Energy Conservation Policy & Measures in Japan

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I. Situations Surrounding Energy Consumption in Japan

I-1. Overall Status

**Transition of Final Energy Consumption (1)**

<table>
<thead>
<tr>
<th>Sector</th>
<th>FY1973</th>
<th>FY1990</th>
<th>FY2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial sector</td>
<td>100</td>
<td>96</td>
<td>10</td>
</tr>
<tr>
<td>Commercial/residential sector</td>
<td>0</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>Transportation sector</td>
<td>0</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>GDP</td>
<td>100</td>
<td>191</td>
<td>223</td>
</tr>
</tbody>
</table>

Source: Energy Balance Tables in Japan, Annual Report on National Accounts
(Note) The GDP is real GDP based on 1995 prices according to 93SNA.
I-1. Overall Status

Transition of Final Energy Consumption (2)

- Japan’s final energy consumption has increased almost continuously, except immediately after the two oil crises and during the recent economic recession.

Source: Energy Balance Tables in Japan, Annual Report on National Accounts
(Note) Note that, due to revision of the aggregation method in Energy Balance Tables in Japan, values for FY1990 onwards and values for preceding years are the results of utilizing different methods.
I-1. Overall Status

**Transition of Final Energy Consumption by Sector**

- Final energy consumption in the industrial sector has remained generally steady since the oil crisis.
- On the other hand, those of the commercial/residential and transportation sectors have increased significantly.

Source: Compiled by the Agency for National Resources and Energy based on Energy Balance Tables in Japan data

(Note) Note that, due to revision of the aggregation method in Energy Balance Tables in Japan, values for FY1990 onwards and values for preceding years are the results of utilizing different methods.
Japanese primary energy consumption per GDP is the lowest in the world owing to various energy conservation measures taken for the respective sectors.

Source: IEA Energy Balance 2004
(Note) Primary energy consumption (tons in oil equivalent)/GDP (thousand US$) indicated in the ratio when the Japanese figure is set at 1. Both are actual figures for FY2002.
I-1. Overall Status

Rising Crude Oil Dependency on Middle Eastern Countries

- The rate of crude oil dependency on Middle Eastern countries has largely surpassed the rate at the time of the oil crises.
  - 77.5% (First oil crisis) → 88.5% (FY2003)

Transition of Crude Oil Dependency on Middle Eastern Countries in Japan

Dependence (%)

Source: Compiled by the Agency for Natural Resources and Energy based on Yearbook of Natural Resources and Energy
I-1. Overall Status

**CO2 Emitted from Energy Utilization in Japan**

- The COP3 (the 3rd Conference of Parties of UN Framework Convention on Climate Change) held in December 1997 agreed reduction targets of Greenhouse Gas (GHG) emissions assigned to each developed country and issued the agreement as the “Kyoto Protocol.” Japan is responsible for reducing the average value of its total GHG in 2008 to 2012 by 6% in comparison with that in the 1990s. (US=-7%, EU=-8%)
- **Approximately 90%** of Japan's GHG is energy-originated CO2.

### Breakdown towards 6% GHG reduction

<table>
<thead>
<tr>
<th>▲0.6% Emissions reduction of CO2, Methane, and Nitrous oxide</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.6%: Emissions reduction of CO2 arising from energy utilization. (Maximize possible measures controlling energy demand &amp; supply)</td>
</tr>
<tr>
<td>▲0.3%: Emissions reduction of non-energy originated carbon dioxide</td>
</tr>
<tr>
<td>▲0.9%: Emissions reduction of methane and nitrous oxide</td>
</tr>
</tbody>
</table>

| ▲3.9% Land and Forest Management |
| ▲0.1% Emissions reduction of CFCs substitutes (HFC, PFC, SF6) |

**Additional Provision (▲1.6%)**

Joint Implementation and Emission Trading

**Source:** FY2005 inventory

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**Breakdown of Japan's greenhouse gases (2003)**

- Energy-originated carbon dioxide 89%
- Non-energy originated carbon dioxide 5%
- Nitrous oxide 2.5%
- Methane 1.5%
- Hydrofluorocarbon 1%
- Perfluorocarbon 0.6%
- Sulfur hexafluoride 0.3%
- CFCs substitutes (HFC, PFC, SF6)
The Kyoto Protocol’s 6% reduction target for CO2 will be achieved by suitably combining the emissions reduction measures for GHG (-0.5%), measures for carbon dioxide absorption by forests (-3.9%), and utilization of the Kyoto Mechanism (-1.6%).

<table>
<thead>
<tr>
<th>Changes in achievement with respect to the base year level by sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2003</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Industrial sector</td>
</tr>
<tr>
<td>Commercial/residential sector</td>
</tr>
<tr>
<td>Transportation sector</td>
</tr>
</tbody>
</table>
I-1. Overall Status

**Basic Concept of the Plan to Achieve the Kyoto Protocol Target**

**Realizing 6% reduction of GHG emissions**

- Measures for carbon dioxide absorption by forests (for 3.9% reduction)
- Utilization of the Kyoto Mechanism (for 1.6% reduction)
- Development of national movement
- Promotion of campaigns led by national and local governments

**Reduction in domestic emissions**

(0.5% reduction from the “reduction based on current measures + 6%”)

- Drastic improvement of the Energy Conservation Law, promotion of energy conservation measures through emphasized utilization of the special account for energy, and industry’s efforts to achieve the target specified in their voluntary action plan. (▲ 2.9% contribution)
- Increased operating rates of atomic power plants (▲ 1.9% contribution)
- CFCs and other gases (▲ 1.7% contribution)

**1. Improvement of environmental conservation, economic vitality, and industrial competitiveness**

2. The whole nation and companies of all industries are responsible for maintaining an environmentally developed nation. (High environmental consciousness and world-leading industrial technologies)

**Visualization of objective data**

- Contribution to preventing global warming, including CO2 emissions reduction in developing countries
- Flexible plans and measures for the limit of efforts made domestically

**Challenge of emissions reduction for the whole nation**

- Development of national movement
- Promotion of campaigns led by national and local governments
- Expansion of the measures in terms of dimension, from “one-dimensional” measures to “linear” and “network-type” measures.
- PDCA-based measures (Plan-Do-Check-Action)

**Preparation of new energy consumption statistics**

**Guideline for nationwide activities**

**Emissions report/publication system**

(Note) Under certain preconditions, CO2 emissions are estimated to be lowered by 0.2% by improving the operating rates of atomic power plants by 1%.

