own research to establish potential solutions for its distinctive mix of energy resources, infrastructure and cost structure. The government's policy on research and development is set out in chapter 11 of the New Zealand Energy Strategy—Sustainable energy technologies and innovation.

There are a number of EECA programs that provide funding for energy efficiency research and development that are aimed at energy intensive businesses. The programs promote energy efficient and renewable energy technologies to business and disseminate knowledge on the cost effectiveness of different technologies and industrial processes. Businesses that use and sell wood energy are also eligible for funding to undertake feasibility studies and supply and demand initiatives. EECA is also looking to develop knowledge and widen access to woody biomass information resources by increasing the potential availability of woody biomass and the development of the Bio energy Knowledge Centre (www.bkc.co.nz/).

In terms of renewable energy, EECA administers the contestable Marine Energy Deployment Fund (MEDF) which was set up to bring forward the development of marine energy in New Zealand waters. The MEDF was established as part of the NZ Energy Strategy to accelerate innovation and assist with the costs associated with concept testing and device deployment.

In addition, EECA administers the Distributed Generation (DG) Feasibility Fund. The fund partially funds DG feasibility studies. The objectives of the fund were to: address the resource and opportunity information barrier faced by developers; help test the DG market to identify potential cost effective niches; build up a body of real world evidence and knowledge about barriers to uptake; and to support projects that are close to being viable but which have failed to attract investment as a result of barriers to uptake.

For renewable transport fuels, EECA administers the Biodiesel Grants Scheme. The purpose of is to encourage the adoption of environmentally responsible fuels that reduce greenhouse gas emissions in the transport sector, diversify the fuel market and level the playing field between the two principal biofuels – bioethanol and biodiesel.

Research

The New Zealand government carries out research and development activities through two agencies. The Ministry of Research, Science and Technology (MORST) undertakes research to help in the development of science-related policy. The Foundation for Research, Science and Technology (FRST) distributes public sector investments to public- and private-sector institutions, such as universities. Other institutions involved directly and indirectly in research and development activities include the Inland Revenue Department; Ministry of Economic Development; Ministry of Research, Science and Technology; and Ministry of Transport.

Central government funding in energy research and development for 2008 was NZD 18 million through FRST. In addition, NZD 8 million has been dedicated over four years for marine generation devices, NZD 12 million over three years to support low carbon energy technologies and a NZD 1.5 million grant has been allocated to funding the National Energy Research Institute.

These policies and programs have resulted in the development of an energy research roadmap; increased investment in energy research and development, international partnerships and collaborative research; business and tax credits for research and development expenditure and capacity building.

EECA carries a public responsibility for shaping, prioritising and resourcing research as outlined in the Energy Efficiency and Conservation Act 2000. This is necessary for the optimal implementation of the NZEECS, climate change commitments and sustainability policies. As such, EECA also administers a research program. This program focuses on providing research in the following areas:

- Better information – energy efficient technology research
- Research energy end use in commercial and residential buildings
- Primary production and manufacturing sector energy end use research
- Macro-economic modelling of energy efficiency potentials
- Behaviour change research and understanding end user service needs.

Within these broad areas, an Energy Research Committee and StageGate™ process for evaluating EECA research is carried out for any research project proposed within the organisation. It prioritises high quality research and ensures they are aligned with the corporate direction and purpose of EECA.

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS

2.1. Government Laws, Decrees, Acts

a) Name

Energy Efficiency and Conservation Act 2000

b) Purpose

The Act is the legislative basis for promoting energy efficiency, energy conservation and renewable energy in New Zealand. The Act can be found at www.legislation.govt.nz/act/public/2000/0014/latest/whole.html#d1m54948.

c) Applicable sectors

Undefined

d) Outline

Before the Act was passed, energy efficiency in New Zealand was addressed by the Energy Research Monitoring Agency which was attached to the Ministry of Commerce (now the Ministry of Economic Development). Legislation for the Act was introduced in 1998 and was passed in 2000.

The Act established the Energy Efficiency and Conservation Authority (EECA) as a stand-alone Crown entity with an enduring role to promote energy efficiency, energy conservation and renewable energy across all sectors of the economy. It empowers the preparation of regulations implementing product energy efficiency standards and labelling, as well as disclosure of information to compile statistics on energy efficiency, energy conservation and renewable energy. The Act provides the enabling legislation for the NZEECS.

e) Financial resources and budget allocation

The funds allocated vary each budget year. EECA's budgeted figures are confirmed by its Statement of Intent published annually. Funding comes from several sources including the government, private sector, voluntary sector and individuals. These funds cover all costs including administration, grants and financial assistance. In 2006/07, the figure was NZD 22 697 000; in 2007/08 NZD 36 361 000; 2008/09 NZD 52 124 000; and 2009/10 NZD 83 173 000.

f) Expected results

To promote energy efficiency, energy conservation and the use of renewable energy sources in New Zealand

2.2. Regulatory Measures

2.2.1. Minimum Energy Performance Standards and Labelling

a) Name

Energy Efficiency (Energy Using Products) Regulations 2002

b) Purpose

To reduce energy demand, energy related greenhouse gas emissions and provide savings to the end-user by improving the energy efficiency of a product class. This will be achieved through setting MEPS that result in improvements to the most energy intensive models

available for sale in a product class and category; and requirements to display energy performance labels, stimulating the production and purchase of more energy efficient products. This is a joint Australia-New Zealand program that offers industries in both economies improved economies of scale and reduced business compliance costs.

c) Applicable sectors

All energy using products but particularly appliances, lighting and equipment in the residential, commercial and industrial sectors

d) Outline

Energy Efficiency (Energy Using Products) Regulations were first published in 2002. The New Zealand Government entered into the Equipment Energy Efficiency Program (E3) with Australia in 2004-05. MEPS and labelling are the main mechanisms the E3 uses to improve product efficiency where requirements are set out in energy performance standards. The standards set out the testing method to establish a product's energy performance and consumption. All covered products must meet or exceed this standard before they can be sold to consumers. The E3 jointly funds:

- The profiling of products and technologies on the market and assessments of their energy efficiency potential
- Cost benefit analysis of options for intervention
- Consultation documents and regulatory impact statements
- Development and publication of joint Australia/New Zealand standards
- Compliance testing of products
- A common foundation for regulation.

A number of government agencies partake in intergovernmental and international cooperation efforts.

Labelling is mandatory for the following electrical products offered for sale in New Zealand:

- Refrigerators and freezers
- Clothes washers
- Clothes dryers
- Dishwashers
- Air conditioners
- Televisions.

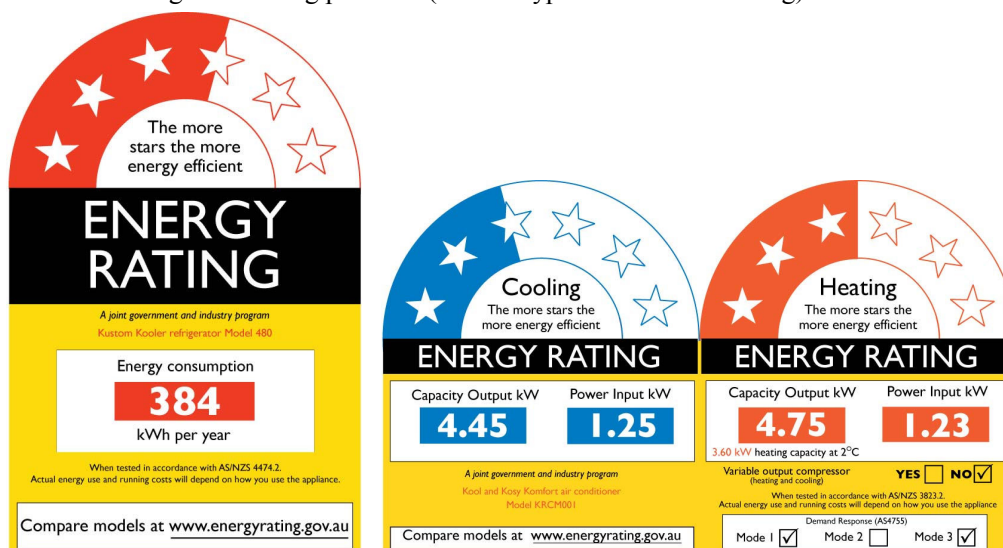
The following products are also regulated on the basis of Minimum Energy Performance Standards (MEPS) – this means that they have regulated minimum energy efficiency labels.

- Refrigerators and freezers (revised MEPS and labelling from mid-2010)
- Mains pressure electric storage water heaters (from 2002)
- Small mains pressure electric storage water heaters (<80L) and low pressure and heat exchanger types (from 1 October 2005)
- Three-phase electric motors (0.73kW to <185kW) (from 1 October 2001, revised April 2006)
- Single-phase air conditioners (from 1 October 2004, revised 1 April 2006 and 2007, further revision proposed for 2010)
- Three-phase air conditioners up to 65kW cooling capacity (from 1 October 2001, revised 1 October 2007, another revision proposed for 2010)
- Distribution transformers (from 1 October 2004, revisions from mid-2010)

- Ballasts for linear fluorescent lamps (from 1 March 2003). In addition to MEPS, ballasts also have to be marked with an energy efficiency index (EEI)
- Linear fluorescent lamps—from 550mm to 1500mm inclusive with a nominal lamp power >16W (from 1 October 2004)
- Commercial refrigeration (self contained and remote systems) (from 1 October 2004)
- Incandescent lamps (from November 2009)
- Compact fluorescent lamps (from mid-2010)
- External power supplies (from mid-2010)
- Set top boxes (from mid-2010)
- Televisions (from mid-2010)
- Commercial building chillers (from mid-2010)
- Close-control air conditioners (from mid-2010).

The following products have been identified through the E3 program as potential areas for regulation in the future. This is subject to favourable cost-benefit analysis, regulatory process and approval from the Ministerial Council on Energy in Australia and New Zealand Cabinet.

- Standby power
- Home entertainment products
- Information and communication technology products (including computers and monitors)
- Gas products (including space and water heating products)
- Industrial products
- Hot water (solar and heat pump water heating)
- Heating and cooling products (various types of air conditioning).



e) Financial resources and budget allocation

NZD 2.4 million a year is allocated to MEPS and labelling, ENERGY STAR and Vehicle Fuel Economy Rating.

f) Expected results

It is expected that MEPS and labelling will result in 12 petajoules, 2.33 Mt CO₂-e and NZD 179 million in energy savings a year in 2025.

2.2.2. Building Energy Codes

a) Name

Compliance Document for New Zealand Building Code Clause H1: Energy Efficiency—Third Edition

b) Purpose

To facilitate the efficient use of energy

c) Applicable sectors

Residential and commercial

d) Outline

Mandatory provisions for building work are contained in the New Zealand Building Code (NZBC). Energy efficiency is covered in NZBC Clause H1.

In 2007 and 2008, new insulation and double glazing requirements were introduced for new houses, major extensions to existing houses, new multi-unit residential apartments and new small buildings with a floor area of up to 300 square metres. These changes are estimated to provide a 30% improvement in thermal performance over previous requirements. Hot water heating requirements, implemented in late-2000 remain unchanged.

In 2008, improved lighting requirements were introduced for new buildings with a floor area greater than 300 square metres. Thermal efficiency requirements for large buildings remain unchanged from 2000 levels, as are the energy efficiency requirements for domestic type hot water systems. Hot water systems over 700 litres are exempt from the Building Code.

In 2009, the Building Code introduced guidance for the energy performance of heating, ventilation and air conditioning systems.

e) Financial resources and budget allocation

No information available

f) Expected results

Improved energy performance of residential and small commercial buildings

2.2.3. Fuel Efficiency Standards

a) Name

Vehicle Fuel Economy Labelling

b) Purpose

To achieve reductions in fossil fuel demand and emissions, and savings to end users, through improving the average fuel efficiency of the vehicle fleet

c) Applicable sectors

Transport

d) Outline

The Energy Efficiency (Vehicle Fuel Economy Labelling) Regulations were first published in 2007. The labels must be displayed on all new and late-model used cars available for sale through registered motor vehicle traders and on Internet listings, provided the information is available. They are intended to allow consumers to make informed decisions about purchasing a car, knowing the effect it will have on the environment and its fuel costs. This should stimulate the supply and purchase of more fuel efficient vehicles.



The label displays a star rating out of six, where six stars indicates the most fuel efficient cars; the indicative cost of running the vehicle and the vehicle's fuel economy²⁴.

e) Financial resources and budget allocation

NZD 2.4 million a year is allocated to MEPS and labelling, ENERGY STAR and Vehicle Fuel Economy Rating

f) Expected results

No information available

2.3. Voluntary Measures

a) Name

Home Energy Rating Scheme (HERS)

b) Purpose

To reduce energy use for space and water heating, with the associated benefits of lower home operating costs, peak load reductions and reduced GHG emissions. Improved indoor climate conditions, particularly higher indoor temperatures in winter, will result in health, mental health and social benefits including reduced hospital admissions, GP visits and days off work or school.

c) Applicable sectors

Residential

d) Outline

The voluntary HERS has been operating since December 2007. In line with international experience, uptake is low. The government is considering complementing the scheme with a simpler energy audit scheme.

The assessment includes the efficiency of the building materials, orientation and design in maintaining a comfortable indoor temperature; and the energy performance of the space heating system and the water heating system—the largest energy users in the home. A home will be given a rating of 0 to 10 stars, with 10 stars being the most energy efficient.

Further development of the HERS was discontinued in April 2009 due to marginal cost benefit analysis results. EECA provides technical support to the Department of Building and Housing in the development of a market-based solution through an industry joint venture. The HERS methodology is being used to underpin the energy efficiency component. The tool is expected to be fully operational in 2010. Until such time, the voluntary HERS remains available.

e) Financial resources and budget allocation

NZD 0.1 million in 2009/10

f) Expected results

The rating tool is expected to deliver two levels of functionality. These include: a free or low cost online assessment for the homeowner looking to improve the performance of their homes; and a comprehensive recognised third party audit for the home owner looking for a star rating for their home that will potentially add value at the point of sale.

a) Name

ENERGY STAR

²⁴EECA (2010a).

b) Purpose

To achieve reductions in energy demand and energy-related GHG emissions and savings to the end user through stimulating the uptake of, demand for, and marketability of high efficiency products.

c) Applicable sectors

Residential

d) Outline

The ENERGY STAR™ concept was developed by the US Environmental Protection Agency in 1992 as a voluntary labelling program designed to promote energy efficient products to reduce GHG emissions. It provides an independent endorsement mark for high-efficiency products that can be used by industry/retail partners in product labelling, promotional material and advertising.

New Zealand became a licensed partner for ENERGY STAR™ in 2005 and has both adopted United States' specifications and developed New Zealand specifications for certain product classes (air conditioning, fridge/freezers, clothes washing machines, dishwashers and compact fluorescent lamps).

ENERGY STAR™ rated heat pumps are the only products specified for use under the Warm Up New Zealand: Heat Smart insulation and clean heating program.

e) Financial resources and budget allocation

NZD 2.4 million a year is allocated to MEPS and labelling, ENERGY STAR and Vehicle Fuel Economy Rating.

f) Expected results

No information available

2.4. Financial Measures Taken by the Government**2.4.1. Tax Scheme**

New Zealand does not have a tax scheme for stimulating conservation energy efficiency improvements.

2.4.2. Low-Interest Loans**a) Name**

Crown Energy Efficiency Loan Scheme

b) Purpose

To improve central government energy efficiency and ensure greater value for money from the public sector

c) Applicable sectors

Government (central)

d) Outline

The scheme was introduced in 1989 and provides funds to government agencies to encourage investment in energy efficiency measures in their building, facilities and vehicle fleets. The loans are repaid by the recipient department/agency over a calculated payback period. The enduring energy savings accrue to the recipient for the remaining life of the project or measure.

e) Financial resources and budget allocation

The government plans to lend at least NZD 1.8 million in crown loans to support energy management. It is an ongoing program, with NZD 2 million a year allocated in the 2008-09 budget.

f) Expected results

Improved central government energy efficiency equivalent to energy savings of around NZD 1.8 million a year by 2012-13

2.4.3. Subsidies and Budgetary Measures**a) Name**

Warm Up New Zealand: Heat Smart Programme

b) Purpose

To improve energy efficiency in the residential sector; reduce the numbers of people with health problems due to living in cold, damp houses; crowd in the market for energy services; and reduce economy-wide energy demand

c) Applicable sectors

Residential

d) Outline

The New Zealand Insulation Fund was announced by the New Zealand government on 28 May 2009 and came into effect on 1 July 2009 as Warm Up New Zealand: Heat Smart. It is now the centrepiece energy program in the residential sector alongside the Ministry for the Environment funded Clean Heat Grant program. Funding is provided to fit homes with insulation and clean heating devices such as heat pumps and approved wood burners.

The scheme offers to meet 33% of the cost (up to NZD 1300 including tax) of installation of ceiling and under-floor insulation to all households. Households with sufficient ceiling and under-floor insulation may also be eligible for clean heating device funding of up to NZD 500. Lower-income households (i.e. Community Services Card holders) are eligible for more funding—60% of the total cost of installation and NZD 1200 toward a clean heating appliance (provided the home is insulated). Landlords with Community Services Card holding tenants can also get the 60% subsidy and up to NZD 500 for the clean heating device if the home is insulated.

The program also works on a co-funding basis with four proposed sets of partners: local government; Iwi (Maori); existing and new service providers; and energy retailers. Working with these partners, EECA will retrofit over 180 000 homes over the next four years.

In November 2009, the government announced that the program would be enhanced by an additional NZD 24 million targeted exclusively at low income families. This will allow an additional 8000 homes to benefit from the program. Over time, the goal of the Fund is that the private funders will take over without the Crown subsidy by claiming the full costs back via rates or energy bills.

The program includes a two-year independent evaluation program that measures the effectiveness and efficiency of delivery and achievement of energy, health and economic outcomes. The longer-term goals for the Fund are: energy savings, health benefits, and stimulating the supply and demand side for energy efficiency upgrades.²⁵

²⁵ EECA (2010b).

e) Financial resources and budget allocation

The government allocated NZD 323 million over four years in the 2009 Budget. In November 2009, the government announced that the program would be enhanced by an additional NZD 24 million targeted exclusively at low-income families.

f) Expected results

188 000 homes insulated; 80 000 homes with clean heating devices; NZD 256 million in energy savings; 9.89 PJ energy demand reduction; NZD 240 million in health benefits; 1500 full-time equivalent jobs in construction and related industries.

a) Name

Solar Water Heating Programme

b) Purpose

To increase the uptake of solar water heating products

c) Applicable sectors

Residential, commercial and industry

d) Outline

The Solar Water Heating Initiative was designed to contribute to industry development by promoting and providing incentives to encourage the uptake of solar water heating systems. The overall aim of the programme is sustained future growth of the industry without government support.

e) Financial resources and budget allocation

NZD 15.5 million over 3 years starting in 2006

f) Expected results

2600 new solar hot water heater installations supported by mid-2009; 0.13 PJ of additional solar thermal energy a year; NZD 21.5 million in energy savings; 0.06 Mt of CO₂ avoided a year.

a) Name

Energy Intensive Business Grants

b) Purpose

To encourage energy intensive businesses to adopt energy efficient technologies

c) Applicable sectors

Industry

d) Outline

Energy Intensive Business Grants provide financial assistance to businesses with high energy use to fund energy efficiency projects. Funding is available for projects using technologies that have already been proven to increase energy efficiency but are not yet common place in New Zealand. In this sense, the program is designed to overcome investment risks in areas of emerging technologies.

e) Financial resources and budget allocation

NZD 1.04 million in grant funding for fiscal year 2008-09

f) Expected results

For the combined business programs Energy Intensive Business and Emprove (see 2.4.4), expect to achieve energy savings of 3 PJ a year; NZD 60 million in energy savings a year; and 350 000 tonnes of CO₂ avoided a year by 2012. It is also anticipated that increased competitiveness will create more employment opportunities.

2.4.4. Other Incentives**a) Name**

Emprove

b) Purpose

To create more energy efficient and competitive businesses using more renewable energy and emitting less CO₂

c) Applicable sectors

Industry

d) Outline

Provides advice through energy audit grants on energy management best practices to large energy users and small to medium-sized enterprises in order for them to cut energy costs and reduce GHG emissions.

e) Financial resources and budget allocation

NZD 1.18 million for fiscal year 2008-09

f) Expected results

For the combined business programs, Energy Intensive Business and Emprove (see 2.4.3), expect to achieve energy savings of 3 PJ a year; NZD 60 million in energy savings a year; and 350 000 tonnes of CO₂ avoided a year by 2012. It is also anticipated that increased competitiveness will create more employment opportunities.

a) Name

Efficient Lighting

b) Purpose

To encourage uptake of efficient lighting technologies

c) Applicable sectors

Residential, Commercial

d) Outline

The Electricity Commission provides a subsidy to reduce the initial cost of purchasing efficient lighting technologies including compact fluorescent lamps and linear fluorescent lamps. This aligns with the Commission's Right Light initiative (www.rightlight.govt.nz).

e) Financial resources and budget allocation

No information available

f) Expected results

0.6 PJ energy savings; 0.12 Mt CO₂ by 2012; NZD 3 million energy savings per year by 2012

a) Name

Commercial audit and works program

b) Purpose

To provide information and incentives to enable businesses to make informed investment decisions on energy efficiency investments

c) Applicable sectors

Commercial

d) Outline

The Electricity Commission has contracted several service providers to work with large commercial businesses to conduct energy and operational audits to identify measures that will generate electricity savings and to oversee the implementation of the recommended measures.

For approved projects, the Commission funds the cost of the audit and contributes a portion of the technology and implementation costs where the value of measures planned for implementation meet the Commission's investment criteria.

For each approved project, the service provider guarantees a set level (and minimum period) of electricity savings. If the guaranteed savings are not achieved, the service provider is required to repay a pro-rata proportion of the Commission's financial contribution based on the extent of the shortfall in electricity savings.

e) Financial resources and budget allocation

No information available

f) Expected results

No information available

a) Name

Electric motor retirement subsidies

b) Purpose

Remove lower-efficiency three-phase motors with MEPS compliant motors

c) Applicable sectors

Industry

d) Outline

Bounty payments for the removal of lower efficiency three-phase motors that are replaced with MEPS compliant motors

e) Financial resources and budget allocation

No information available

f) Expected results

1 PJ energy savings; 0.194 Mt CO₂ per year in 2012

a) Name

Compressed air system (CAS) accreditation audits and assessments

b) Purpose

Assist the development of specialist CAS auditing skills and fund audits on larger sites in return for commitments to act on agreed cost-effective recommendations

c) Applicable sectors

Industry

d) Outline

The Electricity Commission facilitates the development of a CAS Auditor Accreditation Scheme. This involves accredited auditors having their competency subjected to an independent assessment. A prerequisite to having a competency assessment is for the auditor to have satisfactorily completed a training course.

The Electricity Commission also funds in-depth CAS audits of larger industrial sites, in return to a commitment to action from the CAS user. On a case-by-case basis, the Commission may then also contribute to funding of CAS plant investments that implement identified cost-effective energy efficiency investments.

e) Financial resources and budget allocation

No information available

f) Expected results

0.4 PJ energy savings; 0.078 Mt CO₂ per year in 2012

a) Name

Vehicle fleet auditing for businesses

b) Purpose

To improve the vehicle efficiency of the commercial vehicle fleet

c) Applicable sectors

Commercial

d) Outline

This program provides audits for businesses with fleets of more than 100 vehicles. Businesses are eligible for a government funded grant of up to 50% of the audit (up to a maximum of NZD 10 000). Monitoring and case study information is collected by EECA.

e) Financial resources and budget allocations

No information available

f) Expected results

No information available

a) Name

Biodiesel Grant Scheme

b) Purpose

The grant will assist the production and adoption of environmentally responsible fuels which reduce greenhouse gas emissions and provide a similar advantage for biodiesel to that currently available to bioethanol.

c) Applicable sectors

Biodiesel producers in New Zealand

d) Outline

Under the scheme, a grant of up to 42.5 cents per litre for biodiesel or biodiesel content of a biodiesel blend will be available to biodiesel producers. The grant will be payable monthly in arrears to producers whose product sales amount to, or are in excess of 10 000 litres, B100 content (100% biodiesel) per month.

e) Financial resources and budget allocation

NZD 9 million in 2009/10; NZD 12 million in 2010/11; NZD 15 million in 2011/12

f) Expected results

No information available

a) Name

Improve energy sustainability in local government and communities

b) Purpose

To encourage and assist regional councils to develop regional energy strategies; and deliver operational and policy advice on energy efficiency, conservation and renewable energy

c) Applicable sectors

Government

d) Outline

The program was established in fiscal year 2008-09. It provides funding and technical assistance to local government bodies to improve energy efficiency and conservation in their communities with a focus on households.

e) Financial resources and budget allocation

NZD 170 000 a year

f) Expected results

Reduced barriers to sustainable energy in households

2.5. Energy Pricing

New Zealand's energy sector is guided by free market principles. As a government agency, the Electricity Commission regulates the operation of the electricity industry and markets to ensure electricity is produced and delivered to all consumers in a fair, reliable and environmentally sustainable manner.

Since New Zealand's pricing is market-based, its effect on energy efficiency improvement programs varies with fluctuating supply and demand for energy. Generally, when energy prices increase because of weather conditions (for example a drought decreases hydroelectricity generation, New Zealand's primary source of electricity) or global fuel prices, people are more likely to adopt more energy efficient behaviour.

2.6. Other Efforts for Energy Efficiency Improvements**2.6.1. Cooperation with other Government Organisations**

MED and EECA work closely with the Ministry of Health, Ministry of Social Development, Ministry for the Environment, Ministry of Transport, Ministry of Agriculture and Forestry, the

Department of Building and Housing, Housing New Zealand and Statistics New Zealand. EECA also works closely with local government and District Health Boards.

2.6.2. Cooperation with Non-Government Organisations

In general, non-government organisations (NGOs) and community energy groups in New Zealand have good knowledge and awareness of energy efficiency improvement programs implemented by the central government under the NZEECS. NGOs have established partnerships with central agencies to realise the goals of the NZEECS in certain areas. Central government agencies have been providing financial and technical support to local governments in implementing energy efficiency and renewable programs. Local governments are currently focused on energy efficiency improvement efforts to lower or maintain the energy expenditures, while NGOs are focused on the alleviation of fuel poverty and improving health outcomes among lower-income families. Through EECA, NGOs/community energy groups are implementing the ENERGYWISE™ Homes Programmes and are able to use local networks to assist in reaching more participants.

2.6.3. Cooperation through Bilateral, Regional and Multilateral Schemes

The New Zealand government cooperates with other economies and New Zealand agencies on energy efficiency, including:

- The Australian Department of Environment, Water, Heritage and the Arts (DEWHA) and Australian State Regulators through the E3 committee to set joint standards and regulatory requirements for appliances and equipment
- APEC forums
- Energy Regulators Advisory Council (Australia and New Zealand) to align regulations for energy using products such as gas/electrical safety and radio spectrum management
- The Commonwealth Scientific and Industrial Research Organisation (CSIRO, Australia)
- Regulators' Forum
- WTO TBT notification.

2.6.4. Other Cooperation/Efforts for Energy Efficiency Improvements

Through the WUNZ: HS programme, EECA has contractual agreements with private service providers to safely install insulation and clean heating measures into homes.

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PERU

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. Overall Energy Efficiency Improvement Goals

a) Key indicator

Total Primary Energy Supply/GDP, Energy Elasticity to GDP, Total Energy Use, etc.

b) Goals

To reduce energy consumption by up to 15 percent by 2018

c) Base year

2005

d) Goal year

2018

Description

The Peruvian Government through the Ministry of Energy and Mines (MINEM) will formulate the economy's goals in the next years according to Law No. 27345 Promoción del Uso Eficiente de la Energía (Law of Promotion for the Efficient Use of Energy) and its regulatory measure, which is the energy efficiency framework for the economy.

1.2. Sectoral Energy Efficiency Improvement Goals

a) Sector

The Referential Plan for the Efficient Use of Energy 2009–2018 (Plan Referencial para el Uso Eficiente de Energía—PRUEE) in Peru contemplates goals in four sectors, where the energy efficiency improvements are to be approached from the energy demand point of view. The sectors to be considered are:

- Residential
- Industry (productive and services)
- Public
- Transport.

b) Goals

The Peruvian Government has established the goal of 15% energy savings among the residential, industry (productive and services), public and transport sectors. To achieve this goal, all action plans will be implemented in each sector as proposed in the Referential Plan (see Table 1).

Also, as a result of the energy efficiency programs in each sector, carbon dioxide (CO₂) emissions have been estimated. The total CO₂ emission reduction is expected to be 35.6 million tonnes.

c) Base year

2005

d) Goal year

2018

Table 6. Reduction of energy demand with the implementation of energy efficiency programs in each sector from 2009 to 2018

Sector	Total (PJ)
Residential	143.63
Industry (Manufacturing & Services)	147.14
Public	0.91
Transport	80.95
Total	372.64

Source: Referential Plan for the Efficient Use of Energy 2009 – 2018, Ministry of Energy and Mines (MINEM), Peru.

