Energy Conservation Policies of Japan

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Agency of Natural Resources and Energy
Energy Conservation and Renewable Energy Department
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1. Conditions surrounding energy

2. Energy conservation policies of Japan
   (1) Industrial sector
   (2) Consumer sector (including Top Runner Program)
   (3) Transportation sector

3. Budgetary provisions
Principally in Asia, but the energy demands of the world are expected to rise rapidly to **about 1.3 times the current amounts by 2030**. The energy supply structure will be hard pressed, due to the intensification of the competition to acquire resources among the countries of consumption, such as China.

Japan has the lowest self-sufficiency rate among the major industrialized nations.

### Outlook of global energy

<table>
<thead>
<tr>
<th>Region</th>
<th>2008 (million tons)</th>
<th>2030 (million tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>Approx. 1.9 times</td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>Approx. 1.7 times</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>Approx. 1.3 times</td>
<td></td>
</tr>
</tbody>
</table>

### International comparison of energy self-sufficiency rates (FY2009)

<table>
<thead>
<tr>
<th>Country</th>
<th>Self-sufficiency Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>(85%)</td>
</tr>
<tr>
<td>USA</td>
<td>(70%)</td>
</tr>
<tr>
<td>UK</td>
<td>(61%)</td>
</tr>
<tr>
<td>France</td>
<td>(47%)</td>
</tr>
<tr>
<td>Japan</td>
<td>(44%)</td>
</tr>
<tr>
<td>Germany</td>
<td>(35%)</td>
</tr>
<tr>
<td>Italy</td>
<td>(19%)</td>
</tr>
<tr>
<td>Others</td>
<td>(14%)</td>
</tr>
</tbody>
</table>

*The self-sufficiency rate is for instances where atomic power is imported. (Figures inside brackets are for instances where atomic power is considered to be produced domestically.)*

Source: Calculated from statistics published by IEA.

The final energy consumption of Japan has basically consistently increased, except for periods immediately following the two oil crises and the economic downturn in recent years.

The GDP kept on increasing to about 2.3 times from 1973 to 2009 and the consumption of energy for individual sectors significantly increased with the consumer sector increasing to about 2.4 times, while the transportation sector increased to about 1.9 times, whereas the industrial sector increased about 0.85 times.
Energy Conservation Efforts in Japan Since Oil Crisis

Since the Oil Crisis in the 1970s, Japan has been conducting energetic activities involving both the public and private sectors, resulting in improvements in energy efficiency by about 33% in the 30 years from 1979 to 2009.

Through various energy conservation strategies the highest energy efficiency in the world was realized. Since the latter part of the 1980s, however, the efficiency per GDP has been sluggish in performance, requiring the implementation of further strategies.

Primary energy consumption per real GDP in Japan

<table>
<thead>
<tr>
<th>Year</th>
<th>Energy Consumption per Real GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1973</td>
<td>1.8</td>
</tr>
<tr>
<td>1976</td>
<td>1.6</td>
</tr>
<tr>
<td>1979</td>
<td>1.4</td>
</tr>
<tr>
<td>1982</td>
<td>1.2</td>
</tr>
<tr>
<td>1985</td>
<td>1.0</td>
</tr>
<tr>
<td>1988</td>
<td>0.8</td>
</tr>
<tr>
<td>1991</td>
<td>0.6</td>
</tr>
<tr>
<td>1994</td>
<td>0.4</td>
</tr>
<tr>
<td>1997</td>
<td>0.2</td>
</tr>
<tr>
<td>2000</td>
<td>0.0</td>
</tr>
<tr>
<td>2003</td>
<td>0.0</td>
</tr>
<tr>
<td>2006</td>
<td>0.0</td>
</tr>
<tr>
<td>2009</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Comparison of primary energy supply per unit GDP of respective countries (2009)

<table>
<thead>
<tr>
<th>Country</th>
<th>Primary Energy Supply per Unit GDP (Petroleum equivalent in tons / US$100, at 2000 price)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>1.0</td>
</tr>
<tr>
<td>USA</td>
<td>1.9</td>
</tr>
<tr>
<td>EU27</td>
<td>1.7</td>
</tr>
<tr>
<td>Australia</td>
<td>2.4</td>
</tr>
<tr>
<td>Canada</td>
<td>3.0</td>
</tr>
<tr>
<td>Korea</td>
<td>3.0</td>
</tr>
<tr>
<td>Thailand</td>
<td>5.9</td>
</tr>
<tr>
<td>Middle East</td>
<td>7.5</td>
</tr>
<tr>
<td>Indonesia</td>
<td>7.8</td>
</tr>
<tr>
<td>China</td>
<td>7.2</td>
</tr>
<tr>
<td>India</td>
<td>7.7</td>
</tr>
<tr>
<td>Russia</td>
<td>16.3</td>
</tr>
<tr>
<td>World</td>
<td>3.1</td>
</tr>
</tbody>
</table>

Source: Calculated from statistics published by IEA.

1. Conditions surrounding energy

2. Energy conservation policies of Japan
   (1) Industrial sector
   (2) Consumer sector (including Top Runner Program)
   (3) Transportation sector

3. Budgetary provisions
Programs for energy conservation policies in Japan are classified roughly into categories of "industrial sector", "consumer sector (commercial and household)" and "transportation sector".

*Strategies implemented from both aspects of regulation and support* (budget, tax programs, etc.) in the respective sectors are according to the Energy Conservation Law.

*Development of energy conserving technologies* and *nationwide activities intended to improve energy awareness* have been implemented as support across fields.

### Regulatory measures

**Industrial sector**
- Business operators (energy consumption of at least 1,500kl): Energy conservation measures (periodical reports) and reduction efforts of 1% per year.
- Residential buildings and structures (at least 300m²): Observation of Energy Conservation Standards at the time of construction (submission of notification).

**Consumer sector**
- Automobiles and household electrical appliances: Regulation by Top Runner Program, etc.
- Household electrical appliances: Display of energy conservation performance, etc.

**Transportation sector**
- Cargo owners and carriers (of specific minimum size): Energy conservation measures (periodical reports), etc.

### Support measures

**Industrial sector**
- Provision of subsidies and supplement of interests, etc., for implementation of energy conserving facilities.
- Tax system (accelerated depreciation) for implementation of energy conserving facilities or construction of energy conserving buildings.
- Provision of subsidies for development of energy conserving technologies (high performance heat pumps, high performance thermal insulation materials, etc.)
- Provision of information and promotion of nationwide activities (such as forum activities) intended to improve energy conservation awareness, etc.

**Consumer sector**
- Residential Eco Points, etc.
- Residential renovation tax reductions, etc.

**Transportation sector**
- Provision of subsidies for implementation of Clean Energy cars, etc.
- Eco Car tax reductions, etc.
The Energy Conservation Law is the basis of all energy conservation policies in Japan. It was established in 1979, triggered by the Oil Crisis.

### Fields Subject to Regulations Under Energy Conservation Law

1. **Manufacturing plants & business establishments**
   - Business operators with an annual energy consumption of at least 1,500kl (equivalent crude oil) at manufacturing plants and business establishments.

2. **Transportation**
   - Freight carriers with a transportation capacity of a minimum certain scale, such as 200 trucks or 300 railway cars for railroads, etc., (currently 637 companies).
   - Cargo owners with an annual freight transport order of at least 30 million tons (currently 874 companies).

3. **Residential buildings and structures**
   - Structures on a large scale with a total floor areas of at least 2000m².
   - Small to mid size structures with a total floor area of at least 300m².
   - Business operators who build and sell residential buildings (annually supplying at least 150 units).