▲ 2.9% contribution

▲ 1.9% contribution

▲ 1.7% contribution
I-2. Transition of Energy Consumption in the Industrial Sector

Transition of Energy Consumption in the Industrial Sector

- The energy consumption in the industrial sector has been generally steady since the oil crisis.
- The energy consumption intensity per Index of Industrial Production for the manufacturing industry fell sharply through to the 1980s, but has tended to increase since the 1990s.
- Japan’s energy consumption intensity per GDP in the industrial sector is lower than those of other major countries.

Transition of energy consumption intensity per Index of Industrial Production for the manufacturing industry

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Index (FY1973=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1973</td>
<td>110</td>
</tr>
<tr>
<td>1974</td>
<td>100</td>
</tr>
<tr>
<td>1975</td>
<td>90</td>
</tr>
<tr>
<td>1976</td>
<td>80</td>
</tr>
<tr>
<td>1977</td>
<td>70</td>
</tr>
<tr>
<td>1978</td>
<td>60</td>
</tr>
<tr>
<td>1979</td>
<td>50</td>
</tr>
<tr>
<td>1980</td>
<td>40</td>
</tr>
<tr>
<td>1981</td>
<td>30</td>
</tr>
<tr>
<td>1982</td>
<td>20</td>
</tr>
<tr>
<td>1983</td>
<td>10</td>
</tr>
<tr>
<td>1984</td>
<td>0</td>
</tr>
<tr>
<td>1985</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Energy Balance Tables in Japan, Yearbook of Indices of Industrial Production
(Note 1) The Index of Industrial Production is weighted with value added structure (2000 standard).
(Note 2) The Index of Industrial Production is affected by sales values. When a sales price drops, the index may go below the index of production volume.

Energy Consumption Intensity per GDP in the Industrial Sector by Country

<table>
<thead>
<tr>
<th>Country</th>
<th>Energy Consumption Intensity per GDP (FY2002)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>1.14</td>
</tr>
<tr>
<td>U.S.</td>
<td>1.22</td>
</tr>
<tr>
<td>U.K.</td>
<td>1.22</td>
</tr>
<tr>
<td>France</td>
<td>1.07</td>
</tr>
<tr>
<td>Germany</td>
<td>1.14</td>
</tr>
</tbody>
</table>

Source: Compiled by the Agency for Natural Resources and Energy based on Handbook of Energy & Economic Statistics in Japan data
(Note) Final energy consumption (tons in oil equivalent)/real GDP (1995 value in US$) (both are actual figures for FY2002), indicated in the ratio when the Japanese figure is set at 1.
I-2. Transition of Energy Consumption in the Industrial Sector

Energy Consumption Trend under Nippon Keidanren's Voluntary Action Plan on the Environment

- Nippon Keidanren has drawn up a voluntary environmental action plan with the common goal of “reducing CO2 emissions from the industrial and energy conversion sectors to at least the FY1990 level by FY2010.”
- Implementation of the plan has reduced CO2 emissions against the FY1990 level and energy consumption has leveled off.

Source: Nippon Keidanren (Japan Business Federation) data
I-3. Transition of Energy Consumption in the Commercial/Residential Sector

Transition of Energy Consumption in the Commercial/Residential Sector

- Energy consumption in the commercial/residential sector surged after the oil crisis and is still growing.
- Japan's per-capita energy consumption in the commercial/residential sector is relatively low compared to other major countries, but the difference is narrowing.

![Graph showing transition of energy consumption in the commercial/residential sector]

(Source) Energy Balance Tables in Japan

![Graph showing transition of energy consumption per capita in the commercial/residential sector]

Source: Compiled by the Agency for Natural Resources and Energy based on Handbook of Energy & Economic Statistics in Japan data
I-3. Transition of Energy Consumption in the Commercial/Residential Sector

**Example of Energy Efficiency Improvement**

○ Transition of the energy-saving performance of CRT television

Transition of the performance of 21 inch CRT television

![Bar chart showing energy consumption of CRT television from 1984, 1994, and 2004 models.]

Source: Japan Electronics and Information Technology Industries Association

○ Transition of the energy-saving performance of air conditioner

Transition of the performance of heating-and-cooling type wall-mounted air conditioner with a cooling capacity of 2.8 kW (for a 10 tatami-mat room)

![Bar chart showing energy consumption of air conditioner from 1995, 1998, and 2004 models.]

Source: Japan Refrigeration and Air Conditioning Industry Association

Standard of Japan Refrigeration and Air Conditioning Industry Association

Source: JRA4046 (Standard for the calculation of periodic power consumption of room air conditioners)
Energy consumption in the residential sector has made a steady increase due to changes in the social structure (e.g. increase in the number of households), lifestyle changes, and other factors, despite energy efficiency improvements for individual appliances.

Source: Compiled by the Agency for Natural Resources and Energy based on Energy Balance Tables in Japan and Statistics of Population.
Standby power consumed by households accounts for approximately 10% of total household power consumption (equivalent to TV power consumption per household).

* Standby Power Consumption: Power consumed while electrical appliances are not in use (Power consumed by the timer function, remote controller receiver, etc.)
Energy consumption in the commercial sector increases with an increase in total floor area of offices, business buildings, etc. (Floor area and energy consumption increased by 2.2% and 1.6% on an annual average, respectively.)

Source: Handbook of Energy & Economic Statistics in Japan
(Note) The figures in the graph represent each industry's floor area ratio against the industry total.
### Status of Management of Energy Intensity in the Commercial Sector

#### I-3. Transition of Energy Consumption in the Commercial/Residential Sector

<table>
<thead>
<tr>
<th>Category</th>
<th>Management Implemented (%)</th>
<th>Management Not Implemented (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Respondents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factories, etc.</td>
<td>16.8</td>
<td>48.5</td>
</tr>
<tr>
<td>Government offices</td>
<td>24.3</td>
<td>53.4</td>
</tr>
<tr>
<td>Commercial Buildings</td>
<td>51.4</td>
<td>0.0</td>
</tr>
<tr>
<td>Hotels</td>
<td>47.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Hospitals</td>
<td>21.3</td>
<td>0.0</td>
</tr>
<tr>
<td>Laboratories/Institutes</td>
<td>52.7</td>
<td>0.0</td>
</tr>
<tr>
<td>Schools</td>
<td>15.3</td>
<td>0.0</td>
</tr>
<tr>
<td>Department stores/ Retailers</td>
<td>49.6</td>
<td>0.0</td>
</tr>
<tr>
<td>Others</td>
<td>30.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

**Source:** FY2000 survey on Type 2 Designated Energy Management Factories

- **Management Implemented:**
  - Management is conducted by factory/by floor.
  - Management is conducted by factory/by the bldg.
  - Energy conservation properties are examined & controlled only when individual machinery/equipment is introduced.
  - Management is implemented because the time and effort for such management cannot be justified.
  - Management is not implemented because energy sales for the third party is our business.