1.3. Action Plans for Promoting Energy Efficiency

1.3.1 Action Plans or Strategies for Promoting Energy Efficiency

a) Name

Referential Plan for the Efficient Use of Energy 2009-2018

b) Objectives

To promote and disseminate the features and benefits of energy efficiency at all levels through visual media, print media, and so on

c) Applicable sectors

The Referential Plan for the Efficient Use of Energy in Peru contemplates goals in four sectors, and energy efficiency improvements were taken from the energy demand point of view. The sectors are:

- Residential
- Industry (manufacturing and services)
- Public
- Transport.

d) Outline

The Peruvian government has actively pursued energy efficiency since the 1980s and 1990s, through the creation of the Energy and Environment Centre (CENERGIA) in 1986 and Energy Conservation Program (PAE) in 1994. The Government Decree regulating the Law for the Promotion of Efficient Use of Energy, which requires MINEM to formulate an energy efficiency policy (as part of the economy's energy policy), was established in 2000. As a result of this policy, the government has elaborated the Referential Plan for the Efficient Use of Energy 2009–2018, which is the main instrument to achieve the energy efficiency goals through the action plans proposed in each sector. From the Referential Plan, different action plans in four sectors were contemplated, which are described as follows:

Residential sector: There are several proposals in order to achieve the energy saving goal in the sector; however, only four projects have been taken into account which could have high impact within the sector:

- 1) Modernisation of lighting
- 2) Improved energy consumption habits of people
- 3) Replacement of electric water heaters with solar water heater systems
- 4) Replacement of traditional stoves with improved stoves.

Industry sector (productive and service sector): According to the Efficient Use of Energy and Energy Diagnosis Guidelines of 2008, equipment with high energy demand includes motors, heaters and lighting equipment, and for this reason, the action plans are focused on these. Four major impact projects are considered:

- 1) Replacement of conventional motors with efficient electric motors
- 2) Optimisation and modernisation of high-pressure heaters
- 3) Modernisation and improvement of lighting
- 4) Implementation of cogeneration projects.

Public sector: According to the Efficient Use of Energy and Energy Diagnosis Guidelines of 2008, higher electricity demand comes from lighting and computers, as well as air conditioners in buildings. One of the principal projects here is the Efficient Lighting in the Public Sector.

Transport sector: In Peru, most of the energy consumption in transport sector is related to road transport (80%), which is the sub-sector where energy efficiency improvements should be developed. Two of the most important projects that have been quantified in the Referential Plan are Efficient Driver Project and One Day without a Car Project.

e) Financial resources and budget allocation:

There is currently no budget allocation for new action plans. However, the Peruvian Government is working to establish a financing mechanism for the energy efficiency market. In case of the sectoral programs in industry (production and service sectors), the mechanisms are:

- Promotion of financing mechanisms for medium- and large-size enterprises by means of commercial banks
- Implementation of a trust fund for the promotion of the efficient use of energy (Fideicomiso para la Promoción del Uso Eficiente de Energía).
- Financing programs from International Technical Cooperation for medium- and small-size enterprises.

f) Method for monitoring and measuring effects of action plans:

In the framework of Law No. 27345 (Ley de Promoción del Uso Eficiente de la Energía) of 8 September 2000, and its Supreme Decree No. 053-2007-EM of 2007, the Peruvian Government designated Energy Consumption Indicators as a Ministerial Resolution, which was published as RM No. 038-2009-MEM/DM on 21 January 2009. The purpose of the Energy Consumption Indicators is the development of a fundamental tool to achieve the economy's goals on energy efficiency.

Activities for monitoring and reporting

On 1 January 2009, the Peruvian Government published the Ministerial Resolution (or Supreme Decree) No. 038-2009-MEM/DM, which approves the Energy Consumption Indicators and monitoring methodology for key economic sectors.

Departments/agencies for monitoring and reporting

Currently, the General Directorate of Electricity of the Ministry of Energy and Mines (MINEM) is responsible for the energy efficiency and renewable energy policies and monitoring activities.

Outputs of monitoring

The Supreme Decree on Energy Consumption Indicators and its Monitoring Methodology will establish disaggregated indicators for each sector with the purpose of developing Energy Action Plans encouraged by the Ministry of Energy and Mines (MINEM) in the coming years.

Several energy indicators have been developed for residential, industry and commercial sectors, as well as the public and transport sectors. Also, global indicators have been identified to be followed.

Outcomes of monitoring

The Supreme Decree was approved recently, as well as the management application.

Financial resources and budget allocation for monitoring

Will be developed with the National Government Budget

Description

The goal is to become acquainted through sectoral indicators with the necessary considerations to establish directives or guidelines in the Referential Plan of the Efficient Use of Energy.

g) Expected results

To achieve the goals outlined in Section 1.2

h) Future tasks

The current Referential Plan will provide the goals and will be regularly revised and updated according to recent available data.

1.4. Institutional Structure

1.4.1 Central Institutional Structure

a) Name of organisation

Ministry of Energy and Mines (MINEM) by means of the General Directorate of Electricity (DGE) of the Vice-Ministry of Energy

b) Status of organisation

Government

c) Roles and responsibilities

The main goal is to promote sustainable development and a competitive power sector, giving priority to private investments and energy matrix diversification, in order to satisfy energy requirements in an efficient and effective way to enable the development of productive activities and improve the living conditions of the population.

The activities are coordinated with state sectors that share an interest in energy efficiency and are also showing interest in participating, such as the Ministry of Education, Ministry of Production, Ministry of Housing, Universities, Local and Regional Governments, among others.

d) Covered sectors

All economic sectors

e) Established date

Time interval: 1996–2003 and 2005–present

f) Number of staff members

In the General Directorate of Electricity, there are now five professionals, three engineers, and two graduates in education.

1.5. Information Dissemination, Awareness-Raising and Capacity-Building

a) Information collection and dissemination

In the coming years, this activity should be implemented according to the Law on Promotion of Energy Efficiency (Law No. 27345) statements and its regulations.

b) Awareness-raising

No information available

c) Capacity-building

No information available

1.6. Research and Development in Energy Efficiency and Conservation

1.6.1. Specific Policies on Energy Efficiency RD&D

In the coming years this activity should be implemented according to the Law on Promotion of Energy Efficiency (Law No. 27345) statements and its Regulations.

1.6.2. Programs on Energy Efficiency RD&D

Same as above

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS

2.1. Government Laws, Decrees, Acts

a) Name

The Law for the Promotion of Efficient Use of Energy of 2000 (Law No. 27345), to be implemented by Government Decree No. 053-2007-EM of 23 October 2007, assigns the Ministry of Energy and Mines (MINEM) as the competent authority to promote the efficient use of energy by creating a culture for the rational use of energy, the elaboration and implementation of sectoral energy efficiency programs, and the promotion of energy efficiency consultancy services and ESCOs.

In addition, through the Supreme Decree No. 034-2008-EM of 19 June 2008, the Peruvian government established support for energy saving measures in the public sector by replacement of inefficient lamps (incandescent lamps) with compact fluorescent lamps (CFLs), as well as the acquisition of equipment with energy efficiency labels.

b) Purpose

The promotion of the efficient use of energy that will be in the economy's interest for energy security supply, consumer protection, encouragement of competitiveness and reduction of the negative environmental impacts from energy consumption.

c) Applicable sectors

All economic sectors

d) Outline

The law was approved on 8 September 2000; and one of the main barriers is the financing of energy efficiency audits.

e) Financial resources and budget allocation

Funding comes from the Ministry of Energy and Mines.

f) Expected results

In the coming years this activity should be implemented according to the Law on Promotion of Energy Efficiency and the Regulations approved in 2007.

2.2. Regulatory Measures

a) Name

Regulatory Measure of Law No. 27345, Law for the Promotion of the Efficient Use of Energy—Supreme Decree No. 053-2007

b) Purpose

The primary goal is to develop the regulatory measures to promote the efficient energy consumption.

c) Applicable sectors

All economic sectors

d) Outline

It was approved on 23 October 2007; one of the main barriers is the financing of energy efficiency.

e) Financial resources and budget allocation

Funding comes from the Ministry of Energy and Mines.

f) Expected results

In the coming years, this activity should be implemented according to the Law on Promotion of Energy Efficiency and its Regulations, which were approved in 2007.

2.2.1. Minimum Energy Performance Standards and Labelling

The Law for the Promotion of the Efficient Use of Energy (Law No. 27345 of 2000) requires mandatory energy efficiency labelling of energy consuming equipment and appliances. This requirement has been confirmed by Supreme Decree No. 053-2007-EM of 23 October 2007 regulating Law No. 27345/2000. The Ministry of Energy of Mines (MINEM) intends to develop and implement energy efficiency standards and labelling for a wider range of end-use appliances and to develop and implement a comprehensive market transformation strategy, based on mandatory energy efficiency labelling, minimum energy performance standards (MEPS), and the development of testing infrastructure and procedures and consumer awareness. The proposed project will build on the achievements so far and provide support in developing and implementing all those measures that are necessary to overcome the institutional, technical and awareness-related barriers that impede the implementation of this strategy, in particular:

- 1) Increase the awareness and strengthen technical and managerial capacities of government and other key public and private agents
- 2) Carry out a market study in order to establish a comprehensive and detailed data base of energy end-uses and end-use technologies
- 3) Develop a market transformation strategy for the introduction and dissemination of energy efficiency standards and labelling
- 4) Design and implement market transformation instruments (additional technical and energy efficiency labelling standards, MEPS)
- 5) Foster the development of the required infrastructure and procedures for product testing and certification, in particular test laboratories
- 6) Develop and implement an enabling legal and regulatory framework, in particular government regulations for mandatory energy efficiency labelling and MEPS
- 7) Develop a consumer communication strategy including awareness campaigns, incentives to consumers and training of equipment sales personnel
- 8) Develop and implement an appropriate monitoring and evaluation system.

Furthermore, the establishment of the Regional Energy Efficiency standards and labelling Committee and the Regional Energy Efficiency S&L Information System will foster exchange of experience and coordination of economy-wide programs with other economies in the region.

2.3. Voluntary Measures

2.3.1. Energy Efficiency Labelling

a) Name

Guideline for Labelling

b) Level

Central

c) Purpose

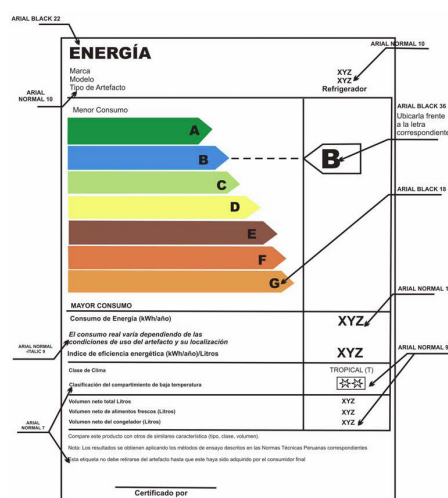
To gather information on energy efficiency of households and their minimum performance standards with the goal of promote the culture on energy efficient consumption

d) Applicable sectors

All economic sectors

e) Outline

The elaboration of test procedures and energy efficiency labelling standards in Peru was initiated in 1996 by the Technical Committee of Standardization for Rational and Efficient Use of Energy (CTNUREEE) and its respective subcommittees, with the participation of relevant public and private agents. So far, energy efficiency test procedures have been developed for refrigerators and freezers, lighting equipment (lamps and ballasts), electric motors, electric water heaters, industrial boilers and solar thermal and photovoltaic systems. Energy efficiency labelling standards are in place for refrigerators and freezers, household lamps and electric motors, in addition to minimum efficiency performance standards for CFLs.



It is a voluntary measure, and it came into effect in January 2009.

2.3.2. Energy Saving in the Public Sector

a) Name

Supreme Decree on Energy Savings in Public Sector; D.S. No. 034-2008-EM

b) Level

Central

c) Purpose

To induce the public sector to reduce its energy demand through energy efficiency campaigns and promote the use of more efficient equipment

d) Applicable sectors

All economic sectors

e) Outline

It is a mandatory measure, which was published in June 2008.

f) Financial resources and budget allocation

Funding comes from the Ministry of Energy and Mines.

g) Expected results

In the coming years, this activity should be implemented as it is part of the Law on Promotion of Energy Efficiency and its Regulations, which were approved in 2007.

2.3.3. Technical Norms (Standards) on Energy Efficiency**a) Name**

Technical Norms (Standards) on Energy Efficiency (Essays, Limits, and Labels)

b) Level

Central

c) Purpose

To provide the minimum energy efficiency standards, (especially norms, limits, and labels) for lighting, water heaters, heater boilers, motors, solar energy, etc.

d) Applicable sectors

All economic sectors

e) Outline

They are voluntary norms (standards), which have been published from 2000 to the present.

f) Financial resources and budget allocation

Funding comes from the Ministry of Energy and Mines.

g) Expected results

No information available

2.4. Financial Measures Taken by the Government**2.4.1. Tax Scheme**

No information available

2.4.2. Low-Interest Loans

No information available

2.4.3. Subsidies and Budgetary Measures

No information available

2.4.4. Other Incentives

Information not available

2.5. Energy Pricing

Pricing is energy market based in form of marginal cost.

There is an inversely proportional relationship, whereby if the price of energy increases, there will be recession in the economy. In order to develop the economy, a move to complementary energy sources could be considered to offset this.

2.6. Other Efforts for Energy Efficiency Improvements

2.6.1. Cooperation with Non-Government Organisations

There is no financial support for NGOs.

2.6.2. Cooperation through Bilateral, Regional and Multilateral Schemes

Peru has cooperation through bilateral schemes with international organisations such as:

- Japan International Cooperation Agency (JICA)
- German Technical Cooperation (GTZ)
- United Nations Development Program (UNDP)
- Inter-American Development Bank (IADB)
- The Global Environment Facility Trust Fund (GEF) of the UNDP.

2.6.3. Other Cooperation/Efforts for Energy Efficiency Improvements

No information available

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PHILIPPINES

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. Overall Energy Efficiency Improvement Goals

The Philippine Government launched The National Energy Efficiency and Conservation Program (NEECP) in August 2004. It plans to further strengthen the implementation of energy efficiency and conservation programs through the promotion of saving and efficient utilisation of energy in the economy in the period 2005-14. The Government's objective is to make energy conservation a way of life for every Filipino through the theme 'Energy Conservation Way of Life'.

Since then, to effectively promote the NEECP, the DOE in cooperation with the private sector has continuously pursued the strong implementation of existing energy conservation programs to rationalise energy demand consumption. The NEECP is a comprehensive plan to institute measures for improving energy efficiency and conservation in all sectors of the economy by 2014, particularly for petroleum products and electricity in the Philippines.

The overall goals of the program are to:

- Curb the impact of oil price volatility on the economy and reduce carbon dioxide emissions to protect the environment
- Improve utilisation by all users through energy efficiency and conservation programs, which is expected to achieve an estimated potential cumulative energy savings of 9.08 million barrels of fuel oil equivalent (boe) at the end of the planning period in 2014.

1.2. Sectoral Energy Efficiency Improvement Goals

The Philippines has no sectoral quantitative goals in its NEECP. However, under the 2009-30 Philippine Energy Plan (PEP), the government's energy efficiency and conservation program was to set a sectoral energy efficiency goal from the previous program based on the planning goal. Accordingly, a target reduction of 10% of final energy demand has been set for the commercial, residential, industrial, transport and agriculture sectors.

1.3. Action Plans for Promoting Energy Efficiency

The Philippine National Energy Efficiency and Conservation Program is a medium-term comprehensive program of work for promoting energy efficiency in the Philippines. According to the NEECP framework, there are nine components focusing on the entire area of energy efficiency with specific actions to achieve goals.

a) Objectives

The specific objectives of NEECP are:

- To reduce the impact of the increase in prices of petroleum products and electricity through the implementation of energy efficiency and conservation measures
- To promote cost avoidance/savings for fuel and electricity without sacrificing productivity
- To help protect the environment
- To generate cumulative energy saving for the planning period 2007–14 by 9.08 million boe, which is to a deferred megawatt capacity of 210.56 MW and greenhouse gas (GHG) emissions of 2 917.07 giga-grams (hereafter Gg) of CO₂ at the end of planning year.

b) Applicable sectors

The NEECP is being implemented in the period 2007–2014. It contains a comprehensive set of measures that cover six sectors: government (government energy management, education and information), industry (including power), residential, commercial, agriculture, and transport.

c) Outline

The NEECP consists of nine components across six sectors including²⁶:

Component 1: *Information, Education and Communication Campaign*

Component 2: *Standards and Labelling for Household Appliances*

Component 3: *Government Energy Management Program (GEMP)*

Component 4: *Energy Management Services/Energy Audits*

Component 5: *Voluntary Agreement Program*

Component 6: *Recognition Award Program*

Component 7: *Fuel Economy Run Program* (currently part of the IEC program; however, necessary to establish/generate significant data for a vehicle labelling program in the future)

Component 8: *Locally Funded Projects that promote Energy Efficiency Conservation* include:

- Fuel Conservation and Efficiency in Road Transport (FCERT)
- Power Conservation and Demand Management (Power Patrol)
- Philippine Energy Efficiency Project (PEEP—a USD 31 million ADB loan by the Philippine Government to promote energy efficiency conservation)

Component 9: *Foreign Assisted/Technical Assistance*. This includes Philippine Industrial Energy Efficiency Project for the Philippines (a UNIDO-assisted project with the objective of showing optimisation system models in industrial manufacturing facilities and to establish Philippine Energy Management Standard in view of ISO 5001).

Major programs that have been implemented as of 2007 are as follows:

IEC Campaign

The main focus of the IEC campaign is to promote the efficient use and conservation of electricity and fuel in all energy-consuming sectors. The campaign is in compliance with E.O. 123 ‘Institutionalising the committee on power conservation and efficiency in road transport’ (Road Transport Patrol). Among the activities conducted under the IEC campaign are seminar-workshops for target participants in commercial, residential, industrial and government buildings; fuel economy runs for road transport vehicles; and the use of television, radio and print media ads to reach wider target sectors.

About 25 seminar-workshops on energy conservation were held across the economy in 2006 until the first quarter of 2007 with participants from the sectors of government, business and transport, as well as academia, especially elementary and high school students and teachers.

Energy efficiency and conservation dissemination through television channels and radio stations has reached a wider consumer base in the residential and transport sectors.

Voluntary program

Activities under this program include the promotion of the car-less day, carpooling and anti-idling campaigns. The aim is to promote fuel conservation and reduce pollution and traffic

²⁶NEECP, answers of the Philippine Government from questionnaires for energy efficiency compendium, 2009.

congestion in the economy in partnership with various transport groups, local government units, schools and shopping malls as well as with private individuals. A voluntary agreement has been arranged between the DOE and the industrial establishments under the so-called Partnership for Energy Responsive Companies/Ecozones.

Energy Efficiency Standard and Labelling Program

As part of its continuing efforts to promote the welfare of consumers, the DOE has been closely cooperating with various organisations including through an active alliance with DTI, Philippine Appliances Industry Association and the Philippine Lighting Industry Association for the effective implementation of the government's energy efficiency standard and labelling for selected household appliances and lighting products. Significant benefits have been gained through this program such as the improved quality of locally-manufactured products, making them more competitive in the local market. At the same time, it discourages the manufacturing and the importation of inefficient household appliances and lighting products sold in the market. In 2006, the labelling program generated an estimated energy savings of 0.29 Mtoe, which is an increase of over 100% from its 2005 performance of 0.14 Mtoe. CFL labelling was the biggest contributor, generating an estimated savings of 0.16 Mtoe.

The DOE aims to expand the coverage of the program within the planning period to include fluorescent lamps, luminaries, household electric fans, industrial fans and blowers, television sets and electric motors. Consumer education will also be undertaken as a complementary activity for the effective implementation of the program.

Government Energy Management Program (GEMP)

The GEMP aims to integrate energy efficiency concepts into the operation of government agencies to realise the reduction target of 10% in electricity and fuel consumption in compliance with the presidential directive under A.O.126. The major activities under this program include conducting monitoring and energy audit spot checks in all government buildings and the carrying out seminars on energy efficiency and conservation for government employees.

In 2006 and the first quarter of 2007, the DOE was able to conduct spot checks in about 300 government buildings across the economy.

System Loss Reduction Program

Under the umbrella of the Energy Management Program, the System Loss Reduction program enables private utilities to reduce their system losses through redesigns of transmission lines and improvement of substation equipment such as installation of capacitors.

Recognition Program

In recognition of the private sector's effort to promote and implement energy conservation programs, the Don Emilio Abello Energy Efficiency Awards are presented to private companies that make significant improvements in their energy consumption patterns. On the other hand, the Government Energy Management Program Award is given to government agencies that exceed the mandatory 10% reduction in energy consumption. In addition, the ASEAN Energy Management Award for Major buildings and industries was launched in 2000 under the program area on energy efficiency and conservation of the ASEAN Plan of Action (2000–09). Objectively, this is a recognition program aimed to provide international prominence and recognition to buildings and entities. For this award, San Miguel Polo Brewery and Republic Cement Corporation gained first and second runner up recognition at the award night on 24 August 2007 in Singapore.

Energy Auditing

This technical service is offered by the DOE to manufacturing plants, commercial buildings and other energy-intensive facilities to evaluate the energy utilisation efficiencies of

equipment, processes and operation of the companies, and appropriate energy efficiency and conservation measures are recommended.

In 2006, the DOE conducted energy audits at 16 industrial and commercial companies across the economy. This activity is continuously implemented in partnership with accredited energy service companies (ESCOs). In order to enhance the energy management advisory services in the economy, the Energy Service Company Association of the Philippines was organised in 2004. This association intends to (a) organise the firms engaged in the energy service industry to provide a forum for the effective exchange of information about industry practices and introduce new technologies for the industry; and (b) promote energy efficiency and demand reduction technologies, thereby creating tangible economic value.

Philippine Efficient lighting Market Transformation Project (PELMATP)

Since the project's inception in 2005, the UNDP-GEFF-funded PELMATP has been aggressively addressing the barriers to the widespread use of energy-efficient lighting systems (EELS) in the economy. The project aims to achieve an aggregate energy savings of 29 000 MWh and a reduction of about 4600 Gg of CO₂.

There are five core components in the achievement of these objectives, namely EEL policy, Standard and Guidelines Enhancement Program, EEL Application Consumer Awareness Improvement Program, EEL Initiatives Financing Assistance Program, and EEL System Waste Management Program.

Energy Labelling and Efficiency Standard Program

The DOE is looking into a minimum 15% increase in the average efficiency rating of new appliance models within the planning period. This program is also expected to generate the biggest contribution of energy savings from 0.97 MTOE in 2010 to reach 1.17 MTOE in 2014.

Apart from the above-mentioned programs, the Philippine Government is carrying out the following measures:

- Pursuing the passage of the Energy Conservation Bill into law
- Pursuing the inclusion of standardised technical specification requirements in the procurement process of energy efficiency lighting systems and other electrical equipment and devices in government offices
- Developing a benchmark in commercial and government buildings including in the manufacturing industry sector
- Filling in the gap in the implementation of utility-based demand-side management (DSM), market-based applications under the Demand Reduction Program will instead be promoted. At the same time, the existing policy framework for utility-driven DSM will be reviewed, and a new set of recommendations will be submitted to concerned stakeholders for consultation to provide new policy directions
- Evaluation of the impact of IEC programs in the household sector through contracted survey services under the auspices of the National Statistics Office (NSO)
- Strengthening of product testing and research through the enhanced testing capability of the DOE lighting and appliance testing laboratory Inventory of legitimate and accredited testing laboratories to encourage the private sector to set up independent and competent testing laboratories
- Promotion and establishment of accreditation of ESCOs
- Intensified promotion of heat rate improvement in power plants
- Establishment of energy labels for all new vehicles regarding the fuel mileage rating

- Expanding promotion of the Energy Efficiency and Conservation Program and Energy Consumption Monitoring in large seaborne vehicles, such as passenger and cargo ships, power generation plants and power distribution utilities.

The above measures will also help the government to review the NEECP, determine appropriate levels of funding for various initiatives, allow for increased competition and accountability among implementing partners, and determine appropriate roles for private sector participation.

d) Financial resources and budget allocation

The energy sector continues to undertake an aggressive campaign to promote energy efficiency and conservation. The DOE has lined up several activities which will require PHP 48.69 billion in capital investments for the period 2007–14. From this amount, PHP 43.77 billion will be sourced from private investors and the remaining PHP 4.92 billion will come from the government.

Activities on energy labelling and energy efficiency standards will constitute the biggest share at PHP 19.72 billion, followed by the energy management programs of PHP 16.10 billion.

e) Method for monitoring and measuring effects of action plans

- Monitoring of activities through monthly and quarterly accomplishment reports
- Action plan measured through percentage use of annual budget fund
- Other activities monitored and measured through the submission of a Quarterly Energy Consumption Report and Annual Energy Conservation Program reports of private companies (commercial, government buildings, and industrial sector).

Surveys, statistics compilation, end-use information, reporting and trend analysis are all being undertaken, and databases are being developed to assist in program evaluation and policy formation. The Department of Energy-Energy Utilization Management Bureau (Energy Efficiency and Conservation Division) (DOE EUMB-EECD) has the duty of energy efficiency monitoring and reporting. The following are some examples of government-initiated activities aimed at energy efficiency monitoring and reporting:

- Under DOE Circular 93-03-05, companies consuming 1 million litres of oil equivalent are required to submit quarterly energy consumption reports. In addition, companies consuming 2 million litres of oil equivalent or more annually are required to submit an annual energy conservation program to the DOE
- Quarterly Energy Consumption Reports submitted by establishments (commercial, industrial and transport) are entered in a National Energy Consumption database for monitoring and data evaluation processing
- Under the Government Energy Management Program (GEMP), government buildings are required to submit a Monthly Electricity and Fuel Consumption Report as per Presidential Directives (Administrative Orders 110, 126)
- Fuel Mileage Rating Data are being generated under the 'Fuel Economy Run' for a future Vehicle Labelling Program.

f) Expected results

- Meet the set major final output for the year
- Meet the target of 400 MW deferred capacity under the Philippine Energy Efficiency Project for the CFL Distribution project component by 2010
- Post a savings of more than PHP 1.6 billion (USD 32 million), as set forth in 2008 under the recognition award program, by the end of 2008.

g) Future tasks

- Establish energy benchmarks in the manufacturing and building sectors
- Promote and establish an accreditation system for energy auditors and energy managers
- Intensify promotion of heat rate improvement in power plants
- Establish an energy label for all new vehicles (relative to fuel mileage rating only)
- Expand the promotion of energy efficiency and conservation program as well as energy
- Consumption monitoring in large seaborne vessels (passenger ships, cargo/tanker ships)
- Power generation plants, and power distribution utilities
- Expand reportorial requirements for the industrial, commercial and transport sectors to
- Include establishments consuming more than 500 000 litres of oil equivalent annually.
- Promote green building concepts and technology and the appropriate policy framework
- Formulation, development and submission to the Philippine Congress of an appropriate
- Philippine energy conservation policy
- Modernise the energy consumption database monitoring system to
- Monitor the energy consumption and annual energy conservation programs of private
- Companies (industrial, commercial, government buildings and transport sectors).

1.4. Institutional Structure**a) Name of organisation**

The Energy Efficiency & Conservation Division (EECD) under the Department of Energy-Energy Utilization Management Bureau (DOE EUMB) has the roles and responsibilities to formulate policies, plans and programs related to energy efficiency and conservation, and it ensures effective implementation thereof in the government, industrial, commercial, residential, transport and electric power sectors. As such, EECD plays the role of focal coordinator for EE&C and is authorised to administer the implementation of the Philippine Energy Efficiency and Conservation Program (NEECP). In addition, DOE has two regional offices, the DOE-Vizayas Field Office and the DOE-Mindanao Field Office. These two offices also implement energy efficiency and conservation programs based on the plans and programs of the EUMB-EECD.

b) Status of organisations

All agencies report implementation of energy efficiency programs to the DOE.

c) Roles and responsibilities

Varies across agencies

d) Covered sectors

All sectors of the economy

e) Established date

1980

f) Number of staff members

Currently 18

1.5. Information Dissemination, Awareness-raising and Capacity-building

a) Information collection and dissemination

General information about NEECP is readily available to Philippine energy consumers. For example, the Standards and Labeling Program of the Department of Energy can be easily accessed at the official website of the DOE. For labels of selected appliances such as refrigerators and freezers, CFL lamps and linear fluorescent lamps, a yellow label tag and specification of the unit inscribed on the box designate that it passed government minimum energy labelling requirements.

b) Awareness-raising

The purpose of the dissemination program in Component 2 is to increase public awareness of EE&C and support for popularising energy-efficient appliances in the domestic retail market. In recent years, the EE&C promotion and dissemination program has been conducted frequently in the public media.