4. **Machinery and equipment**
   - Passenger cars, air conditioners, television sets, etc., 23 items.
   - (Comprises about 70% of household energy consumption.)
Summary of Energy Conservation Law

Manufacturing plants & business locations

Obligation for business operators to make an effort and public disclosure of judgment standards

- Specified business operators and specified chain business operators
  (Energy consumption of 1,500kl per year)
  - Obligation to appoint Energy Managers, etc.
  - Obligation to periodically report on energy consumption status.
  - Obligation to submit medium and long term plans.

Transportation

Obligation for business operators to make an effort and public disclosure of judgment standards

- Specified carriers (freight and passengers)
  (Fleet of vehicles: At least 200 trucks or at least 300 railway cars for railroads, etc.)
  - Obligation to submit medium and long term plans.
  - Obligation to periodically report energy consumption status.

- Specified consigners
  (Annual transport volume of at least 30 million ton-km.)
  - Obligation to submit plans.
  - Obligation to periodically report consumption of energy related to consigned transportation.

Residential buildings and structures

Obligation for construction clients and owners to make an effort and public disclosure of judgment standards

- Specified buildings
  (Total floor area of at least 300m².)
  - Obligations relating to the submission of notifications pertaining to energy conserving measures implemented by construction clients in relation to large scale modifications and obligations relating to reporting the status of overall maintenance.

- Housing providers
  (Annual supply of at least 150 units.)
  - Obligation to observe targets for improving energy conservation performance of supplied ready built residential housing.

Provisions relating to machinery and equipment

Obligation for manufacturers and import business operators of energy consuming equipment to make an effort

Top Runner Standards (23 units)
  - Standards for energy conservation of passenger cars, air conditioners, television sets, etc. To exceed the performance of most superior products that have been commercialized at the present time is required of each type of unit.

Provision of information

Obligation to make effort in providing information to general consumers

- Provision of information on energy conservation (annual electric power consumption, fuel economy, etc.) that is easy to understand at storefronts of retailers who sell household electrical appliances, etc.
- Popularization of energy conserving equipment and the provision of information, etc., by electric power and gas companies.
1. Conditions surrounding energy
2. Energy conservation policies of Japan
   (1) Industrial sector
   (2) Consumer sector (including Top Runner Program)
   (3) Transportation sector
3. Budgetary provisions
Iron and steel, as well as chemical industries, comprise 60% of energy consumption in the overall industrial sector.

Energy unit consumption rapidly improved since the Oil Crisis and until the middle of 1980s, however, it has been in a levelled off trend since the 1990s.

Current measures

- **Regulation:** Thorough implementation of energy conservation activities by individual businesses and the formulation of benchmarks for each sector, etc.
- **Support:** Support for the implementation of highly efficient energy conserving facilities, support for the development of innovative technologies, the provision of low-interest loans, etc.

**Energy consumption amounts and proportions in manufacturing industry (FY2009)**

**Transition of energy unit consumption per mining and manufacturing production indices in manufacturing industry**

- Iron and steel: 26%
- Chemicals: 35%
- Others: 14%
- Textile: 1%
- Non-ferrous metals: 2%
- Food and tobacco: 4%
- Paper and pulp: 5%
- Ceramic products and earthenware: 6%
- Metal working machinery: 7%
- Others: 9%

Source: "Comprehensive Energy Statistics" of EDMC/Agency for Natural Resources and Energy and estimates of EDMC.

(Note 1) Added value weighting is used for mining and manufacturing production indices (standards for 2000).

(Note 2) It is necessary to consider that the mining and manufacturing indices are impacted by sales prices and therefore reductions can be greater than the reductions of the production volume when the sales prices are sinking.
Current Regulatory Scheme at Manufacturing Plants, etc.

- Business operators with overall annual energy consumption (head office, manufacturing plants, branch offices, sales offices, etc.) of at least 1,500kl in crude oil equivalent are subject to regulations.
- Business modes, such as franchised chain of stores, are also considered single business operators and those consuming at least 1,500kl for the whole chain are subject to regulations.

On the basis of energy consumption, about 90% of the industrial sector and about 50% (estimated) of the commercial sector are covered, as they are subject to regulations.

- Obligation to report periodically
  - Transition of energy unit consumption
  - Status of activities relating to energy conserving measures
  - Obligation to annually report on status of benchmark indices (for subject business lines only), etc.

(Flow of measure implementation)

- Business operator
  - Submission of periodical reports.
  - Implementation of onsite investigations.

- Ministry of Economy, Trade and Industry
  - Onsite inspections
  - Guidance
  - Evaluation on details of reports and investigations.
  - When activities are significantly inadequate.
  - When instructions are not followed.

- Rationalization plan
  - Instruction
  - When activities are significantly inadequate.

- Public disclosures and issuance of orders

* Fines imposed for instances when orders are not followed.

- Numerical targets: Reduction of annual average by at least 1%.

- Guidelines pertaining to energy conservation measures:
  - Stipulation of judgment standards (guidelines) based on the Energy Conservation Law as observance items for energy management.

  - Energy conservation measures for business operators overall
    - Maintenance of energy management organization.
    - Allocation of persons in charge.
    - Formulation of policies for activities pertaining to energy conservation targets, etc.

  - Energy conservation measures at individual manufacturing plants and business establishments
    - Example: Air conditioning systems.
    - Preparation and implementation of management standards (manuals) pertaining to the following measures:
      - Operational management (operating time, set temperature, etc.).
      - Periodical measurement and recording of temperature, humidity, etc.
      - Periodical maintenance and inspection of facilities.

- New numerical targets to include in addition to existing targets
  - Benchmark indices and standards to be targeted
    - Currently set business lines: Iron and steel, electric power, cement, paper manufacturing, petroleum refining and chemical.
    - Standards to be aimed for: Levels satisfied by most superior business operators in respective industries (10 to 20%).
1. Business operators overall

<table>
<thead>
<tr>
<th>Annual energy consumption (crude oil converted amount kl)</th>
<th>At least 1,500kl</th>
<th>Under 1,500kl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classification of business operator</td>
<td>Specified business operator or specified chain business operator</td>
<td>-</td>
</tr>
</tbody>
</table>
| Items to be observed                                     | Judgment standards for manufacturing plants, etc. (standards components)  
  - Set management standards, operational standards based on management standards, measurement  
  records, maintenance inspections, etc. | |
| Target                                                  | Judgment standards for manufacturing plants, etc. (target components)  
  - Reduce energy unit consumption by 1% or more in the medium to long term  
  - Attain benchmark indices (only for applicable business lines), etc. | |
| Obligations                                             | Person to be appointed  
  - Energy Management Control Officer and Energy Management Planning Promoter | - |
| Documents to be submitted                                | Medium to long term plans, periodical reports and notification on appointment of  
  energy management control officers, etc. | |

2. For each manufacturing plant of installation

<table>
<thead>
<tr>
<th>Annual energy consumption (crude oil converted amount kl)</th>
<th>At least 3,000kl</th>
<th>At least 1,500kl to under 3,000kl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type designation</td>
<td>Type 1 Designated Energy Management Factory, etc.</td>
<td>Type 2 Designated Energy Management Factory, etc.</td>
</tr>
</tbody>
</table>
| Obligations and persons to be appointed                 | Manufacturing business, mining  
  business, as well as electric power supply, gas supply and heat supply businesses | Other than those described on the left (hotels, schools, etc.) |
|                                                         | Energy Manager | Energy Management Officer | All business lines |
Business operators must manage the energy unit consumption at manufacturing plants, as well as other installations and they must set targets to reduce the unit consumption, from a medium to long term perspective, with an annual average of at least 1% (judgment standards).