- **Management Not Implemented:**
  - Management is not implemented because of low utility/fuel costs.
  - Management is not implemented due to lack of human resource/know-how for the implementation.

- According to the survey on Type 2 Designated Energy Management Factories, business establishments in the commercial sector have a lower operation rate of management of Energy Intensity than factories.

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**Source:** Energy Conservation Center, Japan
I-4. Transition of Energy Consumption in the Transportation Sector

Transition of Energy Consumption in the Transportation Sector

- Energy consumption in the transportation sector surged after the oil crisis and leveled off in recent years.
- Per-capita energy consumption in the transportation sector is on the increase in all major countries.

Source: Compiled by the Agency for Natural Resources and Energy based on Handbook of Energy & Economic Statistics in Japan data
I-4. Transition of Energy Consumption in the Transportation Sector

Contributing Factors that Increase Energy Consumption in the Transportation Sector

- Private passenger vehicles contributed 90% of the total energy consumption increase during FY1991 to 2003 in the whole transportation sector.
- Private passenger vehicles have poor energy consumption intensity compared to other transportation.

Transition of energy consumption intensity by transportation

Source: Compiled by the Agency for Natural Resources and Energy based on Handbook of Energy & Economic Statistics in Japan data
I-4. Transition of Energy Consumption in the Transportation Sector

Factors for the Increase in Energy Consumption for Private Passenger Vehicles

- Energy consumption for private passenger vehicles marked a drastic 63% increase over 12 years from FY1990.
- The trend is mainly attributed to the increase in household ownership of passenger vehicles extending total driving distance and increased vehicle weights, compromising actual fuel economy.
II. Energy Conservation Measures by Sector

II-1. Overview of Energy Conservation Measures

- Energy control at factories and business establishments shall be thoroughly and strictly managed in accordance with the Energy Conservation Law (including the appointment of energy managers, preparation and submission of periodical reports and mid- and long-term plans concerning the use of energy). As a result of revision of the law, the divisions of heat and electricity, which were separated in the past, shall be integrated for control purpose (effective April 2006).
- Promotion of construction of large-scale energy-saving facilities (20.3 billion yen budget for FY2005)
  - An accelerated increase in the use of “High-performance industrial furnaces” in small and medium manufacturers
  - Positive introduction of innovative energy-saving facilities (such as next-generation coke ovens)
  - Utilization of heat or the like at industrial complexes in a manner that goes beyond individual corporate frameworks
- Reinforcement of energy-saving performance in compliance with the Energy Conservation Law (Top Runner standard); standard is reinforced for 9 items, such as the addition of LCD and plasma televisions, and reviewed standard for air conditioners.
- An accelerated increase in the introduction of high-efficiency hot-water systems (Target: 8 million units, approximately 20% of all households by 2010) (10.8 billion yen budget for FY2005)
- Promotion of the presentation of easy-to-understand energy-saving information over the counter at home appliance shops and promotion of distribution of energy-saving devices as well as energy-saving information to users by power/gas companies [in conformance with the Revised Energy Conservation Law]
- Submission of energy-saving measure application reports shall be compulsory for residential houses that are larger than the specified size as with newly constructed buildings (non-residential) [in conformance with the Revised Energy Conservation Law] (in cooperation with the Ministry of Land, Infrastructure and Transport)
- Establishment of fuel economy standard for large-sized trucks and the like [in conformance with the Energy Conservation Law] (in cooperation with the Ministry of Land, Infrastructure and Transport)
- Submission of energy-saving measure plans and reports on the energy used shall be compulsory for consigners as well as carriers [in conformance with the Revised Energy Conservation Law] (in cooperation with the Ministry of Land, Infrastructure and Transport)
- Introduction of high-efficiency maintenance and the promotion of technological development (in cooperation with the Ministry of Land, Infrastructure and Transport)
- Promotion of conversion of commuters’ means of transportation from their private cars to public transportation with the cooperation of passenger transportation companies and factories [in conformance with the Revised Energy Conservation Law] (in cooperation with the Ministry of Land, Infrastructure and Transport)
- Improvement of physical distribution bases for enhanced physical circulation and distribution efficiency, use of IC tags, assistance for realization of cooperative transportation/distribution systems [in conformance with the Law for Improving Physical Circulation and Distribution]
  - Reduction in CO₂ emissions intensity upon electric power generation
  - Support for introducing new energy such as wind power, solar energy, biomass, etc.
II-1. Overview of Energy Conservation Measures

### Overview of the Law Concerning the Rational Use of Energy

The revised version of the law with additional provisions of measures for transportation etc. was promulgated in August 2005 and will be enforced in April 2006.

**Fundamental policies:** The Minister of Economy, Trade and Industry shall make public fundamental policies related to the measures to be taken by energy users etc. for the rational use of energy.

