EMAK & Japan's Energy Efficiency Policy

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1. EMAK (Energy Management Action Network)

1-1. Overview

- ***EMAK*** (Energy Management Action Network) was established in 2009 as a forum under the activity of IPEEC (International Partnership for Energy Efficiency Cooperation).
- EMAK aims to promote ***improvement of energy efficiency and energy savings*** in the industrial and the commercial sectors, primarily through a ***network of policy-makers and industry stakeholders.***
- It does so by ***facilitating discussions on policy issues*** related to energy management, sharing the best practices of each country, region and industry, and by supporting exchanges on proven and innovative practices and capacity building.
- EMAK contributes to work under the G20 Energy Efficiency Leading Programme.

1-2. Outputs 2015-2017

- Since 2009, EMAK has organised ***8 workshops and 2 webinars*** for the purpose of sharing experiences on the design and implementation of energy efficiency policies and programmes.
- Published a report on the workshops' main findings and ***key elements for designing and implementing award schemes***.
- Released a two-page digest of ***workshop recommendations*** to help communicate outcomes to policy makers and other stakeholders.

1-3. Recent example of EMAK's impact

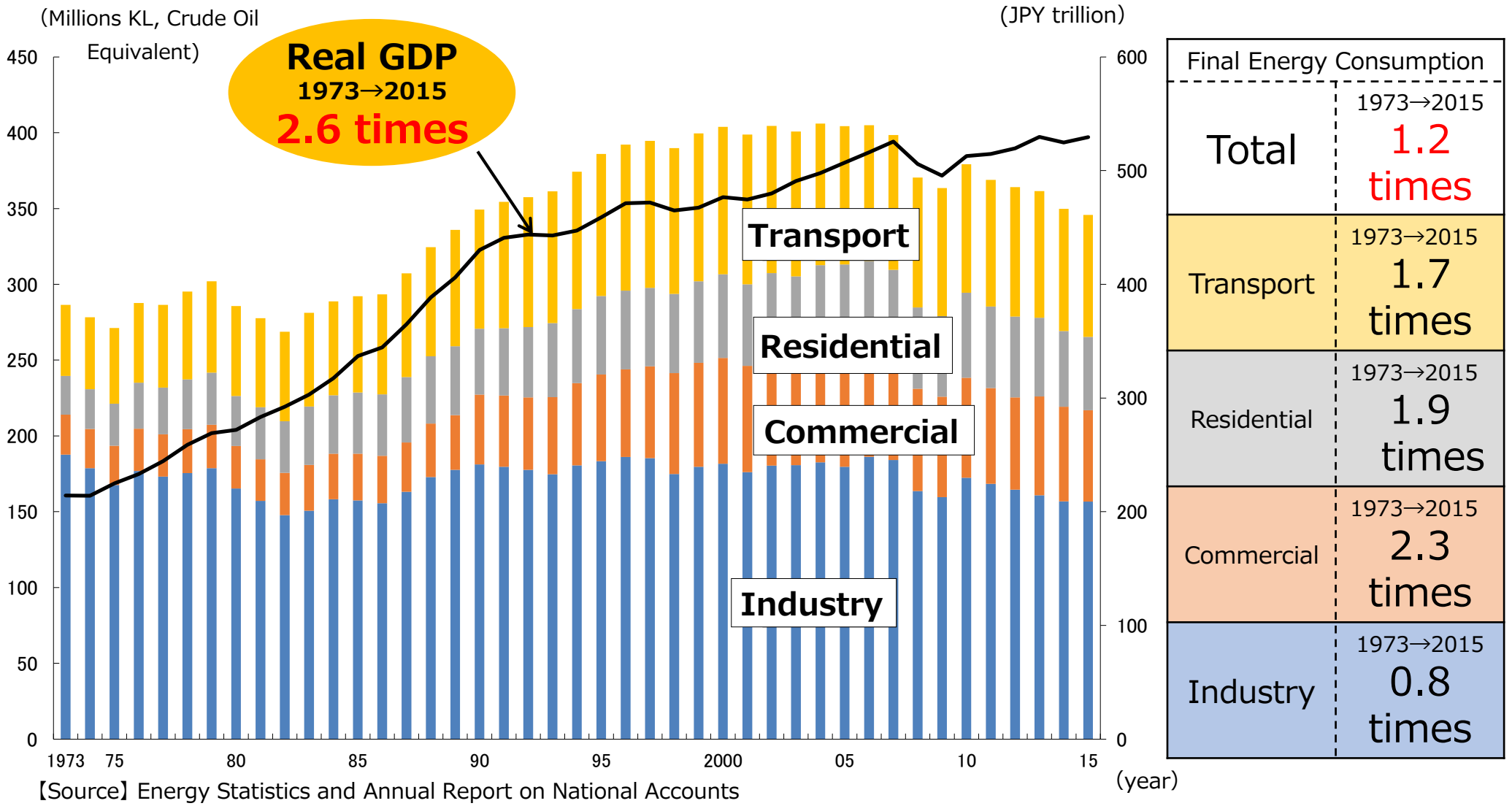
- EMAK's report on "Recognised Energy Management Best Practices and Award Programs for Best Practices" provides insights on ***how governments can design and implement impactful energy management award programmes***.
- By considering these practical elements, policy makers can ***accelerate the development of their own award programmes*** and ensure that these ***successfully support their government's energy management goals*** in an impactful manner.