**Energy unit consumption = (A - B) / C**

- **A** = Energy consumption (consumption of fuel, consumption of heat supplied by others, as well as the consumption of electric power supplied by others)
- **B** = Amount of energy sold externally
- **C** = Value that is closely related to the consumption of energy

*"A" and "B" are calculated in crude oil equivalent kiloliters.*

### Status on setting "Value that is closely related to the consumption of energy" (C).

- **Manufacturing sector** (subject sites: 9,597 business establishments)
  - Weight: 4,146
  - Amount: 2,139
  - Count: 1,540
  - Area: 728
  - Volume: 424

- **Commercial sector** (subject sites: 5,186 business establishments)
  - Area: 2,435
  - Area □ time: 1,054
  - Volume: 508
  - Weight: 377
  - Number of people: 182

Source: FY2009 periodical reports
Implementation of Benchmarks by Sectors

Background for implementation of benchmarks:
- More impartial evaluations on the efforts of business operators under the Energy Conservation Law.
- Supportive efforts by business operators through the visualization of energy conservation efforts.
- The spread of information pertaining to the practice of the sectoral approach to the world.

More specifically, for each specific business line (sector):
- Indices that can be used to compare the energy conservation status of business operators in each business line.
- The spread of information pertaining to the practice of the sectoral approach to the world. Determine benchmark indices and set standards to be attained in the medium to long term.

The achievement of numerical targets (reducing energy unit consumption by an annual average of at least 1%), as set under the Energy Conservation Law, had been difficult to sustain for business operators who already had progressed with considerable energy conservation activities.

For this reason, a more impartial evaluation on the efforts of business operators is made possible by establishing an index (benchmark index), which can be used to compare the energy conservation status of business operators, so that business operators lagging behind in taking action are prompted to put in more effort.

Standards to be targeted are to be levels satisfied by most superior business operators in their respective industries (10 to 20%).

[Concept for setting business lines subject to benchmarks]
- Three business lines of iron and steel, cement and electric power were set in FY2008. These were set with a consideration for the amount of energy used and the progress of international debates in the respective business lines.
- The setting was further expanded to include paper manufacturing, petroleum refining and chemical industries in FY2009.

The coverage rate of energy consumption in the industrial sector: About 40% for the three business lines set in FY2008, which increased to about 60% with the addition of three more business lines considered in FY2009. Expansion to include the commercial sector, such as offices and retailers, is also being considered.
With regards to benchmarks, it has been determined that “In order to support voluntary efforts by business operators, the average values and standard deviations for the business operators of reported benchmark indices are publicly disclosed by the Government. Furthermore, the names of the business operators whose energy conservation efforts have been particularly advanced, are publicly disclosed by the Government.”

(Summary of Manufacturing Plant Judgment Standards Subcommission, Energy Efficiency Standards Subcommittee, Advisory Committee on Energy and Natural Resource (March 31, 2009))

Periodical reports from last fiscal year provided reports on the results for FY2009 from formulations of the stipulations in FY2008 regarding five business industries, steel manufacturing with blast furnaces, ordinary steel manufacturing with electric furnaces, special steel manufacturing with electric furnaces, electric powr supplies and cement manufacturing. The results are shown below:

<table>
<thead>
<tr>
<th>Public disclosure of results from benchmark reports</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(1) Steel manufacturer using blast furnaces</strong></td>
</tr>
<tr>
<td>Average: 0.597kl/t</td>
</tr>
<tr>
<td>Standard deviation: 0.044kl/t</td>
</tr>
<tr>
<td>Attaining business operators: None.</td>
</tr>
<tr>
<td><strong>(2) Ordinary steel manufacturer using electric furnaces</strong></td>
</tr>
<tr>
<td>Average: 0.184kl/t</td>
</tr>
<tr>
<td>Standard deviation: 0.032kl/t</td>
</tr>
<tr>
<td>Attaining business operators: Jonan Steel Corporation, Tokai Steel Corporation, Tohoku Steel Corporation, Yamaguchi Kogyo Co., Ltd.</td>
</tr>
<tr>
<td><strong>(3) Special steel manufacturer using electric furnaces</strong></td>
</tr>
<tr>
<td>Average: 0.58kl/t</td>
</tr>
<tr>
<td>Standard deviation: 0.31kl/t</td>
</tr>
<tr>
<td>Attaining business operators: Sintokogio, Ltd., KYB Cadac Co., Ltd.</td>
</tr>
<tr>
<td><strong>(4) Electric power supplier</strong></td>
</tr>
<tr>
<td>Average: 99.2%</td>
</tr>
<tr>
<td>Standard deviation: 1.1%</td>
</tr>
<tr>
<td><strong>(5) Cement manufacturer</strong></td>
</tr>
<tr>
<td>Average: 4089MJ/t</td>
</tr>
<tr>
<td>Standard deviation: 250MJ/t</td>
</tr>
</tbody>
</table>

* Business operators who succeeded in achieving their targets and who agreed to be listed on a public disclosure are listed in phonetic order.
The amendment of the law in 2007 stipulated that the Government will make appropriate considerations in order to promote activities relating to joint energy conservation projects (project for contributions towards the support of rationalization for the energy used by other parties).

Business operators implementing joint energy conservation projects may report the relevant activity status to the Government and the Government will take that into consideration when evaluating the business operator.

Amount necessary to achieve target (reduction of unit consumption by 1%) can be evaluated in a comprehensive manner, if a report on the amount of energy jointly conserved is reported.

Activities that realize further energy conservation are supported through a collaboration of multiple business operators.
Flow of Necessary Procedures According to the Energy Conservation Law

Business operator

- Notification on Status of Energy Consumption
  - Grant of opportunity for providing explanations
    - In case particular explanations are to be offered (explanation document)
    - In case no explanations are to be offered (no procedure necessary)
  - Business operator receives designation of specified business, specified chain business operator, designated energy management factory, etc.
  - Appointment of energy management control officers and energy management planning promoters, energy managers and energy management officers.
  - Energy management control officer and energy management planning promoter, energy manager and energy management officer appointment notification
  - Periodical reports
  - Medium- to long-term plan

Minister of Economy, Trade and Industry

- Submission
  - Acceptance
  - Notification
  - Explanation demand notice
  - Acceptance and individually dealt
  - Designation notification issued after a certain period
  - Submission
    - Acceptance
    - Report
      - Acceptance
    - Submission
      - Acceptance
  - Acceptance

Competent minister project
1. Conditions surrounding energy

2. Energy conservation policies of Japan

   (1) Industrial sector

   (2) Consumer sector (including Top Runner Program)

   (3) Transportation sector

3. Budgetary provisions
Looking at the transition of the final energy consumption in Japan reveals that in comparison with the industrial or transport sectors, the consumer sector (commercial and households), which comprise 30% of the overall energy consumption, had a notable increase and this sector requires enhancements to energy conservation strategies more than others.
The consumer sector, which is comprised of commercial and household consumers, has **the highest** growth in energy consumption of all sectors.

Since entering into the 2000s, however, the trend has practically flattened out. This occurred because on one hand areas and business hours increased for the commercial sector and the number of households, as well as the use of electrical appliances for the household sector increased, whereas on the other hand the efficiency of household electrical appliances also improved, due to the impact of the Top Runner Program under the Energy Conservation Law, etc.
Energy conservation standards for building structures are comprised of the standards relating to the thermal insulation performance of such items as the external wall design (specifications of glass, thickness of the thermal insulation materials, etc.), "Perimeter Annual Load" (PAL) and Standards of Judgement for Energy Conservation of Buildings, "Coefficient of Energy Consumption" (CEC).

The "CEC" stipulates standards for each building facility. [CEC/AC (air conditioning facilities), CEC/V (mechanical ventilation facilities), CEC/L (lighting facilities), CEC/HW (hot water supply equipment) and CEC/E (elevators)]

Energy conservation standards of "PAL" and "CEC" are stipulated for specific building uses.

[Clerical offices, hotels, hospitals, sales outlets, dining and drinking establishments, schools, assembly halls and manufacturing plants.]

The Energy Conservation Standards were established in 1980 (Year of Showa 55) and sequentially enhanced in 1993 (Year of Heisei 5) and 1999 (Year of Heisei 11).