The conduct of energy efficiency and conservation seminars in the commercial, residential and industrial sectors contributed significantly to the dissemination of proven energy efficient technologies available in the market, including service companies and financial institutions that support energy efficiency. Awareness-raising campaign programs are centred on the following areas: (a) fuel conservation and efficiency in road transport; (b) power conservation and demand management in the commercial, residential and industrial sectors; (c) energy efficient technology promotion in all sectors; and (d) tips for saving energy in all sectors.

c) Capacity-building

A range of training courses, workshops, publishing technical documents for energy efficiency knowledge and assessment addressing all nine components have been developed and are being implemented under the NEECP. These include training courses on energy auditing, capacity-building for EE&C units, and so on. Personnel of EUMB-EECD are being activated through attendance in local as well as overseas training programs provided by foreign institutions. The areas of capacity development are Energy Auditing Techniques, Energy Management, Energy Conservation Opportunities, Co-Generation, and so on.

1.6. Research and Development in Energy Efficiency and Conservation

The Philippines has no specific policy on research and development in energy efficiency and conservation yet. Under this item, the DOE's programs on energy research, development and demonstration are limited to the Philippine Energy Efficiency Project, funded under a loan agreement between the Philippine government and the Asian Development Bank. This project is an energy efficiency demonstration (efficient lighting system) and promotion of Energy Service Companies (ESCOs).

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS

2.1. Government Laws, Decrees, Acts

- DOE Memorandum Circular No. 93-03-05 Series of 1993 (Energy Consumption Monitoring)
- Executive Order No. 123, Series of 1993 (Power Conservation and Demand Management)
- Executive Order No. 472, Series of 1998 (Fuel Conservation in Road Transport)
- Administrative Order No. 103, Series of 2004 (Adoption of Austerity measures - Fuel and Electricity)
- Administrative Order No. 110, Series of 2004 (Institutionalization of Government Energy Management Program)

- Administrative Order No. 126, Series of 2005 (Directing the Enhanced Implementation of the Government Energy Conservation Program)
- Administrative Order No. 183, Series of 2007 (Directing the Use of Energy Efficient Lighting/Lighting Systems in Government Facilities)
- Guidelines on Energy Conserving Designs of Buildings (2007) (note: this guideline is a reference document of the National Building Code.).

a) Applicable sectors

All of above-mentioned legal documents issued by the government apply to government and commercial buildings, households, industrial facilities, and transport facilities.

b) Financial resources and budget allocation

Budget allocation for EO 123 and 472 has been deferred by the Department of Budget and Management for 2010, while for 2009 there was a budget of PHP 20 million (USD 400 000). The other policies being implemented were funded under the Regular Budget fund for Personnel Services (PS) and Maintenance and Other Operating Expenses (MOOE).

c) Expected results

All of the policies indicated above are meant for IEC awareness campaigns and energy consumption monitoring. Accomplishment reports and reporting compliance by the concerned sectors under these policies are expected regularly.

2.2. Regulatory Measures

2.2.1. Minimum Energy Performance Standards and Labelling

a) Name

- Mandatory Energy Efficiency Labelling is only applied to home appliances and devices and equipment, such as refrigerators and freezers, window-type air conditioners, compact fluorescent lamps, linear fluorescent lamps, and so on.
- Guidelines on Energy Conserving Designs of Buildings (this guideline has been a referral code of the National Building Code).

b) Applicable sectors

Residential, commercial, public buildings and local government units

c) Outline

The purpose is to establish compliance with mandatory labelling of selected home appliances, to adopt minimum design requirements in the design of buildings, and to specify minimum standard requirements for the design and construction of lighting in roadways.

d) Financial resources and budget allocation

No information available

e) Expected results

- Compliance by home appliance manufacturers and importers of CFL and linear fluorescent lighting
- Compliance by the building designers and architects
- Compliance by the local government units in rehabilitating inefficient roadway lighting especially in parks and streets.

2.3. Voluntary Measures

Under this program, measures include promotion of the car-less day and carpooling. The aim is to promote fuel conservation and reduce pollution and traffic congestion in the economy,

and a voluntary agreement is arranged between the DOE and the industrial establishment under the so-called Partnership for Energy Responsive Companies.

2.4. Financial Measures Taken by the Government

2.4.1. Tax Scheme

Currently, no tax incentives are given for any energy efficiency improvements. Tax incentives are provided as in the past, for example, on co-generation technology. The Department of Trade and Industry-Board of Investment (DTI-BOI) provides incentives specified under the Investment Priority Plan (IPP). For 2010, the DOE negotiates with the BOI to include energy efficiency incentives for imported energy efficient goods and technologies.

2.4.2. Low-Interest Loans

Financial loans for energy efficiency improvement programs are being provided by local commercial banks in cooperation with other foreign financial and lending institutions such as the World Bank-IFC.

2.4.3. Subsidies and Budgetary Measures

The PDOE does not provide any financial subsidies or other budgetary measures to any private or other government entities for efficiency improvements or projects.

2.4.4. Other Incentives

The non-incorporation of tax incentives into the BOI-IPP also does not provide any incentive scheme for import duties on energy efficiency products. Energy Audits by the PDOE for Walk-Through Audits are free of charge; however, detailed audits have applicable charges and fees. Generally, there are no incentives given by the government in terms of energy efficiency improvements and importation of energy efficiency products. Recognising the company for reducing its energy consumption (energy consumption performance improvement) through application of appropriate energy conservation measures, programs and projects implemented are recognised under the Don Emilio Abello Energy Efficiency Award as mentioned previously. Financial requirements of this program are shared by the members of the Technical Working Group, which is composed of the oil companies, other government energy agencies, private energy organisations and other stakeholders in the energy sector. The amount to implement this program ranges from PHP 300 000–350 000 (USD 6000–7000). An expected result in average energy saving of not less than PHP 1 billion (USD 20 million) is estimated.

2.5. Energy Pricing

Generally, energy pricing is market-based (oil pricing is deregulated under the Philippine Oil Deregulation Law, for example). However, the pricing mechanism for electricity tariffs in the Philippines is controlled by the government (Energy Regulatory Commission—ERC).

In the transport sector, the almost daily increases in the price of transport fuel (gasoline and diesel) require vehicle owners, fleet operators and other business sectors to open up their options for the application of energy conservation measures—carpooling, stopping of long engine idling, regular maintenance, and trip-scheduling, among others. Residential, commercial and industrial sectors opted for the energy efficient lighting system, such as compact fluorescent lamps and slim-type fluorescent lamps. The introduction of the Yellow Label Tag for refrigerators and freezers and air conditioners also helps in the promotion of the government's energy efficiency and conservation program.

2.6. Other Efforts for Energy Efficiency Improvements

2.6.1. Cooperation with Non-Government Organisations

Cooperation with non-governmental organisations is limited to capacity-building through seminars and workshops on energy efficiency and conservation.

2.6.2. Cooperation through Bilateral, Regional and Multilateral Schemes

ASEAN Regional Cooperation efforts focus on the ASEAN-Promotion of Energy Efficiency and Conservation (ASEAN-PROMEEC) cooperation initiative. They include the ASEAN Award for Energy Management for major Buildings and Industries, The ASEAN Award for Best Competition in Buildings, ASEAN Energy Manager Accreditation System (AEMAS), and ASEAN Labelling Program.

2.6.3. Other Cooperation/Efforts for Energy Efficiency Improvements

The Philippines is a member of the Association of Southeast Asian Nations (ASEAN) and is involved in various working groups, including the Energy Efficiency and Renewable Energy Network. Apart from that, the Philippines is designated as a lead economy for the working group on biofuels for transport and other uses in the EAS-Energy Cooperation Task Force (ECTF).

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RUSSIAN FEDERATION

INTRODUCTION

Russia has the highest energy intensity among the G-8 economies.²⁷ According to the 2007 report “Russian Federation: Regular Review of Energy Efficiency Policies” published by the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (hereafter the “PEEREA report”), the Russian economy’s energy intensity (adjusted by purchasing power parity) is 2.3 times higher than world average, twice that of the United States, and 2.3 times higher than that of the European Union and Japan. Nonetheless, according to the IEA report “Progress with Implementing Energy Efficiency Policies in the G8” (2009), Russia’s energy intensity has reduced dramatically in the past decade. From 1990 to 2007, Russia led G8 economies in energy intensity decline with an average improvement of 2.5% per year.²⁸ This decrease, however, did not reflect any actual improvement in energy efficiency and was attributed largely to the growth in GDP due to high energy prices.

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. Overall Energy Efficiency Improvement Goals

According to the World Bank, about 45% of Russia’s total primary energy consumption and as much as USD 120-150 billion per annum could be saved by Russia achieving its full energy efficiency potential.²⁹

The Russian government is developing an effective legal base and policy framework to facilitate the achievement of its objectives of improved energy savings and energy efficiency. However, due to Russia’s geography (climate, territory size and so on), low domestic energy prices (especially gas and electricity), inadequate and outdated energy infrastructure, as well as lack of transparent auditing, the Russian Government’s efforts for the effective improvement of energy efficiency and encouragement of energy saving will continue to be hindered.

On 4 June 2008, President Medvedev issued Presidential Decree N. 889 titled “Concerning some measures for improving the energy and ecological efficiency of the Russian economy”, which established a more ambitious energy efficiency goal of a minimum 40% reduction in the energy intensity of the Russian economy (defined as energy use, or total final energy consumption, per unit of GDP) by 2020 compared to 2007. The decree also identified several target areas, such as the introduction of measures for technical regulation in the power generation, construction, residential and transportation sectors in 2008–09, and called for the finalising of the drafts of the laws and regulations, federal targeted programs, and other relevant legislative acts in the field of energy efficiency and ecological improvement.

In addition, energy efficiency has been identified as one of the key priority areas for the Russian government in the recently published ‘Energy Strategy of the Russian Federation up to the year of 2030’ (hereafter ES2030), which was approved and adopted on 13 November 2009, in accordance with the Government Decree No.1715-p. Specifically, the ES2030, which will be put into effect in three stages, stressed that during the second stage (between 2015 and 2022), the goal will be to improve overall energy efficiency on the basis of innovative development of the fuel and energy industry. During the final stage of 2022–2030, the focus will shift to the efficient use of energy resources across the economy, paving the way for the transition to non-fuel types of energy. In addition, as the primary goal for the improvement of

²⁷ Energy Charter Secretariat (2007), p. 3.

²⁸ IEA report “Progress with Implementing Energy Efficiency Policies in the G8: Energy Efficiency Progress Report–Russia,” (2009, p. 58).

²⁹ World Bank Group report “Energy Efficiency in Russia: Untapped Reserves” (2008, p. 5); the same estimate is given in the PEEREA report, p. 3.

energy efficiency, the ES2030 identified a 50% reduction in energy intensity as well as a minimum 1.6 times reduction of electrical intensity in the Russian economy by 2030 compared to 2005. For this purpose, the strategy included a number of detailed policy recommendations and measures for the improvement of energy efficiency and conservation. In addition, it set forth the indexes of energy efficiency of the Russian economy (measured as the energy intensity of GDP) as a maximum 78% for the first stage (2010–2015), maximum 57% for the second stage (2015–2022), and 44% for the third stage (2022–2030).³⁰ Furthermore, in order to boost energy conservation, the strategy envisioned the USD 244–259 billion total budget for the period 2009–30, constituting about 10% of the overall ES2030 budget during the same period.³¹

1.2. Sectoral Energy Efficiency Improvement Goals

Russia has no clearly-established sectoral goals. However, a number of measures and targets (both quantitative and qualitative) for energy efficiency improvement have been introduced in several sectors of the Russian economy upon the adoption of “Federal Targeted Program for an Energy Efficient Economy for the period 2002–2005 with an outlook to 2010” (hereafter FTP EEE) in November 2001.³² The FTP EEE envisioned the following sectoral potential saving targets.

Commercial and Residential

It is important to note that there is no clear distinction between the commercial and residential sectors in Russia, especially concerning the assessment of energy and heat efficiency of buildings, light fixtures, and appliances.

The Russian government has developed an economy-wide building code for energy efficiency that features various requirements for existing and new buildings in both commercial and residential sectors. Special emphasis is placed on refurbishing and upgrades of the existing buildings through the introduction of higher buildings standards, phasing out of inefficient lighting, water and heat systems. According to FTP EEE, following the successful implementation of the measures to improve energy saving and energy efficiency in this sector would lead to about 38 million tonnes fuel equivalent (hereafter “tfe”) in energy savings during 2006–10.³³

In addition, Russia has recently announced a plan to phase out incandescent lighting by 2012 and has been developing an energy labelling scheme based on the European energy efficiency labelling standards.

Power

The FTP EEE envisages that successful adoption of energy saving technology and measures would result in 44 million tfe in savings of energy resources in the entire Russian fuel and energy complex during 2006–10.³⁴

In addition, “State Policy Guidelines for the Power Industry Energy Efficiency Improvement” (Government of the Russian Federation Resolution No. #1-r), adopted on 8 January 2009 as a supplement to the “Renewable Energy Use for the Period up to 2020” program, emphasised, “The state policy on the power industry energy efficiency improvement based on the renewable energy use is an integral part of the Russian energy policy.” The document

³⁰ ES2030, Appendix 2 “Indexes of energy security: Indexes of energy efficiency”.

³¹ Ibid, Appendix 4 “Estimates for Russia’s fuel and energy balance up to the year of 2030: Forecast of necessary investment into the development of the fuel-energy complex and energy supply of the Russian economy up to the year of 2030”.

³² It is expected that the new “Federal Targeted Program for energy conservation and improvement of energy efficiency up to 2020” will be officially adopted and will replace the FTP EEE in early 2010.

³³ “Federal Targeted Program for an Energy Efficient Economy for the period 2002–2005 with an outlook to 2010” (hereafter FTP EEE 2010), 17 November 2001, www.mnr.gov.ru/old_site/files/part/3601_1636_0796_2001.pdf, (in Russian only), p.29.

³⁴ FTP EEE 2010, p. 31.

established the following state policy targets (defined as “the share of electricity generation at renewable energy generating facilities and its consumption in the total Russian electricity generation and consumption volume”) in *power generation* sector up to 2020, excluding hydro power plants with the installed capacity of over 25 MW: in 2010—1.5%; in 2015—2.5%; and in 2020—4.5%. The document notes that presently the share of renewable energy resources (excluding hydro power) in the total volume of the electricity generation in Russia is less than 1%. In addition, it sets forth a number of measures and principles focused on effective implementation of the state policy on the energy efficiency improvement in the renewable energy based electricity generation sector as well as improvement of the renewable energy infrastructure and the sector’s competition conditions vis-à-vis fossil organic fuel based electricity producers. The Russian Ministry of Energy was assigned the task of differentiating the target values by each renewable energy source type and assigning additional targets, if needed, to achieve the above goals. It is also responsible for carrying out the monitoring of the renewable energy generation sector development.

Industry

To date, a wide range of sectoral development programs and individual energy company investment programs have been developed and implemented. They include the Strategy of Metallurgy Development through 2015; the Strategy of Chemistry and Petrochemistry Development through 2015; the Set of Measures to Improve Competitiveness of the Forestry Industry; energy saving and investment programs of JSC Gazprom, JSC Lukoil, JSC Norilsk Nickel, Urals Mining and Metallurgical Company, JSC Severstal, and others.³⁵

In addition, the government has been promoting a number of general energy efficiency measures especially in energy-intensive sectors of Russian economy (such as oil refining, steel, cement, cellulose-paper, aluminium, etc.), while putting a special emphasis on the promotion of high efficiency technologies for energy savings in these areas. For example, in accordance with FTP EEE, the expected decrease in energy intensity in the oil refining industry resulting from the reconstruction and technological upgrades would reach 7% by 2010 (measured in oil equivalent). Furthermore, the program stipulates that as a result of effective implementation of energy-efficient technological upgrades in energy-intensive industries (particularly, in metallurgy, steel, chemical, refining, machinery, cement, wood, cellulose and paper, textile, and food), the total energy savings would reach 50–54 million tfe.

Transport

In accordance with the FTP EEE, due to the introduction of Western energy efficient technologies in the Russian domestic automobile production and overall improvement of energy efficiency in the transportation sector, energy savings of the railroad sub-sector during 2006–10 would reach 5 million tfe, and 4.3–5.5 million tfe in other transportation sub-sectors.³⁶ In addition, a number of qualitative measures and environmental requirements have been introduced for road vehicles and motor fuels.

Government

It is expected that the improvements through introduction of higher building standards, phasing out of inefficient lighting, water and heat systems, the total savings in the consumption of energy and heat resources in the government (especially budget) sector would be 30–35%.³⁷ In addition, the FTP EEE envisages energy savings of about 8.3 million tfe, which is based on the 5% annual decrease in energy consumption in this sector. Furthermore, overall economic effect of successful implementation of various energy saving and energy

³⁵ PEEREA report, p. 36.

³⁶ FTP EEE 2010, p. 30.

³⁷ Homepage of the Ministry of Energy of the Russian Federation, “Energy efficiency and savings: Activities” accessed on 2009/10/20 at <http://minenergo.gov.ru/activity/energoeffektivnost/index.php> (hereafter ME HP).

efficient measures in this sector during the period of 2002-2010 is estimated at RUB 3.6 billion.³⁸

Other

In agriculture, the government adopted a special development program that encourages a gradual replacement of the energy-inefficient agricultural equipment and vehicles, especially tractors. According to the FTP EEE, these measures for the reduction of energy intensity should result in 6-7 million tfe in energy savings during the period of 2006-2010.³⁹

1.3. Action Plans for Promoting Energy Efficiency

One of the action plans for promoting energy efficiency and saving in Russia entitled a “Federal Targeted Program for an Energy Efficient Economy for the period 2002-2005 with an outlook to 2010” (FTP EEE) was adopted on 17 November 2001.

a) Objectives

The FTP EEE, in line with the ES2030, is aimed at helping the transition of the Russian economy to an energy-saving development path by decreasing the energy-output ratio of GDP on the basis of energy-saving policies in Russian industries. The key targets set in the 2001 program included the reduction of energy intensity by 13.4% (total final energy consumption/GDP) below 2000 levels by 2005, increasing to a 26% reduction below 2000 levels by 2010. The program’s other objectives include reliable provision of energy resources to industries, decreased production costs in energy sector as well as preserving and widening export potential of the fuel and energy complex of the Russian Federation.

b) Applicable sectors

The FTP EEE sets targets and outlines measures for energy efficiency improvements in various sectors of the Russian economy.

c) Outline

The FTP EEE is composed of three key sub-programs, such as “Energy efficiency of Fuel and Energy Complex”, “Security and Development of Nuclear Power”, and “Energy Efficiency in the Sphere of Consumption” (with a special focus on energy saving measures in energy-intensive industrial sectors, agriculture, residential, commercial, transportation, and government).

The program is to be implemented in two stages, 2002–05 and 2006–10.

The First Stage of the FTP EEE includes the following measures that aim to promote the strengthening of structural reforms and market foundations in Russia’s energy sector:

- Ensuring a stable supply of fuel and energy resources to the regions lacking such resources during the winter period
- Realising the structural reforms in power and gas sectors and technical restructuring of gas industry
- Increasing the supply of domestically produced high-tech equipment, materials and technologies in the Russian domestic market for a wide use in energy sector
- Modernising existing atomic stations with the goal of safe and effective operations
- Completing distribution of the equipment and audit systems that would allow consumers to conduct energy saving performance checks as well as realising highly effective, cost-beneficial and inexpensive energy saving projects.

During the Second Stage, the program sets forth the following five key tasks:

- Maximal speeding up the renewal and upgrade of the material and technical base

³⁸ FTP EEE 2010, p. 31.

³⁹ Ibid, p. 28.

- Increasing efficiency and competitiveness of industrial production
- Increasing the fuel and energy potential of the atomic stations currently in operation
- Preparing for the removal of the outdated and expiring energy equipment
- Increasing energy efficiency of production based on the utilisation of modern, highly efficient technological processes and equipment.

d) Financial resources and budget allocation

The total budget for the program was set at RUB 7004.66 billion (about USD 269.41 billion at the January 2001 exchange rate). It was to be financed partially by the federal budget (RUB 50.26 billion in total) as well as municipal/regional budgets, and other, non-budgetary, sources. Eligible costs and expenses included equipment, external expertise, infrastructure (buildings, etc.), labour costs (training, study trips, etc.), and others.

e) Method for monitoring and measuring effects of action plans

The FTP EEE calls for the establishment of various administrative mechanisms for effective management and control of monitoring and measuring the program's effects based on the compilation of data and statistics and trend analysis. Additional monitoring mechanisms include energy-efficiency and energy-saving surveys, data collection, and the comparison of the results with the indicative targets or norms established by the related legal acts. In addition, according to the new Federal Law No. 261-F3 on "Energy Conservation and Increase of Energy Efficiency" (hereafter FLEC IEE) adopted in November 2009, other methods include mandatory energy monitoring and regular auditing (once every five years) for heat and power usage of buildings, energy-intensive equipment, and other energy-consuming entities; installation of compulsory meters and requirements of the energy efficiency certificates ("energy passports"); establishment of a single, unified federal energy efficiency information network system comprised of the data collected from the energy audits; and others.

The State Standard, GOST P 51380-99 "Energy conservation and methods of assurance for energy efficiency compliance", which has been in force since November 1999, sets forth the requirements for the verification of energy-consuming products' energy efficiency indicators and their comparison to the normative values. In accordance with the standard, the following monitoring methods have to be applied: producers' declaration of energy efficiency performance; certification of production testing and verification; collection of data and its analysis concerning product energy consumption in comparison with energy efficiency normative values.

Annual energy efficiency and energy saving surveys are conducted through comparison of energy intensity per GDP unit with the indicative targets of the ES2030. Similar evaluations are made in a number of Russian Constitutional Entities regarding changes in their economy's energy intensity per gross regional product. At the level of enterprises and economic entities, energy efficiency and energy saving are monitored at their discretion and at their expense or with the involvement of energy audit organisations.

At the federal level, monitoring of the realisation of energy efficiency and energy saving policies and measures is carried out by the Section on Monitoring of the Department of the State Energy Policy and Energy Efficiency at the Ministry of Energy. In addition, the Federal Agency on Technical Regulating and Metrology (FATERM), which was founded in May 2004 and placed under jurisdiction of Ministry of Energy of the Russian Federation, carries out the functions on rendering state services, administration of public estate in the field of technical regulating and metrology, including licensing of activities with respect to manufacture and maintenance of various technical requirements. It also controls and supervises the compliance of mandatory requirements of state standards and technical regulations, including in the field of energy efficiency.

The Russian government is currently planning to establish a Federal Agency of Energy Savings, which will be modelled on the German Agency of Energy Efficiency (DENA). The priority task of this agency will be the monitoring of the energy savings policy at the federal and regional level. Furthermore, the agency will establish energy efficiency criteria and indicators.

f) Expected results

Successful implementation of the program should help overcome negative development tendencies in the fuel and energy complex as well as the achievement of the following targets:

- 1) Necessary levels of extraction and production of fuel and energy resources, including primary energy resources
- 2) Transition of the economy towards an energy-saving development path through the use of technological upgrades (total energy saving during 2002–05 would be 143–156 million tfe and during 2006–10 would be 152–169 million tfe)
- 3) Assurance of the safe operation of nuclear power stations
- 4) Lowering the GDP energy/output ratio by 13.4% in 2005 and by 26% in 2010 compared to 2000 levels
- 5) Technological upgrades of existing equipment (by 2010 the technical – more energy efficient – upgrades in the oil sector should reach up to 50%, in the oil refining sector up to 70% in the gas sector up to 40%, in the coal sector up to 30%, and in electrical power generation up to 30%)
- 6) Reduction of emissions and environmental damage
- 7) Maintaining and expanding the expert potential of the fuel and energy complex
- 8) Creation of 199 000 additional jobs.

g) Future tasks

The Ministry of Energy recently submitted to the government for final approval the draft of the federal targeted program “On Energy Saving and Energy Efficiency Improvement up to the year of 2020,” which will replace and upgrade the FTP EEE, while focusing on reaching the overall target of minimum 40% decrease in energy intensity of the Russian economy by 2020 compared to 2007.

The latest draft of the new FTP EEE envisions the following two key policy directions for the improvement of energy efficiency of the Russian economy: 1) the stimulation of various cross-sector processes and mechanisms encouraging the improvement of energy efficiency of the Russian economy, and 2) the realisation of the energy conservation projects by sectors to reach the energy saving potential of the Russian economy. To reach these goals, the program proposes such measures as:

- 1) Significantly increasing the share of renewable energy resources in the total energy consumption balance
- 2) Enhancing and coordinating federal, regional and municipal energy efficiency and energy saving programs
- 3) Establishing information dissemination, public awareness and promotion of education initiatives
- 4) Introducing various financial assistance measures for the promotion of the efficient use of energy and heat resources, and many others.

The new program (which will be carried out in two stages, 2010–15 and 2016–20, to gradually reach the overall goal by its completion) is expected to be approved and come into effect in early 2010. Upon successful completion of the above measures and policy proposals, the program envisions the reduction of energy intensity of GDP by 7.4% by 2015, reaching an overall goal of a 13.5% reduction by 2020. According to Russian Ministry of Energy estimates, the savings of energy and fuel resources from the successful implementation of the

program are expected to reach 300 million tfe during the first stage and 1000 million tfe in total during the entire term of the program.

In addition to the new FTP EEE, a new Federal Targeted Program, titled “Increasing effectiveness of energy consumption in the Russian Federation,” which focuses on the improvement of energy saving and energy efficiency improvement in the government (especially budget) sector, is being drafted by the Ministry of Energy to be adopted by the government later in 2010. Furthermore, the Ministry of Energy put forth a “Complex Measures Plan for the realisation of the federal policy for energy saving and improvement of energy efficiency” across the Russian economy in order to facilitate the execution of the 4 June 2008 Presidential Decree No. 889 entitled “Concerning some measures for improving the energy and ecological efficiency of the Russian economy”. The plan was comprised of the following five key areas:

- The development of modern legal and regulatory framework
- The establishment of institutional structures
- Government financial support and the creation of a favourable investment climate (to encourage energy-efficient investments)
- Interaction with private financial and business sectors on the basis of public-private partnerships
- Informational and educational support for various measures and activities at the international, federal, regional, and municipal levels.

Each of the above areas included a range of specific measures that have already been put in effect to promote greater energy savings and efficiency in different sectors of the Russian economy, such as the use of codes and energy efficiency passports to ensure effective implementation and monitoring of progress of energy efficiency and energy saving policies.

Additionally, a number of regional and local energy saving programs, which identify major energy saving and energy efficiency measures at a regional or municipal level and use regional or municipal budgetary resources for their implementation, have also been developed and put in effect to supplement the above-mentioned federal programs. According to the 2007 PEERA report, more than 600 energy saving programs that have been developed and implemented in 78 of the Russian constituent entities: 50 regional, 93 sectoral (residential, education and other sectors), and 462 municipal programs.⁴⁰ Currently, several regions of the Russian Federation have already established or are currently establishing regional energy efficiency programs or initiatives. One example is the territorial project of the region of Arkhangelsk, called “White Sea Energy”, with an estimated project investment of USD 1 billion. Jointly with the Russian energy company Roskommunenergo, the administration of the Arkhangelsk region established a public-private partnership program with such participating financing institutions as the Russian banks (Mosuralkbank, Sberbank, and the Foreign Trade Bank of the Russian Federation) and the Czech Export Bank. The aim of the project is to provide comprehensive optimisation and development of the housing sector and the power supply of the regional enterprises. Furthermore, it is envisaged to implement efficient, high-tech and ecological projects in the electricity, industry and municipal services sector in the Arkhangelsk region. The third project task comprises the improved competitiveness of the enterprises in Arkhangelsk through the optimisation of the energy costs.

1.4. Institutional Structure

In the Russian Federation, legislative power is vested with the two-chamber Federal Assembly consisting of the State Duma (more powerful lower house) and the Federation Council (upper house). In addition, policy responsibility for energy efficiency actions varies

⁴⁰ PEERA report, p. 18.

between the levels of government, with the federal government holding the higher jurisdiction.

At the federal level, until May 2008, energy saving and energy efficiency policy was placed within the competence of the Federal Assembly. However, during the administrative restructuring of the Russian government in May–June 2008, the responsibility for energy policymaking and oversight was transferred from the Ministry of Economic Development and Trade (which was reorganised into the Ministry of Economic Development and a separate Ministry of Industry and Trade), the Ministry of Industry and Energy and the Federal Energy Agency to the newly established Ministry of Energy (Minenergo), currently headed by Sergey Shmatko.

Within the new Ministry of Energy, for the first time, the Department of the State Energy Policy and Energy Efficiency (currently headed by Mr. Sergei A. Mikhailov) was created to deal specifically with the issues and policies pertaining to energy saving and efficiency. In addition, in 2009, to facilitate policymaking and improve inter-government communication concerning energy saving and energy efficiency, two special intergovernmental groups were established. The first group, the commission on the fuel and energy complex, is located at the prime minister's office and headed by Minister of Energy Sergey Shmatko. It is engaged in legal aspects and institutional structures, as well as preparing and monitoring the National Program. The second group, the Expert Group on energy efficiency within the Commission on Modernization and Technological Development of the Russian Economy, was established in May 2009. The Commission's Expert Group is located at the president's office and is headed by President Dmitry Medvedev himself. It holds regular monthly meetings and is engaged in the coordination of federal, regional, and municipal projects and initiatives, as well as choosing and funding the most innovative projects in energy efficiency and renewable energy that can be implemented within the Russian Federation.