<table>
<thead>
<tr>
<th>Factories and Business Establishments</th>
<th>Transportation</th>
<th>Residences and Buildings</th>
<th>Measures for Machinery and Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Publication of responsibilities and criteria for enterprises</strong></td>
<td><strong>Publication of responsibilities and criteria for enterprises</strong></td>
<td><strong>Publication of responsibilities and criteria for enterprises</strong></td>
<td><strong>Responsibilities for manufacturers or importers of energy-consuming equipment</strong></td>
</tr>
<tr>
<td><strong>Type 1 Designated Energy Management Factory</strong> (Annual energy use: 3,000 kl)</td>
<td><strong>Designated carriers</strong> (Vehicle ownership: More than 200 trucks or more than 300 items of rolling stock or the like)</td>
<td><strong>Designated consignors</strong> (Annual cargo: 30 million ton kilometers)</td>
<td><strong>Designated equipment</strong> (Top Runner standard)</td>
</tr>
<tr>
<td>• Appointment of Energy Manager</td>
<td>• Submission of mid- and long-term plans</td>
<td>• Submission of plans</td>
<td>• Energy conservation standards of commercialized products.</td>
</tr>
<tr>
<td>• Submission of periodical reports on energy use</td>
<td>• Submission of mid- and long-term plans</td>
<td>• Submission of periodical reports on energy use</td>
<td>• LCD and plasma televisions, DVD recorders, and heavyweight vehicles are newly listed as products subject to the measures.</td>
</tr>
<tr>
<td>• When the Ministry finds the rational use of energy to be significantly insufficient in consideration of the criteria, it shall advise, announce to the public, or order (penalize) the particular factory</td>
<td>• When the Ministry finds the rational use of energy to be significantly insufficient in consideration of the criteria, it shall advise, announce to the public, or order (penalize) the operator in question.</td>
<td>• Appointment of a qualified person for energy management of type 2 designated factory</td>
<td>• When the Ministry finds the rational use of energy to be significantly insufficient in consideration of the criteria, it shall advise or announce to the public the name of the owner in question.</td>
</tr>
<tr>
<td><strong>Type 2 Designated Energy Management Factory</strong> (Annual energy use: 1,500 kl)</td>
<td>• The divisions of heat and electricity, which were separated in the past, shall be integrated for control purposes (represented in crude-oil equivalent).</td>
<td>• Submission of periodical reports on energy use for consignment transportation</td>
<td>• When the competent authority finds energy-saving measures to be significantly insufficient in consideration of the criteria, the authority shall advise or announce to the public the name of the owner in question.</td>
</tr>
<tr>
<td>• Appointment of a qualified person for energy management of type 2 designated factory</td>
<td>• When the Ministry finds the rational use of energy to be significantly insufficient in consideration of the criteria, it shall advise, announce to the public, or order (penalize) the operator in question.</td>
<td>• Submission of plans</td>
<td>(* Competent authorities: Prefectural authorities, with district construction surveyors, governing construction authorization procedures)</td>
</tr>
<tr>
<td>• Submission of periodical reports on energy use</td>
<td>• When the Ministry finds the rational use of energy to be significantly insufficient in consideration of the criteria, it shall advise, announce to the public, or order (penalize) the consignor in question.</td>
<td>• Submission of periodical reports on energy use required for consignment transportation</td>
<td>• Periodical reports on maintenance of buildings with respect to measures by the designated clients etc. of buildings who have submitted notification to the competent authorities.</td>
</tr>
<tr>
<td>• The divisions of heat and electricity, which were separated in the past, shall be integrated for control purposes in view of today’s actual circumstances at factories and business establishments.</td>
<td>• When the Ministry finds the rational use of energy to be significantly insufficient in consideration of the criteria, it shall advise, announce to the public, or order (penalize) the consignor in question.</td>
<td>• Submission of periodical reports on energy use for consignment transportation</td>
<td>• When the competent authority finds energy-saving measures to be significantly insufficient in consideration of the criteria, the authority shall advise or announce to the competent authorities etc. in question.</td>
</tr>
<tr>
<td>• Consequently, the level of energy use as the standard to designate factories was lowered to increase the number of factories and business establishments subject to designation. (From approximately 10,000 to 13,000)</td>
<td></td>
<td>• Measures for the transportation sector are newly added. (Periodical reports shall be prepared from April 2007.)</td>
<td></td>
</tr>
<tr>
<td>• Establishment of registered examination body system. (If a factory or business establishment is examined and verified by a registered examination body, the factory or the like shall be excused from the submission of periodical reports.)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In conjunction with the systems related to the calculation, reporting, and publication of the emissions of GHG specified in the Partially Modified Law Concerning the Promotion of Measures against Global Warming enacted in the current Diet session, the emissions of energy-originated carbon dioxide is required to be obtained on the basis of the data in the periodical reports submitted in compliance with the Energy Conservation Law.
II-2. Energy Conservation Measures for the Industrial Sector

**Factories/Business Establishment Measures Under the Energy Conservation Law (1)**

- Plan-based and voluntary energy control at relevant factories and business establishments shall be thoroughly and strictly managed in accordance with the Energy Conservation Law. Those factories and business establishments shall submit periodical reports on the use of energy, prepare and submit mid- and long-term plans for measures to achieve energy conservation targets, and appoint energy managers in accordance with the law.

### Factories/business establishments with high energy consumption

*(Type 1 Designated Energy Management Factories)*

- Annual fuel (thermal) use: 3000 kl in crude oil equivalent or larger
- Annual electricity use: 12 million kwh or larger

### Factories/business establishments with medium energy consumption

*(Type 2 Designated Energy Management Factories)*

- Annual fuel (thermal) use: 1500 kl in crude oil equivalent or larger
- Annual electricity use: 6 million kwh or larger

### Factories

- Appointment of Energy Manager (Mandatory to possess a license for a qualified person for energy management of type 1 designated factory)
- Preparation & Submission of Periodical Reports
- Formulation & Submission of Mid- and long-term Plans

### Business Establishments

- Appointment of a qualified person for energy management of type 2 designated factory (Training Required)
- Preparation & Submission of Periodical Reports
- Preparation and Submission of mid- and long-term plans (Participation by a qualified person required)

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### Factories and business establishments

- Appointment of a qualified person for energy management of type 2 designated factory
- Preparation & Submission of Periodical Reports

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**Department Store, Schools, Office Building, Hotel**
II-2. Energy Conservation Measures for the Industrial Sector

Factory/Business Establishments Measures Under the Energy Conservation Law (2)

- **On-site investigation (factory inspection)** has been conducted since FY2001 on Type 1 Designated Energy Management Factories.
- Compliance with factory/business establishments standards is investigated to assess the need for guidance based on objectively set criteria.
- Establishments that have an extremely poor level of energy use rationalization are instructed to prepare/submit a rationalization plan, implement the plan, and take other relevant steps after on-the-spot inspection has been conducted.

Flow of general inspection:

1. **Factory subject to investigation**
   - Send a preliminary survey form

2. **Local bureau of economy, trade and industry**
   - According to judging criteria, examine the status of energy management standards, records, maintenance checklists, etc.