Image of energy conservation strategies for building structures

Comparison of energy consumption by building structures covered by respective Energy Conservation Standards

* Amount of energy consumption (energy consumption index) necessary to achieve the same levels of indoor environments, when the energy consumption for building structures, prior to the 1980 standards (conventional types), is set to 1.
Japan was sectioned into six regions and the standards pertaining to the thermal insulation, air tightness and sunlight shielding were stipulated for each region.


Items pertaining to common building facilities in 2006.

Image of thermal insulation for residential buildings of timber construction

Provisional calculation for annual energy consumption*

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat loss coefficient</td>
<td>-</td>
<td>Up to 5.2 W/(m²K)</td>
<td>Up to 4.2 W/(m²K)</td>
<td>Up to 2.7 W/(m²K)</td>
</tr>
<tr>
<td>Speciation standards</td>
<td>None</td>
<td>Glass wool 30mm</td>
<td>Glass wool 55mm</td>
<td>Glass wool 100mm</td>
</tr>
<tr>
<td>Thermal insulation materials (ceilings)</td>
<td>None</td>
<td>Glass wool 40mm</td>
<td>Glass wool 85mm</td>
<td>Glass wool 180mm</td>
</tr>
<tr>
<td>Openings (windows)</td>
<td>Aluminum sash + single pane</td>
<td>Aluminum sash + single pane</td>
<td>Aluminum sash + single pane</td>
<td>Aluminum double sash or aluminum single sash + multi-layered glass</td>
</tr>
</tbody>
</table>

Annual heating and cooling costs*

- Approx. 133,000 yen / year
- Approx. 92,000 yen / year
- Approx. 75,000 yen / year
- Approx. 5,000 yen / year

Annual heating and cooling energy consumption*

- Approx. 56GJ
- Approx. 39GJ
- Approx. 32GJ
- Approx. 22GJ

* Provisional calculation based on certain assumptions by the Ministry of Land, Infrastructure and Transportation.
Top Runner Standards (Standards for Judgment by Construction Clients of Residential Housing Businesses)

- Top Runner Standards (standards for judgment by construction clients of residential housing businesses).
- Targets for improving energy conservation performance of ready built residential housing supplied by building owners (construction clients of residential housing businesses) engaged in the business of building residential housing in order to induce further improvements to energy conservation performances through such means as securing thermal insulation or implementing highly efficient building facilities.
- In cases where substantial improvements in the energy conservation performance are considered necessary, such as a status of insufficient attainment of targets by the targeted fiscal year (five years (FY2013) set as the target year), the Minister of Land, Infrastructure and Transportation issues a recommendation to the applicable construction client of the residential housing business to improve their performance by showing the targets and if such a recommendation is not adhered to, then public disclosures are made or orders (with penal provisions) are issued.

Energy Conservation Standards
(judgment standards for construction owners and owners of specified building structures pertaining to the rationalization of the use of energy for residential housing (announced in 1999)).

Evaluation of thermal insulation performance for external walls, windows, etc.

No evaluation for energy conservation performance of facilities

Top Runner Standards (standards for judgments by construction clients of residential housing businesses (announced in 2009)).

The thermal insulation performance of external walls and windows were evaluated in a comprehensive manner, based on energy consumption (facilities with a high energy conservation performance were evaluated positively, whereas facilities with a low energy conservation performance were evaluated negatively.)

Activities for a total reduction of 10% for energy consumption in comparison with installing standard facilities.
The compliance rate for the Energy Conservation Standards of new buildings is about 90%, which is quite high, but the compliance rate of newly built residential housing is only about 40%.

(The reason for the rise in the compliance rate for residential housing from 2009 to 2010 was due to the impact of the Residential Eco Point program.)

* Proportion of floor areas in building structures, which complied with the Energy Conservation Standards (1999 standards), for building structures (at least 2,000㎡) constructed and verified in the applicable year.
[Definition of ZEB]

Building structures that have an annual primary energy consumption of net zero or almost zero through a reduction in the consumption of primary energy in building structures with improvements to the energy conservation performance of building structures and facilities, as well as by utilizing renewable energy on site.

- Variable flow rate and variable air flow rate control systems
- Automatic ventilation control system that responds to concentrations of carbon dioxide
- LED lighting
- Motion sensor control
- Initial light intensity compensation
- Day light linkage control
- Blind control
- Light duct system (Natural lighting)
- Solar power generating system
- Natural ventilation and night purge (external air intake during night time)
- Hybrid air conditioning control technology
- Highly efficient air conditioner heat source equipment
- Utilization of unused energy in urban areas (such as river heat and ground heat)

The increase in the commercial sector (office buildings, retail stores, hospitals and schools, etc.), which comprises the majority of the consumer sector, has been more significant than the household sector and it is the sector that most needs the enhancement of energy conservation strategies.

Activities for ZEB (Net Zero Energy Building), which carry forward fundamental energy conservation in this field, are necessary.
Double skin
Natural flow of air is used during the intermediate period and features high thermal insulation characteristics, even during summer or winter, without the use of air conditioning energy, saving energy and reducing carbon dioxide emissions.

Green Tomorrow (total floor area: 420㎡)

New Toshima City Government Building (planned)
Energy conservation and creation is realized through solar power generation, as well as through the installation of planting panels and Eco wood louvers on external walls.

Intelligent lighting system using LEDs

Double sash and double glazed windows

Source: Nihon Sekkei (design collaborator: Kengo Kuma)
Circumstances Surrounding ZEB in Respective Countries

Policy targets intended for ZEB

**UK**
An ambitious target for making "all newly constructed non-residential building structures zero carbon by the year 2019" was announced by the Finance minister in March 2008.

**USA**
Energy Independence and Security Act of 2007 (EISA) stipulates the "Net-Zero Energy Commercial Buildings Initiative", which is intended for the following purposes:
- All newly constructed commercial buildings in the United States by the year 2030
- 50% of all existing commercial buildings in the United States by the year 2040
- All commercial buildings in the United States by the year 2050
are to be made ZEB though the development and popularization of technologies, practices and policies.

- Policy target of Japan (Cabinet Decision in June 2010, the "Basic Energy Plan")
  - Realize ZEB for newly constructed public buildings, etc., by the year 2020.
  - Realize ZEB for an average of newly constructed buildings by the year 2030.
Some industrialized nations already have legal obligations to comply with energy conservation standards. Japan, on the other hand, does not necessarily require compliance with standards but obligates the submission of notifications pertaining to building constructions that outline possible strategies for construction.

<table>
<thead>
<tr>
<th>Country / region</th>
<th>Legal system</th>
<th>Scope</th>
<th>Legally binding authority</th>
</tr>
</thead>
</table>
| Japan            | Law Concerning the Rational Use of Energy (Energy Conservation Law) | • Residential and non-residential buildings  
• New constructions and extension or renovation work  
• Lower limit exists (at least 300㎡) | ☐ Obligation to submit notifications  
* Instructions, public disclosure, orders or penalties (for floor areas of 2,000㎡ or more) or recommendations (for floor areas of at least 300㎡ but under 2,000㎡) issued in cases where implementations are significantly insufficient. |
| UK               | Building Act | • Residential and non-residential buildings  
• New constructions and extension or renovation work  
• Lower limit exists for extensions and renovations (in excess of 1,000㎡) | ☐ Obligation to comply with standards |
| Germany          | Energy Conservation | • Residential and non-residential buildings  
• New constructions and extension or renovation work  
• No lower limits | ☐ Obligation to comply with standards |
| USA (State of California) | California state law | • Residential and non-residential buildings  
• New constructions and extensions or renovation work  
• No lower limits | ☐ Obligation to comply with standards (State level) |
| Korea            | Energy Conservation | • Residential and non-residential buildings  
• New constructions, extension work or changes of use  
• Lower limits exist (commercial buildings with a total floor area of at least 3,000㎡ and accommodation facilities with a total floor area of at least 2,000㎡)  
* All residential housing and non-residential buildings with a total floor area of at least 500㎡ from 2012. | ☐ Obligation to comply with standards |
In order to promote energy conservation in households and commercial areas, it is essential for the energy conservation performance of building materials (such as thermal insulation materials and windows) to be improved, along with improvements to the energy conservation performance of facilities and equipment.

