

JAPAN

1. GOALS FOR EFFICIENCY IMPROVEMENT

1.1. 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).

a) Future tasks

See (f), above

1.2. 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 (MLT)

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

1.3. 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.

1.4. Research and Development in Energy Efficiency and Conservation

1.4.1. 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 83 billion (approximately USD 995 million) in the 2009 fiscal year was allocated for R&D investment.

f) Outputs

Relevant R&D reports of the 21 categories of technology are 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

Among the selected 21 innovative technologies, the following 4 technologies are related with energy conservation. The measures for introduction and dissemination of each technology are also shown.

1) *High-efficiency house and building*

- Diffusion of energy-saving housing by financing, tax system, etc
- Establishment, expansion and diffusion of housing performance indication system, etc
- Insulation wall and easy construction system
- Technologies to utilize insulation walls and windows (structure, design and construction)

2) *Next-generation high-efficiency lighting*

- Creation of initial demands by subsidiary, tax system reform, etc for individual houses
- Effective management with top-runner method for industry
- Active promotion of cooperation to developing nations

3) *Ultra high-efficiency heat pump*

- Subsidiary, preferential treatment in tax system
- Diffusion promotion by top-runner program
- Research and development with industry-academia-government cooperation
- Information provision to public
- International cooperation promotion through IEA etc.

4) *High-efficiency information device and system*

- Promotion of energy saving technology development with industry-academia-government cooperation and diffusion promotion by top-runner program, etc for Technology development
- Green IT promotion council and holding of international symposium for system

1.4.2. 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.

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

Japan's "New Strategy"(June 2010) puts emphasis on science & technology as a prior investment for the future and sets the amount of more than 4% equivalent for GDP as investment by public and private combined by fiscal 2020. Japan would reconstruct the systems for science & technology policies. Japan would accelerate research and development in the field of energy and environment within the framework of "Green Innovation".

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. The law was revised in May 2008 and enacted in April 2010.

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.

Headquarter of franchise chain business operator, whose franchise stores use in each fiscal year amounts to 1500 kilolitres (crude oil equivalent) or more in total also has the same

responsibility as above-mentioned business organisations.

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 23 categories of products are designated in the program as of March 2010: 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, transformers, routers and switching units. Detailed information can be found at www.enecho.meti.go.jp/policy/saveenergy/toprunner2010.03en.pdf

Financial resources and budget allocation

No information available

e) 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 18 categories of products are subject to the labelling as of March 2011. 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, five categories of products (air conditioners, TV sets, refrigerators, electric toilet seats and fluorescent lights) 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 (newly defined as “Type 1 House/Building”), 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. The relevant authority is able to give orders or penalties (in addition to make an official announcement) to the construction business organizations, when they are not able to achieve satisfactory performance on energy conservation.

Construction business organisations are obliged, when they construct, extend, reconstruct or repair a house or building with floor area of 300 to 2000 square metres (newly defined as “Type 2 House/Building”), to report their energy conservation measures to the relevant authority beforehand and periodical (every three years) report on the state of maintenance of building (no need for periodical report for a house).

2.2.4. Transport

Transport business organisations (freight transport companies, passenger service companies, consignors) that are larger than a certain size (freight transport companies with 300 railway cars or more, 200 trucks or more, 200 buses or more, 350 taxis or more, 20 000 tonnages of ships or more and 9000 maximum takeoff weight of aircrafts or more, defined as “Specified Carriers”) are obliged to prepare and submit energy conservation plans as well as an annual report on their energy consumption amounts and other related matters.

Business organisations which consign their own freights with 30 million ton-kilometres are defined as “Specified Consignors”. Specified consignors are obliged to prepare and submit energy conservation plans as well as annual report on their energy consumption amounts.

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*

The business operators (industrial and commercial sectors) that purchase the specified energy conservation equipment are able to choose either of the following options

A) Tax exemption which is equivalent to 7% of the equipment acquisition cost for small and medium sized companies.

B) Special depreciation of 30% of the equipment acquisition cost in the year of acquisition, in addition to ordinary depreciation and applies to all companies including large sized companies.

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**
- The owners of the target automobiles would pay automobile tax in the next year of acquisition of automobiles

In FY2010, the following tax benefits will be granted (In case that the automobiles are registered in FY2009).

- For electric vehicles, fuel-cell vehicles and plug-in-hybrid vehicles, automobile tax is reduced by 50%.
- For natural gas vehicles with the weight of under 3.5 tonnes, which have achieved 75% reduction or more of exhaust gas compare to 2005, automobile tax is reduced by 50%
- For natural gas vehicles with the weight of over 3.5 tonnes, which have achieved 10% reduction or more of nitrogen oxide(NO_x) or particulate molecular(PM) compare to 2005, automobile tax is reduced by 50%

- For gasoline and LPG vehicles with the achievement of 75% reduction or more of exhaust gas compare to 2005, which have achieved a fuel efficiency target of 25% or higher(target year:2005), automobile tax is reduced by 50%.
- For gasoline and LPG vehicles with the achievement of 75% reduction or more of exhaust gas compare to 2005, which have achieved a fuel efficiency target of 15% (target year:2010), automobile tax is reduced by 25%.
- For diesel vehicles with the achievement of 75% reduction or more of exhaust gas compare to 2005, which have achieved a fuel efficiency target of 25% compare to 2005, automobile tax is reduced by 50%
- For diesel vehicle with the achievement of 75% reduction or more of exhaust gas compare to 2005, which have achieved a fuel efficiency target of 15% compare to 2020, automobile tax is reduced by 25%