3. **On-site investigation**
   - If the assessment result is less than 50 points

4. **Inspection**
   - If deemed extremely insufficient against judging criteria

5. **Rationalization plan guidance**
   - If the establishment refuses to comply

6. **Public disclosure/compliance order**
II-2. Energy Conservation Measures for the Industrial Sector

Reinforcement of Energy Conservation Measures for Factories and Business Establishments through the Integration of Heat and Electricity Control

- In connection with designated energy management factories, the divisions of heat and electricity are abolished and they are integrated into a single amount of energy; designation is made on the basis of the total amount of heat and electricity consumed.
- The level of energy use as the standard to designate factories was lowered to consequently increase the number of factories and business establishments subject to energy conservation measures.
- Type 1 designated energy management factories must assign a licensed energy manager who has expert knowledge of both heat and electricity.
- Type 2 designated energy management factories must assign a licensed energy manager who has completed a training program for knowledge of both heat and electricity.
- A five-year transitional period is established, during which both a heat manager and an electric manager are designated to act as the energy manager (or qualified person for energy management of type 1 or 2 designated factories) and execute the required duties specified in the law.

Current system

- Designated heat management factory
  - Type 1: 3,000 kl or more
  - Type 2: 1,500 kl or more
- Designated electricity management factory
  - Type 1: 12 million kWh or more
  - Type 2: 6 million kWh or more

After modification

- Designated energy management factories
  - (Heat and electricity are integrated)
  - Type 1: 3,000 kl or more
  - Type 2: 1,500 kl or more

Integrated heat-and-electricity control
(The divisions of heat and electricity are abolished.)

- For example, Electricity: 750kWh, Heat: 800kWh
  - With electricity and heat levels considered separately, the factory is un-designated.
  - Heat-electricity integrated: 1550kWh
  - Newly designated as a Type 2 energy management factory

<Responsibilities>
- Preparation of mid- and long-term plans
- Periodical reports
- Appointment of an energy manager (or a qualified person for energy management of type 2 designated factory)

The number of factories that are newly designated as Type 1 factories is estimated to be approximately 1,800.

The number of factories that are newly designated as Type 2 factories is estimated to be approximately 2,800.

Current system

- Designated heat management factory
  - Type 1: 3,000 kl or more
  - Type 2: 1,500 kl or more
- Designated electricity management factory
  - Type 1: 12 million kWh or more
  - Type 2: 6 million kWh or more

After modification

- Designated energy management factories
  - (Heat and electricity are integrated)
  - Type 1: 3,000 kl or more
  - Type 2: 1,500 kl or more

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- Periodical reports
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The number of factories that are newly designated as Type 1 factories is estimated to be approximately 1,800.

The number of factories that are newly designated as Type 2 factories is estimated to be approximately 2,800.
II-2. Energy Conservation Measures for the Industrial Sector

Intensive Support for Introducing Energy Conservation Facilities

Under the “Supporting project for business operators employing rational use of energy”, investment and installation activities by business operators expected to show superior cost-effectiveness and policy significance are encouraged and intensively supported. Supported activities include:
- investing for energy conservation on a large scale, jointly capitalized by multiple business operators for industrial complexes, etc.
- installing the industry’s first model plant for highly efficient plants
- installing highly efficient industrial furnaces, etc.

Example of introduction of energy-saving facilities (High-Performance Industrial Furnace)

– **Industrial furnaces** are used at factories throughout the country for heating, dissolving, sintering, and drying purposes.
– **High-performance industrial furnaces** are industrial furnaces that are confirmed to have an **energy-saving effect of more than 30%** owing to waste-heat recovery mechanisms etc.
II-3. Energy Conservation Measures for the Commercial/Residential Sector

Improving Equipment Efficiency with the Top Runner Program

The Top Runner Program* was introduced in 1998 for the energy conservation standards for home/office appliances and the fuel economy standard of automotives. The program standards for LCD and plasma televisions and heavyweight vehicles are to be added.

Example of Top Runner Program

<table>
<thead>
<tr>
<th>Specific Equipment</th>
<th>Target Year</th>
<th>Energy conservation effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger vehicles (Gasoline and LP gas)</td>
<td>2010</td>
<td>Gasoline: 23%</td>
</tr>
<tr>
<td>(Gasoline and LP gas)</td>
<td>2003</td>
<td>LP gas: 11%</td>
</tr>
<tr>
<td>Passenger vehicles (diesel)</td>
<td>2005</td>
<td>15%</td>
</tr>
<tr>
<td>Freight vehicles (gasoline)</td>
<td>2010</td>
<td>13%</td>
</tr>
<tr>
<td>Freight vehicles (diesel)</td>
<td>2005</td>
<td>7%</td>
</tr>
<tr>
<td>Air conditioners (cooling &amp; heating)</td>
<td>2004 (partly 2007)</td>
<td>63%</td>
</tr>
<tr>
<td>Air conditioners (cooling only)</td>
<td>2007</td>
<td>14%</td>
</tr>
<tr>
<td>TV sets</td>
<td>2003</td>
<td>16%</td>
</tr>
<tr>
<td>Video cassette recorders</td>
<td>2003</td>
<td>17%</td>
</tr>
<tr>
<td>Fluorescent lights</td>
<td>2005</td>
<td>17%</td>
</tr>
<tr>
<td>Copying machines</td>
<td>2006</td>
<td>30%</td>
</tr>
<tr>
<td>Computers</td>
<td>2005</td>
<td>83%</td>
</tr>
<tr>
<td>Magnetic disc units</td>
<td>2005</td>
<td>78%</td>
</tr>
<tr>
<td>Electric refrigerators/freezers</td>
<td>2004</td>
<td>30%</td>
</tr>
</tbody>
</table>

Energy conservation effect in comparison with FY1999 (and as compared with FY1995 for automobiles, and FY1998 for electric refrigerators/freezers).

The energy conservation effect is as compared with that of FY1997 (and as compared with FY1999 for automobiles, and FY1998 for electric refrigerators/freezers).

*Top Runner Program:
The concept of the program is that fuel economy standards for vehicles and energy conservation standards for electric appliances, etc. shall be set exactly the same as or higher than the best standard value of each product item currently available in the market.
The energy-saving labeling system has been introduced to inform consumers of energy efficiency of home appliances and to promote energy-efficient products.

**Examples of energy-saving labeling**

<table>
<thead>
<tr>
<th>Energy conservation standard achievement percentage</th>
<th>Energy consumption efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>131%</td>
<td>105.9 lm/W</td>
</tr>
</tbody>
</table>

Target year FY2005

<table>
<thead>
<tr>
<th>Energy conservation standard achievement percentage</th>
<th>Energy consumption efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>89%</td>
<td>72.1 lm/W</td>
</tr>
</tbody>
</table>

Target year FY2005

As of April 2005, labeling is applied to the following 13 products: air conditioners, refrigerators, freezers, fluorescent lights, TV sets, space heaters, gas cooking appliances, gas water heaters, oil water heaters, electric toilet seats, computers, magnetic disks, and transformers.
II-3. Energy Conservation Measures for the Commercial/Residential Sector

Reduction in Standby Power Consumption

- Standby power consumption in the household sector accounts for approximately 10% of total power consumption.
- The relevant industries have introduced voluntary programs for reducing standby power consumption.