Complying with the Energy Conservation Standards for residential housing and building structures can be effective for new constructions, but directly improving the energy conservation performance of building materials and the like can promote measures to deal with existing stock in an effective manner.

Deciding factors for energy conservation performance of residential housing and building structures

- **Energy conservation performance of building materials**
  (thermal insulation materials and windows, etc.)

- **Energy conservation performance of facilities and equipment**
  (heating and cooling, ventilation, lighting and hot water supply, etc.)

Stipulated according to the Energy Conservation Standards for residential housing and building structures
(primarily for new constructions)

→ Measures to deal with existing stock can be made possible through stipulations of the Top Runner Program.

Stipulated by the Top Runner Standards

→ A certain level of results already attained.

### Residential housing

- **Heating** 25%
- **Cooling** 2%
- **Hot water supply** 29%
- **Kitchens** 8%

### Building structures

- **Heating** 16%
- **Cooling** 11%
- **Hot water supply** 15%
- **Kitchens** 9%

**Source:** EDMC estimates

Contributing to reducing the energy consumption for heating, cooling and hot water supply, which comprise approximately 60% in residential housing and 40% in building structures, by improving the energy conservation performance of building materials.
Necessity of Top Runner Standards Pertaining to Construction Materials

- Under the current Energy Conservation Law, new constructions and extension constructions and renovations are not subject to submission of notification for residential housing with total floor area of under 300m² and are therefore presumed to have low standard compliance rate.
- In order to further promote energy conservation in the consumer sector, it is necessary to implement provisions that cover such residential housing (65% of new constructions and existing stock).
- Improvement of energy conservation with residential housing can be expected by popularizing high performance construction materials by implementing a construction material TR system.

<Newly constructed residential housing>  
Approx. 800,000 units annually.

<Existing stock>  
Approx. 50 million units.

About 65% of newly constructed residential housing (based on floor area) are not subject to submission of notification.


* Although major repair work such as work done on roofs or walls of large size residential housing is subject to submission of notification, not many construction work that are by themselves subject to submission of notification are speculated to exist.

From FY2008 Housing and Land Survey.
 energía conservación estándares de acuerdo con el Programa Top Runner han sido implementados para los automóviles y electrodomésticos de uso familiar según la Ley de Conservación de la Energía, como fue ampliada en 1998. Hasta el año 2011, 23 equipos están sujetos a estos estándares.

Promocionado para mejorar la eficiencia de consumo de energía y eficiencia de equipos y maquinaria, se realiza mediante la establecimiento de estándares de eficiencia de consumo de energía con consideraciones por futuros avances de sus prestaciones y desarrollos técnicos, como estándares de economía de combustible para automóviles y criterios de cumplimiento de los fabricantes para mejorar el desempeño de equipos específicos como equipos eléctricos (electrodomésticos de uso familiar y equipo de OA).

(2) Además, equipos específicos que están sujetos a las regulaciones del Programa Top Runner son equipos que consumen energía y satisfacen tres de las siguientes condiciones (Artículo 78 de la Ley de Conservación de la Energía):

- Equipo y maquinaria que se utilizan en grandes cantidades en Japón.
- Equipo y maquinaria que consumen grandes cantidades de energía cuando se utilizan.
- Equipo y maquinaria para el que la mejora en la eficiencia de consumo de energía es especialmente importante (aquellos que tienen espacio para mejorar la eficiencia).

Regulaciones en el Sector de Equipos y Máquinas (Programa Top Runner)

Ejemplo del Programa Top Runner

<table>
<thead>
<tr>
<th>Estándares de conservación de energía según el Programa Top Runner</th>
<th>Cuando se establecen</th>
<th>Año fiscal objetivo</th>
</tr>
</thead>
<tbody>
<tr>
<td>19km/L</td>
<td>18km/L</td>
<td>17km/L</td>
</tr>
<tr>
<td>15km/L</td>
<td>14km/L</td>
<td>13km/L</td>
</tr>
<tr>
<td>12km/L</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Requirements of Top Runner Program and Surety Provisions

- Business operators who failed to meet the standards by the targeted fiscal year are required to submit reports indicating reasons why they failed to achieve the targets and their intended future actions towards improvement of efficiency under the Energy Conservation Law and if improvement of efficiency is still insufficient after implementing applicable actions, then the Minister of Economy, Trade and Industry issues recommendations and if business operators fail to adhere with such recommendation, then provisions, such as public disclosure of such business operators and issuance of orders are conducted. Furthermore, a failure to abide by an order results in the execution of penalty not exceeding one million yen.

- The Energy Conservation Law obligates all manufacturers to improve energy consumption efficiencies in order to achieve standards by the targeted fiscal year, but since funding and technical capabilities are necessary to attain such standards, requirements based on annual production or importation volume (only shipments intended for Japan) are stipulated and those manufacturers who do not satisfy such requirements are not subjected to provisions such as recommendations.

<table>
<thead>
<tr>
<th>Requirements (production or importation volumes) of business operators subject to recommendations and orders</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Passenger cars</strong> 2,000 units 350 units for those vehicles with capacity of 11 people</td>
</tr>
<tr>
<td><strong>Trucks</strong> 2,000 units</td>
</tr>
<tr>
<td><strong>Air conditioners</strong> 500 units</td>
</tr>
<tr>
<td><strong>Lighting apparatuses</strong> 30,000 units</td>
</tr>
<tr>
<td><strong>Television receivers</strong> 10,000 units</td>
</tr>
<tr>
<td><strong>Copying machines</strong> 500 units</td>
</tr>
<tr>
<td><strong>Computers</strong> 200 units</td>
</tr>
<tr>
<td><strong>Magnetic disk devices</strong> 5,000 units</td>
</tr>
<tr>
<td><strong>Video tape recorders</strong> 5,000 units</td>
</tr>
<tr>
<td><strong>Electric refrigerators</strong> 2,000 units</td>
</tr>
<tr>
<td><strong>Electric freezers</strong> 300 units</td>
</tr>
<tr>
<td><strong>Heaters</strong> 300 units</td>
</tr>
<tr>
<td><strong>Gas cooking appliances</strong> 5,000 units</td>
</tr>
<tr>
<td><strong>Gas water heaters</strong> 3,000 units</td>
</tr>
<tr>
<td><strong>Oil water heaters</strong> 600 units</td>
</tr>
<tr>
<td><strong>Electric toilet seats</strong> 2,000 units</td>
</tr>
<tr>
<td><strong>Vending machines</strong> 300 units</td>
</tr>
<tr>
<td><strong>Power transformers</strong> 100 units</td>
</tr>
<tr>
<td><strong>Jar rice cookers</strong> 6,000 units</td>
</tr>
<tr>
<td><strong>Microwave ovens</strong> 3,000 units</td>
</tr>
<tr>
<td><strong>DVD recorders</strong> 4,000 units</td>
</tr>
<tr>
<td><strong>Routing equipment</strong> 2,500 units</td>
</tr>
<tr>
<td><strong>Switching equipment</strong> 1,500 units</td>
</tr>
</tbody>
</table>
Formulation, Operation and Flow of Top Runner Standards

<Formulation, operation and flow of Top Runner Standards>

- Start formulating standards (subcommittee established by Standards Committee)
- Considered by committee (interim summaries prepared by respective subcommittees)
- Summary of standards (final summary prepared by Standards Subcommittee)
- Decision made to start formulating standards of new equipment that satisfy TR applicable requirements (implementation of advance investigations).
- Maintaining laws and regulations (establishment and amendment of cabinet ordinances, ministerial ordinances and notifications)
- Enforcement of judgment standards
- Report collection conducted year after targeted fiscal year (verification on attainment of standards and issuance of recommendations as required, etc.)
- Issuance of public comments and TBT notifications
Manufacturers are required to calculate energy consumption efficiencies and weighted average values of shipment volume of products shipped during targeted fiscal year, which are set for each individual equipment and must exceed standard values set for each individual product category.