At the government level, the responsibility for the state energy policy, including energy saving and energy efficiency, is also shared by the Ministry of Regional Development, the Ministry of Natural Resources and Ecology, the Ministry of Finance, the Ministry of Agriculture, the State Atomic Energy Corporation "Rosatom", the Federal Tariff Service, and other agencies. At the level of the Russian constituent entities, the relevant functions are performed by the regional legislative and executive bodies.

In addition to governmental organisations, there are several energy efficiency centres operating under different external supporting programs in the Russian Federation. Some of the largest are: the Center for Energy Efficiency (CENEF), Center for Energy Policy, AcademEnergoservis, Institute for Energy Policy, RusDem, ESCO Negawatt, Rus Esco, 3E, Energo Servis and regional centers for energy efficiency with the major located in Kaliningrad, Murmansk, Kola, Karelia, and Ekaterinburg.

In order to improve policy coordination at different levels, a number of Coordination Councils for the realisation of energy saving and energy efficiency policies have been established in Russian regions and municipalities. Energy saving and energy efficiency issues and policies have been addressed by energy service organisations and associations, as well as by energy producer and end-user economic entities at the regional and municipal levels. The majority of the Russian constituent entities have relevant energy saving management infrastructures (in 2007 there were 75 centres and agencies and 24 energy saving foundations).⁴¹ Additionally, according to the Russian Ministry of Energy, the establishment of a state energy services company "Federal Service Company" (OAO FESCO) and regional (municipal) public-private energy service companies (RESCO) is planned. It is envisaged to create a network of such companies in the regions to cover with their activities all the territory of the Russian Federation. These federal and regional ESCOs will, however, only serve state-owned enterprises and municipal buildings.

⁴¹ Ibid, p. 19.

a) Name of organisation

The Ministry of Energy of the Russian Federation; its official website is available in Russian only at <http://minenergo.gov.ru/>.

b) Status of organisation

The Ministry of Energy is a Federal governmental body within the legal branch of the Russian government. In accordance with the administrative reform of May 2008, it replaced the Federal Energy Agency and the Ministry of Industry and Energy. The ministry reports to the executive branch of the Russian Federation, the prime minister's office and the Russian president.

c) Roles and responsibilities

The ministry is responsible for design, realisation, and oversight of the state energy policy and legal framework of the Russian energy structure, particularly in the oil and gas, power generation, coal, renewable energy sectors as well as in the area of energy efficiency, saving and transportation.

d) Covered sectors

The Ministry's Department of the State Energy Policy and Energy Efficiency covers all sectors of the Russian economy.

e) Established date

In May 2008, the Ministry of Energy replaced the old Ministry of Industry and Energy and the Federal Energy Agency.

f) Number of staff members

No information available

1.5. Information Dissemination, Awareness-raising and Capacity-building**a) Information collection and dissemination**

The new FLEC IEE includes a separate chapter entitled "Information provision concerning energy conservation measures and energy efficiency increase". Article 22 of Chapter 6 outlines the following activities for the dissemination of information:

- Establishment of a single integrated federal information network on energy conservation and energy efficiency
- Publication of information about energy saving and energy efficiency programs in the print and other media at the federal, regional, and municipal levels
- Organisation of various television and radio programs on the measures and best practices for energy efficiency improvement and latest equipment and technologies in the field of energy conservation
- Distribution of information on energy saving issues to the consumers
- Dissemination of information about the energy saving measures and potential in the building and residential sectors
- Organisation of exhibitions of equipment and technologies with high energy efficiency
- Realisation of other measures for energy conservation and energy efficiency improvement in accordance with the FLEC IEE.

In addition, a number of measures to improve information dissemination and awareness-raising have been developed by the Russian government under the "Complex Measures Plan for the realisation of the federal policy for energy saving and improvement of energy efficiency," which was presented by the Ministry of Energy in June 2008.

A report on energy saving and energy efficiency published by the Ministry of Energy notes the lack of efforts made to provide “informational and motivational” background for preparing and putting into effect the policies concerning energy saving and energy efficiency issues. The shortage of information and public awareness has hence led to the development of the pervasive public attitude of “do as others do”, meaning that it was acceptable to waste energy resources.⁴² The report also states that it is critical for the government to cooperate with the private sector as well as provide informational and educational support for the energy saving and energy efficiency initiatives and programs at the international, federal, regional, and municipal levels. The Ministry of Energy, along with the State Foundation of Support for Social and Informational Programs, have developed a plan to provide information support for the improvement of energy efficiency and energy saving.⁴³

Finally, private companies distribute information about the energy efficiency and energy saving potential of their products to consumers through their websites or informational brochures.

b) Awareness-raising

In accordance with Chapter 6 of the FLEC IEE on “Information provision concerning energy conservation measures and energy efficiency increase”, the federal, regional and municipal governments are required to organise and support various media-based awareness campaigns and events for the promotion of energy saving, improvement of energy efficiency, and effective use of natural resources in industrial and social spheres of Russia. In addition, the producers of energy-consuming equipment and suppliers of energy resources are obliged to inform consumers on a regular basis about energy- and heat-consuming potential of their products by using the Internet, advertisements and other means.

c) Capacity-building

Currently, there are no specific programs or strategies available to boost capacity building in the field of energy efficiency, particularly concerning the short supply of energy efficiency audits and advisory services. As one of the measures for improvement in this area, President Medvedev, in his Decree No. 889 “Concerning some measures for improving the energy and ecological efficiency of the Russian economy” (4 June 2008), stressed the need to include basics of ecology, including improving basic knowledge on energy saving, into the federal standards for secondary education, which was incorporated in Chapter 6 of the FLEC IEE.

1.6. Research and Development in Energy Efficiency and Conservation

The ES2030 stressed the need to gradually replace imported technology and equipment with domestically produced innovative and advanced technologies and equipment in order to help boost energy efficiency and energy conservation in various sectors of the Russian economy. With this task in mind, the FTP EEE’s funding and budgetary scheme features a special provision for measures and activities aimed at promoting scientific and technology research, as well as innovating and investing in the field of energy saving and energy efficiency. The federal funding for these measures and activities was set at RUB 12.34 billion in 2002–05 and RUB 37.92 billion in 2006–10. The share of the total budget (including non-governmental funding) for the scientific research and modelling projection works was 4% (RUB 130.7 billion) of the FTP EEE’s entire budget in 2002–05, rising to 4.4 % and reaching RUB 171.1 billion during 2006-10.⁴⁴

In addition, two Federal Targeted Programs, titled “Research and Development in Priority Areas of Science and Technology Complex of Russia 2007-2012” and “National Technological Basis for 2007-2011”, which contain tasks and measures related to appropriate

⁴² ME HP, p. 2.

⁴³ Ibid, p.6.

⁴⁴ FTP EEE 2010, p. 33.

research and development activities (including on energy saving) in the Russian economy have been introduced.

There have been a growing number of private research institutes and organisations engaged in research on improving energy efficiency and energy saving in various sectors of the Russian economy, such as the Center for Energy Efficiency (CENEF), the Sustainable Energy Development Center (ISED), the Institute of Energy Strategy (IES), and others.

According to the PEEREA Report, research is under way on priority areas of the development of science, technology, and equipment in the Russian Federation and on the List of Critical Technologies having a direct bearing on the improvement of energy efficiency (including technologies of nuclear energy, hydrogen energy, new and renewable energy resources, development of energy saving heat and electricity transportation, distribution and consumption systems, development of energy efficient engines and propulsion plants for transportation systems, nanotechnologies and nanomaterials, etc.)⁴⁵

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS

2.1. Government Laws, Decrees, Acts

2.1.1. Energy Efficiency Act

The legal framework for energy efficiency is based on various codes and Federal laws, such as the Civil Code, the Tax Code, the Customs Code, the Urban Development Code, the Laws on Electricity Sector and on Municipal Housing Sector, as well as a specific law, Federal Law on Energy Saving No. 28-F3, which has been in force since 3 April 1996 and has been recently replaced by the new law. In November 2009, the Russian Government has taken the policy for energy efficiency improvement and energy conservation to a new level by adopting the Federal law No. 261-F3 “On Energy Conservation and Increase of Energy Efficiency” (approved by the President on 23 November 2009). President Medvedev announced that the new law will take effect on 1 January 2010 after amendments to several sections of the legislation are approved. In addition, a number of draft laws amending some existing laws and technical regulations with a view of improving opportunities for the use of non-traditional energy and improving energy efficiency and energy conservation are being currently developed to supplement the new law.

a) Name

Federal Law No. 261-F3 “On Energy Conservation and Increase of Energy Efficiency” (hereafter FLEC IEE) has been approved and adopted by the Russian government and signed by the President on 23 November 2009 is expected to come into effect in January 2010.

b) Purpose

The FLEC IEE is designed to create economic and organisational conditions leading to the increase in energy savings and improvement of energy efficiency of the Russian economy. It also sets a legal framework for the use of energy resources in Russia in terms of promoting rational use of exhaustible energy resources and alternative fuel resources for electricity and heat generation.

c) Applicable sectors

The FLEC IEE applies to all large energy users across all sectors throughout the Russian Federation.

d) Outline

The FLEC IEE, which is effective throughout the territory of the Russian Federation, sets forth the following five key principles of the policy for energy saving and energy efficiency

⁴⁵ PEEREA report, p. 36.

increase in the Russian Federation:

- Effective and efficient use of energy resources
- Support and encouragement of energy conservation and energy efficiency improvement
- Systematic and full-fledged realisation of the measures to encourage energy conservation and energy efficiency improvement
- Planning activities for energy conservation and energy efficiency improvement
- Use of energy assets based on resource, technological, ecological, and social conditions.

The law is comprised of 10 Chapters and 50 Articles, including the following regulations and provisions:

- General government regulations in the area of energy conservation and energy efficiency
- Requirements for energy efficiency labelling of goods and commercial inventory of energy resources
- Energy efficiency of buildings and installations in the residential and commercial sectors
- Requirements for mandatory energy efficiency audit, inspection, and monitoring (including requirements for data collections and analysis of the energy passports)
- Requirements for information dissemination (including the establishment of the federal integrated information system) and campaigns for awareness raising
- Requirements for energy conservation and energy efficiency in the budget/governmental sector
- Government support and stimulation of energy conservation and energy efficiency
- Enforcement of compliance with energy conservation and energy efficiency requirements.

e) Financial resources and budget allocation

There is currently no information available about budget allocation in support of the FLEC IEE. However, the law includes a separate chapter (Chapter 8), which stipulates the directions and forms of government support in the field of energy conservation and energy efficiency. In accordance with Article 27 of Chapter 8, the programs and activities in this field should be financed by federal, regional, and municipal budgets; domestic and foreign private investments; and other resources in accordance with the existing laws and regulations. In addition, the article stipulates that the government support of investment activities in the field of energy conservation and energy efficiency improvement will come in the forms of various stimulation measures, such as direct subsidies, special loans, tariff regulations, special privileges, tax deductions, fee reductions, payback schemes, and others.

f) Expected results

The new law on energy saving and energy efficiency will become the core of a legal framework for the use of energy resources in the Russian Federation in terms of promoting rational use of exhaustible energy resources and alternative fuel resources for electricity and heat generation. Notably, it will help provide state support for the companies implementing investment activities in the energy efficiency field. Furthermore, the law will help encourage additional financial incentive mechanisms for energy saving activities, separation of energy saving competences between the federal, regional, and municipal level authorities, promotion of increased production and sales of equipment that corresponds to the most advanced energy efficiency requirements, a linkage between addressing environmental and energy saving programs, and increased use of renewable energy and alternative types of fuel. The enactment

of the FLEC IEE will ultimately help create the necessary environment to achieve the overall energy efficiency goal of reducing energy intensity of the Russian economy by a minimum 40% by 2020 compared to 2007.

2.2. Regulatory Measures

The FLEC IEE has several articles dedicated to standardisation, mandatory certification, audit, and declaration of energy efficient indicators (“energy passports” and energy efficiency certificates). Specifically, Article 9 and Article 10 in Chapter 3 “Federal regulations in the field of energy conservation and increase of energy efficiency”, require governmental standard declarations for all energy-consuming production to be supplemented by energy efficiency data, including energy consumption data; prohibition of the production and circulation of goods with low energy efficiency performance; mandatory inventory of energy resources; energy efficiency requirements for buildings and installations; requirements of mandatory energy audit and energy passports, and so on.

In addition, there is many federal and regional codes and regulations (State Standards or “GOST”) in the area of energy conservation and energy efficiency improvement, most important of which include GOST P 51541-99 “Composition of indicators and basic concepts in the field of energy saving and efficiency”, GOST P 51379-99 “Power-engineering certificates for industrial consumers of fuel-energy resources” (adopted and set in force on 30 November 1999) that regulates the mandatory issuance of energy passports to energy- and fuel-consuming industrial producers; GOST P 51380-99 “Energy conservation and methods of assurance for energy efficiency compliance”, GOST P 51388-99 “Energy conservation and informing consumers about energy efficiency of equipment in the residential sector”, as well as a number of building codes and thermal performance regulations.

2.2.1. Minimum Energy Performance Standards and Labelling

Presently, there are no MEPS in Russia, but the government is planning to introduce mandatory MEPS for white goods and electric appliances.

In accordance with GOST P 51388-99 “Energy conservation and informing consumers about energy efficiency of equipment in the residential sector”, instead of MEPS, partially mandatory energy performance certificates and energy saving labelling (based on a 7-class, 95/75 ES and 92/2 ES international standards system) for specified equipment, materials, and products are currently being used. In addition, Article 10 of the FLEC IEE stipulated the requirements for obligatory posting of technical information, including energy efficiency class/rank, by marking and labelling most domestically-produced and imported goods (to come into effect on 1 January 2011 for white goods and on 1 January 2012, for computers and computer-related goods).

In addition, in accordance with Article 10, Section 8 of FLEC IEE, in order to improve energy saving of lighting devices, the government has ruled to introduce a ban on the distribution, sale, and general use of inefficient lighting, such as 100-watt or higher incandescent lamps, starting on 1 January 2011, particularly in the budgetary and government sector. This ban will be followed by the prohibition of sale and distribution of 75-watt lights from 1 January 2013, and completely prohibiting the sales and distribution of all incandescent lighting (25-watts or higher) starting on 1 January 2014.

a) Name

Labelling and “energy passports” (energy efficiency and thermal efficiency performance certificates for specified equipment and materials)

b) Purpose

To provide the energy labelling of the goods, appliances, and materials in order to improve their energy efficiency

c) Applicable sectors

The requirements apply to white goods, appliances, heat and lighting units, and other equipment and materials in the industry, transport, residential/commercial, and government sectors.

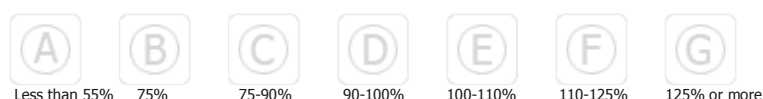
d) Outline

In accordance with GOST P 51388-99 “Energy conservation and informing consumers about energy efficiency of equipment in the residential sector” as well as FLEC IEE and FTP EEE, it is required to verify, and provide consumers with information about, energy efficiency and actual energy performance of the following types of products: household appliances and equipment, including lighting; gas stoves and heaters for residential/commercial use; heat-insulation products and materials; as well as automobiles and vehicles in private use.

In addition, the aforementioned GOST established an energy efficiency performance classification system, particularly for white goods and appliances. It is based on the 7-class standards system, with the A class being the most efficient (less than 55% actual energy consumption than expected), while the G class being the worst (exceeding expected energy performance by over 125%).



1. Maker
2. Model
3. Energy Consumption Class (A to G)
4. Actual energy consumption (kWh/year)
5. Size of the freezer and refrigerator, etc.



2.2.2. Building Energy Codes

a) Name

Federal and regional building and heat efficiency (thermal performance) codes

b) Purpose

The aim of the existing building codes is to improve the energy efficiency of the design and construction, as well as thermal efficiency of existing and new buildings.

c) Applicable sectors

Residential/commercial and government (especially budgetary offices)

d) Outline

Energy efficiency provisions for housing were first introduced in the mid-1990s at both federal and regional levels. Established in 1996, GOST 30494-96 “Residential and Public Buildings: Microclimate parameters for indoor enclosures” (the code for the temperature and humidity of indoor facilities) was among the first Russian building codes to promote building efficiency and account for energy consumption.

In addition, in February 2003, the new Thermal Performance of Building Code (also known as Construction Code and Regulations, or SNiP 23-02-2003) was introduced. Effective 1 October 2003, it required architects, builders and contractors to comply with energy

efficiency requirements and technical regulations. More specifically, the new code established numerical values for required technical targets, corresponding to world levels; classified new, renovated, and existing buildings according to their energy efficiency and thermal performance, encouraging buildings that are more efficient than required by code (such buildings would qualify for economic incentives); created a mechanism for identifying low-performing existing buildings and mandating necessary upgrades; developed design guidelines for both prescriptive and performance-based compliance paths; and developed methods for oversight and enforcement of compliance in terms of thermal performance and energy efficiency (energy passports), during the design, construction, and prospective operation phases.

Between 1995 and 2004, 50 regions of the Russian Federation implemented their own building codes in accordance with federal building standards. Some local enforcement agencies offered incentives for exemplary performance, while others mandated auditing. Regions established their own requirements for calculating a building's energy consumption and compliance with local codes.⁴⁶

Furthermore, Article 11 and 13 of FLEC IEE introduced requirements for the monitoring of energy efficiency standards for existing and new buildings and installations, including such measures as keeping records on energy efficiency compliance information in the mandatory energy passports; updating at least once every five years energy efficiency requirements for buildings and installations; installing compulsory meters to encourage lower use of water, electricity, and heating as well as reducing budget expenditures on energy use and heating (the compliance deadline is set on 1 January 2011 for most of the public sector and on 1 January 2012 for most of the residential sector); regular building audit and monitoring in existing and new buildings and construction units to ensure compliance with the established regulations and laws; and so on.

e) Financial resources and budget allocation

In addition to introducing various incentives to improve energy consumption performance in the building sector, the government established a special Housing Reform Fund at the amount of RUB 25 billion (USD 726.3 million) in early 2009 in order to provide financial support for the remodelling of existing housing facilities by private citizens and entities.

f) Expected results

Overall improvement of energy efficiency and thermal performance of new, existing, and renovated buildings, indoor facilities, and related equipment

2.2.3. Fuel Efficiency Standards

Currently, Russia does not have enforceable fuel efficiency standards for its domestic transport industry. However, Article 14, Chapter 3 of FLEC IEE introduces the measures for the use of vehicles with a high level of fuel efficiency, specifically by replacing gasoline with more efficient fuels such as natural gas in motor vehicles in the transport sector.

The fuel standards and other measures and initiatives for the promotion of energy efficiency in the transport sector (such as eco-driving educational campaigns) as well as financial incentives for compliance are expected to be introduced for all types of vehicles in the new federal targeted program "On Energy Saving and Energy Efficiency Improvement up to the year of 2020", which was adopted in early November and will come into effect in early 2010.

2.3. Voluntary Measures

No information available

2.4. Financial Measures Taken by the Government

FLEC IEE and the "Federal Targeted Program for Energy Saving and Improvement of Energy

⁴⁶ IEA Energy Efficiency: Policies and Measures database (Russia).

Efficiency in the Russian Federation up to 2020,” which is expected to be come into effect in early 2010, encourage tax-related, budgetary, and other financial measures of governmental support designed specifically for energy efficiency and energy saving programs and initiatives in the Russian Federation.

In accordance with FLEC IEE (Article 27 of Chapter 8), the programs and activities in the field of energy conservation and improvement of energy efficiency should be financed by federal, regional, and municipal budgets; domestic and foreign private investments; and by other resources in accordance with the existing laws and regulations. In addition, the law stipulates introduction of incentives and tax benefits for Russia’s heavy industry to replace highly energy-inefficient machinery and equipment.

With the aim to promote energy saving and improvement of energy efficiency in Russia, the article also recommends the following forms of government support of investment activities and stimulation measures in this field, such as direct subsidies, special loans, tariff regulations, special privileges, tax deductions, fee reductions, payback schemes, and others.

2.4.1. Tax Scheme

Currently under consideration

2.4.2. Low-Interest Loans

Currently under consideration

2.4.3. Subsidies and Budgetary Measures

President Medvedev, in his Decree No. 889 “Concerning some measures for improving the energy and ecological efficiency of the Russian economy” (4 June 2008), called to develop certain types of subsidies allocated from the Federal budget in order to support ecologically clean and energy effective technologies.

FLEC IEE (Section 3, Article 27 of Chapter 8) introduces various methods of budgetary support, including direct budget distribution through subsidies and co-financing among federal, regional, municipal organs, and other entities of the Russian Federation in support of their respective energy conservation and energy efficiency programs. However, the entities can qualify for such government support based on their proposed programs’ energy efficiency performance and energy saving potential.

2.4.4. Other Incentives

In accordance with Article 27 of Chapter 8 of FLEC ICC, economic entities in the Russian Federation can qualify for government support in order to develop energy efficient technology as well as energy saving procedures and measures in their production (including the use of renewable energy resources). If they have successfully introduced such technologies and measures, they can also apply for various financial benefits and privileges and will also have a right to internalise their energy saving costs in the prices and tariffs of their products, goods, and services for the amount and period determined by the law.

2.5. Energy Pricing

In Russia, prices for the products of natural monopolies, such as electricity, gas, pipeline transport, etc., are regulated by the state, which sets an upper limit on heat and power tariff increases. These state-regulated prices are established by the Federal Tariff Service (FTS) and regulated by the Federal and Regional Energy Commissions within their authority (due to Russia’s geographical size, electricity and gas prices are differentiated by 9 territorial zones). The Federal Energy Commission regulates wholesale electricity tariff and prices, while the Regional Energy Commissions regulate retail tariffs for power and energy at a regional level.

In order to stimulate efficient use of energy resources, the government established a system of seasonal energy consumption quota and gas prices, seasonal tariffs for heat and electricity, as

well as differentiated (based on the time of the day) electric power rates in accordance with the federal law on price and tariff regulations and FLEC IEE recommendations.

It is important to note that despite the existence of several independent gas producers and oil companies that can sell gas in a deregulated sector, the overall gas sector is not fully liberalised yet since the market is dominated by the de-facto monopolist Gazprom. Currently, domestic gas and electricity prices in the industrial, residential, and commercial sectors are kept at an artificially low level and regulated below market prices. In May 2008 the government approved the increases in electricity prices for the domestic market to be capped at the rate of 26% in 2009, 22% in 2010, and 18% in 2011. As for the gas tariff growth, the government raised the limit of 25% in 2009, followed by higher caps of 30% and 40% for 2010 and 2011, respectively. Furthermore, in accordance with Section 6 Article 25 of Chapter 7 of FLEC ICC, the government introduced a long-term tariff system in order to encourage energy conservation and improvement of energy efficiency.

Since 1 September 2006, the new rules of operation of wholesale and retail electricity markets have come into force. As a consequence, the wholesale electricity (capacity) market saw a transition to regulated contracts to be concluded between buyers and generation companies, the free trade sector was liquidated, and spot market (day ahead market (DAM)) was launched. In accordance with Russian Federation Government Resolution of 7 April 2007, there are plans to replace regulated contracts with free (unregulated) ones by 2011. The rules of operation of retail markets suggest that gradual liberalisation of retail markets should go in parallel with wholesale market liberalisation. It is important to note that during the transition period electricity tariffs for the population will remain regulated.

One of the important developments as the first step towards liberalisation and privatisation of the Russian electricity market was the completion of the reorganisation of the former monopolist Unified Energy System of Russia (RAO-UES) and the subsequent creation of several electricity generation, transmission and distribution companies located over the territory of the Russian Federation in July 2008. As a result of the ongoing policy of a phased liberalisation (except in the household and public services sectors), electricity and gas prices in industrial and power sectors are expected to reach market levels by 2011–2012.⁴⁷

2.6. Other Efforts for Energy Efficiency Improvements

2.6.1. Cooperation with Non-Government Organisations

There is no official record of the Russian government cooperating with non-government organisations in order to stimulate energy saving and energy efficiency improvements.

2.6.2. Cooperation through Bilateral, Regional and Multilateral Schemes

The Russian government cooperates actively with many economies within bilateral and multilateral formats. Some examples include the establishment of the Russia-EU Energy Dialogue, which has been in place since 2000 and has a special area dedicated to energy efficiency; the Joint Ministry of Industry and Energy of Russia and US Department of Energy Working Panel on Energy Efficiency, and Russian-German Energy Efficiency Forum under the auspices of the Russian-German Energy Agency (RUDEA). In addition, a number of important intergovernmental agreements were recently signed concerning cooperation in the area of energy efficiency and energy conservation, such as the Memorandum of Understanding (hereafter MoU) that was concluded between the then Ministry of Industry and Energy of Russia and the Ministry of Economy of the Netherlands Regarding Energy Efficiency and Renewable Energy Sources (2006); the Memorandum on Cooperation between the Ministry of Energy of the Russian Federation and the Ministry of Economics, Trade and Industry (METI) of Japan Regarding Increasing Energy Efficiency and Renewable Energy Usage (May 2009); the Memorandum on Cooperation between the Russian Ministry of Energy and French Ministry of Ecology, Energy, and Sustainable Development (20 September

⁴⁷ IHS Global Insight, Russia – Country Report (Energy): Tariffs and Prices, February 2009.

2008); and the MoU to cooperate in energy efficiency projects between the energy ministries of Russia and the UK (5 October 2009). In addition, Russia is an active participant in international energy organisations, such as CERA, IEA, IEF, Gas Exporting Countries Forum, and others.

2.6.3. Other Cooperation/Efforts for Energy Efficiency Improvements

Russia has been pursuing international cooperation in the area of energy efficiency on the basis of such instruments as the Kyoto Protocol and the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA).

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SINGAPORE

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. Overall Energy Efficiency Improvement Goals

In its Sustainable Singapore Blueprint (2009), Singapore has set a target of achieving a 35% energy intensity improvement by 2030. Energy intensity is defined as total energy consumed per dollar of GDP. This is a voluntary and unilaterally implemented goal, which would result in a reduction in Singapore's energy consumption from the business-as-usual level⁴⁸.

1.2. Sectoral Energy Efficiency Improvement Goals

Singapore does not have sectoral energy efficiency improvement goals.

1.3. Action Plan for Promoting Energy Efficiency

a) Objectives

Due to Singapore's constraints as a small economy without the natural endowments to utilise renewable energy resources like wind and hydro power, energy efficiency is Singapore's key strategy to mitigate greenhouse gas emissions. Energy efficiency also helps to improve Singapore's economic competitiveness, energy security, and environmental sustainability.

b) Applicable sectors

All sectors of the economy, namely power generation, industry, transport, buildings, and households⁴⁹

c) Outlines

- Power generation

Singapore's competitive electricity and gas markets encourage investment in efficient power generation and fuel switching (overall power generation efficiency improved from 37% to 44% from 2000 to 2007)

Singapore is also promoting greater use of co-generation and tri-generation by integrating the deployment of these technologies into ongoing and future industrial planning.

- Industry

- The Energy Efficiency Improvement Assistance Scheme (EASe)

EASe provides up to 50% funding for companies to carry out detailed energy assessments of buildings and industrial facilities. It is administered by the National Environment Agency (NEA).

- Grant for Energy Efficient Technologies (GREET)

GREET provides up to 50% funding, capped at SGD2 000 000 per project, to encourage owners and operators of industrial facilities to invest in energy efficient equipment or technologies. It is administered by the NEA.

- The Investment Allowance (IA) Scheme

Administered by the Economic Development Board (EDB), the IA scheme encourages companies to invest in energy efficient equipment. The IA Scheme provides a capital allowance on qualifying equipment costs that allows a

⁴⁸ Ministry of National Development (2009).

⁴⁹ Ministry of National Development (2009); Energy Market Authority (2007).

deduction against chargeable income. The IA can be awarded for capital expenditures that result in more efficient energy use.

- The Design for Efficiency (DfE) Scheme
The DfE Scheme provides up to 80% funding or SGD 600 000, whichever is lower, for large consumers of energy to conduct design workshops to design more energy efficient facilities. It is administered by the NEA.
- Accelerated Depreciation Allowance Scheme
The Accelerated Depreciation Allowance Scheme allows capital expenditure on qualifying energy efficiency or energy saving equipment to be written off in one year instead of three. It is administered by the NEA.
- Innovation for Environmental Sustainability (IES) Fund
The IES Fund provides seed funding for companies to undertake innovative environmental projects, including energy efficiency projects that could help to meet the government's goal of environmental sustainability. It is administered by the NEA.
- Transport
Promoting public transport through a series of measures, including investments in new MRT lines and upgrading of existing facilities, central bus planning, bus priority schemes, tightening quality of service standards, and enhancing commuter information.
 - Managing car ownership and usage by reducing vehicle growth rate through the Vehicle Quota System (VQS), refining the Electronic Road Pricing (ERP) system, improving Off-Peak Car and Park & Ride schemes, and further developing Intelligent Transport System (ITS) solutions
 - Green Vehicle Rebate to encourage the use of hybrid, CNG and electric vehicles
 - Implemented mandatory Fuel Economy Labelling Scheme Euro IV emissions standard for new diesel vehicles registered from 1 October 2006 Euro IV compliance is applicable to green buses, taxis and commercial vehicles
 - Test-bedding new technologies such as the Diesel Particulate Filter (DPF), diesel-hybrid buses, electric cars
 - Developing a Green Framework for rail systems
 - Encouraging cycling and walking with investments in infrastructure.
- Buildings
Since the introduction of the Ministry of National Development (MND) Research Fund for the Built Environment in December 2006, agencies such as the Building and Construction Authority (BCA) and the NEA have encouraged the development and construction of energy efficient buildings.
 - EASe for Buildings
EASe scheme is available to buildings owners and operators.
 - Energy Smart Label
The Energy Smart Building Labelling Programme, developed by the Energy Sustainability Unit (ESU) of the National University of Singapore (NUS) and the NEA, aims to promote energy efficiency and conservation in the buildings sector by according recognition to energy efficient office and hotel buildings, as well as retail malls. Buildings that are in the top 25 percentile in terms of energy efficiency of the total building cohort are awarded with a certificate and an

Energy Smart Label. In addition to its energy performance, the building's indoor environmental conditions such as air quality, thermal comfort, ventilation and lighting level are taken into consideration when evaluating a building for the award.