Outline of voluntary efforts by the relevant industries

- Japan Electronics and Information Technology Industries Association, Japan Electrical Manufacturers' Association, and Japan Refrigeration and Air Conditioning Industry Association worked hard toward the goal of lowering the standby power consumption to 1 W or lower until the end of FY2003 with regard to products that essentially require standby power (until the end of FY2004 with regard to air conditioners), with the target achieved at the end of the target year.

- Japan Industrial Association of Gas and Kerosene Appliances is planning to achieve the goal of lowering standby power consumption of gas cooking appliances to 1 W or lower by the end of FY2008, as the association considers the reduction of the total energy consumption by gas and oil appliances as the target of their industrial efforts.
Energy Efficient Product Retailer Assessment System

- In order to promote energy efficient products, it is essential to introduce measures for retailers, who are the contact point between manufacturers and consumers.
- Recognition should be extended to retailers who actively promote energy-efficient products or provide appropriate energy conservation information.
- The **energy efficient product retailer assessment system** was introduced in FY2003.

Targeted retailers:
- All home appliance retailers whose sales coming from home appliances account for 50% or more of total sales

Selected retailers are authorized to carry a special logo.

- “Outlets that Excel at Promoting Energy-Efficient Products” are selected each year and publicized along with their rankings. Effective FY2004, Minister of Economy, Trade and Industry Award and Minister of Environment Award are awarded to large stores.
- Selected retailers are authorized to carry a special logo.
II-3. Energy Conservation Measures for the Commercial/Residential Sector

Promotion of High-Efficiency Boilers

- Energy demand for hot-water supply dominates approximately 30% of total energy consumption in a household.
- A subsidy system has been introduced to promote the proliferation of energy efficient hot-water systems.

**CO2 Refrigerant Heat-Pump Boiler (ECO CUTE)**

Utilizing the principle of a heat-pump used in an air-conditioner, it can be heated with energy of approximately 3 times more than input energy. Energy saving of approximately 30% compared to a traditional combustion-type boiler is achieved.

**Latent-heat Recovery Boiler (ECO JOZU)**

Recovers the latent heat of exhausted gas, which is usually wasted. Energy saving of approximately 15% compared to a conventional combustion-type boiler is realized.

**Gas Engine Boiler (ECO WILL)**

Uses the gas-powered engine’s exhaust heat and power to provide heat (main) and electricity (sub) for approximately 10% of overall energy saving for a building.
II-3. Energy Conservation Measures for the Commercial/Residential Sector

Promotion of High-Efficiency Air Conditioning Systems

Decentralized separate-unit system

- Refrigerating capacity: 8 Rt to 300 Rt
- The system is mainly used for small stores, medical clinics, small offices, and suburban stores.

Maximum energy conservation effect by changing to high-efficiency units: Approximately 25%

Centralized control system

- Refrigerating capacity: 100 Rt to 3000 Rt
- The system is mainly used for medium-sized buildings, shopping centers, large-sized buildings, and high-rise buildings.

Maximum energy conservation effect by changing to high-efficiency units: Approximately 63%
II-3. Energy Conservation Measures for the Commercial/Residential Sector

Reinforced Energy Conservation Measures in Residence & Building Sector

[Modified points of the law]

- **Reinforced measures against stock**
  Compulsory submission of the notification of energy-saving measures to the competent authorities by a party who will extensively repair non-residential buildings of a certain floor size (a total floor area of 2,000 m² or more) etc. (The current law only requires the responsibility of parties who newly build, extend, or rebuild buildings.)

- **Reinforced measures for residences**
  Compulsory submission of notification of energy-saving measures to the competent authorities for residences of a certain size (a total floor area of 2,000 m² or more) as in the case of non-residential buildings. (The current law only requires the concerned parties to make efforts to do so.)

* Competent authorities: Prefectural authorities, with district construction surveyors, governing construction authorization procedures
* Energy-saving measures: Insulation of exterior walls, windows, etc. and effective use of air conditioning systems or the like
* Extensive repair: Extensive repair or rearrangement of exterior walls, windows, etc, and new installation or extensive repair of air conditioning systems or the like

[Contents of modification]

- **Compulsory notification of energy conservation measures (applicable to buildings of a certain scale)**
  Buildings with a total floor of 2,000 m² or larger (non-residential buildings)
  - Submission of notification related to energy conservation measures upon new construction, extension or rebuilding, or extensive repair
  - If the energy conservation measures are found to be significantly insufficient, instructions shall be given and the status shall be announced to the public.

- **Residences with a total floor of 2,000 m² or larger**
  - Submission of notification related to energy conservation measures upon new construction, extension or rebuilding, or extensive repair
  - If the energy conservation measures are found to be significantly insufficient, instructions shall be given and the status shall be announced to the public.

Those who have submitted the notifications mentioned above shall periodically report the maintained status of energy conservation measures to the competent authorities. (If the maintained status is found significantly insufficient, the authorities shall advise the concerned parties.)

<Requirements after modification>
II-3. Energy Conservation Measures for the Commercial/Residential Sector

Full-Fledged Energy Management Utilizing IT
Establishment of HEMS (Home Energy Management System)

- Promotion of efforts for establishing a system utilizing IT technologies that support energy demand management (energy conservation behavior) at home, including optimum operation of home appliances (air conditioners, refrigerators, etc.) and real-time displays of energy consumption.

Field test example

- Data Center
  - Accumulation and analysis of collected data
  - Collecting power consumption monitoring data
  - Processing communications with AIGIS, etc.

- AIGIS terminal
  - Monitoring the load current for each of the home appliances to identify appliance usage status and patterns in using such devices

- Refrigerator
  - Displaying the times of opening/closing doors and the power consumption

- 180-degree camera
  - Transmitting images to PHS, etc. for monitoring the status of the home (Example)
  - Safety confirmation service for elderly persons living alone

- Information terminal
  - Collecting data from various appliance adapters to display power consumption and charges. Also making a central control of various functions.