1-4. Programme of work / Outlook

- Holding ***further workshops*** to facilitate best practice exchange on energy management systems (e.g. *9th EMAK workshop* in the Brazil)
- Possibly enhancing cooperation and ***partnerships with other IPEEC Task Groups*** and international organisations.
- Identifying options (tools and best practices) to ***overcome energy efficiency barriers***, both at workshops and by sharing workshop outcomes and reports.
- Posting reports and presentation papers from workshops on the IPEEC portal.

2. Japan’s Energy Efficiency Policy

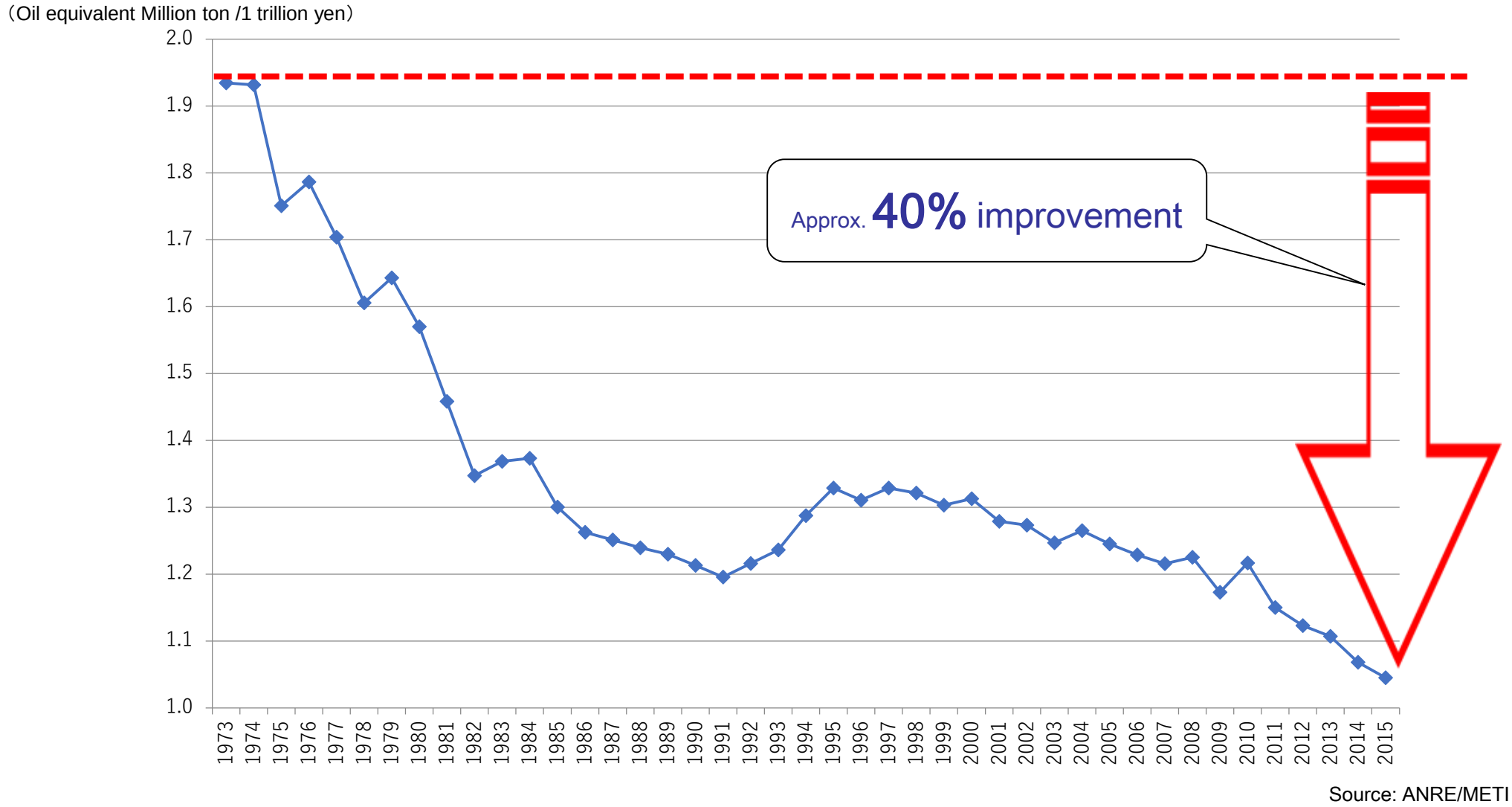
Trend of Final Energy Consumption



Final Energy Consumption	
Total	1973→2015 1.2 times
Transport	1973→2015 1.7 times
Residential	1973→2015 1.9 times
Commercial	1973→2015 2.3 times
Industry	1973→2015 0.8 times