3) *Eco-car tax reduction*

In purchasing of automobiles with excellent exhaust gases performance and high fuel efficiency, automobile acquisition tax and automobile tonnage tax is exempted or reduced in the following conditions:

- The conditions for exemption(100% reduction) of automobile acquisition and automobile tonnage tax
 - Electric vehicles, fuel cell vehicles and plug-in hybrid vehicles
 - Natural gas vehicle with the weight of under 3.5 tonnes, which have achieved 75% reduction or more of exhaust gas compare to 2005
 - Natural gas vehicle with the weight of over 3.5 tonnes, which have achieved 10% reduction or more of nitrogen oxide (NO_x) compare to 2005
 - Hybrid vehicles with the weight of under 3.5 tonnes, which have achieved 75% reduction or more of exhaust gas compare to 2005 and also have achieved a fuel efficiency target of 25% or higher(target year: 2010)
 - Hybrid vehicles with the weight of under 3.5 tonnes, which have achieved 10% reduction or more of NO_x or PM compared to 2005 and also have achieved a fuel efficiency target of 2015
 - Diesel Passenger vehicle with the weight of under 3.5 tonnes
- The conditions for 75% reduction of automobile acquisition and automobile tonnage tax
 - Diesel vehicles with the weight of over 3.5 tonnes, which have achieved both the target of regulation of exhaust gas emissions of FY2009-2010 and a fuel efficiency target of FY2015
 - Trucks and buses (diesel-driven) with the weight of from 2.5 to 3.5 tonnes, which have achieved both the target of exhaust gas emissions of FY2009-

2010 and a fuel efficiency target of FY2015

- Truck and buses(gasoline-driven) with the weight of from 2.5 to 3.5 tonnes, which have achieved both 75% reduction or more of exhaust gas emissions of FY2009-2010 and a fuel efficiency target of FY2015(In this case, automobile tonnage tax is reduced by 50%)
- The conditions for 50% reduction of automobile acquisition and automobile tonnage tax
 - Diesel vehicles with the weight of over 3.5 tonnes, which have achieved both 10% reduction or more of NOx or PM and a fuel efficiency target of FY2015
 - Trucks and buses(gasoline-driven) with the weight of from 2.5 to 3.5 tonnes, which have achieved both 50% or more of exhaust emissions and a fuel efficiency target of FY2015

Unlike vehicle greening tax scheme, eco-car tax reduction is applied for purchasing for both new and seconded-handed vehicles.

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 72 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) Subsidy project for the business operators promoting the rational use of energy:

The introduction of energy-saving facilities (as replacement of the existing facilities) as planned by business operators are subsidized if the planned new facilities are considered highly significant in terms of “the possibility of the technology becoming widely used in the future and the advanced nature of the technology,” “the effectiveness in energy conservation” and “cost-effectiveness.” Priority is given to the introduction of leading-edge facilities and technologies and efforts by small and medium companies. Budget allocation is JPY 40.0 billion (for fiscal 2011).

2) Subsidy project for promoting the introduction of high-efficiency energy systems into homes and buildings:

In order to help achieve net-zero-energy in homes and buildings by 2030, subsidies are provided to those who plan to introduce energy-saving, high-efficiency energy systems (capable of reducing annual energy consumption by about 25%) into houses/buildings or building energy management system (BEMS). As part of the subsidy project, the effects of introducing such systems are monitored for verification and the data obtained utilized for further advancement of energy conservation drive. Budget allocation is JPY 7.0 billion (for fiscal 2011).

3) 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 22.0 billion (for fiscal 2009).

4) Promotion of development of energy conservation technology:

This project pursues energy conservation technology development over a medium- and long-term basis, with four phases consisting of pioneering research, preparatory research, practical application development and demonstration research, in order to contribute to the reduction in greenhouse gas emissions. Budget allocation is JPY 10.2 billion (for fiscal 2011).

5) *Promotion of Energy Management System (BEMS & HEMS) Implementation:*

A subsidy is provided for the implementation of BEMS (Building Energy Management System) to small to medium size businesses, in order to promote activities to inhibit electric power demand by linking up with the implementation of Smart Meters. A subsidy is also provided for the implementation of HEMS (Home Energy Management System), which raises the effects of implementation for Smart Meters in households, in order to promote electric power savings and peak-cut electric power generation in the consumer sector, as aspects for electric power demand and supply measures. Budget allocation is JPY 30.0 billion (for the third revised budget of fiscal 2011)

6) *Promotion of Expenses Relating to Refurbishment of Building Structures for Conservation of Electric Power*

A subsidy is provided for expenses relating to the implementation of facilities (air conditioning and hot water supply equipment, lighting facilities etc.) in existing building structures that offer a certain level of electric power saving effects, in order to promote electric power savings in the consumer sector, as part of electric power demand and supply measures. Budget allocation is JPY 15.0 billion (for the third revised budget of fiscal 2011)

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

2.5. Energy Pricing

Outline of electricity prices:

USD 0.227 per kWh (for residential sector) and USD 0.157 per kWh (for business sector)—averages in 2009.

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 1.285 per litre—as of December 2009.

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 per litre), the gasoline tax (C = JPY53.8 per litre) and the tax on transactions of gas oil (D = JPY32.1 per litre).

- 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