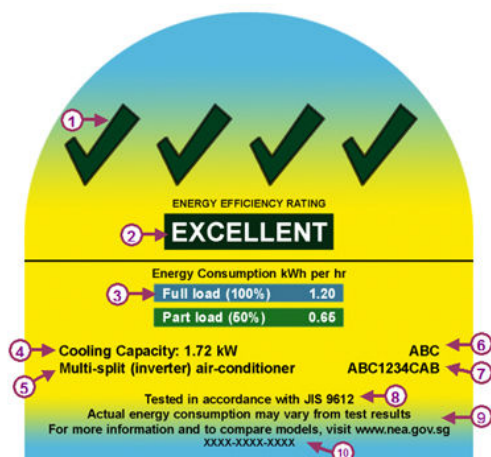
- **Building Control Regulations**
The BCA has established the Envelope Thermal Transfer Value (ETTV) standard and minimum efficiency requirements for commercial air conditioners and a maximum lighting power budget.
- **Green Mark Buildings**
The Green Mark scheme is a green building rating system launched by the BCA in 2005 to evaluate a building based on its environmental impact performance. From 2008, all new and existing buildings with gross floor area (GFA) above 2000 m² that are undergoing major retrofitting works must meet the Green Mark Certified standard.
- **Green Mark Incentive Scheme**
The Green Mark Incentive Scheme was launched in 2006 to encourage building developers to achieve higher Green Mark ratings. New and retrofitted buildings with a GFA above 5000 m² that have achieved ratings of Green Mark Gold and above will be awarded monetary incentives.
- **Public Sector taking the lead**
The public sector is taking the lead in moving toward environmental sustainability for its buildings. It aims to demonstrate the associated environmental and economic benefits and set an example for the private sector.
- **Households**
 - **Mandatory Energy Labelling Scheme**
All household refrigerators, air conditioners and clothes dryers that are sold in Singapore must be energy labelled⁵⁰. Singapore is also evaluating the introduction of minimum energy performance standards (MEPS) for energy-intensive household appliances.

Singapore's Energy Label design and certain aspects of the Energy Labelling Scheme are presented below⁵¹:

'Registered suppliers supplying registrable goods must affix the Energy Label on the units that they supply in Singapore. The Energy Label shall be affixed only after the National Environment Agency (NEA) has issued the Certificate of Registration (COR) for the model. Retailers are only allowed to display models that have the label affixed on them.'

⁵⁰ National Climate Change Committee (2009).

⁵¹ National Environment Agency (2009).



Specifications

Dimensions: 9cm (width) x 9cm (height)

Arc: 9cm (diameter)

Font: Arial, bold, black

Table 7. Features of the rating system

Feature	Air conditioners	Refrigerators	Clothes Dryers
① Ticks	The number of Ticks shall conform to the Tick Rating system.		
② Energy Efficiency Rating	The model's relative energy efficiency rating is also expressed in words:		
	Green Ticks	Energy Efficiency Rating	
	0	Low	
	1	Fair	
	2	Good	
	3	Very Good	
	4	Excellent	
③ Energy Consumption	Effective power input x 1h expressed in kWh per hour and rounded to two decimal places. For inverter type air conditioners, the energy consumed at part-load cooling capacity shall also be displayed on the label.	Energy consumption over 24 hours x 365 days expressed in kWh.	Energy consumption per wash expressed in kWh and rounded to two decimal places.
④ Capacity	Full-load cooling capacity expressed in kW and rounded to two decimal places.	Measured total storage volume expressed in litres (L) in whole digits.	Rated capacity expressed in kilograms (Kilogram Kg) and rounded to one decimal places.
⑤ Type	Type of air conditioners: (a) Casement (b) Window (c) Single Split (non-inverter / inverter) (d) Multi-split Sys (non-inverter/inverter)	Type of refrigerators: • Refrigerator • Refrigerator-freezer	Type of clothes dryers: (a) Air-vented (b) Condenser
⑥ Brand Name	Brand of air conditioner	Brand of refrigerator	Brand of clothes dryer
⑦ Model Number	The model number found on the air conditioner nameplate. For multi-split type air conditioners, only the model number of the outdoor unit shall be displayed.	The model number found on the refrigerator's nameplate.	The model number found on the clothes dryer's nameplate .
⑧ Test Standards	The test standard used as specified here (app.nea.gov.sg/cms/htdocs/article.asp?pid=2843#standards).		
⑨ Disclaimer	The following disclaimer applies to all appliances: 'Actual energy consumption may vary from test results.'		
⑩ Registration Number	A unique number found on the registered model's COR, which is issued by NEA upon successful registration of the model.		

- Reducing Standby Power Consumption
NEA will step up efforts to inform and encourage households to completely switch off appliances that are not in use.
- Residential Envelope Transmittance Value (RETV) standard
From 2008 onwards, residential buildings with GFA of 2000 m² must comply with BCA's Residential Envelope Transmittance Value (RETV) standard.
- Electricity Vending System (EVS)
The Energy Market Authority (EMA) has developed a prototype EVS as a platform to allow small consumers such as households to choose their electricity retailers. The EVS allows for time-of-use pricing to encourage consumers to shift their load from the more expensive peak periods to the less expensive off-peak periods. The EVS also allows for demand response features whereby consumers can monitor their "live" electricity consumption. The availability of such information empowers consumers to make conscious decisions to track and potentially reduce their electricity usage.

d) Financial resources and budget allocation

- The Sustainable Energy Fund—SGD 50 million
- The EASe scheme—SGD 10 million
- The Green Mark Incentive Scheme—SGD 20 million.

Other funding in relation to R&D is stated in point 1.6.

e) Method for monitoring and measuring the effect of the measures

Programs have inherent methods for monitoring and measuring the effect of measures; other methods include monitoring through surveys.

f) Expected results

Information not available

g) Future task

Extend implementation of energy policy measures and programs

1.4. Institutional Structure

Energy efficiency matters in Singapore are lead by the Energy Efficiency Programme Office (E²PO), formed in 2007. The E²PO is a multi-agency committee led by the National Environmental Agency (NEA) and the Energy Market Authority (EMA). E²PO is comprised of: the EMA—for Power Generation; EDB—for Industry; LT—for Transport; NEA—for Households; HDB—for Households; BCA—for Buildings; Infocomm Authority of Singapore (IDA)—for Infocomm; and A*STAR—for R&D.

As a statutory board under the MEWR, NEA is the key agency for climate change and energy efficiency. The EMA has expanded its traditional role as a regulator for electricity and gas markets to take on a bigger role as an energy planner, promoter and developer on an economy-wide basis. In addition, the Economic Development Board (EDB) spearheads the development of energy in industry under its Clean Energy Programme Office. In addition the Energy Studies Institute (ESI) has been set up at the National University of Singapore (NUS) to promote and develop policy-oriented research in economics and environmental and international relations aspects of energy, as well as contribute to energy dialogue and collaboration within the region.

a) Name of organisation

Energy Efficiency Programme Office

b) Status of organisation

Multi-Agency Committee

c) Role and responsibility

- Promoting adoption of energy efficient technologies and measures by addressing the market barriers to energy efficiency
- Building capacity to drive and sustain energy efficiency efforts and to develop the local knowledge base and expertise
- Raising awareness to reach out to the public and businesses as to simulate energy efficient behaviour and practices
- Supporting research and development to enhance Singapore's capability in energy efficient technologies.

d) Covered sectors

Power generation, industry, transport, buildings, information/communications, and households

e) Established date

2007

f) Number of staff members

Information not available

1.5. Information Dissemination, Awareness-raising and Capacity-building**a) Information collection and dissemination programme**

Regarding the E²PO, ministries and agencies collect information concerning the development of energy programs; relevant agencies disseminate information about programs.

b) Awareness-raising program, (e.g., consumer campaign)

A public campaign—10% Energy Challenge—was launched in April 2008 and aims to educate households on ways they can reduce energy consumption at home.

c) Capacity-building (human resource development) programme (training)

- Singapore Certified Energy Manager (SCEM) Programme

The Singapore Certified Energy Manager (SCEM) Programme, developed by the Energy Sustainability Unit of the National University of Singapore (NUS) under the sponsorship of the Economic Development Board's Locally-based Enterprise Advancement Program (LEAP), offers a formal training and certification system in the area of energy management. In support of the SCEM programme is the SCEM Training Grant, a co-funding scheme administered by NEA 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.

- ESCO Accreditation Scheme

The NUS ESU administers an Energy Service Companies (ESCOs) Accreditation Scheme. The objective is to enhance the professionalism and quality of energy services offered.

- Seminars and conferences

In addition to the formal training provided under the SCEM programme, the E²PO organises numerous seminars and conferences to bring together stakeholders and

experts in the field of energy efficiency to share knowledge and expertise in effective energy management.

1.6. Research and Development in Energy Efficiency and Conservation

Ministry of National Development (MND) Research Fund for the Built Environment to encourage and support applied R&D, including that for energy efficiency.

Innovation for Environmental Sustainability (IES) projects include:

- Seed funding for industry-led projects, including energy efficiency projects that could contribute to the long-term environmental sustainability of Singapore; responsible agency: NEA; financial resources: SGD 20 million
- R&D, including that for energy efficiency that will raise the quality of life and make Singapore a distinctive global city; responsible agency: BCA; financial resources: SGD 50 million
- Basic and applied research projects which pursue innovative and novel ideas in the Clean Energy Space, including energy efficiency; responsible agency: EDB; financial resources: SGD 50 million
- Technical trials on new sustainable transport initiatives, including the setup of vehicle emission test laboratory, diesel particulate filter, diesel-hybrid bus, and electric vehicle charging infrastructure; responsible agency: LTA; financial resources: SGD 17 million.

The Singapore Initiative in New Energy Technologies (SINERGY) Centre set up by the Agency for Science, Technology and Research (A*STAR) conducts research, development and demonstration of new and innovative energy technologies, and supports the development of these technologies from research to successful introduction in the marketplace.

The Energy Research Institute (ERI@N) recently set up at Nanyang Technological University (NTU) will act as a think tank for scientists to assemble and exchange ideas across scientific disciplines. Up to six research centres will be set up under the institute, including the Centre for Sustainable Energy Research, which focuses on the study of fuel cells and wind and tidal energy, as well as energy efficiency and smart buildings.

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS

2.1. Government Laws, Decrees, Acts

Energy efficiency is governed through a number of regulatory measures (see section 2.2).

2.2. Regulatory Measures

EPMA:

- Environmental Protection and Management Act (EMPA)
- Mandatory energy labelling of household air conditioners and refrigerators in January 2008 (see section 1.3 for details)
- Mandatory fuel economy labelling for passenger and light goods vehicles in April 2009 (see section 1.3 for details)
- Mandatory energy labelling of household clothes dryers in April 2009.

LTA:

- Vehicle Quota System (VQS) (see section 1.3 for details)
- Off-Peak Car scheme
- Electronic Road Pricing (ERP).

BCA:

- Building Control Act (BCA)
- Building control regulations for environmental sustainability in April 2008.

2.3. Voluntary Measures

These include Green Mark Building, public sector energy audits, and other measures (see section 1.3 for details).

2.4. Financial Measures Taken by the Government

2.4.1. Tax Scheme

Investment Allowance (IA) Scheme and Accelerated Depreciation Allowance Scheme (see section 1.3 for details)

2.4.2. Low-Interest Loans

Information not available

2.4.3. Subsidies and Budgetary Measures

Energy Efficiency Improvement Assistance Scheme (EASe); Grant for Energy Efficient Technologies; Design for Efficiency (DfE) Scheme; Green Vehicle Rebate; Innovation for Environmental Sustainability (IES) Fund; and Green Vehicle Rebate (see section 1.3 for details)

2.5. Energy Pricing

As energy prices in Singapore are not subsidised, energy users must pay the true cost of energy and so have better incentives to be energy efficient.

2.6. Other Efforts for Energy Efficiency Improvements

2.6.1. Cooperation with Non-Governmental Organisations (NGOs)

- Sustainable Energy Association of Singapore (SEAS) for the Singapore Certified Energy Manager Programme
- Singapore Environmental Council (SEC) for the 10% Energy Challenge
- NEA is a member of the Renewable Energy and Energy Efficiency Partnership (REEEP).

2.6.2. Cooperation through Bilateral, Regional and Multilateral Schemes

Cooperation through the energy efficiency sub-sector in regional forums, such as ASEAN, APEC and EAS Energy Cooperation Task Force

2.6.3. Other Cooperation/Efforts for Energy Efficiency Improvements

Information not available

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CHINESE TAIPEI

1. GOALS FOR EFFICIENCY IMPROVEMENT⁵²

1.1. Overall Energy Efficiency Improvement Goals

a) Goals

Reduce energy intensity 20% by 2015 and 50% by 2025

b) Base year

2005

c) Goal year

2015 and 2025

1.2. Sectoral Energy Efficiency Improvement Goals

a) Industry

Reduce CO₂ intensity by 30% in 2025 in the industry sector

b) Transportation

Raise standard fuel efficiency for private vehicles (measured in terms of passenger kilometres per litre) incrementally to 25% by 2015

c) Residential and commercial

Improve device energy efficiency by 10%–70% in 2011 (this standard is expected to be revised further before 2015, and traditional lighting equipment will be replaced with 20%–90% more efficient equipment in residential and commercial sectors)

d) Government

Reduce energy use by 7% in 2015

e) Base year

2008

f) Goal year

2025 (for industry), 2015 (for transport and government), 2011 and 2015 (for residential and commercial)

1.3. Action Plans for Promoting Energy Efficiency

a) Name

Energy Conservation and GHG Emission Reduction Action Plan

b) Objectives

Reduce CO₂ emissions by applying cleaner energy and energy conservation measures

c) Applicable sectors

Residential, commercial, industry, transport, and government

d) Outline

A number of measures have been introduced to achieve the energy efficiency goals.

- Raise power generation efficiency

⁵² BOE (2008A).

- Replace coal-fired power plants with high-efficiency generating units (efficiency raised 7.5% by 2025) and gas-fired power plants (efficiency raised by 11%)
- Improve power dispatch and transmission facilities (reducing line loss 0.5% by 2015)
- Raise vehicle energy efficiency standard⁵³
- Raising private vehicles' standard fuel efficiency incrementally 25% by 2015
- LED electricity saving lighting
- Traffic signal lamps completely replaced with LED lamps by 2012
- Building (exit, fire alarm signal, etc.) and landscape lighting completely replaced with LED lamps by 2025
- Promote the uptake of energy efficient appliances
- Voluntary energy saving partnership agreement
- Energy auditing of major energy consumers.

Details can be found at <http://www.moeaboe.gov.tw>.

e) Financial resources and budget allocation

For policy development the annual energy research budget will be increased within the next four years from NTD 5 billion to NTD 10 billion.

f) Method for monitoring and measuring effects of action plans

- Measure the sales of energy efficiency appliance monthly
- Monitor the progress of energy efficiency standard revision quarterly
- Monitor the result of voluntary energy saving agreement quarterly.

g) Expected results

Reduced CO₂ emissions through more efficient energy use

h) Future tasks

No information available

1.4. Institutional Structure

a) Name of organisation

Bureau of Energy, Ministry of Economic Affairs

b) Status of organisation

No information available

c) Roles and responsibilities

- Draw up drafts of policy and law
- Plan and predict the energy demand and supply
- Examine and approve energy development, distribution and sale
- Monitor the energy price
- Build an energy database
- Energy saving promotion and dissemination; energy technology R&D.

d) Covered sectors

All sectors of the economy are covered.

⁵³ BOE (2008B).

e) Established date

No information available

f) Number of staff

No information available

1.5. Information Dissemination, Awareness-raising and Capacity-building**a) Information collection and dissemination**

Media dissemination programs will evaluate the potential audience reached. In the meantime, an economy-wide telephone survey is conducted to assess public awareness.

b) Awareness-raising

There are two awareness-raising programs. One is the Research and Promotion of the Energy Conservation Labelling and Energy-Efficiency Labels systems; the other is Energy Conservation Environment Establishment, Achievements Appraised and Technology Promotion.

c) Capacity-building

There is a government-funded program to train energy auditors and managers for manufacturing firms and the commercial sector.

1.6. Research and Development in Energy Efficiency and Conservation

The Chinese Taipei Government's Energy Conservation Technology Mid-Term Project is administered by Bureau of Energy, Ministry of Economic Affairs; the project is applicable to industry (excluding agriculture), transport, residential, commercial, and government sectors.

The aim of the project is to develop and advance Chinese Taipei's research and development capabilities and intellectual property in many energy technologies, including LED lighting, photo voltaic, hydrogen power, air-conditioning, refrigeration, electric motors, energy information and communication technology. The Government allocates an annual budget of about USD 33 million to this project and 59% of this budget is used for energy-related research and design.

The Chinese Taipei Government has allocated USD 1.36 million to establish the Energy Conservation Labeling and Energy-Efficiency Labels system for the transport, residential, commercial and government sectors since December 2001. This system is expected to result in annual energy savings of up to 45 000 kilolitres of oil equivalent, and energy efficiency increases of 30% for air-conditioners, 45% for refrigerators, 36% for hot-warm water drinking fountains, and 15% for automobiles.

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS**2.1. Government Laws, Decrees, Acts****a) Name**

Energy Management Law (EML)

b) Purpose

The EML is designed to govern the energy efficiency of energy-consuming devices.

c) Applicable sectors

The EML applies to all large energy users across all sectors. This mainly includes the industry, transport and commercial sectors.

d) Outline

- Energy utilisation facilities or equipment that are designated by the central competent authority, manufactured by local manufacturers or imported by merchants for domestic use, are to conform to the permit standards of energy consumption established by the central competent authority
- Vehicles that are designated by the central competent authority, manufactured by local manufacturers or imported by merchants for domestic use are to conform to the permit standards of energy consumption established by the competent central authority.

e) Financial resources and budget allocation

Governmental fund

f) Expected results

Energy efficiency improvement of 2% every year for the next eight years; improve appliance energy efficiency 10%–70% by 2015

2.2. Regulatory Measures**a) Name**

Minimum Energy Performance Standard (MEPS) for appliances and lighting; fuel efficiency standards for automobiles

b) Purpose

Improve the energy efficiency of appliances, lighting devices, and vehicles

c) Applicable sectors

Industry (including agriculture), transport, residential, commercial, energy, government

d) Outline

The MEPS and efficiency standards for the following products will be raised:

- Private vehicles by 2015
- Compact fluorescent lamps from 2009
- Room air-conditioners and refrigerators from 2011
- Dehumidifiers from 2012.

2.3. Voluntary Measures**a) Name**

Energy Labelling Program

b) Purpose

To encourage manufacturers to develop highly-efficient products and promote customer purchases of these products. These projects started in December 2001.

c) Applicable sectors

Industry (including agriculture), transport, residential, commercial, energy, government, etc.

d) Outline

No information available

e) Financial resources and budget allocation

No information available

f) Expected results

Raising energy efficiency of appliances from 10% to 70% (conservation labelling as follows)



2.4. Financial Measures Taken by the Government

2.4.1. Tax Scheme

No information available

2.4.2. Low-Interest Loans

No information available

2.4.3. Subsidies and Budgetary Measures

No information available

2.4.4. Other Incentives

The FREE Energy Audit started 15 years ago, to assist owners in improving their energy efficiency and to increase energy efficiency by 30% by 2025 in the industrial and commercial sectors.

2.5. Energy Pricing

The equation used to adjust gasoline and diesel prices, originally determined by China Petroleum Corporation, was abolished in September 2000 after FPCC's petroleum products were released to the market. Following significant fluctuation in international petroleum prices in the second half of 2005, MOEA authorised CPC to adopt a floating fuel pricing mechanism at the beginning of 2007. However, the petroleum price should maintain the principle of the lowest price among the neighbouring economies in Asia.

The pricing mechanism for electricity is controlled by the government rather than based on the generation cost. The proposal for electricity price adjustment is reviewed by a governmental committee.

Higher energy prices have proved to be an effective tool for energy conservation. Chinese Taipei raised the petroleum and electricity price in June and July 2008, and petroleum and electricity consumption significantly declined in the following months. Higher energy prices may also provide the incentive for equipment replacement. However, the effect is not easy to assess due to higher sales price of higher-efficiency products.

2.6. Other Efforts for Energy Efficiency Improvement

2.6.1. Cooperation with Non-Government Organisations

The Government cooperates with non-government organisations to disseminate energy efficiency and energy saving policies.

2.6.2. Cooperation through Bilateral, Regional and Multilateral Schemes

The Chinese Taipei Government participates in APEC Energy Working Group projects that are related to energy efficiency and conservation.

2.6.3. Other Cooperation/Efforts for Energy Efficiency Improvement

Chinese Taipei is an affiliate partner of the Collaborative Labelling and Appliance Standards Program (CLASP) based in California, USA to promote energy-efficient products by developing and updating the standards and labelling program.

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THAILAND

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. Overall Energy Efficiency Improvement Goals

Thailand has adopted the aspirational goal expressed by APEC leaders in 2007 of reducing the energy intensity of GDP 25% by 2030 (with base year 2005) and also in line with the ASEAN goal agreed to by ASEAN Energy Ministers to improve energy intensity by at least 8% by 2015 compared to 2005.

1.2. Sectoral Energy Efficiency Improvement Goals

Thailand has set goals for reducing its energy consumption in the industrial sector by 3190 ktoe or 4.4%, the transportation sector by 3413 ktoe or 4.7%, and the residential sector by 1217 ktoe or 1.7% by 2011.

1.2.1. Industrial Sector

Thailand has established Energy Efficiency (hereafter EE) Improvement Programs for the industry sector to reduce energy demand and promote the efficient use of energy. Several major measures have been introduced, such as a) promotion of energy management, b) revolving funds for EEs (low-interest funds for EE investments), c) tax incentives, d) technical assistance, e) standards and regulations, f) collaboration with major private corporations (firm commitment and top-down approach), and g) promotion of the energy service company (ESCO) concept. Additional measures are: a) speeding up industry structural reform, b) EE awareness programs and campaigns, c) knowledge and information dissemination, d) capacity building programs, and e) competitions for best practices in energy conservation.

The overall achievement in terms of energy saving for industry sector in Thailand has been measured at USD 160 million and USD 750 million in 2004 and 2008, respectively. In addition, the Ministry of Energy expects a new target to be set at USD 1.5 billion in 2011. The strategy is to focus on high energy intensive industries, such as the food, non-metallic and chemical industries.

1.2.2. Transport Sector

Thailand has established various energy efficiency measures in the transport sector for improving an end-use energy efficiency by better management and logistics such as: 1) by the year 2020, 70% of gasoline consumption replaced by NGV (25%) and gasohol (45%), 2) promotion of biodiesel production (eight-year tax holidays and exemptions of import duties from major equipment), 3) natural gas for vehicles (by 2011, over 500 000 automobiles and 750 refuelling stations economy-wide using natural gas), and 4) establishment of tax measures to promote energy conservation. PTT and the Ministry of Energy have put together a fund of USD 170 million to provide low-interest loans for conversion costs for taxi and fleet corporations.

1.2.3. Residential

Thailand has developed several measures to enhance the energy efficiency of households. Those measures are: 1) Minimum Energy Performance Standards (MEPS) for equipment (target 50, actual 11), 2) High Energy Performance Standards (HEPS) for equipment (target 54, actual 8), for example for air conditioners, refrigerators, ballasts, fluorescent lamps and compact fluorescent lamps, 3) energy labelling program for appliances and houses, 4) promotion of energy efficiency in home design, and 5) public awareness campaigns.

1.2.4. Other Sectors

Factories and commercial buildings which have a peak demand above 1000 MW or consume more than 20 million MJ per year in energy become “designated facilities” by law. They have the obligations to appoint Persons Responsible for Energy (PRE) and implement the Energy Management System according to the guideline prescribed by DEDE. By implementing the Energy Management System for all designated buildings and factories, a reduction of energy consumption of around 5%-10% is expected.

For the Power Sector, there are Demand-Side Management (DSM) and Number 5 labelling programs. In cases of more than 1 MW peak demand or consumption of more than 20 TJ annually will be on a compulsory basis.

1.3. Action Plans for Promoting Energy Efficiency

Thailand has the following strategic approach for promoting energy efficiency.

a) Objectives

The present government under Prime Minister Abhisit Vejjajiva’s administration has set policy to encourage energy conservation and efficiency in the household, industrial, service and transportation sectors through campaigns fostering energy-saving discipline and conscience and promoting effective energy use; providing incentives to induce private sector investment in opting for energy-saving appliances; setting incentive measures for the household sector to reduce electricity consumption during the peak period; supporting research and development and setting standards for electrical appliances and energy-saving buildings; and supporting the development of public mass transportation and railway systems to improve energy efficiency which will help defer the economy’s investment in energy procurement.

b) Applicable Sectors

All sectors, especially industry, transport and household

c) Outline

Thailand is a net energy importing economy, having to import about 60% of the total energy demand. Therefore, it is vulnerable to energy price volatility, especially oil prices. In addition, domestic fossil energy resources are limited and will soon be depleted, if new resources cannot be developed in time. So energy efficiency improvement is one crucial policy measure to enhance energy security of the economy in the long run.

In the industrial sector, key measures include: speeding up EE improvement—revolving funds/tax incentives/investment promotion measures via BOI; promotion of Energy Services Company (ESCO) business; supportive measures for SMEs, by sending experts to visit SME facilities and assist in energy auditing/giving advice on efficient energy management; and provision of grants for equipment replacement by 9 standard (energy-efficient) equipment. In addition, the Department of Industrial Works (DIW), Ministry of Industry, has been operating the “Energy Savings for Small and Medium-Sized Enterprises (SMEs)” program during the past three years with around 20% energy savings in the forms of electricity and heat which is translated into the GHG emission reductions of around 100 tonnes CO₂-e per enterprise, annually. Since there are approximately 60 000 SMEs in Thailand, 10 000 SMEs with the highest energy consumption could be targeted which would reduce around 1M tonnes CO₂-e per year. As the next step, there could be several possible modalities to scale-up and build on DIW’s program, including engaging ESCOs to promote investment in SME energy efficiency projects, with financing through financial intermediary banks and with DIW providing technical support. Further discussion is needed to design the most suitable modality for the proposed concept.

Almost a quarter of the economy’s passenger-km takes place in the Bangkok Metropolitan Region (BMR). Therefore, any improvement in transport energy efficiency of the BMR will

be important to the effort in transport energy reduction. In 2003, approximately 46% of total daily person trips in the BMR were made by private modes; the second most important mode is public bus with a 37% share. Mass Rapid Transit (MRT) accounted for only 3% of total daily trips in 2003, but its share is expected to grow to 15% by 2015 if the planned MRT network (approximately 200 kilometres) is substantially completed and functioning well.

The key measures introduced are the improvement of public transport and logistics systems, including:

- 1) Passenger transportation: speeding up expansion of rail (mass rapid-transit trains) in Bangkok and its vicinity, providing 'Park & Ride' areas and facilitating passengers by providing feeder transport to the central part of a city, and the development of energy-saving vehicles. Thailand's Board of Investment (BOI) has announced new incentives for the manufacturing of low-cost, fuel efficient automobiles, or the so-called 'ECO Cars'.
- 2) Goods transportation: promoting the use of rail system and waterways; establishing Inland Container Depots (ICD); and improvement of logistics management to reduce unloaded truck travelling.
- 3) Bus Rapid Transit (BRT) could also contribute significantly to the improvement of the speed and reliability of bus services, as well as bus transport energy efficiency. The Bangkok Metropolitan Administration (BMA) has recently promoted the development of several BRT routes with an initial route of 15 kilometres under construction. The BRT master plan covers 14 routes with the initial 6 routes (138 kilometres, USD 400 million) for the first phase.
- 4) Although each MRT and BRT can offer better alternatives to BMR transport, integration of various modes, including the following, remains the key to the efficient urban transport development—improving reliability, reducing travel time, and ensuring better air quality. It is crucial to emphasise not only system integration among MRTs and with BRTs, but also coordination with existing bus systems.
- 5) In the household sector, key measures are: promotion of the use of high-efficiency equipment; establishment of Minimum Energy Performance Standards (MEPS) for five products—air conditioners, refrigerators, ballasts, fluorescent lamps and compact fluorescent lamps; energy efficiency labelling; establishment of building code and building material standards; and public awareness campaigns.

d) Financial resources and budget allocation

Government budget and ENCON Fund; budget: approximately about THB 4000 million/year

e) Method for monitoring and measuring effects of action plans

Methods for monitoring include energy consumption reporting, submission of energy conservation targets and plans of designated facilities, and analysis of energy consumption against energy benchmarks of individual sectors.