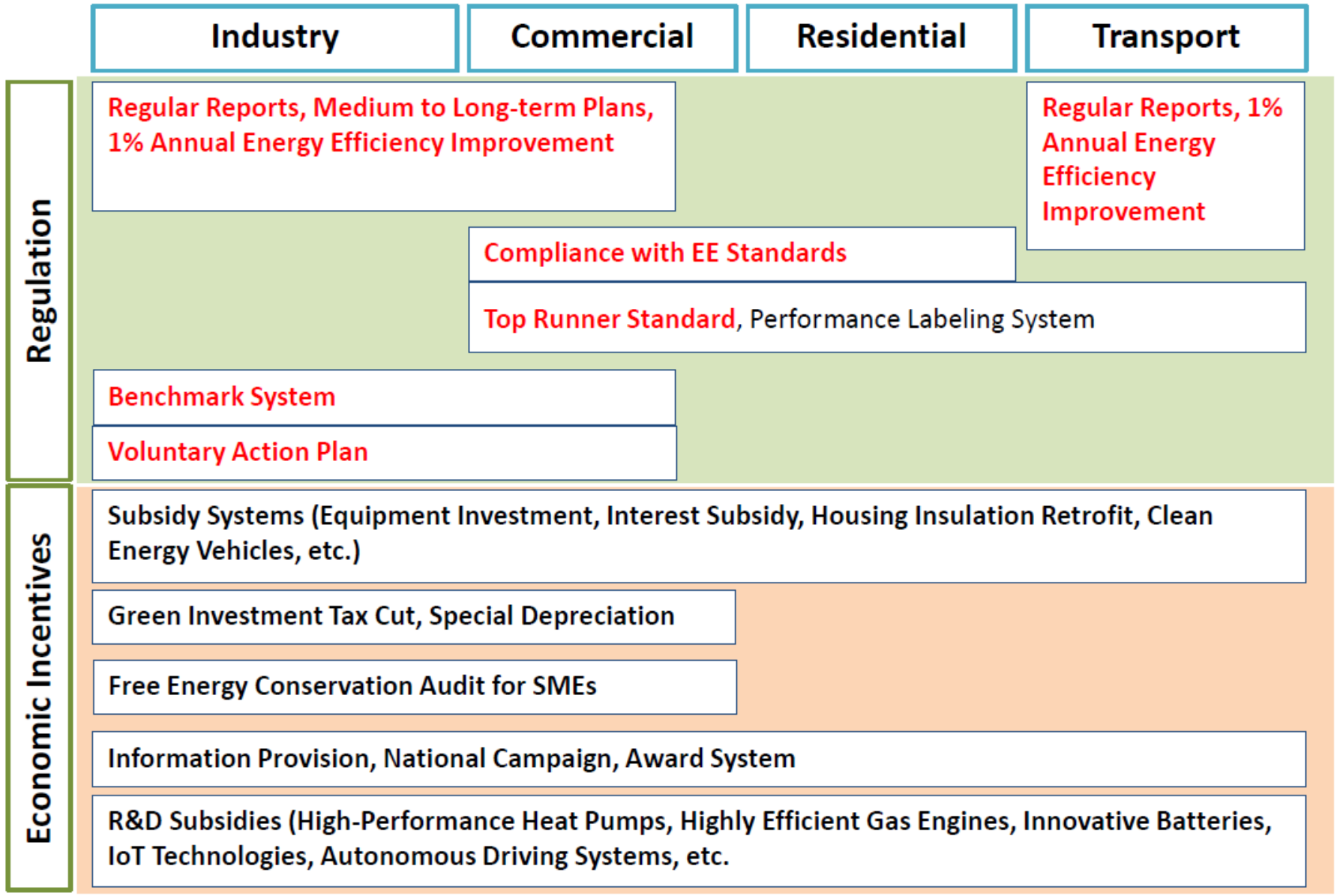
【Source】Energy Statistics and Annual Report on National Accounts

Final Energy Consumption per Real DGP



Source: ANRE/METI

Basic Framework of Energy Efficiency Policy



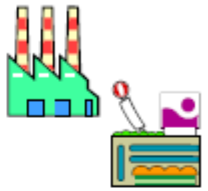
Act on the Rational Use of Energy (1979)

Direct Regulation

Factory・Business

Aspirational Target

Factories/commercial businesses



・Aspirational target

Reporting Obligation

Special business entities

（Annual energy consumption over 1,500kl/year）

- Designation of energy manager
- Reporting obligation of middle, long-term plan
- Reporting obligation of annual energy consumption

Transport

Aspirational Target

Freight/passenger transport businesses

・Aspirational target

Freight owner

・Aspirational target

Reporting Obligation

Special business entities

（Owning trucks of more than 200 units）

- Reporting obligation of middle, long-term plan
- Reporting obligation of annual energy consumption

Special business entities

（freight transport goods of more than 30 million ton km per year）

- Reporting obligation of middle, long-term plan
- Reporting obligation of annual energy consumption

In-direct Regulation

Top Runner Program

Manufactures（At above certain level）

・32 products are under the energy efficiency improvement target

Information

Retailers of appliances and energy

・Information provision to consumers（Aspirational goal）

※Building energy efficiency is regulated under the building energy conservation law since 2019.