Even if products that underrun the standards are shipped, it is acceptable as long as the standards are surpassed based on calculation of energy consumption efficiency that involves weighted average for the shipment volume of products within the same category.
<table>
<thead>
<tr>
<th>Equipment name</th>
<th>Improvement of energy consumption efficiency (actual performance)</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air conditioners (room air conditioners) *</td>
<td>67.8% (FY1997 → FY2004 for freezers)</td>
<td>COP (3.01 → 5.05)</td>
</tr>
<tr>
<td>Electric refrigerators</td>
<td>55.2% (FY1998 → FY2004)</td>
<td>Annual electric power consumption (647.3kW/year → 290.3kW/year)</td>
</tr>
<tr>
<td>Electric freezers</td>
<td>29.6% (FY1998 → FY2004)</td>
<td>Annual electric power consumption (524.8kW/year → 369.7kW/year)</td>
</tr>
<tr>
<td>Gasoline powered passenger cars *</td>
<td>22.8% (FY1995 → FY2005)</td>
<td>Fuel consumption (12.3km/l → 15.1km/l)</td>
</tr>
<tr>
<td>Diesel powered trucks *</td>
<td>21.7% (FY1995 → FY2005)</td>
<td>Fuel consumption (13.8km/l → 16.8km/l)</td>
</tr>
<tr>
<td>Automatic vending machines</td>
<td>37.3% (FY2000 → FY2005)</td>
<td>Annual electric power consumption (2,617kW/year → 1,642kW/year)</td>
</tr>
<tr>
<td>Fluorescent lighting apparatus *</td>
<td>35.7% (FY1997 → FY2005)</td>
<td>Lumen/Watt (63.1lm/W → 85.6lm/W)</td>
</tr>
<tr>
<td>Computers</td>
<td>99.1% (FY1997 → FY2005)</td>
<td>Watt / mega operation (0.17 → 0.0015)</td>
</tr>
<tr>
<td>Magnetic disk devices</td>
<td>98.2% (FY1997 → FY2005)</td>
<td>Watt / gigabyte (1.4 → 0.0255)</td>
</tr>
<tr>
<td>Copying machines</td>
<td>72.5% (FY1997 → FY2006)</td>
<td>Electric power consumption (155Wh → 42.7Wh)</td>
</tr>
<tr>
<td>Electric toilet seats</td>
<td>14.6% (FY2000 → FY2006)</td>
<td>Annual electric power consumption (281kW/year → 240kW/year)</td>
</tr>
<tr>
<td>Gas water heaters (gas instantaneous water heaters and gas bath heaters)</td>
<td>5.5% (FY2000 → FY2006)</td>
<td>Thermal efficiency (77.7% → 82.0%)</td>
</tr>
<tr>
<td>Gas cooking appliances (burner section)</td>
<td>15.7% (FY2000 → FY2006)</td>
<td>Thermal efficiency (48.3% → 55.9%)</td>
</tr>
<tr>
<td>Gas heaters</td>
<td>1.9% (FY2000 → FY2006)</td>
<td>Thermal efficiency (80.9% → 82.4%)</td>
</tr>
<tr>
<td>Kerosene heaters</td>
<td>5.4% (FY2000 → FY2006)</td>
<td>Thermal efficiency (78.5% → 82.7%)</td>
</tr>
<tr>
<td>Television receivers (LCD and plasma television sets)</td>
<td>29.6% (FY2004 → FY2008)</td>
<td>Annual electric power consumption (179.7kW/year → 126.5kW/year)</td>
</tr>
<tr>
<td>DVD recorder (landbased digital broadcasting non-supported)</td>
<td>40.9% (FY2004 → FY2008)</td>
<td>Annual electric power consumption (66.0kW/year → 39.0kW/year)</td>
</tr>
<tr>
<td>Microwave ovens</td>
<td>10.5% (FY2004 → FY2008)</td>
<td>Annual electric power consumption (77.2kW/year → 69.1kW/year)</td>
</tr>
<tr>
<td>Jar rice cookers</td>
<td>16.7% (FY2003 → FY2008)</td>
<td>Annual electric power consumption (119.2kW/year → 99.3kW/year)</td>
</tr>
</tbody>
</table>

Energy conservation standard for energy consumption efficiency per unit (example: km/l) is stipulated for those equipment that are marked with an asterisk (*), while energy consumption (example: kWh/year) is stipulated for those equipment that are not marked with an asterisk (*). The "improvement of energy consumption efficiency" described in the table above represent improvement rates according to respective standards (example: When 10km/l becomes 15km/l, then it is considered to be an improvement by 50% (it is not considered 33% improvement because the fuel consumption for driving 100km has improved from 10 liters to 6.7 liters) and if 10kWh/year becomes 5kWh/year then it is considered to be an improvement by 50%).
"Energy Conservation Label": Stipulated by JIS standards for 18 equipment, primarily household equipment with a large amount of general consumer usage in particular, among equipment that are subject to Top Runner Standards.

"Unified Energy Conservation Label": A unified energy conservation label that covers air conditioners (for household use), television receivers, electric refrigerators, electric toilet seats and fluorescent lighting apparatuses (for household use) to facilitate recognition and comparison of energy conserving performance by consumers when products are purchased and displayed by retailers in five-stage ranking from five stars down to one star (multistage evaluation).

Examples of energy conservation labels (primarily displayed by manufacturers)

Examples of unified energy conservation label and simplified version label (primarily displayed by retailers)
Article 86 (provision of information to general consumers) of the Energy Conservation Law stipulates that energy suppliers must strive to provide information that contribute to energy conservation conducted by general consumers. As specific energy conservation information, five items have been stipulated by notifications of the Ministry of Economy, trade and Industry.

<table>
<thead>
<tr>
<th>Information that contribute to rationalization of energy use conducted by general consumers.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Provision of information pertaining to values representing energy consumption from the previous month to general consumers.</td>
<td>This is currently already provided on meter reading slips.</td>
</tr>
<tr>
<td>(2) Provision of information pertaining to consumption amount and utility charges for energy on a monthly basis for the past year to general consumers.</td>
<td>Some of electric power companies are providing informatin provision service on their web sites.</td>
</tr>
<tr>
<td>(3) Provision of information pertaining to rough estimates for reductions in energy consumption and utility charge that have been accomplished through devised usage methods for machinery and equipment that consume energy.</td>
<td>Energy conservation advice is currently already provided on meter reading slips, etc. Provision of more quantitative and detailed advice is considered possible along with information on electric power consumption for individual household electrical appliances by the home energy management system (HEMS).</td>
</tr>
<tr>
<td>(4) Provision of information pertaining to performance of applicable machinery and equipment with comparison against energy consumption, as well as subsidy programs provided to promote popularization of such machinery and equipment</td>
<td>Information is currently already provided on web pages of respective electric power companies. Provision of more information is considered possible through energy management service made possible by implementing HEMS.</td>
</tr>
<tr>
<td>(5) Other than those already cited in preceding sections, provision of information pertaining to rough estimate of energy consumption by contracts or residential housing modes, as well as those that contribute to rationalization of energy use by general consumers, through creative actions implemented by energy suppliers.</td>
<td>Qualitative energy conservation advice is currently already provided on meter reading slips, etc. Provision of qualitative and more detailed information is considered possible through implementation of Smart Meters.</td>
</tr>
</tbody>
</table>

Source: Prepared from Ministry of Economy, Trade and Industry Notification No. 235, "Guidelines to be implemented by business operators engaged in supplying of energy to general consumers".
1. Conditions surrounding energy

2. Energy conservation policies of Japan
   (1) Industrial sector
   (2) Consumer sector (including Top Runner Program)
   (3) Transportation Sector

3. Budgetary provisions
Energy consumption for the transportation sector in 2008, in comparison with 1990, increased by 8%. It has been generally transitioning into a declining trend (Table 1).