- Blind/fan/air conditioner
  - Making a coordinated control of blinds and fans to reduce air conditioner operation

- AV devices
  - Cutting off standby power consumption with the use of an adapter

- Motion sensor/air-conditioner
  - Air-conditioner control by motion sensor

- Heat pump
  - Hot-water system
  - Remote ON/OFF control and remote bathwater filing

- Number of monitors: 300 households
  - (For limited monitors only)
Use IT technology to promote and facilitate a system that supports energy demand management for commercial buildings (e.g., a system that ensures recognizing real-time room conditions in buildings by temperature sensors and/or the optimal operation of lighting and air-conditioning responding to conditions in the room).
II-3. Energy Conservation Measures for the Commercial/Residential Sector

**Promotion of ESCO Business**

**What Is ESCO Business?**

- A business that offers comprehensive services on energy conservation to clients, who in return will offer part of their energy saving gains (saving on utility bills, etc.)
- The business has two forms: “Guaranteed savings agreement”, where customers cover business costs, and “Shared savings agreement” where the ESCO business covers business costs. These options enable service provision according to customer needs.

*ESCO stands for Energy Service Company*

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**Overview of ESCO business**

**Guaranteed method**
- Before the introduction of ESCO business
  - Utility charge payment
- During the implementation of ESCO business
  - Customer gain
  - ESCO expenses
    - Repayment
    - Interest
    - Initial investment
  - Energy conservation effect
  - ESCO operator shall guarantee the achievement.
- After the contract term completed
  - Customer Gain
  - Utility charge payment

**Shared method**
- Before the introduction of ESCO business
  - Utility charge payment
- During the implementation of ESCO business
  - No initial costs
  - Customer
  - Installation
  - ESCO
  - Lease/loan
- After the contract term completed
  - Leasing company
  - Financial institution
  - Customer
  - Energy-saving guarantee
  - ESCO
ESCO-related markets have shown rapid growth in recent years. However, market size in FY2004 decreased due to the decreased number of large-scale projects in the industrial sector. Yet chances are high that market size will further expand in the future. (FY2004 orders established: Approximately 37.4 billion yen)

Research estimates its potential market size at 2,470 billion yen. (Source: The ECCJ’s ESCO Introduction Promotion Study Group Report)

The market scale of ESCO business in the US in 2000 is approximately US$2 billion.

Source: JAESCO (Japan Association of Energy Service Companies) survey
II-3. Energy Conservation Measures for the Commercial/Residential Sector

Support for the Introduction of ESCO Business

- Support, in the forms of partial subsidy for initial investments, low-interest loans, etc., is extended to private enterprises and local governments implementing ESCO business.

- A model ESCO project will also be introduced at a national facility, i.e. METI building, from FY2004 onwards.

Example of ESCO business introduction (at a hospital)

Energy conservation effect due to the introduction of ESCO: Approximately 25%
II-4. Energy Conservation Measures for the Transportation Sector

Introduction of Energy Conservation Measures in the Transportation Sector (1)

Energy conservation efforts of transportation business operators in the transportation sector are specified to be compulsory. Business operators who manage their own transportation needs are also specified to be responsible for such efforts.

- Of those who transport cargo or goods of their own or of other business operator along with their business operations or those who transport passengers, those with a certain transportation capacity divided by transportation type (trucks for business use, trucks for private use, railroad, marine transportation, airlines and the like)

1. Preparation of plans (to be submitted to the Minister of Land, Infrastructure and Transport) [once a year]
   - Introduction of low-fuel economy vehicles, low-emissions vehicles, eco-ships, etc.
   - Promotion of eco driving or the like
   - Use of large-sized vehicles and containers
   - Preparation of a manual for reducing the number of transportation/distribution counts by improving the transportation lot
   - Preparation of a manual to increase circulative cargo transportation and backhauling
   - Introduction of an efficient vehicle dispatching system, and others
   * These items are specified in the judgment criteria (announcement).

Any failure to fulfill the submitted plans requires documentation and submission of the reasons.

2. Periodical reports (to be submitted to the Minister of Land, Infrastructure and Transport) [once a year]
   - Energy consumption for transportation (kl)=Amount of gasoline, diesel oil, etc.
   - Energy consumption intensity for transportation= Energy consumption for transportation (kl) ÷ Total transportation volume etc.
   - If the energy consumption intensity for transportation fails to improve by 1%* or more against the previous year, the reasons must be reported
   * Examined on the basis of the actual status of rational use of energy for transportation. These items are specified in the judgment criteria (announcement).

Examples of items included in the plans
- Preparation of plans to increase transportation lot
- Introduction of an efficient vehicle dispatching system
- Preparation of a manual for reducing the number of transportation/distribution counts by improving the transportation lot
- Preparation of a manual to increase circulative cargo transportation and backhauling
- Introduction of low-fuel economy vehicles, low-emissions vehicles, eco-ships, etc.
- Promotion of eco driving or the like
- Use of large-sized vehicles and containers

Legislative actions
- If efforts are significantly insufficient and intensity has not been improved → Advice is given for proper measures
- If the advice was not followed → The name of the business operator is made public.
- If measures in accordance with advice were not taken, without a valid reason → An order is issued to comply with the advice.
- If the order is disobeyed → A fine is imposed (One million yen or less)
II-4. Energy Conservation Measures for the Transportation Sector

Introduction of Energy Conservation Measures in the Transportation Sector (2)

Energy conservation efforts of business operators who act as consigners as well as transportation business operators in the transport sector are specified to be compulsory. Business operators who manage their own transportation needs are also specified to be responsible for such efforts.

1. Preparation of plans (to be submitted to the Minister of Economy, Trade and Industry and other Ministers of competent authorities) [once a year]

- Appointment of officers in charge of energy conservation
- In-house training
- Promotion of the use of railroad and cargo ships (modal shift)
- Shift from private cargo vehicles to business-use cargo vehicles
- Study on the feasibility of the use of 3PL (third-party logistics)
- Preparation of a manual for cooperative physical distribution with other companies
- Standardization and downsizing of products for improving the loading ratio

* The business operators themselves may select the types of efforts out from the judgment criteria (announcement) in accordance with their ability.

2. Periodical reports (to be submitted to competent minister) [once a year]

- The total of cargo weight (tons) x transportation distance (kilometers) of each type of cargo

- The total of cargo weight and total of transportation volume (ton kilometers) of the consignment transportation for each transportation mode *1

- Energy use (kl) required for consignment transportation for each transportation mode *2

- Energy consumption intensity for consignment transportation= Energy consumption for consignment transportation (kl) ÷ Sales volume or transportation cost etc.*3

*1: Applicable modes include 2t truck, 4t truck, 10t truck, railroad, cargo ship, airplane, etc.