History of the Act on the Rational Use of Energy

Industry

1979 Establishment
Designated Energy Management Factories
Guidance for Buildings and Appliances

1983 Introduction of licensed energy manager system

1992 Introduction of periodical reporting system

1998 Amendment: Expand coverage of factories

2005 Amendment: Integration of Heat and Power Control

2008 Amendment: Company based rather than plant based regulation, introduction of Bench Marking.

2013 Evaluation of Peak Shift

2015 SABC class system

2018 Amendment joint energy efficiency implementation

Residential/Commercial

1992 Amendment Periodical reporting

1998 Amendment: Introduction of Top Runner Program

2002 Amendment Energy Management of Office Buildings

2008 Amendment Energy Management of Office Buildings

2013 Amendment on building EE&C evaluation to primary energy basis, introduction of building material TR

2015 New Establishment of Energy Conservation Law for Buildings

Transport

Act on the Rational Use of Energy has been amended 7 times to cope with the changing market situation

2005 Amendment Reporting System on Energy by Carriers

2018 Amendment on freight owner responsible for annual reporting system

Factors Affecting the Successful Implementation of Key EE Policies

Energy Management System

EE&C improvement efforts by the **in-house experienced energy managers** being supported by government's **stable provision of economic incentives** and **know-how sharing platform**

Benchmark System

Assist EE&C efforts by the factories/business entities with the **intra-industry comparison**

Voluntary Action Plan

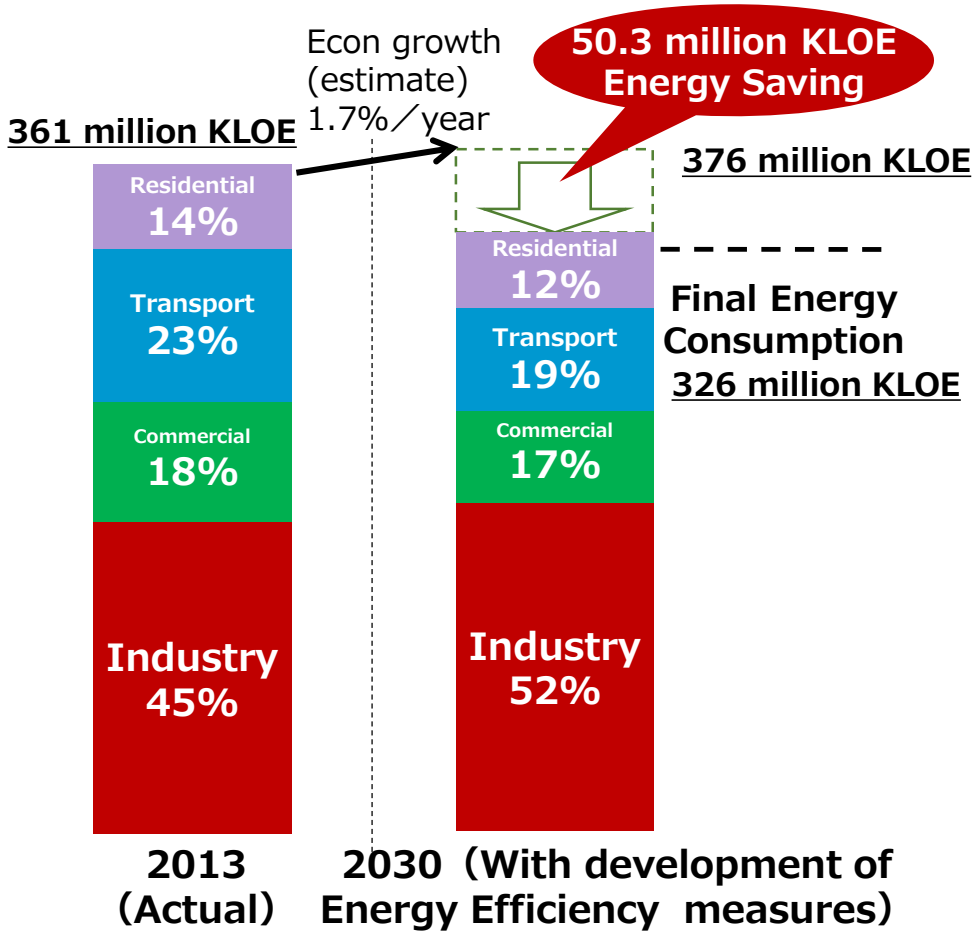
Facilitate **intra-industry sharing** and **deployment of best practices**