The energy unit consumption for freight consigners, to whom the Energy Conservation Law applies, has been in an improving trend for the past three years.

**Table 1** Transition of energy consumption in transport sector

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>37.7</td>
<td>37.4</td>
<td>35.7</td>
<td>35.1</td>
<td>35.1</td>
<td>34.6</td>
<td>34.5</td>
<td>33.5</td>
<td>32.0</td>
<td>30.4</td>
</tr>
</tbody>
</table>

**Table 2** Transition of unit consumption by business lines

<table>
<thead>
<tr>
<th>Business type</th>
<th>FY2007</th>
<th>FY2008</th>
<th>FY2009</th>
<th>FY2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger transport sector</td>
<td>56.0</td>
<td>57.1</td>
<td>56.8</td>
<td>56.6</td>
</tr>
<tr>
<td>Freight transport sector</td>
<td>55.0</td>
<td>53.9</td>
<td>52.8</td>
<td>50.8</td>
</tr>
</tbody>
</table>

- Regulations: Automobile fuel consumption standards and a thorough implementation of energy management by freight carriers and consigners
- Support: Implementation of highly efficient facilities and promotion for the popularization of the Eco Drive.

Current measures

Source: Comprehensive Energy Statistics.

Source: Calculated based on periodical reports submitted according to the Energy Conservation Law.
Numerical target: Reduction of energy unit consumption by an annual average of at least 1%.

- Energy conservation measures
  - Implementation of low fuel consuming vehicles.
  - Promotion of Eco Drive.
  - Improvement of cargo loading efficiency.
  - Reduction of air freight transport, etc.

- Energy conservation measures
  - Appointment of persons responsible for energy conservation
  - Modal shifting.
  - Activities for joint orders
  - Implementation of corporate internal training, etc.

Measures, such as recommendations, public disclosures and orders, as well as fines are implemented when energy conservation activities of a business operator are significantly inadequate.
1. Conditions surrounding energy
2. Energy conservation policies of Japan
   (1) Industrial sector
   (2) Consumer sector (including Top Runner Program)
   (3) Transportation sector
3. Budgetary provisions
Energy Management System (BEMS & HEMS) Implementation Promotion Project Subsidy

Proposed amount for the third revised budget of FY2011 30 billion yen.

Line of business:

Summary and purposes of project

[BEMS (Building Energy Management System*) implementation support]
- A subsidy is provided for the implementation of BEMS to smaller high voltage consumers, such as small to medium size businesses, in order to promote activities to inhibit electric power demand by linking up with the implementation of Smart Meters.
- The following effects are realized by facilitating concentrated support for implementation through this program:
  - Fundamental electric power saving is realized with small to medium size buildings, which are falling behind in their electric power conserving measures because they are operated by small to medium size businesses, even though there is a significant amount of electric power consumption per account.
  - In addition, a system that makes it possible for information management service business operators, who use energy to trigger emergency requests in cases where there are shortages in electric power demand, will be built.
  - Significant reductions in the price of BEMS and the expansion of voluntary implementations following completion of the project.

[Support for implementation of HEMS (Home Energy Management System*)]
- A subsidy is provided for the implementation of HEMS, 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.
- Support is provided for products with potential expandability, such as connectivity with storage batteries, provided that the interface that makes it possible to connect products of various manufacturers is disclosed.

* EMS (Energy Management System)
Products that offer solutions for energy use by consumers in a smart manner, by advantage is taken of sensors and information technologies. This is not merely about single units of individual equipment, but also includes system linkups with multiple equipment to manage and control energy in an efficient and smart manner.

Conditions (eligible entities, eligible activities, subsidy rates, etc.)

<table>
<thead>
<tr>
<th>Central Government</th>
<th>Subsidy (preparation of funds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private organizations, etc.</td>
<td>Subsidy (1/3, 1/2, fixed amount)</td>
</tr>
<tr>
<td>Private organizations, etc., installers</td>
<td></td>
</tr>
</tbody>
</table>

Image of business operations

[Support for implementation of BEMS]
- Efficient and effective support is provided by managing the effects of cut backs during implementation, giving assistance and after implementation, via (energy use information management and operation service providers) (about ten companies; BEMS system companies, volume household electrical appliance retailers and ESCO business operators are expected to participate).

[Support for implementing HEMS]
- Control of equipment   “Visualization” by HEMS terminal
- Electric power supplied to household from storage batteries
- Electric power supplied to household from solar panels
A subsidy is provided for expenses relating to the implementation of facilities 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.

More specifically:
- Entities eligible for the subsidy must consider the effects of reducing their electric power consumption, with the application limited to air conditioning and hot water supply equipment, lighting facilities, thermal insulations, etc., (implementation in terms of single units is also permitted).
- A subsidy is provided even for the implementation of single unit facilities, as long as the results are for the “replacement of more than half of the applicable facility for the entire building structure” and “there is electric power savings of at least 10%”.

The refurbishment of existing building structures in terms of single unit facilities, which had in the past not been eligible under the subsidy program, are promoted to inhibit electric power demand in the consumer sector starting from the approaching summer.

Subsidy rate
1/3 (1/2 for small to medium businesses)

Image of business operations

- Image of facilities eligible for subsidy
  - Air conditioning
    - Example: Highly efficient air conditioner
  - Thermal insulation, etc.
    - Example: Multi-layered and highly functional glass
  - Lighting facilities
    - Example: Highly efficient lighting (including LEDs), Light intensity sensors
  - Hot water supply (highly efficient heat source)
    - Example: Highly efficient heat pump, Highly efficient boiler, Cogeneration systems

Line of business:

Summary and purposes of project
- A subsidy is provided for expenses relating to the implementation of facilities 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.
- More specifically:
  - Entities eligible for the subsidy must consider the effects of reducing their electric power consumption, with the application limited to air conditioning and hot water supply equipment, lighting facilities, thermal insulations, etc., (implementation in terms of single units is also permitted).
  - A subsidy is provided even for the implementation of single unit facilities, as long as the results are for the “replacement of more than half of the applicable facility for the entire building structure” and “there is electric power savings of at least 10%”.
- The refurbishment of existing building structures in terms of single unit facilities, which had in the past not been eligible under the subsidy program, are promoted to inhibit electric power demand in the consumer sector starting from the approaching summer.
Subsidy for support of business operators for rational use of energy
Estimated amount from requests for the budget of FY2012 30 billion yen (40.01 billion yen)

Line of business:

Summary and purposes of project
- Subsidies are provided for facility implementation costs (replacement costs only) for energy conservation activities, which are considered to be highly politically significant with consideration for the potential for advancement of technology, energy conservation effects and cost effectiveness planned by business operators.
- Furthermore, an emphasis is placed on subsidizing the implementation of advanced facilities and technologies, etc.
- Support is provided with an emphasis on projects with large electric power saving effects, as electric power demand and supply measures.

Conditions (eligible entities, eligible activities, subsidy rates, etc.)

Entities eligible for receiving subsidy
Business operators (must be a corporate entities) from all business lines, installing or owners of the facilities.