The outcomes of monitoring involve the evaluation of the overall achievement of individual projects and the strategic plan implementation after a specified time frame, the result of which will be used for improving and developing the strategic plan for another time frame. The main method used for monitoring and evaluation of the action plans is PMQA Method on the following activities: database creation, EE program evaluation, surveys, auditing, statistics (data gathering) benchmarking, diagnostics, end-use information, monitoring, trends analysis, potentials, and others. Several tools have been used together in order to do the monitoring. Those tools are databases, program evaluation, benchmarking, and information surveys.

The Department of Alternative Energy Development and Efficiency (DEDE) plays the major role in monitoring and reporting tasks for the industrial sector. Energy Policy and Planning

Office (EPPO) monitors residential, transportation, and government sectors. The outputs by monitoring are compiled in the annual government report, annual report of Energy Conservation Promotion Fund, and annual organisation report. Financial resources used for monitoring EE projects are allocated from ENCON Fund.

f) Expected results

Decreasing energy consumption by 10.8% or 7820 ktoe of the total final energy consumption in 2011 (which is also the target of the Energy Efficiency Improvement Program at the end of ENCON Program, Phase 3, 2008–11).

g) Future tasks

No information available

1.4. Institutional Structure

The Royal Thai Government's Ministry of Energy consists of the following departments and organisations:

- Energy Policy and Planning Office (EPPO) (policy maker) recommends economy-wide energy conservation policies, management and development plans; establishes energy conservation measures and the framework of energy conservation promotion budget allocation; and coordinates, follows up on and evaluates the implementation outcome of the policies, management and development plans.
- Department of Alternative Energy Development and Efficiency (DEDE) (regulator/implementer) promotes, supports and monitors energy conservation activities; undertakes research and development for energy efficiency improvement; establishes regulations and standards and disseminates technologies related to production, processing, transportation and energy use efficiency; and follows up on and evaluates the implementation of energy efficiency improvement.
- Energy Conservation Center of Thailand (ECCT) was established in 1985 from a cabinet resolution as an agency to promote energy conservation activities in the economy; it provides technical expertise and services in energy conservation by closely working with DEDE.
- Electricity Generating Authority of Thailand (EGAT) owns and operates various types of power generating plants located at 38 sites together with transmission and main distribution systems economy-wide. It has a unit called the DSM Office to promote energy conservation, especially in electrical appliances through standard and labelling schemes. EGAT is also a significant player in encouraging energy efficiency in major industries via ESCO programs.
- PTT Public Company Limited (PTT) is an integrated energy and petrochemical company, conducting its business as the economy's energy company and being listed on the Thai stock market. PTT also put an emphasis on energy conservation and alternative fuels by conducting research and development together with supporting energy efficiency and alternative energy policies from the government.

a) Name of organisation

Central Institutions: The Energy Policy and Planning Office (EPPO) and the Department of Alternative Energy Development and Efficiency (DEDE) of the Ministry of Energy.

b) Status of organisation

EPPO—policymaker; DEDE—regulator/implementer

c) Roles and responsibilities

EPPO recommends economy-wide energy conservation policies, management and development plans; establishes energy conservation measures and the framework of energy

conservation promotion budget allocation; and coordinates, follows up on and evaluates the implementation outcome of the policies, management and development plans.

DEDE promotes, supports and monitors energy conservation activities; undertakes R&D for energy efficiency improvement; establishes regulations, standards and disseminate technologies related to production, processing, transportation, and energy use efficiency; and follows up on and evaluates the implementation of energy efficiency improvement.

d) Covered sectors

All sectors: industry (including agriculture), transport, residential, commercial, power, government, etc.

e) Established date

EPPO was established in 1992 (formerly, National Energy Policy Office (NEPO) under the Office of the Prime Minister). DEDE was established in 1953 (formerly, Department of Energy Development and Promotion (DEDP) under the Ministry of Science, Technology and Environment).

f) Number of staff members

EPPO—approximately 7 senior persons (responsible for EE); DEDE—approximately 136 persons (responsible for EE); in addition, Thailand has a regional or local institutional structure for energy efficiency improvements.

a) Name

Regional Energy Offices 1-11 at the Ministry of Energy

b) Status of organisation

Regulator/implementer

c) Roles and responsibilities

Among others, promote and disseminate information about the efficient use of energy, including renewable energy, in line with the government policy and measures established by EPPO/DEDE

d) Covered sectors

Industry (including agriculture), transport, residential, commercial, power, government, and others

e) Established date

October 2002

f) Number of staff members

No information available

g) Future tasks

No information available

In addition, the present government aspires to have the Local Administration Organizations (LAOs) act as focal points in creating and disseminating “energy-saving culture” via such target groups as children and juveniles, women (mostly housewives), and the aged, under the “Community Energy Volunteers” mechanism. Workshops, meetings, and seminars are regularly organised by LAOs to disseminate government policy, targets, and action plans as

well as to obtain feedback on the implementation of the plans and recommendations to improve future action plans.

1.5. Information Dissemination, Awareness-raising and Capacity-building

a) Information collection and dissemination

Relevant information and public relations activities implemented by EPPO under the “Divide by Two ($\div 2$)” campaign as well as those carried out by DEDE and EGAT can be easily accessed by the general public and various media and have been used to reach every target group. Also, the information can be accessed via the website of the respective agencies.

b) Awareness-raising

Examples of these activities are: production of series of television commercials on energy saving methods and benefits to be gained; dissemination of energy conservation issues through various types of media—newspapers, magazines, energy talks via TV programs, etc.; energy mobile units undertaken by Regional Energy Offices; energy camps for students, plays and cultural shows based on energy conservation themes and the establishment of energy information centres to disseminate materials, posters, and other printed matter on issues related to energy conservation and renewable energy.

c) Capacity-building

The implementation of the *Strategic Management Program* for government includes:

- 1) Policy research and study to provide recommendations, options or situation overviews, comprising several dimensions, from the energy supply/demand to the economic, social and environmental impacts, to be an element for decision-making pertaining to the improvement of the Energy Efficiency Improvement Program or Renewable Energy Development Program so that the programs would be appropriate and correspond with the changing situations. The study outcomes could serve as a guiding tool for setting the work priorities and budget allocation.
- 2) Monitoring and management to ensure efficient and effective implementation of the Energy Conservation Program
- 3) Special tasks to support and enhance the implementation that is of particular importance or urgency.

Additional capacity-building measures and policies aimed at the community include:

- 1) Development of curriculum, teaching/training materials, aiming to integrate the study of energy conservation and environment into the learning process so that energy conservation consciousness can be fostered among the young generation
- 2) Short-term projects/activities (e.g., school recycling banks, energy conservation competitions), aiming to increase participants’ knowledge and understanding of energy conservation and to stimulate improvement in their energy consumption behaviour so that they can expand/share their experience and knowledge with their peer groups
- 3) Short-term HRD and technical visits abroad
- 4) Undergraduate and post-graduate scholarships—local and abroad
- 5) Provision of research funds to encourage students in public and private universities to seriously consider research on energy management, and energy efficiency and renewable energy technologies
- 6) Public awareness campaigns on energy saving.

1.6. Research and Development in Energy Efficiency and Conservation

Although there is currently no specific policy on energy efficiency research, the Thai government, via the ENCON Fund, has continuously supported research and development

(R&D) work as part of the Energy Conservation Program of the economy. Each year, a budget of THB 50 million (USD 1.5 million) is allocated for funding R&D on energy conservation technologies, which can be accessed by academic institutions, research institutions of the public sector and those of the private sector that are non-profit-making. In addition, there are research funds of about THB 5 million each year for postgraduate and Ph.D. levels. The R&D work under the Energy Conservation Program has to demonstrate its practical application in line with the short-term measures designed for EE improvements.

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS

2.1. Government Laws, Decrees, Acts

a) Name

The Energy Conservation Promotion Act, B.E. 2535 (1992), as amended to No. 2, B.E. 2550 (2007)

b) Purpose

To enforce energy conservation, particularly in designated factories and buildings

c) Applicable sectors

Economy-wide (industry, commercial and government building sectors)

d) Outline

The NEPC is responsible for the promotion of energy conservation pursuant to the provisions specified in the ENCON Act and the management of the ENCON Fund. To assist the NEPC, the Energy Conservation Promotion Fund Committee has been established to be responsible for the management of the ENCON Fund and ensure that the allocations are made in compliance with the regulations stipulated in the Act. The Act stipulates duties of owners of designated factories/buildings with regard to energy conservation in their facilities and promotes the use of energy-efficient machinery or equipment as well as materials contributing to energy conservation. The Act also contains penalty clauses for those who violate or fail to comply with the Ministerial Regulations, issued under this Act.

e) Financial resources and budget allocation

The Energy Conservation Promotion Fund, with an annual budget allocation of about THB 150 million, subject to approval by the Energy Conservation Promotion Fund Committee and the National Energy Policy Council (NEPC). In addition, the Energy Conservation Promotion Fund (ENCON Fund) has been established under the Act to serve as working capital, grants or subsidies for implementing in energy conservation programs in both public and private sectors, including energy efficiency improvement, renewable and alternative energy development, R&D projects, human resources development, public education and campaigns on energy conservation, and for the expenses for management and monitoring of the Energy Conservation Program.

f) Expected results

No information available

2.2. Regulatory Measures

2.2.1. Minimum Energy Performance Standards and Labelling

Thailand has Minimum Energy Performance Standards (MEPS) and High Energy Performance Standards (HEPS) for five types of equipment—air-conditioners, refrigerators, ballast, fluorescent lamps and compact fluorescent lamps. Applicable sectors include residential (households and commercial for appliances, lighting and equipment).

In addition, the government introduced the Energy Efficiency Labelling No. 5 Programme (for further information, refer to Section 2.3. on voluntary measures).

2.2.2. Building Energy Codes

a) Name

Royal Decree on Designated Buildings, B.E. 2538 (1995), effective since 12 December 1995, and Royal Decree on Designated Factories, B.E. 2540 (1997), effective since 17 July 1997

b) Purpose

To improve energy efficiency of the design and construction of the new and existing buildings

c) Applicable sectors

Industry and commercial, including government buildings

d) Outline

Under the ENCON Act (1992), the following two major building sector regulations have been enacted:

- Royal Decree on Designated Buildings, B.E. 2538 (1995), effective since 12 December 1995, to stipulate the characteristics of “designated” buildings (energy consumption ≥ 1000 kW or ≥ 20 million megajoules of electrical energy equivalent, or those authorised to install one or more transformers with a total capacity of 1175 kVA). Under this Royal Decree, three Ministerial Regulations on designated buildings have been issued, effective 12 December 1995, prescribing a) the standards, criteria, and procedures for energy conservation in designated buildings; b) the forms and schedule for submission of information on energy consumption and conservation; and c) the criteria, procedures and schedule for owners of designated buildings to establish and submit energy conservation targets and plans.
- Royal Decree on Designated Factories, B.E. 2540 (1997), effective since 17 July 1997, to stipulate the characteristics of ‘designated’ factories (those with one or more transformers installed, with a total capacity of ≥ 1000 kW or ≥ 1175 kVA, or those consuming ≥ 200 million megajoules of electrical energy equivalent). Under this Royal Decree, two Ministerial Regulations on designated factories have been issued, effective 17 July 1997, prescribing a) the forms and schedule for submission of information on energy production, consumption and conservation, including the criteria on and methods of recording information on energy consumption and installation or modification of machinery or equipment that affects the level of energy consumption and conservation; and b) the criteria, procedures and schedule for owners of designated factories to establish and submit energy conservation targets and plans.

In addition, under the latest revision of the ECP Act in 2007, five Ministerial Regulations have been issued, namely a) Ministerial Regulation Prescribing Qualifications, Duties and Number of Personnel Responsible for Energy B.E. 2552; b) Ministerial Regulation Prescribing Standard, Criteria, and Energy Management Procedures In Designated Factories and Buildings B.E. 2552; c) Ministerial Regulation Prescription of type or size of building and standards, criteria and procedures for designing buildings for energy conservation B.E. 2552; d) Ministerial Regulation Prescribing the Qualifications of Person Applying for Energy Conservation Management Inspection and Certification Permit and Criteria, Methods and Conditions for Applying, Approving and Renewing the Permit; and e) Ministerial Regulation Prescribing Machinery, Equipment and Material for Energy Conservation.

e) Financial resources and budget allocation

Financed by the ENCON Fund, the budget is based on the annual action plan and subject to approval by the ENCON Fund Committee.

f) Expected results

No information available

2.3. Voluntary Measures

Thailand established the Energy Efficiency Labelling No. 5 Programme on a voluntary basis with the purpose to inform consumers that No. 5 labelled appliances/equipment are highly energy efficient and hence will reduce their electricity bills. This will also enhance competition among manufacturers to further improve the energy efficiency of their products. This program applies to the industrial, commercial and residential sectors and has been in operation since 1993. Concerning financial resources and budget allocation, financing comes from various sources, such as: GEF grants and the Australian Government (1993–2000); concessional loans from JBIC (OECD) (1994–2002); reimbursement through the Automatic Electricity Tariff Mechanism (Ft) (1993–2000); and since 2000 through the reimbursement of the Base Tariff (in EGAT's annual budgeting).

The program's main purpose is to provide consumers with better awareness of the importance of the energy efficiency of appliances and equipment when making a buying decision, and thus will help gradually remove low energy-efficient products from the market.

2.4. Financial Measures Taken by the Government

Various measures have been introduced, including revolving funds (soft loans), tax incentives, and investment promotion, via the Board of Investment (BOI), to encourage energy efficiency improvement. Concerning energy efficiency improvements in the industrial sector, these measures are sought to help achieve the energy saving target as follows (source: DEDE, Thailand, January 2010).

2.4.1. Tax Scheme**a) Name**

Tax incentives (monitored by DEDE)

b) Purpose

To induce operators' decision-making to invest in the purchase of energy-efficient equipment/machinery

c) Applicable sectors

Various sectors

d) Outline

Investment in the purchase of energy-efficient equipment/machinery can be reclaimed through corporate tax deduction via three methods:

- 1) Cost-based: allow 1.25 times the actual investment capital for tax deduction calculation, which will lessen the tax burden, by phasing the amount of eligible tax deduction over a period of five years
- 2) Performance-based: 100% of the savings value from energy saving projects would become a tax deduction through income tax for the project owners, but not exceeding THB 2 million
- 3) BOI: A privilege from the Board of Investment for investors who invest in EE and RE business by receiving the waiver of income and import tax for a maximum of eight years.

e) Financial resources and budget allocation

No information available

f) Expected results

During Phase 1 (2006–07), the introduction of 193 approved projects resulted in a total investment of THB 4 836 million in EE improvement. Phase 2 (2008–09) is still ongoing; as of August 2008, there were 127 participating projects.

2.4.2. Low-Interest Loans**a) Name**

Revolving funds or soft loans (monitored by DEDE)

b) Purpose

These measures are provided to stimulate and expedite energy efficiency investment in large buildings and factories.

c) Applicable sectors

Buildings and factories

d) Outline

Provide loans with 0% interest rate and 7-year final maturity to local commercial banks as an incentive to encourage the banks to lend to RE/EE projects, including ESCO companies at a maximum interest rate of 4%.

The maximum loan size is THB 50 million (USD 1.5 million). The banks will manage all aspects of loans and report the project status to DEDE. DEDE will 1) ensure that the projects are genuinely energy-saving projects, not simply equipment replacement; 2) monitor the performance of the banks to ensure that they meet their targets in terms of projects, lending and repayment; and 3) evaluate the program to measure energy savings.

e) Financial resources and budget allocation

Launched in January 2003, with an initial budget of THB 2 billion (about USD 58.8 million) allocated from the ENCON Fund. Up to the present, almost THB 6 billion has been allocated to be soft loans.

f) Expected results

Since its introduction in 2003, the Fund has recruited 11 public and commercial participating banks and extended some USD 200 million loans via the banks in support of approximately 300 projects with about THB 7 billion (USD 500 million) aggregated project costs. The fund has been successful in familiarising the participating banks with RE/EE business.

In addition, the Thai Government introduced the following loan scheme for households.

a) Name

Household Energy Credits

b) Purpose

To assist the general public who are interested in changing to use energy efficiency household electrical appliances, including the No. 5 energy-saving equipment and those items identified by the Ministry of Energy.

c) Applicable sectors

Residential (households)

d) Outline

Loans were provided via local financial institutions, without any interest rate (0%). Maximum loan for each household was THB 10 000, except for those who want to change to use energy-

efficient air-conditioners for which the loan was at maximum of THB 20 000. Program duration was May 2008 to September 2009.

e) Financial resources and budget allocation

Sponsored by the ENCON Fund with a budget of THB 1000 M

f) Expected results

Approximate annual energy saving of 50 ktoe by 2011

2.4.3. Subsidies and Budgetary Measures

a) Name

DSM by Bidding Mechanism (monitored by EPPO)—a new initiative in 2008

b) Purpose

The initiative's main purpose is to provide financial support to encourage business operators to invest in higher energy efficiency machines and equipment. In addition, Demand Side Management by Bidding Mechanism, or DSM Bidding, offers financial support to private sector operators to encourage investment in improving the energy efficiency of their companies by replacing or retrofitting existing machines or equipment, thus reducing energy consumption.

c) Applicable sectors

Private industrial and commercial sectors

d) Outline

In accordance with the initiative, subsidies are granted based on actual energy saving achieved in a year resulting from such investment. The subsidy is defined as “annual energy saving x subsidy rate (as bid by each company)”. With this bidding mechanism, proposals with lower weighted subsidy rate will be subsidised first.

The maximum subsidy rate set for each energy type is as shown in the table.

Table 8: Subsidy rates

Energy Type	Maximum Subsidy Rate
Electricity	THB 1/kWh
Heat from liquid and gas fuels (fuel oil, LPG, natural gas, etc.)	THB 75/MMBtu
Heat from solid fuels (coal, wood, rice husks, sawdust, bagasses and other agricultural waste)	THB 15/MMBtu

e) Financial resources and budgetary allocation

No information available

f) Expected results

This scheme is expected to reduce energy consumption by 149 ktoe in 2011, covering the industrial and commercial sectors.

In addition, to the above-mentioned measures, the government introduced the University Building Energy Efficiency Program. Specifically, the Khon Kaen University was offered financial support from designated bank to support energy auditing and investment in EE of its 360 buildings and one hospital. If the EE investment proves successful, there is a great potential to replicate it at other university compounds and public buildings. As the next step, possible modalities for a pilot project at KK University, including a partnership with private PESCOs under a benefit-sharing arrangement, with debt financing from the financial

intermediary banks. Further discussions are needed to design the most suitable modality for the proposed concept.

2.4.4. Other Incentives

In 2008, the Thai Government introduced a new initiative, the ESCO Venture Capital (monitored by DEDE). The ESCO Fund has been established as a source of venture capital for the investors to jointly invest between public and private operators in energy efficiency and renewable energy projects through various channels—venture capital, equity investment, equipment leasing, carbon market, technical assistance and credit guarantee facility. The fund was launched in October 2008, with an initial capital of THB 500 million (about USD 14.7 million) targeted for potential investors; and as a pilot venture capital initiative to address the issue of lack of equity capital for small developers. The fund provides equity capital up to 50% of total equity; and in the case of very small projects, provides its support through equipment leasing. The fund has outsourced the identification and appraisal of projects to two entities, playing the role as a fund manager (THB 250 million each for ECFT and E for E⁵⁴). The fund has so far approved as many as 17 projects, including a solar firm, biomass power plants, gasification projects and lighting devices.

In addition, Thailand has a number of other supportive measures for SMEs and the residential sector (monitored by various organisations) which provide grants for SMEs for the replacement of existing production processes and technologies by proven high-efficiency ones. Some examples of energy efficiency improvement due to these measures include technological upgrades in the tobacco curing process, ceramic shuttle kilns, and Chinese sausage dryers.

2.5. Energy Pricing

The oil market in Thailand has been liberalised; thus, the pricing of crude oil and all petroleum products except LPG are based on international prices and the market mechanism.

LPG retail prices have been floated since 1 November 2001, while the wholesale prices are still under regulation. The government has planned to remove LPG subsidies, but the energy price crisis in 2008 caused the implementation to be delayed. Instead, the ex-refinery price of LPG has been capped at USD 332 per tonne since March 2008 to alleviate the burden on consumers, especially in the household sector. However, LPG pricing is under review by the government to reflect the actual supply costs and to avoid distorted use of LPG.

For naturally monopolistic businesses like electricity and natural gas, the government set the pricing policy and framework to be fair for both energy service providers and consumers, whereas the regulation of electricity tariffs and natural gas pricing and throughput fees are under the authority of the Energy Regulatory Commission (ERC) to ensure compliance with the government policy and framework.

Although a free and fair energy market is promoted, if the market mechanism fails to work properly, the government must step in to correct it in order to protect consumers. Normally, energy pricing principles in Thailand (whether involving oil, natural gas or electricity) are to reflect actual costs of supply and efficiency of operators. This will cause consumers to be more cautious in the use of energy. However, in certain cases like LPG, where the ex-refinery price has been capped since March 2008 to alleviate the burden of consumers, especially in the household sector, the use of LPG gets distorted, particularly toward greater use of LPG for transport. LPG pricing is now under review by the government to reflect the actual supply costs and to avoid its distorted use.

⁵⁴ Energy Conservation Foundation of Thailand and Energy for Environment Foundation.

2.6. Other Efforts for Energy Efficiency Improvements

2.6.1. Cooperation with Non-Government Organisations

Stand-alone PEA Renewable Energy and Energy Efficiency Project

PEA (Provincial Energy Authority) is collaborating with the Forest Industry Organisation (FIO) to invest in a pilot biomass power generation project using forest residuals as fuel source with a potential to scale up to about 100 sites (with an approximate total capacity of 100 MW) in the next five years, and associated transmission lines and substations. PEA also has a plan to improve energy efficiency of street lighting on highways throughout the economy with private participation of ESCO.

In addition, PEA has a Master Plan for Energy Conservation which focuses on: a) energy conservation projects for public and street lighting, b) energy efficiency for PEA buildings (air conditioning and lighting), and c) consulting services in energy management for PEA costumers. PEA estimates a reduction in energy consumption of at least 300 GWh per year, equivalent to THB 750 million. The financing structure of the EE activities includes the following items: a) PPP scheme to finance EE street lighting, b) turn-key method for building retrofitting, and c) normal EE consultancy services for PEA customers. To implement this Master Plan, PEA has established a subsidiary (100% owned) named PEA Encon International. The following potential project modality was proposed and discussed with PEA (see the table below). However, PEA informed that its wholly owned subsidiary, PEA Encon International, will be the entity to invest in these projects and not the PEA mother company.

Table 9. Energy Saving Targets

Energy Saving Target in the Industrial Sector in 2011: 3,190 ktoe				
	2008	2009	2010	2011
1. Implementation pursuant to the Act	25	50	100	211
2. Tax incentives	232	341	454	570
3. Soft loans	300	400	500	600
4. Promotion & development of ESCO business	97	153	224	300
5. Partnership in ENCON	200	300	400	551
6. Advance technology demonstration	25	50	100	200
7. DSM Bidding + hotels	149	149	149	149
8. Policy promoting CoGen	358	406	500	608
Energy Saving Target (ktoe)	1,387	1,849	2,427	3,190
Saving Achieved @ end-2008	1,345			

Source: DEDE, Thailand, January 2010

2.6.2. Cooperation through Bilateral, Regional and Multilateral Schemes

Thailand has established close relationships in EE in the areas of capacity building and technical assistance with neighbouring economies, such as Lao PDR, Cambodia, Myanmar, Malaysia, and Viet Nam. Regarding multilateral and regional cooperation, Thailand, as ASEAN Chair in 2008, led ASEAN toward the leader's aspirational goal of achieving 8% of EE improvement by 2015. Thailand also chaired the ASEAN Plan of Action for Energy Cooperation (APAEC) Drafting Committee in preparing the APAEC 2010-2015 detailing the EE strategies and actions for ASEAN member states.

2.6.3. Other Cooperation/Efforts for Energy Efficiency Improvements

There is financial support from designated banks to support energy audit and investment in EE in university compounds, hospitals and public buildings through ENCON Fund. Other EE programs also involve joint studies, R&D and promotional activities to enhance efficient use of energy in transportation, industrial and household sectors as well as capacity building and

development of personnel dealing with EE improvement projects/activities through academic conferences, seminars, training, and technical visits, including scholarship granting to pursue further study at the bachelor, master and Ph.D. levels, through ENCON Fund.

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UNITED STATES

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1 Overall Energy Efficiency Improvement Goals

The United States has adopted the aspirational goal expressed by APEC leaders in 2007 of reducing the energy intensity of GDP 25% by 2030 (relative to 2005).

1.2 Sectoral Energy Efficiency Improvement Goals

The United States Department of Energy (DOE) has goals for the research, development and deployment of energy efficient technologies and practices.

1.2.1 Residential Buildings

The DOE's goal for residential buildings is to develop integrated energy efficiency and onsite/renewable power solutions that will be evaluated on a production basis to reduce whole house energy use in new homes by an average of 50% by 2015 and 70% by 2020 (compared to a clearly established DOE benchmark) at positive cash flow. This will help to achieve the strategic goal of net zero energy homes by 2020 when combined with renewable energy supply.

1.2.2 Commercial Buildings

For commercial buildings, the goal is to achieve net-zero energy new buildings by 2025. In support of this goal, DOE is developing integrated whole-building strategies to enable commercial buildings to be designed, constructed, and operated to use up to 70% less energy relative to the relevant commercial building energy standard, ASHRAE Standard 90.1-2004. The balance of the buildings' energy requirements (30% or more) will be met by renewable energy sources.

1.2.3 Other Sectoral Goals

The DOE establishes voluntary agreements with industrial partners to reduce energy intensity (annual energy consumption per unit of physical output) 2.5% per year over a period of 10 years.

Federal government facilities are required to reduce energy intensity (energy consumption per unit area of floor space) 30% by 2015 (relative to 2005).

1.3 Action Plans for Promoting Energy Efficiency

1.3.1 The United States Strategic Approach for Promoting Energy Efficiency

a) Objectives

Establish energy efficient technologies, processes and practices

b) Applicable sectors

All sectors

c) Outline

The US government has, over decades, supported the promotion of energy efficiency through legislation, regulation and dedicated funding. Earlier emphasis, in keeping with economy-wide economic practices, has been on leveraging the market system and the self-interest of decision makers, with occasional explicit efficiency requirements in selected sectors. More recently, with greater recognition of the economic, environmental and security benefits offered by energy efficiency, there has been a series of increasingly stringent energy efficiency targets and mandates, most often expressed by sector or technology. Financial incentives and funding levels have also grown.

d) Financial resources and budget allocation

The 2009 Recovery Act provided:

- USD 5 billion for the Weatherization Assistance Program
- USD 3.1 billion for the State Energy Program
- USD 3.2 billion for Energy Efficiency and Conservation Block Grants
- USD 346 million for energy efficient building technologies
- USD 256 million for the Industrial Technologies Program
- USD 110 million for the Vehicle Technologies Program
- USD 300 million for an Energy Efficient Appliance Rebate Program and ENERGY STAR[®].

This represents a considerable increase in funding for these programs.⁵⁵

1.3.2 The National Action Plan for Energy Efficiency**(a) Objectives**

Boost energy efficiency through actions by participating organisations to overcome barriers to energy efficiency investment

(b) Applicable sectors

Utilities, industry, NGOs, private and public sectors

c) Outline

The National Action Plan for Energy Efficiency was issued by the electric and gas utility industry and State regulators who see the need to increase energy efficiency and have the ability to do so. This Action Plan, facilitated by technical assistance from the US Department of Energy and US Environmental Protection Agency, aims to create a sustainable, aggressive commitment to energy efficiency through gas and electric utilities, utility regulators, and partner organisations. Over 120 organisations, including leading electric and gas utilities, all three of their trade associations, many state regulators and governors, and the National Association of Regulatory Utility Commissioners have endorsed the Action Plan's five main recommendations and have pledged to take individual actions to carry them out.