Top Runner Program

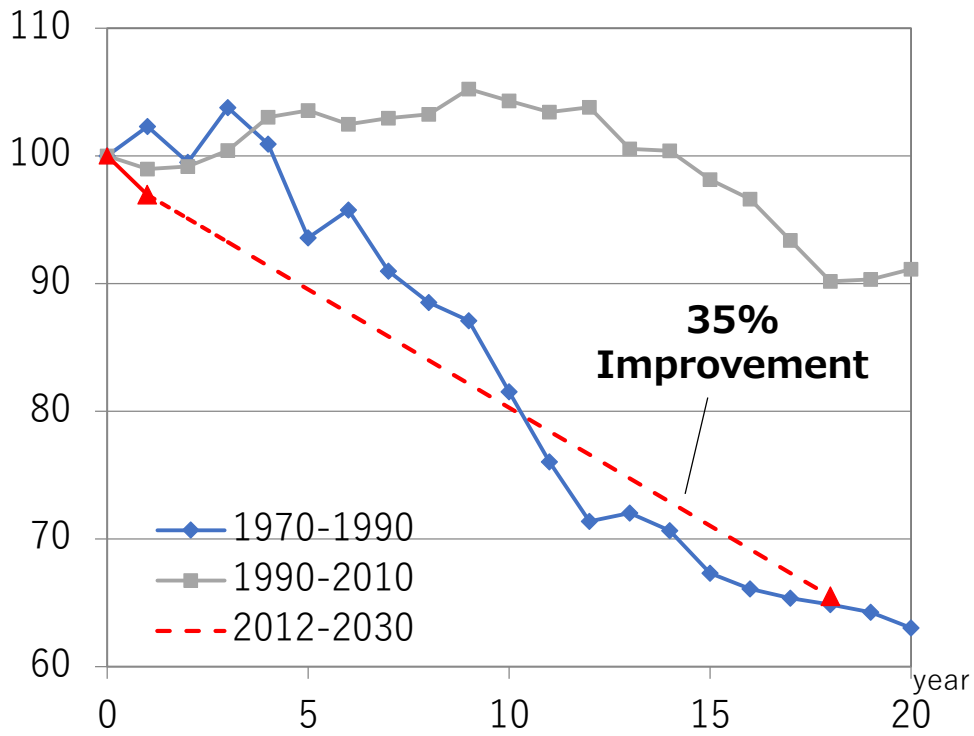
R&D efforts by the manufacturing industries and **consumers' choice toward EE technologies** –supported by labeling and economic incentives

Energy Efficiency improvement towards 2030

Final energy consumption (Long-term energy demand & supply outlook)