*2: Values closely associated with the energy consumption for consignment transportation. (The reporting party shall decide as to which value is to be used in the calculation. However, the selection shall be the same as in the report submitted in the previous year, if any).

*3: Examined on the basis of the actual status of rational use of energy for consignment transportation. The item is specified in the judgment criteria (announcement).

Legislative actions

- If efforts are significantly insufficient and the energy unit has not been improved → Advise is given for proper measures
- If the advice was not followed → The name of the business operator is made public.
- If measures in accordance with the advice were not taken, without valid reason → An order is issued to comply with the advice.
- If the order is disobeyed → A fine is imposed (One million yen or less)
II-4. Energy Conservation Measures for the Transportation Sector

Promotion of Cars with the “Idling-Stop” System

- Idle-free driving can improve fuel economy by approximately 10%.
  An even greater energy conservation effect is expected in urban areas, where car stopping frequency is high.
- Partial subsidy for the purchase of cars equipped with the “idling-stop” system was introduced in FY2003.
- Promotional campaigns for “idling-stop” systems are held in the form of PR events, etc.

Result of the driving experiments by “idling-stop” cars

Results of “The Idling-Stop 2002 Caravan Throughout Japan”

Nationwide (3719km)...5.8% on average
Or 13.4% in city areas

[Stop & “idling-stop” implementation time ratio in urban area]

PR activities

An event for “idling-stop-at-stoplight” experiments is scheduled for October 2005
II-4. Energy Conservation Measures for the Transportation Sector

**Fuel Economy Disclosure and Labeling System for Vehicles**

- The system was introduced in January 2004 to deepen consumer interest/understanding regarding fuel economy, and promote cars with high fuel performance.
- **Disclose Fuel Economy Performance**
  - Disclosure is targeted for cars of which fuel economy standards are set based on the energy conservation law.
  - Either the status of “fully compliant” or “plus 5% of the fuel economy standard” will be publicly displayed.
- **Label a Fuel Economy Identifiable Sticker**
  - Label a sticker on the body of a car that conforms either to “fully compliant with the fuel economy standard” or “plus 5% of the fuel economy standard.”

<table>
<thead>
<tr>
<th>Energy conservation law target year</th>
<th>FY2010</th>
<th>FY2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicles subject to the energy conservation law</td>
<td>Gasoline passenger/freight vehicles/LP gas passenger vehicles</td>
<td>Diesel passenger/freight vehicles</td>
</tr>
<tr>
<td>Model “plus 5% of the fuel economy standard”</td>
<td><img src="Image1" alt="Image" /></td>
<td><img src="Image2" alt="Image" /></td>
</tr>
<tr>
<td>Model “fully compliant”</td>
<td><img src="Image3" alt="Image" /></td>
<td><img src="Image4" alt="Image" /></td>
</tr>
</tbody>
</table>
II-4. Energy Conservation Measures for the Transportation Sector

**Traffic Management Measures**

- Adjusting automotive traffic demands through the promotion of TDM (Transportation Demand Management) measures.
- Promoting ITS (Intelligent Transport System) by promoting ETC (Electronic Toll Collection) and VICS (Vehicle Information and Communication System)

**Promotion of TDM (Transportation demand management) trial**

- Serious traffic congestion in city areas
  - 12 trillion yen in economic loss each year
  - Limitations to road development aimed for transport capacity increase

**ETC promotion measures**

- Raise ETC usage rate to around 70% by the end of FY2007 to alleviate congestion at toll gates.

**Current Status**

- Experimental measure for alleviating congestion in partnership between local governments, the police and transportation businesses
- One-coin bus (¥100 per ride), etc.

**Government Support**

- National Police Agency/Ministry of Land, Infrastructure and Transport certify and partially subsidize (1/3 of costs) for verification trials expected to gain effectiveness on congestion alleviating measures.

**Source:** Organization for Road System Enhancement (What is ETC?)
New System for Developing Energy Conservation Technologies

- Marketing in Steps -

1. **Urgent/Top priority issues**
   - Verification
     - Verification studies using actual plants that include data collection and technological improvements shall be executed for those that are required to have their effectiveness and reliability prior to their commercialization and introduction to the market.
   - Practical Application Development
     - Research and development toward practical application shall be promoted for those products of which practical application is delayed due to lack of peripheral technologies and commercialization technologies.
     - In addition, development shall continue for practical application of seed technologies found in the basic pioneering research phase.
   - Pioneering Research
     - Research and development shall be conducted for innovative and promising basic technologies that represent high repercussion effects on future energy conservation.

2. Development steps
   - Marketability
   - Urgent/Top priority issues
   - Verification
   - Practical Application Development
   - Pioneering Research

3. Grant rates:
   - Urgent/Top priority issues: 1/2 or 2/3
   - Verification: 1/2
   - Practical Application Development: 1/2 or 2/3
   - Pioneering Research: 10/10
II-5. Development of Energy Conservation Technologies

Main Research and Development Projects for Energy Conservation

- **Cross-sector**
  - Strategic development projects for technologies for rational use of energy

    In order to achieve a technological breakthrough that helps promote energy conservation in the industrial sector, commercial/residential sector, and transportation sectors respectively, research and development projects focusing on energy conservation shall be systematized and research and development of higher repercussion effects and higher investment efficiency shall be prioritized.

- **Industrial sector**
  - Research and development of energy efficient chemical processes

- **Commercial/residential sector**
  - Research and development of next-generation highly energy-efficient displays
  - Research and development of energy efficient highly energy-efficient semiconductor devices

- **Transportation sector**
  - Research and development of lightweight automotives and aircraft
Recent Cooperation

○ The 1st Asia ESCO Conference
○ Model Projects for the Efficient Use of Energy
○ Energy Conservation Training Courses in Japan
○ Dispatch Experts

Japan-Thailand Economic Partnership Agreement

On 1 September 2005, Mr Junichiro Koizumi, Prime Minister of Japan and Mr Thaksin Shinawatra, Prime Minister of the Kingdom of Thailand jointly announced that agreement in principle including cooperation for energy conservation has been reached between the Japanese side and the Thai side on all major elements of the Japan-Thailand Economic Partnership Agreement.