The five main recommendations are:

- 1) Recognise energy efficiency (EE) as a high priority resource
- 2) Make a long-term commitment to implement cost-effective EE
- 3) Communicate benefits of EE
- 4) Fund programs to deliver EE
- 5) Align utility incentives with delivery of cost-effective EE.

d) Financial resources and budget allocation

Commitments by participating organisations are expressed as advocacy for priority and funding, communication/education, support for legislation, commitments to efficiency and procurement goals, and funding, among other commitments. Many of the participating organisations fund/operate energy efficiency programs within their spheres of influence.

e) Method for monitoring and measuring effects of action plans

Self-reporting by stakeholders

f) Expected results

Not quantified

⁵⁵DOE (2009).

g) Outputs of monitoring

Annual update describing accomplishments

h) Outcomes

The wide range of outcomes includes legislation, deployed efficiency, education, and increased funding

1.3.3 Industrial Technologies Program**a) Objectives**

Reduce energy consumption per unit of output of an industrial partner by 25% over 10 years

b) Applicable sectors

Industry

c) Outline

The DOE supports the US energy goals for industry through two critical pathways: technology delivery and energy efficiency R&D. These pathways support immediate and long-term efforts to reduce industrial energy consumption. Through technology delivery, DOE helps plants save energy immediately by assessing opportunities and facilitating adoption of best energy management practices and efficient new technologies. Technology delivery activities include: energy assessments, best practices, training and qualification, energy management certification, software tools, technical publications, and deployment/demonstration. Energy efficiency R&D develops technologies addressing top energy saving opportunities in the industrial sector. R&D activities are divided between industry specific R&D and crosscutting R&D. Industries supported in the industry-specific R&D include aluminium, cement, chemicals, food processing, forest products, glass, metal casting, mining, refining, and steel. Crosscutting areas cover energy-intensive processes, nanomanufacturing, fuel and feedstock flexibility, clean distributed energy and materials R&D.

d) Financial resources and budget allocation

The 2009 budget allocation was USD 90 million. The Recovery Act of 2009 provided USD 256 million.

e) Method for monitoring and measuring effects of action plans

The DOE maintains databases of activities and results for a majority of industrial activities. Impacts are reported annually in a publication of results. Effects of the plan are analysed annually as required by the Government Performance and Results Act of 1993 (GPRA). This analysis includes a GPRA data call and DOE programmatic evaluations.

f) Expected results

Working with industry, DOE's Industrial Technologies Program seeks to reduce industrial energy intensity by 25% over 10 years.

g) Responsibility for monitoring

The Industrial Technologies Program

h) Outputs of monitoring

The Industrial Technologies Program releases an annual Impacts Report

i) Outcomes

Energy savings, reduction in industrial energy intensity, and newly commercialised

technologies⁵⁶

1.3.4 Federal Fleet Petroleum Reduction and Alternative Fuel Use Increase

a) Objectives

Reduce petroleum consumed by Federal transport fleets in favour of alternative fuels and hybrid-electric vehicles

b) Applicable sectors

Federal transport

c) Outline

United States Federal agencies have requirements to decrease vehicle fleet petroleum consumption 2% annually and increase vehicle fleet alternative fuel use 10% annually through the year 2015, relative to a year 2005 baseline. Assisting in achieving these goals are mandates requiring Federal agencies to acquire alternative fuel vehicles and hybrid electric vehicles, and requirements to use alternative fuel in Federal alternative fuel vehicles when alternative fuel is available and reasonably priced.

d) Financial resources and budget allocation

No information available

e) Method for monitoring and measuring effects of action plans

Federal agency self-reporting

f) Expected results

20% reduction in fleet petroleum consumption, more than double the amount of alternative fuel use, and increased inventory of hybrid electric vehicles

g) Responsibility for monitoring

Agencies report on their own progress and the DOE monitors results

h) Outputs of monitoring

Annual report on Federal Fleet Compliance with EPACT and E.O. 13423

i) Outcomes

Targets were met, or nearly met, in 2007. Twenty-one covered Federal agencies reported progress toward petroleum reduction and alternative fuel goals.

1.4 Institutional Structure

1.4.1 Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy

a) Status of organisation

Implementer

b) Roles and responsibilities

The Office of Energy Efficiency and Renewable Energy (EERE) develops cost-effective energy efficiency and renewable energy technologies that provide a diverse supply of reliable, affordable, and environmentally sound energy for the economy. EERE achieves this goal through a strong and balanced program of research, development and market deployment. EERE is organised around the three main energy users in the renewable and energy efficiency resource and demand markets—industry, transportation, and buildings.

The *Industrial Technologies Program* reduces the energy intensity of the US industrial sector

⁵⁶ OMB (2009).

through a coordinated program of research and development and deployment activities. The Program collaborates with industry (e.g., energy-intensive industries such as forest and paper products, steel, aluminium, metal casting, and chemicals) on R&D to improve the energy efficiency and productivity of industrial processes.

The *Vehicle Technologies Program* supports R&D in vehicle systems, hybrid electric systems, hybrid and electric propulsion, advanced combustion engines, advanced materials technologies, and fuels technology. Focus areas for technology deployment include: alternative fuel vehicles, alternative fuel infrastructure development, idling reduction for commercial trucks and buses, expanded use of non-petroleum and renewable fuel blends, hybrid vehicles, driving practices for improved efficiency, and engine/vehicle technologies that maximise fuel economy.

The *Building Technologies Program* develops technologies, techniques and tools for making residential and commercial buildings more energy efficient, productive, and affordable. The portfolio of activities includes efforts to improve the energy efficiency of building components and equipment and their effective integration using whole building system design techniques, the development of building codes and equipment standards, the integration of renewable energy systems into building design and operation, and the accelerated adoption of these technologies and practices.

The *Federal Energy Management Program* works with Federal agencies and private sector partners to help agencies realise energy, environmental and cost savings potentials, including Federal energy intensity goals, as set by Presidential Executive Orders or Congressional legislation.

c) Covered sectors

Residential, commercial, industry, transport, power, and public sectors

d) Established date

Department of Energy Organization Act (1974)

e) Number of staff members

Approximately 430 (in Washington D.C. and Golden, Colorado)

1.4.2 Environmental Protection Agency

a) Status of organisation

Regulator, implementer

b) Roles and responsibilities

The EPA mission is to protect human health and the environment by developing and enforcing regulation, giving grants, studying environmental issues, sponsoring partnerships, and informing people about the environment. Efforts in support of energy efficiency include Clean Energy programs, Energy Star (with DOE), the Responsible Appliance Disposal program, the Electronic Product Environmental Assessment tool, and activities to improve energy efficiency at water utilities.

c) Covered sectors

Residential, commercial, industry, transport, and public sectors

d) Established date

1970

e) Number of staff members

Estimated dozens of people spread across clean energy and other EPA programs

1.4.3 Regional Organisations

State and local governments and utility regulators have introduced energy efficiency policy measures that address all sectors. These measures include minimum performance standards (that is, building codes) and a variety of financial incentives.

1.5 Information Dissemination, Awareness-Raising and Capacity-Building

a) Information collection and dissemination

Energy Information Administration: The Energy Information Administration collects and interprets data on energy production, trade, transformation, and consumption. This includes collection of energy use data for many industrial sectors and for residential and commercial buildings.⁵⁷

Database of State Incentives for Renewables & Efficiency (DSIRE): DSIRE is a comprehensive source of information on state, local, utility, and Federal incentives that promote renewable energy and energy efficiency. The DSIRE website (www.dsireusa.org) provides Federal, state, local governments, and the public with a fast and convenient method for accessing information about renewable energy and energy efficiency incentives and regulatory policies administered by Federal and state agencies, utilities, and local organisations across the economy.

www.EnergySavingTips.gov: In December 2004, DOE launched a new website (www.EnergySavingTips.gov) as a consumer-friendly portal to detailed energy saving information from various Federal agencies.

b) Awareness-raising

Powerful Savings Campaign: In May 2004, DOE and the Alliance to Save Energy teamed up on a Powerful Savings campaign to help consumers reduce their energy bills and the economy reduce its energy use through smart energy practices and energy-efficiency. Powerful Savings focuses on increasing public awareness of the importance of energy efficiency and on smart energy practices both at home and on the road through an extensive media outreach campaign.

“Easy Ways to Save Energy”: This campaign promotes energy savings through an “Energy Savers Guide.” The Guide is being distributed to consumers across the economy. Aggressive radio and print advertisements to promote more efficient energy use are also under way.

Public Energy Education Program: The EPACT 2005 states that DOE is required to convene a conference with representatives from industry, education, professional societies, trade associations, and government agencies to design and establish an ongoing economy-wide public education program focused on energy efficiency and other topics. The Office of Science held this conference in January 2007.

Energy Efficiency Public Information Initiative: DOE is required to conduct an advertising and public outreach program about the need to reduce energy use, the consumer benefits of reduced use, the relationship to jobs and economic growth, and cost-effective consumer measures to reduce energy use. Funding at US D90 million per year is authorised for FY2006 to FY2010. DOE is implementing this provision within the limits of annual Congressional appropriations.

Many more information programs are operated by state and local governments and utilities.

c) Capacity-building

Advanced Technology Transfer Centers: The Energy Policy Act of 2005 directs DOE to provide grants to non-profit institutions, state and local governments, or universities to establish a geographically dispersed network of Advanced Energy Technology Transfer

⁵⁷EIA (2009).

Centers. DOE has so far funded pilot projects at the Florida Solar Energy Center and Washington State University. The centres are to encourage the demonstration and commercial application of advanced energy methods and technology through education and outreach to building and industry professionals. The Recovery Act of 2009 has allocated USD 500 million for energy efficiency and renewable energy workforce investment programs.

Industrial Energy Management: Industrial energy management is encouraged through information and training offered by many Federal, state and utility voluntary programs. The Department of Energy's Industrial Technologies Program and the Environmental Protection Agencies Energy Star Program are two key Federal resources for information and training on industrial energy management.⁵⁸

Small Businesses: The US Environmental Protection Agency's Energy Star program provides education and technical resources to help small businesses improve energy efficiency. In addition, many state and local programs provide technical assistance as well as access to funding for implementing energy efficiency measures.⁵⁹

1.6 Research and Development in Energy Efficiency and Conservation

1.6.1 Research and Development on Building System Components

The goal of this program is to develop a range of technologies to reduce energy use in buildings and eventually make possible the construction of zero-energy buildings. The 2009 budget allocation for the Building Program was USD 140 million, of which about 28% was devoted to R&D. The Recovery Act provides USD 346 million for the Building Technologies Program.

Research on the building envelope focuses on systems that determine or control the flow of heat, air, moisture, and light in and out of a building; and on materials that can affect energy use. Goals include market-viable windows with R5 insulation performance by 2010, advanced systems capable of net-zero energy use by 2025, and eventual reduction in average thermal load of 30% for existing residential buildings and 66% for new buildings.

Research on building equipment focuses on means to significantly improve the efficiency of heating, cooling, ventilating, thermal distribution, lighting, home appliances, and on-site energy use. This area also includes advanced refrigerants and cycles, solid-state lighting, smart sensors and controls, microturbines, and heat recovery. A research goal is to develop solid state lighting equipment, which provides 79 lumens per watt in general applications by 2008 and 200 lumens per watt in laboratory devices by 2025.

Development of analysis and design tools emphasises areas, such as performance simulation software, and design tools for building technology professionals. Home performance programs for builders and home buyers/owners have also been supported.

R&D on solid state lighting aims to demonstrate energy-efficient, high-quality, long-lasting lighting technologies by 2025 that can illuminate buildings with half as much electricity as in 2005. More about DOE's comprehensive SSL program is available at www.netl.doe.gov/ssl/.

1.6.2 Industrial Sector Energy Efficiency Research and Development

The overall goal of the Industrial Technologies Program is to contribute to a 20% reduction in the energy intensity (energy per unit of industrial output, as compared to 2002) of energy-intensive industries by 2020. The appropriation for fiscal year 2009 was USD 90 million, of which approximately 18% was allocated to research and development. The Recovery Act provides the USD 256 million Industrial Technologies Program.

Research on *energy conversion and utilisation* focuses on a diverse range of advanced and integrated systems. These include advanced combustion technologies, gasification

⁵⁸DOE (2009b) and EPA and DOE (n.d. - a).

⁵⁹DOE and EPA (n.d. - b).

technologies, high-efficiency burners and boilers, thermoelectric technologies to produce electricity using industrial waste heat streams, co-firing with low-GHG fuels, advanced waste heat recovery heat exchangers, and heat integrated furnace designs. Integrated approaches include combined-cycle power generation, and cogeneration of power and process heat or cooling.

Research on specific, *energy-intensive and high-CO₂-emitting industrial processes* focuses on identifying and removing process inefficiencies, lowering energy requirements for heat and power, and reducing CO₂ emissions. One process under development is a means to produce high-quality iron without the use of metallurgical coke, which is a significant source of CO₂ emissions in steelmaking. Other research concerns processes that may improve product yield, including oxidation catalysis, advanced processes, and alternative processes that take a completely different route to the same end product, such as use of non-carbon inert anodes in aluminium production.

Research on *resource recovery and utilisation* focuses on separating, capturing, and reprocessing materials for feedstock. Recovery technologies include materials designed for recyclability, advanced separations, new and improved process chemistries, and sensors and controls. Reuse technologies include recycling, closed-loop process and plant designs, catalysts for conversion to suitable feedstock, and post-consumer processing. Research in this area aims to improve recycling and recovery efficiencies. For example, in the chemicals industry the goal is to improve recyclability of materials by as much as 30%. Research also aims at new and improved processes to use wastes or by-products; improve separations to capture and recycle materials, by-products, solvents, and process water; and identify new markets for recovered materials, including ash and other residuals such as scrubber sludges.

1.6.3 Research and Development in Transport Sector Energy Efficiency

The overall goal of the Vehicle Technologies Program is to develop and deploy vehicle technologies that will reduce petroleum consumption by increasing efficiency or switching to alternative fuels. The 2009 budget allocation for the program was USD 273 million, of which approximately 54% was allocated to research and development. The Recovery Act provides USD 110 million for the Vehicle Technologies Program.

Research on *light vehicles*, organised primarily in support of the FreedomCAR and Fuel Partnership, focuses on materials; power electronics; hybrid vehicles operating on gasoline, diesel, or alternative fuels; high-efficiency, low-emission advanced combustion engines, enabled by improved fuels; and high-volume, cost-effective production of lightweight materials. Beginning in Fiscal 2007, the Department of Energy is increasing the funding for advanced batteries, power electronics, and systems analyses specifically needed to accelerate the introduction of “plug-in” hybrid vehicles.

The vehicle technologies research programs have a number of specific goals:

- 1) Electric propulsion systems with a 15-year life capable of delivering at least 55 kW for 18 seconds and 30 kW continuous at a system cost of USD 12/kW peak
- 2) Internal combustion engine powertrain systems costing USD 30/kW, having peak brake engine efficiency of 45%, and that meet or exceed emissions standards
- 3) Electric drivetrain energy storage with a 15-year life at 300 Wh with discharge power of 25 kW for 18 seconds and USD 20/kW
- 4) Material and manufacturing technologies for high-volume production vehicles, which enable/support the simultaneous attainment of 50% reduction in the weight of vehicle structure and subsystems, affordability, and increased used of recyclable/renewable materials
- 5) Internal combustion engine powertrain systems, operating on hydrogen with a cost target of USD45/kW by 2010 and USD30/kW in 2015, having a peak brake engine efficiency of 45%, and that meet or exceed emissions standards.

Research areas for *heavy vehicles*, organised primarily under the 21st Century Truck Partnership, include lightweight materials, aerodynamic drag, tire rolling resistance, electrification of ancillary equipment, advanced high-efficiency combustion propulsion systems (including energy-efficient emissions reduction), fuel options (both petroleum- and non-petroleum based), hybrid technologies for urban driving applications, and onboard power units for auxiliary power needs.

The research objectives are to:

- 1) Reduce energy consumption in long haul operations
- 2) Increase efficiency and reduce emissions during stop-and-go operations
- 3) Develop more efficient and less-polluting energy sources to meet truck stationary power requirements (i.e., anti-idling).

By 2010, the goals include a laboratory demonstration of an emissions-compliant engine system that is commercially viable for Class 7-8 highway trucks, and an engine that improves the system efficiency to 53% by 2010 and to 55% by 2013, from the 2002 baseline of 40%. By 2012, the goals include advanced technology concepts that reduce the aerodynamic drag of a Class 8 tractor-trailer combination by 20%.

Research on aviation fuel efficiency includes engine and airframe design improvements. Aviation fuel efficiency goals include new technologies with the potential to reduce CO₂ emissions from future aircraft by 25% within 10 years and by 50% within 25 years.

1.6.4 Electric Power Sector Energy Efficiency Technology Research and Development

The Office of Electric Delivery & Energy Reliability supports the development of technologies to modernise the electric grid. Some of these technologies will have important benefits for energy efficiency. The total 2009 budget allocation for this office was approximately USD 100 million. The Recovery Act provided USD 4.5 billion to the Office of Electric Delivery & Energy Reliability.

Research on *high-temperature superconductivity* (HTS) is focused on improving the current carrying capability of long-distance cables; its manufacturability; and cost-effective ways to use the cable in equipment such as motors, transformers, and compensators. Research goals include HTS wires with 100 times the capacity of conventional copper/aluminium wires. The program aims to develop and demonstrate a diverse portfolio of electric equipment based on HTS, with half the energy losses and half the size of conventional equipment with the same rating.

Research on *transmission and distribution technologies* is focused on real-time information and control technologies; and systems that increase transmission capability, allow economic and efficient electricity markets, and improve grid reliability. Examples include high-strength composite overhead conductors, grid-status measurement systems that improve reliability by giving early warning of unstable conditions over major geographic regions, and technologies and regulations that enable the customer to participate more in electric markets through a demand response. Research program goals in this area include, by 2010, demonstrated reliability of energy-storage systems; reduced cost of advanced conductors systems by 30%; and operation of a prototype smart, switchable grid in a region within the United States transmission grid.

Research on *energy storage* is focused in two general areas. One goal is storage technologies that reduce power-quality disturbances and peak electricity demand, and improve system flexibility to reduce adverse effects to industrial and other users. A second goal is to improve electrical energy storage for stationary (utility, customer-side, and renewable) applications. Research focuses on storage technologies with high reliability and affordable cost.

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS

2.1. Government Laws, Decrees, Acts

a) Name

There have been many laws, decrees and acts including provisions intended to achieve energy efficiency improvements enacted at Federal, state and local levels. Some of the most important examples at the Federal level include US Code Title 42, Chapter 77; Code of Federal Regulations (CFR) Title 10, Chapter II; Energy Policy Act of 2005 (EPA 2005); Executive Order 13423; and the Energy Independence and Security Act of 2007 (EISA). The American Recovery and Reinvestment Act of 2009 has also directed substantial energy efficiency investments.

b) Purpose

Promote energy efficiency in all sectors of the economy

c) Applicable sectors

Residential, commercial, industry, agriculture, power, and public sectors

2.2. Regulatory Measures

2.2.1. Minimum Energy Performance Standards (MEPS) and Labelling

a) Name

- Appliances and Commercial Equipment Standards (many standards were added or revised by the Energy Policy Act of 2005 and the Energy Independence and Security Act of 2007)
- Energy Star Labels.

b) Purpose

Improve the energy efficiency of appliances and equipment

c) Applicable sectors

Residential, commercial, industry, and public sectors

d) Outline

The DOE *Appliance Standards* program develops, promulgates, and enforces test procedures and energy conservation standards for residential appliances and certain commercial equipment. DOE has energy efficiency standards in place for most major types of energy-using appliances, including air conditioners, clothes washers and dryers, space and water heaters, kitchen ranges and ovens, refrigerators and freezers, and lighting. Section 135 of EPA 2005 establishes new or revised energy conservation standards for a number of products as follows:

- *Residential*: ceiling fans, compact fluorescent lighting fixtures (medium base), dehumidifiers, torchiere lighting fixtures
- *Commercial*: commercial refrigerators and freezers, commercial package air conditioning and heating equipment, fan-type unit heaters, coin-operated clothes washers, low-voltage dry-type distribution transformers, illuminated exit signs, traffic signal indicator light modules, pedestrian signals, automatic ice makers, commercial ice cream freezers, mercury vapour light ballasts, tubular fluorescent lamp ballasts (34, 60, 95 watts), pre-rinse spray valves, air flow through duct work, refrigerated beverage vending machines, determination of standards for battery chargers and external power supplies.

The Energy Independence and Security Act of 2007 (EISA) set standards for certain consumer and industrial products and requires new or revised standards for others. EISA sets

incandescent lighting standards that will cut energy consumption 30% by 2014 and substantially more by 2020. These standards will encourage but not require the use of compact fluorescent bulbs and advanced solid state lighting technologies. Other related provisions of EISA include:

- Statutory efficiency standards for external power supplies (0.5 watts for units up to 250 watts), residential boilers, dehumidifiers, electric motors, and walk-in coolers
- Requirement for electric motors to meet efficiency levels specified by the National Electrical Manufacturers Association (these were previously voluntary)
- Water use standards for clothes washers and dishwashers
- Authority to set regional standards for home heating and cooling equipment
- Mandates to develop standards for furnace fans, refrigerators, and standby power
- Requirements for periodic updating of all standards and test procedures labelling of electronic products.

EISA also outlines a rigorous lighting efficiency program, which mandates increases in the energy efficiency of light bulbs by 30%. This will effectively phase out most common types of incandescent light bulbs by 2014. EISA mandates revised lighting efficiency standards effective in 2020 which could be met by compact fluorescents, LED or other energy efficient bulbs. EISA sets efficiency standards for metal halide lamps and requires amended standards in 2012 and 2019. DOE is progressing on rule-making to update and expand the scope of energy efficiency standards for fluorescent lamps and ballasts, and incandescent reflector lamps.

The Energy Security and Independence Act of 2007 requires that test procedures for covered consumer products be amended to include standby mode and off mode energy consumption, taking into consideration the most current versions of Standards 62301 and 62087 of the International Electrotechnical Commission. EISA mandates that any final rule establishing or revising a standard for a covered consumer product, adopted after 1 July 2010, incorporate standby mode and off mode energy use. DOE is revising test procedures for battery chargers and external power supplies and developing an efficiency standard to address standby energy use. With accurate measurement of standby power needs included in testing to meet appliance standards, as well as with standards for external power supplies, typical appliances will use less standby power. The Federal government is required to buy devices that use less than 1 watt of standby power. Some states have implemented standby limits on certain consumer electronics products.

The *Energy Star®* labelling program is designed to clearly signal high efficiency in buildings and products to consumers and businesses. Over 50 types of products can now earn the label. The US Environmental Protection Agency (EPA) manages the labelling of buildings, new homes, office equipment, home electronics, and residential heating, ventilation and air conditioning (HVAC). The US DOE manages the labelling for a variety of residential products, including appliances, compact fluorescent lamps (CFL), solid state lighting, windows, and residential water heaters.

2.2.2. Building Energy Codes

a) Name

Energy Efficiency Standards for Buildings

b) Purpose

Reduce energy used in the heating, cooling and ventilation of buildings

c) Applicable sectors

Residential and commercial

d) Outline

The United States has developed energy efficiency standards for new buildings since 1975, with the first codification of those standards taking place in 1977. Adoption and enforcement of these codes and standards is the responsibility of the states, with the US DOE playing a major support role in the development of new economy-wide model codes. According to the Database of State Incentives for Renewables & Efficiency, all 50 states and the District of Columbia have building energy codes. In 2007, DOE undertook to support a 30% improvement in ASHRAE/IESNA Standard 90.1 for the year 2010 (relative to Standard 90.1-2004). Standard 90.1 is the primary reference for economy-wide model commercial codes. In 2008, DOE provided support to a 30% improvement in the economy-wide model residential code.

e) Financial resources and budget allocation

At the Federal level, about USD 4 million was allocated in 2008. Additional budget is allocated at the state level.

f) Expected results

Many new residential and commercial buildings will use 30% less energy in 2010 than in 2007 due to widespread state compliance with model buildings codes developed.

2.2.3. Fuel Efficiency Standards**a) Name**

Corporate Average Fuel Economy (CAFE) Standards for Light Vehicles

b) Purpose

Improve the fuel economy of light vehicles

c) Applicable sectors

Transport

d) Outline

The Energy Independence and Security Act of 2007 (EISA) mandates a corporate average fuel economy standard of 35 miles per gallon for new light vehicles (cars and light trucks (vans, SUVs, and pickups)) throughout the United States by 2020. On 19 May 2009, President Obama greatly accelerated the vehicle efficiency improvement by introducing a policy aimed at both increasing fuel economy and reducing greenhouse gas pollution. The new standards, covering model years 2012-16, require an average fuel economy standard of 35.5 miles per gallon in 2016. They are projected to save 1.8 billion barrels of oil over the life of the program, with a fuel economy gain averaging more than 5% per year and a reduction of approximately 900 million tonnes in greenhouse gas emissions.

Early in 2009, the Department of Transportation issued updated fuel economy standards for new vehicles produced in Model Year 2011. Updated standards for future model years are expected to be finalised during 2010.

The United States has also greatly expanded support for development and manufacture of more fuel-efficient vehicles. Loan guarantee authority funded in 2008 and the economic stimulus program enacted in 2009 have expanded support for the retooling of auto manufacturing plants to increase fuel efficiency, the manufacture of advanced batteries, and purchase of plug-in hybrid vehicles. This support is in the form of expanded R&D, loan guarantees, direct financial assistance, and tax incentives.

e) Financial resources and budget allocation

Information not available

f) Expected results

Fuel economy for new cars and light trucks will gradually increase to 35 miles per gallon by 2020. Then, as the vehicle stock turns over, the overall vehicle stock will approach this level of efficiency by 2040.

2.3. Voluntary Measures**2.3.1. Climate VISION-Voluntary Innovative Sector Initiatives****a) Purpose**

Reduce energy intensity and greenhouse gas intensity of industrial output

b) Applicable sectors

Industry

c) Outline

Climate VISION works with its partners to standardise measuring and monitoring, find cost-effective solutions to reduce energy use and GHG emissions, accelerate R&D, and explore cross-sector efficiency gains to reduce emissions. Partners represent a broad range of industrial sectors: oil and gas production, transportation, and refining; electricity generation; coal and mineral production and mining; manufacturing; railroads; and forestry products.

2.3.2. Commercial Lighting Initiative**a) Purpose**

Reduce energy use for commercial lighting

b) Applicable sectors

Commercial

c) Outline

This initiative works to reduce energy use for lighting in stores, offices, hospitals, and other commercial buildings to 30% below the prevailing US commercial buildings energy standard, the ASHRAE/IESNA Standard 90.1-2004, using voluntary market pull strategies.

2.4. Financial Measures Taken by the Government**2.4.1. Tax Schemes**

Federal Tax Credits for Energy Efficiency: Home Improvements

a) Level

Federal

b) Purpose

Promote energy efficiency in existing residential buildings

c) Applicable sectors

Residential

d) Outline

Individuals can get an income tax credit for 30% of the cost of energy efficiency measures.

e) Financial resources and budget allocation

Given there are about 100 000 000 households in the United States, this credit represents a potential investment in the order of USD 150 billion dollars for as much as USD 450 billion in efficiency improvements. Clearly the actual uptake will be some fraction of this potential.

f) Expected results

Improved residential uptake of energy efficiency measures

g) Description

Home improvement tax credits are now available for home improvements “placed in service” from 1 January 2009 through 31 December 2010. Any qualified home improvements made in 2008 are not eligible for the tax credit. The maximum lifetime amount that a taxpayer may claim is USD 1500.

*Tax Credit for Manufacturers of Energy-Efficient Appliances***a) Level**

Federal

b) Purpose

Promote the production of energy-efficient appliances

c) Applicable sectors

Commercial

d) Outline

Tax credits for manufacturers of high-efficiency residential clothes washers, refrigerators, and dishwashers

e) Financial resources and budget allocation

Information not available

f) Expected results

Increased domestic manufacturing of energy efficiency appliances

g) Description

The credits are in the form of a tax credit for increases in unit production of efficient appliances over a two-year baseline. The amount of the credit is tied to specified efficiency ratings, and varies according to appliance and the level of achieved efficiency. The appliances must be produced in the United States.

*Federal Tax Credits for Energy Efficiency: Vehicle Fuel Efficiency***a) Level**

Federal

b) Purpose

Encourage market penetration of fuel-efficient hybrid electric vehicles

c) Applicable sectors

Residential and commercial transport

d) Outline

Credits are available for hybrid vehicles placed in service after 31 December 2006 and purchased on or before 31 December 2010. A similar credit is also available for plug-in hybrid, all-electric, and diesel vehicles.

e) Financial resources and budget allocation

The net US investment depends on consumer uptake of the certified vehicles.

f) Expected results

Increased consumer uptake of the certified vehicles, reducing fuel consumption and associated emissions

g) Description

Private or commercial purchasers of certified vehicles receive a USD 250-USD 3400 tax credit for certified vehicles. For the case of hybrid-electric vehicles, the tax credit for a given manufacturer is phased out after the first 60 000 certified vehicles are sold. For plug-in hybrid-electric vehicles, the tax credits are: PHEV10 (vehicles with a range of 10 miles): USD 2500, PHEV20 (20 miles): USD 4000, PHEV30: USD 5000, PHEV40: USD 5000. In this case the tax credit for a given manufacturer is to be phased out after 200 000 vehicles are sold.