Energy Efficiency Improvement



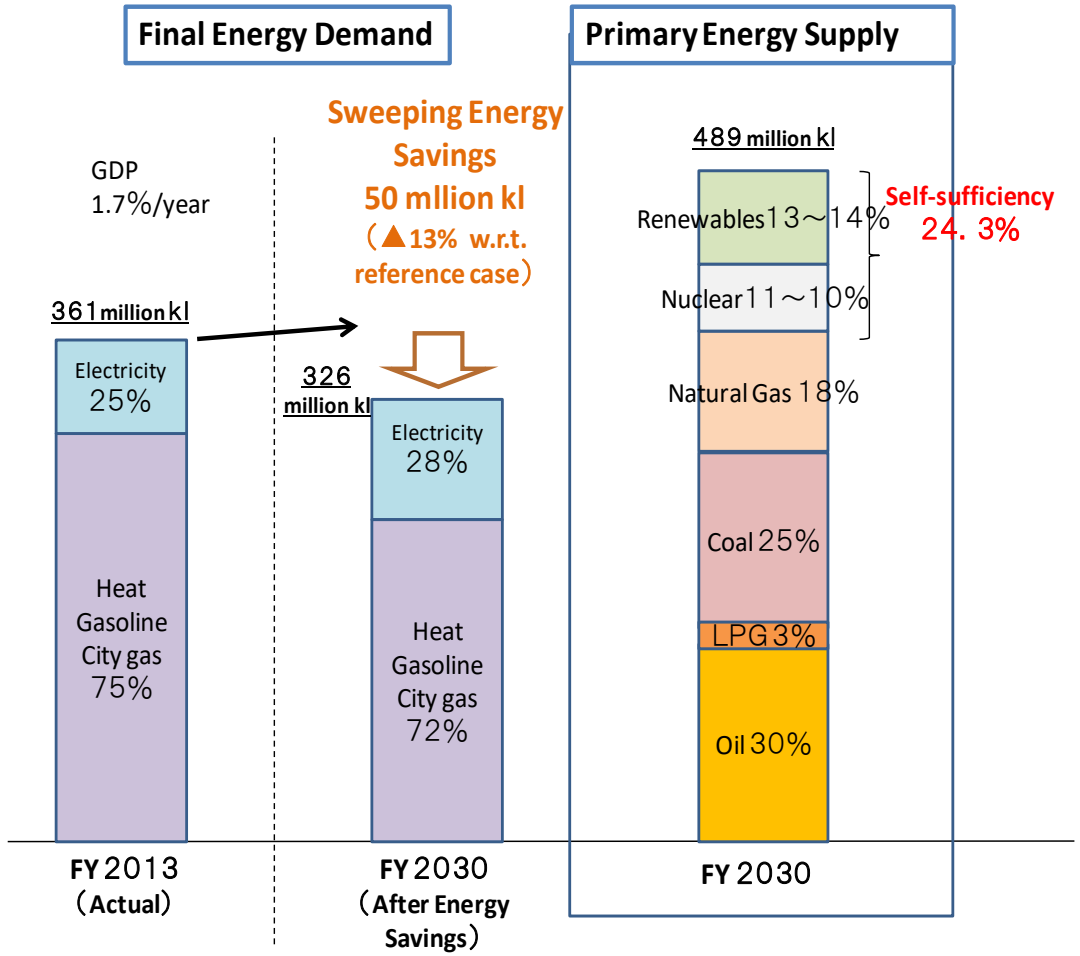
Energy efficiency rate ＝ Final energy consumption ／real GDP

Energy Supply/Demand Structure toward CO_2 Emissions Reduction Target in 2030

○ While energy demand growth is projected in line with economic growth (**an average 1.7%**), energy efficiency is expected to improve as much as after the oil crises thorough energy conservation (**35% in 20 years**).

○ **Energy supply/demand structure improvement** (energy self-sufficiency rate: 6% in 2014 ⇒**24.3%** in 2030)

○ **Japan's CO_2 emissions reduction target**
(**26% CO_2 emissions reduction** in 2030 compared with 2013 level)



(Source) METI "Long-term Energy Supply/Demand Outlook" p.5 (July 16, 2015)

Measures and Energy Saving Potential by Sector

Industry <▲10.42 million kl>

- Energy-intensive industry (iron/steel, chemical, cement, paper/pulp)
- Voluntary agreement
- Energy management
- IT technology and energy management
- Innovative technology
- COURSE50 (Co_2 Ultimate Reduction in Steelmaking process by Innovative technology for cool Earth 50)
- Use of CO2 as feedstock
- Advanced EE technology
- boiler, cogeneration

Transport <▲16.07 million kl>

- Next generation vehicles, fuel economy improvement
- next generation vehicles to represent 1unit /2units
- more than 100,000 fuel cell vehicles to be sold annually
- Traffic stream management