Subsidy rate
- Individual projects: Up to 1/3.
- Associated projects (*) Up to 1/2.
(*) Associated implementation of entities with different capital relations, such as businesses located within an industrial complex, etc.
Subsidy for Expenses of Implementation Promotion Project for Specific Facilities with Rational Use of Energy

Estimated amount from requests for the budget of FY2012 **3 billion yen (new)**

### Summary and purposes of project

Subsidy for Expenses of Implementation Promotion Project for Specific Facilities with Rational Use of Energy

1. Eligible projects
   A subsidy is provided towards the interest payments for loans taken out from private financial institutions by business operators who implement energy conserving facilities or install Top Runner equipment through private organizations to ensure that their interest payments remain low, since increased investments for energy conserving facilities are anticipated, due to heightened needs for energy conservation and electric power savings in the industrial sector, arising from the Great East Japan Earthquake.

2. Entities eligible for receiving a subsidy and subsidy rate
   Private financial institutions, fixed amount (interest subsidy 1.0%)

### Conditions (eligible entities, eligible activities, subsidy rates, etc.)

- **Central Government**
  - Subsidy (fixed amount (10/10))

- **Private organizations, etc.**
  - Fixed amount (interest subsidy 1.0%)

- **Business operator**
  - Loan
  - Repayment

- **Private sector business operator, etc.**

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**Highly efficient turbo chillers**

**Top Runner equipment**
In order to realize ZEB (*) with newly constructed public building structures in 2020, subsidies amounting to a maximum of one-third of the project expenditure are provided to projects anticipated to cause certain ripple effects by transforming single buildings into ZEBs and also by multifaceted utilization of energy.

Furthermore, in order to promote the popularization of ZEH (*), as an energy conservation strategy for the household sector, subsidies amounting to half of the project expenditure are provided to projects to modify existing residential housing into ZEH and subsidies that amount to one-third of the project expenditure are provided to projects to newly construct ZEH residential housing.

* ZEB: Net Zero Energy Building
* ZEH: Net Zero Energy House

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**Line of business:**

**Summary and purposes of project**

- In order to realize ZEB (*) with newly constructed public building structures in 2020, subsidies amounting to a maximum of one-third of the project expenditure are provided to projects anticipated to cause certain ripple effects by transforming single buildings into ZEBs and also by multifaceted utilization of energy.
- Furthermore, in order to promote the popularization of ZEH (*), as an energy conservation strategy for the household sector, subsidies amounting to half of the project expenditure are provided to projects to modify existing residential housing into ZEH and subsidies that amount to one-third of the project expenditure are provided to projects to newly construct ZEH residential housing.

**Conditions (eligible entities, eligible activities, subsidy rates, etc.)**

- **Central Government**
  - Subsidy (fixed amount (10/10))

- **Private organizations, etc.**
  - Subsidy (max. 2/3)

- **Installers**

**ZEB validation project**

- Central Government
  - Subsidy (fixed amount (10/10))
  - Subsidy (max. 2/3)

**ZEB modification support project**

- Central Government
  - Subsidy (fixed amount (10/10))
  - Subsidy (max. 1/2)

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**Image of business operations**

**ZEB**

- External air conditioning and carbon dioxide control
- Variable flow rate and variable air flow rate control systems
- Automatic ventilation control system
- Solar power generating system
- Desiccant system (a cooling system that utilizes dehumidification)
- Hybrid air conditioning control technology

**ZEH**

- Highly thermally insulated
- Highly efficient air conditioner
- Highly efficient hot water dispenser
- High performance glass
- Energy conservation ventilation system
- HI lighting and LED lighting
- Motion sensor control
- Initial light intensity lighting
- Daylight linkage control
- Light duct system
- Integrated control system
- Energy conservation ventilation system
Summary and purposes of project

Projects effected for providing business operators a diagnosis on the potential of implementing energy conserving technologies. Energy conservation at manufacturing plants and business establishments are promoted through this effort.

Eligible entities

Business operators who conduct diagnostic business operations, which include consideration for the potential for implementing energy conserving technologies, at manufacturing plants and office buildings, etc.

* In consideration for changes in the conditions following the earthquake disaster, the scope of eligible business operators that conduct diagnosis is increased from FY2012, along with the acceptance of applications for diagnosis pertaining to electric power savings.
Publicly offered proposal-type research and development, for providing consistent support from the discovery of seeds to commercialization for new and innovative energy conserving technologies, will be carried out in a strategic manner.

In order to review the current projects for innovative energy conserving technology developments will be reviewed and further research and development promoted through the collaboration of the industry, academia and government, which are focused on results, the attainment of targets will be thoroughly enforced through the implementation of the stage gate screenings and support for promising topics with the sights trained on commercialization will be promoted in a powerful manner.

Consortiums comprised of relevant research and development organizations, as well as users for individual technical domains, are established to set issues for developments pertaining to specific technologies and formulate energy conserving technology strategies, in order to promote technology innovations, efficient technology developments and secure effectiveness of business operations.

**Line of business:**

**Summary and purposes of project**

- Publicly offered proposal-type research and development, for providing consistent support from the discovery of seeds to commercialization for new and innovative energy conserving technologies, will be carried out in a strategic manner.
- In order to review the current projects for innovative energy conserving technology developments will be reviewed and further research and development promoted through the collaboration of the industry, academia and government, which are focused on results, the attainment of targets will be thoroughly enforced through the implementation of the stage gate screenings and support for promising topics with the sights trained on commercialization will be promoted in a powerful manner.
- Consortia comprised of relevant research and development organizations, as well as users for individual technical domains, are established to set issues for developments pertaining to specific technologies and formulate energy conserving technology strategies, in order to promote technology innovations, efficient technology developments and secure effectiveness of business operations.

**Conditions (eligible entities, eligible activities, subsidy rates, etc.)**

<table>
<thead>
<tr>
<th>Central Government</th>
<th>NEDO</th>
<th>Enterprises, Universities, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsidy fund</td>
<td>Subsidy (2/3, 1/2)</td>
<td></td>
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</tbody>
</table>

**Energy Conserving Technology Initiative (tentative name)**

- Investigative research on energy conserving technologies
- Management of research and development stage gate screening
- Acceptance and screening

**Support for research and development of energy conserving technologies**

- Incubation research (2/3 subsidy)
- Research and development (2/3 subsidy)
- Validation development (1/2 subsidy)

**Within 1 year**

- Discovery of seeds and commercialization strategies
- Establishment of consortium for individual technical domains

**Within 2 years**

- Power electronics
- ZEB
- Human factors for comfort and energy conservation
- Next generation-type heat pump systems

**Next generation-type heat pump systems**

- Incubation research
- Research and development
- Validation development

**Support for research and development of energy conserving technologies**

- Enterprises, universities and research institutions
- Approx. 20 million yen per case
- 2/3
- Within 1 year

- Enterprises, universities and research institutions
- Approx. 300 million yen per case
- 2/3
- Within 2 years

- Enterprises, etc.
- Approx. 1 billion yen per case
- 1/2
- Within 2 years

*For industry, academia and government collaborations only; 100% subsidy for public research institutions.

**Summary**

- Advance research and formulation of development and implementation scenarios in order to assess development investments for promising energy conserving technologies.
- Research and development for practical implementation are conducted. Target attainment is thoroughly implemented through appropriate management of research and development through advice provided by external experts, etc.
- Further technology developments and validations are conducted in order to overcome inhibiting factors for technologies that have undergone practical implementation, but for which drawing in of business opportunities is difficult.

**Eligible entities**

- Enterprises, universities and research institutions
- Enterprises, universities and research institutions
- Enterprises, etc.

**Upper limit amount**

- Approx. 20 million yen per case
- Approx. 300 million yen per case
- Approx. 1 billion yen per case

**Subsidy rates**

- 2/3
- 2/3
- 1/2

**Implementation period**

- Within 1 year
- Within 2 years
- Within 2 years