*Federal Tax Credits for Energy Efficiency: Fuel Cells***a) Level**

Federal

b) Purpose

Promote the use of energy-efficient fuel cells for stationary applications

c) Applicable sectors

Residential

d) Outline

Credits are available for residential fuel cells and micro turbine systems.

e) Financial resources and budget allocation

Information not available

f) Expected results

Increased installation of fuel cell/microturbine systems

g) Description

There is a residential consumer tax credit of up to 30% of the cost (up to USD 1500 per 0.5 kW of capacity maximum) for installing a qualified fuel cell and microturbine system. The system must have an efficiency of at least 30% and a capacity of at least 0.5 kW. The credits are available for systems placed in service from 1 January 2006 through 31 December 2016. This credit is not limited to the USD 1500 home improvement cap.

2.4.2. Low-Interest Loans*Qualified Energy Conservation Bonds***a) Level**

Federal

b) Purpose

Accelerate the deployment of energy efficiency improvements

c) Applicable sectors

State, local, and tribal governments

d) Outline

For qualified projects, which include certain energy efficiency improvements, the borrower pays back the principal of the bond, and the bondholder receives Federal tax credits instead of bond interest.

e) Financial resources and budget allocation

The tax credit bond limit in the original October 2008 legislation was USD 800 million but was increased in the ARRA 09 to USD 3.2 billion.

f) Expected results

Larger-scale adoption of energy efficiency measures

*DOE Loan Guarantee Program***a) Level**

Federal

b) Purpose

Accelerate the deployment of energy efficiency improvements, including efficient windows, lighting, and roofs

c) Applicable sectors

Commercial, industry, state and local government, agriculture, others

d) Outline

The loans, available to non-Federal entities, must be repaid by the lesser of 30 years or 90% of the projected useful life of the physical asset.

e) Financial resources and budget allocation

As extended under ARRA, up to USD 6 billion may be allocated through September 2011.

f) Expected results

Larger-scale adoption of energy efficiency measures

*Energy Efficient Mortgages***a) Level**

Federal

b) Purpose

Help homebuyers or homeowners save money on energy bills by enabling them to finance the cost of adding energy-efficiency features to new or existing housing as part of their home purchase or refinancing mortgage.

c) Applicable sectors

Residential

d) Outline

Cost-effective energy saving measures may be financed as part of the mortgage. A buyer's debt-to-income ratio on the loan for an energy efficient home could be stretched, so that a larger percentage of the borrower's monthly income can be applied to the monthly mortgage payment. All homes built to the Council of American Building Officials Model Energy Code (MEC) can qualify for an Energy Efficient Mortgage.

e) Financial resources and budget allocation

Maximum loan amounts vary by originator, but may be expressed in terms of a maximum dollar amount or as a percentage of the home's appraised value.

f) Expected results

Larger-scale adoption of energy efficient technologies

*State and Utility Based Loan Programs***a) Level**

State and local government, utilities

b) Purpose

Promote adoption of energy efficient technologies

c) Applicable sectors

Residential, commercial, non-profit, state/local government

d) Outline

More than 200 state and utility programs are identified at the DSIRE website www.dsireusa.org/summarytables/FinEE.cfm?&CurrentPageID=7&EE=1&RE=1.

e) Financial resources and budget allocation

Varies

f) Expected results

Wider adoption of qualifying energy efficiency measures

2.4.3. Subsidies and Budgetary Measures*Weatherization Assistance Program***a) Level**

Federal

b) Purpose

Improve the energy efficiency of homes inhabited by low-income families

c) Applicable sectors

Residential

d) Outline

The program provides cost-effective energy efficiency improvements to low-income households through the weatherisation of homes. It thereby helps low-income families to permanently reduce their energy bills. DOE's weatherisation program performs energy audits to identify the most cost-effective measures for each home, which typically includes adding insulation, reducing air infiltration, servicing heating and cooling systems, and providing health and safety diagnostic services. Priority is given to the elderly, persons with disabilities, families with children, and households that spend a disproportionate amount of their income on energy bills (utility bills make up 15% to 20 % of household expenses for low income families, compared to 5% or less for all other Americans).

e) Financial resources and budget allocation

A major expansion of the program is funded by the economic stimulus bill passed in February 2009. The bill includes USD 6.2 billion for weatherisation efforts.

f) Expected results

Some 6.2 million homes have been weatherised since the program began in 1974. Over 1.2 million more homes should be weatherised during 2009 and 2010 in view of the maximum expenditure per home of USD 5000.

Numerous economy-wide, state and local energy efficiency subsidies

a) Level

Federal, state and local governments, local utilities

b) Purpose

Improve the energy efficiency of residences and commercial buildings

c) Applicable sectors

Residential, commercial, industry, and agriculture

d) Outline

Numerous subsidies are available to assist private citizens and business owners in obtaining energy efficiency audits and perform efficiency improvements. See the summary information at www.dsireusa.org.

e) Financial resources and budget allocation

Varies

f) Expected results

Improved energy efficiency in applicable sectors

Energy Savings Performance Contracts

a) Level

Federal

b) Purpose

Facilitate financing of energy efficiency improvements by Federal government agencies

c) Applicable sectors

Public sector

d) Outline

Energy Savings Performance Contracts (ESPCs) are a contracting vehicle that allows agencies to accomplish energy efficiency projects for their facilities without up-front capital costs and without Congressional appropriations. An ESPC project is a partnership between the customer and an energy services company (ESCO). The ESCO conducts a comprehensive energy audit and identifies improvements that will save energy at the facility. In consultation with the agency customer, the ESCO designs and constructs a project that meets the agency's needs and arranges financing to pay for it. The ESCO guarantees that the improvements will generate savings sufficient to pay for the project over the term of the contract. After the contract ends, all additional cost savings accrue to the agency. Contract terms up to 25 years are allowed. Federal agencies structure ESPCs so that financial savings cover costs of their investments.

e) Financial resources and budget allocation

Since the program inception in 1998, there has been about USD 2.3 billion in private sector investment in Federal sector energy efficiency improvements, resulting in about USD 1.4

billion in net cost savings to the government.

f) Expected results

The current ESPC contract permits contractor payment of up to USD 5 billion. Contracts with 16 private companies were awarded.

Utility Energy Service Contracts

a) Level

Federal

b) Purpose

Facilitate financing of energy efficiency improvements by Federal government agencies

c) Applicable sectors

Public sector

d) Outline

Utility arranges financing to cover the capital costs of an efficiency project; the costs are paid back by efficiency savings achieved by the installed measures.

e) Financial resources and budget allocation

More than 45 electric and gas utilities have provided project financing for energy and water efficiency upgrades at Federal facilities, investing more than USD 600 million through utility energy services contracts since 1995.

f) Expected results

The Edison Electric Institute has committed to encouraging USD 2 billion in private investment by 2010.

2.5. Energy Pricing

The pricing mechanism is generally market based. However, particularly in the electric power sector, there is a significant regulated element in the price for many customers. Most of the wholesale electricity business is based on competitive supply to various utilities. But only about half the states offer retail choice of suppliers to small customers. The transmission and distribution component of price is generally regulated by states on a cost-of-service model. There are also a variety of taxes and fees which are levied, for example highway tolls and gasoline taxes on automobiles, which affect market prices and vary considerably from state to state within the United States.

Demand for energy fluctuates with price but is rather inelastic, particularly in transport and residential buildings. As a result, policies to improve automotive fuel efficiency have focused on regulating the fuel economy of new vehicles, and policies to reduce energy use in buildings have focused on efficiency standards and labels.

2.6. Other efforts for energy efficiency improvements

2.6.1. Cooperation with non-government organisations

Many NGOs are prominent in promoting energy efficiency in the United States. Examples include Alliance to Save Energy; American Council for an Energy Efficient Economy; American Society for Heating, Refrigeration and Air Conditioning Engineering; Northwest Energy Efficiency Alliance; Precourt Institute for Energy Efficiency; Resources for the Future; Rocky Mountain Institute; and various trade associations.

2.6.2. Cooperation through bilateral, regional and multilateral schemes

The United States cooperates extensively with other economies to develop energy efficiency standards, and on developing and deploying energy efficient technologies and processes. US agencies including DOE, EPA, and AID maintain relevant cooperative efforts with numerous economies and organisations involving work on all continents. For example, the United States participates in IEA Implementing Agreements on Buildings and Community Systems, Demand Side Management, District Heating and Cooling, Energy Storage, Heat Pumps, Combustion, Superconductivity, Fuel Cells, Hybrid and Electric Vehicles, and Advanced Motor Fuels. The United States participates in APEC, United Nations programs, and the Asia Pacific Partnership on Clean Development and Climate (APP). The United States is also actively engaged in efforts to launch the International Partnership for Energy Efficiency Cooperation (IPEEC) which will help economies to share best practices in implementing energy efficiency technologies and monitoring progress toward their energy efficiency goals.

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VIET NAM

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. Overall Energy Efficiency Improvement Goals

In 2005, the Vietnamese Government (Ministry of Industry and Trade—MOIT) released the National Strategic Program on Energy Savings and Effective Use (Vietnam National Energy Efficiency Program, VNEEP) for the period 2006–2015, which was approved and enforced on 14 April 2006 by the Prime Minister (Decision No.79/2006/QĐ-TTĐ). The VNEEP calls for coordinated efforts for improving energy efficiency, reducing energy losses, and implementing extensive measures for conservation of energy.

The VNEEP is the first-ever long-term comprehensive plan to institute measures for improving energy efficiency and conservation in all sectors of the economy in Viet Nam. Phase 1 (2006–2010) aims to actively start up all components of the program, and Phase 2 (2011–2015) aims to expand each component, based on the lessons learned from Phase 1.

The overall objectives of the program are as follows:

- The program is a set of activities to encourage, promote, and disseminate energy efficiency and conservation (EE&C) in the public sphere; in science and technology research activities and in management measures needed to carry out synchronous activities on energy efficiency and conservation throughout society
- The program's energy savings goal is 3%-5% of total energy consumption (compared to the BAU case) in the period 2006–10; 5%–8% of the total energy consumption in the period 2011–15.

1.2. Sectoral Energy Efficiency Improvement Goals

Viet Nam currently has no sectoral quantitative targets.

1.3. Action Plans for Promoting Energy Efficiency

Vietnam National Energy Efficiency Program (VNEEP) is the comprehensive program of work to promote energy efficiency in Viet Nam. According to the VNEEP framework, there are six components focusing on the entire field of energy efficiency with specific actions, including 11 large projects for promoting energy efficiency.

a) Objectives

The VNEEP aims to reach a certain target of energy saving, which will result in lower investment requirements for the energy supply system and social economic benefits. At the same time, it will contribute to environmental protection and rational extraction of energy resources, moving towards social and economic sustainable development.

b) Applicable sectors

Phase one of the VNEEP was implemented in the period 2006–10. It contains a comprehensive set of measures that cover six sectors: government (institutions, education, and information), industry, equipment and appliances (for the residential and commercial sectors), buildings and transport. However, this phase focuses on the development and completion of the legal documents, education, information, and capacity building, such as the Energy Efficiency Law, Decree on Punishment and Reward for Energy Efficiency, organising training courses, workshops, dissemination to the community, etc. Phase 2 of the VNEEP will start from 2011 with a deeper and larger focus in each sector.

c) Outline

The VNEEP consists of six component packages with 11 projects (actions). The actions and

achievements to date are listed below⁶⁰:

Component 1: State Management on Energy Efficiency and Conservation

Project 1: Complete the legislative framework on EE&C in industrial production, construction site management, domestic activities, and energy consumed equipment

Achievements (2007-2008)

- Completed the draft Law on Energy Conservation and Efficient Use
- Issued Joint Circular No. 142/2007/TTLT/BTC-BCT of 30 November 2007, guiding the management and use of non-business funds for the implementation of the target program on economical and efficient use of energy
- Directed and guided all localities to carry out the energy efficiency activities
- Set-up the EE&C Centres in Hanoi and Tien Giang to coordinate program activities in the whole economy
- Organised workshops, seminars, and training on energy efficiency laws, policies, institutional issues, and technology and solutions
- Developed VNEEP websites: www.tietkiemnangluong.com.vn
- Published the leaflets, handbooks, and technical guidelines on energy efficiency.

Component 2: Education and Information Dissemination

Project 2: Public awareness enhancement on EE&C

Project 3: Integrate EE&C in to the education system

Project 4: Develop pilot models for 'EE&C in the household' movement

Achievements (2007-2008)

- Broadcast EE&C news and released on television and radio
- Developed documentary films on energy efficient technologies
- Printed EE&C information on various newspapers and electronic media
- Organised contest on energy efficient buildings
- Provided guidelines to disseminate EE&C information at all levels of the education system.

Component 3: High Energy Efficiency Equipment

Project 5: Develop standards and provide energy efficiency labels for selected products

Project 6: Technical assistance to domestic producers on energy efficiency compliance

Achievements (2007-2008)

- Completed demonstration model for solar water heater and industrial biogas
- Carried out labelling program for three appliances, i.e., FTL T8-36W, T5-32W, and electronic ballasts
- Collaborated with Vietnam Standard Centre to develop and issue three sets of standards on energy efficiency and testing methods for refrigerators, air conditioners, and electric fans
- Conducted pilot EE&C information for households by Vietnam Woman Union in six provinces and cities
- Implemented two programs to support lighting manufacturers in the technology transition from incandescent lamps to compact fluorescent lamps.

⁶⁰ Decision 79 /2006/QĐ-TTg (2006); APEC EWG (2009).

Component 4: EE&C in Industrial Enterprises

Project 7: Develop EE&C management models in enterprises

Project 8: Support industrial enterprises in improving, upgrading, and optimising technology aiming at energy savings and efficiency

Achievements (2007-2008)

- Completed a survey in 2008 on the energy consumption of more than 500 large enterprises to identify the potential of energy savings and set the energy consumption rates in the industrial sectors that consume a lot of energy

Component 5: EE&C in Buildings

Project 9: Improving capacity in EE&C and conducting EE&C in building design and management

Project 10: Develop pilot models and disseminate EE&C management activities in building operation

Achievements (2007-2008)

- Implemented various dissemination activities led by the Ministry of Construction (MOC)

Component 6: EE&C in Transportation

Project 11: Make optimal use of transportation facilities and equipment, minimise the amount of fuel consumed, and reduce discharge of exhausted gases to environment

The major actions that have been taken by 2008 are as follows:

Achievements (2007-2008)

- Conducted research activities on the enhancement of public passenger transportation in cities, and creation of fuel consumption measurement equipment to serve the management and exploitation of diesel-powered ships for fuel-saving purposes

The VNEEP has provided a platform for implementing a variety of EE&C in all sectors. However, the first two years of VNEEP implementation have been focused mostly on education, capacity building, and study, and there is much more work to be done. With the introduction of several enabling efforts and capacity building, VNEEP now is a good position to review its objectives and targets, and develop an overall strategy and detailed implementation plan to achieve them. This will aid the government in determining appropriate levels of funding for various initiatives, allow for increased competition and accountability among implementing partners, and the appropriate roles of private sector participation and leverage.

d) Financial resources and budget allocation

In 2007, VND 30 billion (about USD 2 million) of the state budget was allocated for 28 projects registered under VNEEP. About a third of these funds were allocated to support two energy efficiency lighting manufacturers. In 2008, VND 36 billion (about USD 2.25 million) were allocated for 48 projects, many of which were initiated in 2007. Of this, about one third was used to set up an energy efficiency laboratory for air conditioners and refrigerators.

e) Method for monitoring and measuring effects of action plans

Surveys, statistic compilation, end-use information, reporting, and trend analysis are all being undertaken and databases are being developed to assist in program evaluation and policy formation. However, these activities are very limited because there has been no official agency until now that is responsible for energy data collection and analysis. Most of the past and ongoing energy data monitoring and evaluation were undertaken as part of individual projects or energy audits of customers. In addition, the capability of human resources and government budget shortages are also another impediment in this area.

Energy Efficiency and Conservation Office (EECO) at MOIT is the only agency that has a duty regarding energy efficiency monitoring and reporting so far.

f) Expected results

Reducing total final consumption by more than 5%-8% compared to the BAU case

g) Future tasks

Tasks include completing the Law of Energy Conservation and Efficient Use and related legal documents, establishing the official energy database to be included energy efficiency data, developing human resources, and so on.

1.4. Institutional Structure

a) Name of organisation

MOIT plays the role of focal coordinator on EE&C and is authorised to administer the implementation of the VNEEP. As part of this enforcement, the Energy Efficiency and Conservation Office within the Ministry of Industry and Trade was established on 7 April 2006 (Ministerial Decision No.919/QD-BCN). The main work of the Energy Efficiency and Conservation Office is to develop organisations and systems related to improving energy efficiency and conservation on government levels from the central government to local governments.

The National Steering Committee chaired by MOIT was established for inter-ministerial coordination in monitoring implementation of the VNEEP. Members of the Steering Committee include representatives from the Ministry of Construction, Ministry of Transport, Ministry of Education and Training, Ministry of Culture and Information (renamed the Ministry of Culture, Sports and Tourism in August 2007), Ministry of Science and Technology, Ministry of Planning and Investment, Ministry of Justice, Ministry of Finance, and the Union of Vietnam Associations of Science and Technology.

The National Steering Committee and Energy Efficiency and Conservation Office (EECO) were established in 2006 to manage the EE activities and VNEEP in Viet Nam. Since then, EECO has completed preparatory tasks including the formulation of the action plans and detailed programs needed to launch and implement the VNEEP successfully in cooperation with other governmental organisations. The EECO currently has a 15-member staff.

At the level of implementing agencies, the following main agencies have been carrying out energy efficiency programs or related energy efficiency programs:

- Institute of Energy (IE)
- Energy Efficiency Centres in some big cities such as Hanoi, Tiengiang, HCM City, Phu tho, Dongthap, Haiphong, Danang
- Vietnam Standards and Quality Centre (VSQC)—STAMEQ (MOCT)
- Electricity of Vietnam (EVN)
- Other agencies under different ministries.

b) Status of organisation

All agencies report implementation of EE programs to the EECO and MOIT.

c) Roles and responsibilities

Vary across agencies

d) Covered sectors

All sectors of the economy are covered

e) Established date

Since 2002 (only for EE&C centres)

f) Number of staff

25 staff members (only for EE&C centres)

1.5. Information Dissemination, Awareness-raising and Capacity-building**a) Information collection and dissemination**

General information on VNEEP is readily available to Vietnamese energy consumers. For example, the EE&C website developed under the VNEEP framework is a public source of information on energy efficiency. There are also a number of other websites containing information energy efficiency improvement from EEC HCM Centre, EE Hanoi Centre, etc.

b) Awareness-raising

The purpose of the dissemination program in Component 2 is to increase the public awareness of the definition of EE&C and support the penetration of energy efficient appliances into the domestic retail market. In recent years, the EE&C promotion and dissemination program has been appearing frequently in the media.

Four projects were carried out in 2007 and six projects were implemented in 2008-2009. The projects are mainly focused on communication via public media, radio, television, newspapers, and other public relations activities.

Almost all projects in Component 2 have completed the proposed tasks, including Viet Nam television and radio, the contest for energy efficient buildings, and provision of EE&C information to the school education system at all levels.

c) Capacity-building

A range of training courses, workshops, publishing of technical documents for energy efficiency knowledge and assessment addressing all six components are developed and being implemented under the VNEEP. These include: training courses on energy auditing, publishing a guidebook on energy efficiency, capacity building for EE&C centres, and so on. Generally, most of these activities are scheduled to be completed in the first phase of the program. Training courses in construction and design of energy efficient buildings, enhancing capacity for facility management on energy efficiency of local industry department leaders and energy managers are also being developed under the VNEEP.

EECO outlines annual plans on implementation of energy efficiency program by 2010, in which there are several activities for the development of human resource to ensure that Viet Nam will have the skills and knowledge required to reach energy efficiency goals under VNEEP.

1.6. Research and Development in Energy Efficiency and Conservation

Viet Nam has no specific policy on research and development (R&D) in energy efficiency and conservation. However, there are a number of measures that encourage research and development in energy efficiency incorporated in the energy policy and other related legal framework documents. In this regard, the decision on “The National Energy Development Strategy of Vietnam for the period up to 2020 with outlook to 2050” pointed out in Item d of Article 4: “The policy on encouraging energy conservation and energy efficiency needs to define concrete requirements on energy saving in intensive energy use sectors; encouraging application of energy efficient equipment and technologies”⁶¹. The important role R&D in energy efficiency improvement is also spelled out in the Decree on Energy Conservation and Energy Efficiency (102/2003/ND-CP). The decree stipulates that R&D should be a main tool for improvement of energy efficiency in various sectors in Viet Nam. The decree also

⁶¹ Decision 1855/QĐ-TTg (2007).

mandates various organisations in the government at central and local levels to put reasonable efforts into R&D for energy efficiency improvement. The contents of energy efficiency R&D in the decree are: development of suitable energy efficiency and conservation technologies in the industrial sector; promotion of those technologies developed from R&D efforts and improvement of energy efficiency in production activities of Vietnamese people especially in the rural and remote areas. The decree also calls the government to allocate a suitable budget for R&D work in energy efficiency improvements from the Science-Technology Research and Development Fund. Until now, Viet Nam's R&D is under the purview of the Ministry of Science and Technology (MOST). MOST is also responsible for setting up long- and medium-term R&D programs and budget allocations. In this regard, there are no any specific action plans or programs developed in accordance to the measures stipulated in the above documents on the R&D for energy efficiency improvements so far.

2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS

2.1. Government Laws, Decrees, Acts

In 2003 a first Decree on Energy Efficiency and Conservation (Decree No.102/2003/ND-CP) was issued (see below). In addition, in July 2004 the Ministry of Industry issued a circular providing guidance for the implementation of energy conservation in the industry sector (Circular No. 01/2004/TT/BCN on Energy Efficiency and Conservation).

In 2005 the MOIT released the National Strategic Program on Energy Savings and Effective Use (Vietnam Energy Efficiency Program—VNEEP) for the period 2006-2015, which was approved and enforced on 14 April 2006 by the Prime Minister's Decision (Decision No.79/2006/QD-TTG). The VNEEP calls for coordinated efforts for improving energy efficiency, reducing energy losses, and implementing extensive measures for conservation of energy. In addition, in November 2006 MOIT issued a Guideline for Energy Efficiency Standard and Labeling in order to assist on the implementation of energy efficiency standards and labelling in appliances (Circular No.08/2006/TT/BCN).

Other related regulations are the Electricity Law approved and enforced in July 2005, comprising sections that specify electricity efficiency in the generation, transmission, distribution and use processes. This was followed by the "Electricity Saving Program for the period 2006–2010" approved by the Prime Minister in April 2006. Furthermore, the Building Code which aims to reduce energy losses and improve living conditions in buildings was issued in November 2005 (Energy Efficient Commercial Building Code No.40/2005/QD-BXD).

a) Name

Decree on Energy Conservation and Energy Efficiency (102/2003/ND-CP)

b) Purpose

The decree aims to promote the energy conservation and energy efficiency for meeting the increasing energy demand as well as environmental protection, reasonable energy resource exploitation, and sustainable socio-economic development.

c) Applicable sectors

The decree applies to all large energy users across all sectors. This mainly covers the industry, commercial sectors (buildings), and energy consuming equipments.

d) Outline

The decree regulates all designated energy consumers that use at least 1000 tonnes of oil equivalent of energy a year (or 3 million kWh/year for electricity consumption). It also confirmed that the government carries out the state management on energy efficiency and conservation and the Ministry of Industry, as its duty to government, is responsible for

implementing the state management on energy efficiency and conservation. Apart from that, other related ministries such as Ministry of Science and Technology, Ministry of Construction, Ministry of Transport and the General Statistics Office, etc. are responsible for coordinating with the Ministry of Industry (now called MOIT) in implementing the state management duty on energy efficiency and conservation in provinces and sectors.

e) Financial resources and budget allocation

The decree also indicated that the Ministry of Finance is responsible for instructing implementation of the financial encouragement and incentive measures, policies for energy efficiency and conservation activities. However, financial resources and budget allocation were not identified clearly in the decree.

f) Expected results

No information available

2.2. Regulatory Measures

2.2.1. Minimum Energy Performance Standards and Labelling

Mandatory measures are expecting to be gradually applied after The Law of Energy Conservation and Effective Use is approved and enforced by the National Assembly (expected during 2010). Viet Nam is now preparing the road map for implementation of energy efficiency standard and labelling programs for equipment and appliances in line with Phase 2 of VNEEP (2010–2015).

2.2.2. Building Energy Codes

a) Name

Vietnam Energy Efficiency Building Codes (No. 40/2005/QD-BXD)

b) Purpose

This code introduces minimal requirements that need compliance in design and construction to improve the energy efficiency of existing extensions and new buildings and to minimise loss of energy used in all types of buildings, and improve thermal comfort and visual conditions.

c) Applicable sectors

Residential, commercial, and public buildings

d) Outline

Energy efficiency provisions for buildings were first introduced in 2000 based on research results of the fourth component of the Demand Side Management—DSM—project with the cooperation of Vietnamese Ministries of Industry and Construction and an international consulting company, The Deringer Group (US). Regulations in this code are applied to the building envelope, systems of outdoor and indoor lighting, air conditioning and ventilation together with other power-consuming and energy-managing equipments. The provisions varied according to the size of the buildings—small buildings (gross floor area from 300 m² to 2499 m²), medium-sized buildings (gross floor area from 2500 m² to 9999 m²), and large buildings (minimum gross floor area of 10 000 m²).

e) Financial resources and budget allocation

No information available

f) Expected results

No information available

2.3. Voluntary Measures

Labelling is currently voluntary for the following electrical products in Viet Nam:

- Refrigerators
- Fans
- Water heaters
- Lighting equipment: CFLs, TFLs, electronic ballast
- Air conditioners
- Three-phase electric motors.

2.4. Financial Measures Taken by the Government

In order to implement energy efficiency programs within the framework of the VNEEP, MOIT together with MOF (Ministry of Finance) issued Circular No. 142/2007/TTLT/BTC-BTC to guide the management and use of non-business funds for the implementation of the target program on economical and efficient use of energy (unfortunately, no detailed information identified in this circular is currently available). The total VNEEP budget in 2007 and 2008 was nearly VND 70 billion (equal to USD 5 million) of which VND 10 billion to support for two EE lighting manufacturers and VND 4 billion was invested to set up an energy efficiency laboratory for air conditioners and refrigerators.

2.4.1. Tax Scheme

No information available

2.4.2. Low-Interest Loans

No information available

2.4.3. Subsidies and Budgetary Measures

Apart from the VNEEP, there are a number of subsidies and budgetary measures for energy efficiency improvement programs at the central government levels. One example is provided below.

a) Name

The Pilot Commercial Energy Efficiency Program (CEEP)

b) Purpose

The Pilot Commercial Energy Efficiency Program aims to enhance capacity building in EE&C activities for agencies and provide financial support to enterprises.

c) Applicable sectors

Residential, commercial, and industrial sectors

d) Outline

For this project the Government of Vietnam has received a grant from the Global Environment Facility (GEF) through the International Bank for Reconstruction and Development (World Bank—WB). The implementation period of the Program is the four years from 2004–2009.

The pilot program has three components:

- Training of Project Agents in all aspects of energy-efficient commercial business services and customised technical assistance follow-up to support their development and completion of energy efficiency investment projects (Annex 5 summarises the training plan)

- Energy audit and efficiency investment grants (at decreasing levels over four years) to enable individual business efficiency investment transactions to overcome initial barriers to adopting energy efficient business services (to be administered by a commercial bank to work as an administrative unit)
- Program marketing to promote energy efficiency as both a good business service and a good investment for end users, together with program administration to ensure success of the overall project strategy.

e) Financial resources and budget allocation

This has been funded by the state budget, World Bank, and Global Environmental Facility.

f) Expected results

Upon implementation, the total electricity consumption will be reduced by 1540 GWh.

2.4.4. Other Incentives

No information available

2.5. Energy Pricing

The pricing mechanism for some kinds of energy fuels (coal for power generation, several kinds of petroleum products) and electricity tariff in Viet Nam is controlled by the government.

2.6. Other Efforts for Energy Efficiency Improvements

2.6.1. Cooperation with Non-Government Organisations

The Vietnamese Government cooperates with non-government organisations to stimulate energy efficiency improvements.

2.6.2. Cooperation through Bilateral, Regional and Multilateral Schemes

The Vietnamese Government cooperates with other economies through the Promotion of energy efficiency in ASEAN economies (PROMEC Programs—funded by Japan), Promotion of energy efficiency in Small and Medium Enterprises (PECSME Program—in cooperation with UNDP), and other programs and initiatives.

2.6.3. Other Cooperation/Efforts for Energy Efficiency Improvements

As there is a wide variety of donor activities, coordination of donor support in the future months and years will be crucial. In October 2008, the MOIT and the World Bank co-chaired an Energy Efficiency Donor Coordination Meeting, which included presentations of each donor on their programs and planned activities as well as a roundtable discussion on ideas for coordinating efforts and further sharing of information. The following summarises major donors and their activities in the field of energy efficiency in Viet Nam:

- Supporting implementation of the Energy Efficiency program (ADB)
- Load management and demand side management (Agence Francaise de Developpement—AFD)
- Technical training and certification program for energy efficiency (Danish International Development Agency—DANIDA)
- Study on National Energy Efficiency Master Plan (Japan International Cooperation Agency—JICA)
- Demand Side Management and Energy Efficiency Project (The World Bank Group—WB).

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