Commercial <▲12.26 million kl>

- Building EE improvement
- Large-scale buildings' compliance on EE standards
- LED and OEL diffusion
- BEMS and energy management
- half of buildings to install BEMS
- Awareness promotion

Residential <▲11.60 million kl>

- Building EE improvement
- Residential buildings' compliance on EE standards after 2020

LED and OEL diffusion

- HEMS and Energy management
- all residential households to introduce the system
- Awareness promotion

Progress for the Target 2030

Total <approx. -50.30 million kl> → **-6.00 million kl (Progress rate : 11.8%) as of 2015**

Industrial Sector <approx. -10.42 million kL>

-1.19 million kl (Progress rate : 11.5%) as of 2015

➢ Main measures

- Promotion of efficient lights including LED [0.33 / 1.08 million kl (30.6%)]
- Introduction of industrial heat pump [0.03 / 0.88 million kl (3.5%)]
- Introduction of industrial motors [0.04 / 1.66 million kl (2.4%)]
- Implementation of energy management through FEMS [0.06 / 0.67 million kl (9.2%)]

Commercial Sector <approx. -12.26 million kL>

-1.26 million kl (Progress rate : 10.3%) as of 2015

➢ Main measures

- Promotion of efficient lights including LED [49.0 / 228.8 million kl (21.4%)]
- Improve energy-saving performance of equipment by equipment top runner program [25.0 / 278.4 million kl (9.0%)]
- Implementation of energy management through BEMS [29.5 / 235.3 million kl (12.5%)]

Residential Sector <approx. -11.60 million kL>

-1.11 million kl (Progress rate : 9.5%) as of 2015

➢ Main measures

- Promotion of efficient lights including LED [60.0 / 201.1 million kl (29.8%)]
- Improve energy-saving performance of equipment by equipment top runner program [10.8 / 133.5 million kl (8.1%)]
- Implementation of energy management through HEMS [0.7 / 178.3 million kl (0.4%)]

Transportation Sector <approx. -16.07 million kL>

-2.41 million kl (Progress rate : 15.0%) as of 2015

➢ Main measures

- Diffusion of next-generation automobiles [59.1 / 938.9 million kl(6.3%)]
- Other measures in transportation sector [181.5 / 668.2 million kl (27.2%)]

(Breakdown)
Freight transport [74.4 / 337.6 million kl (22.0%)]
Passenger transport [107.1 / 330.5 million kl (32.4%)]

Further Challenges for improving EE

Industrial	Transportation		Commercial and Residential	
	Cargo	Automobile	Appliance	House and Building
●Improvement of energy efficiency come to a standstill	●Trucks are more difficult to electrify than automobiles	●Acceleration of spread of EV・PHV/FCV is a challenge	●Further energy efficiency improvement of appliances is difficult by extension of conventional technology alone	
Factory regulation ↓ **Corporation** regulation (Industrial top runner program)	**Equipment** regulation (equipment top runner program) Consignor・Transporter regulation	Fuel consumption standard (+Eco car tax reduction etc)	**Energy efficiency goal of appliances** Expanding target appliances up to **70%** of household energy consumption	**Energy efficiency improvement of houses** Promote zero energy of newly-ordered detached houses
Issue①	Issue②	Issue③	Issue④	Issue⑤
Improvement of energy efficiency by corporate cooperation Beyond the boundaries of companies ●Same industry ●Supply chain	**Enhancement of collaboration between consignor and transporter** ●Strengthen energy efficiency of online shopping business operators ●Energy efficiency throughout distribution	**Acceleration of spread of EV・PHV/FCV** ●Positioning of EV in fuel consumption standards	**Improvement of energy efficiency through cooperation among appliances** ●Promotion of energy efficiency improvement through collaboration between appliances by utilizing IoT and AI ●Evaluate energy efficiency technology through cooperation among appliances by equipment top runner program	**Zero energy use of houses and buildings** ●Mandating compliance with energy efficiency standards for newly built houses and buildings ●Promotion of spread of ZEH including collection and existing housing

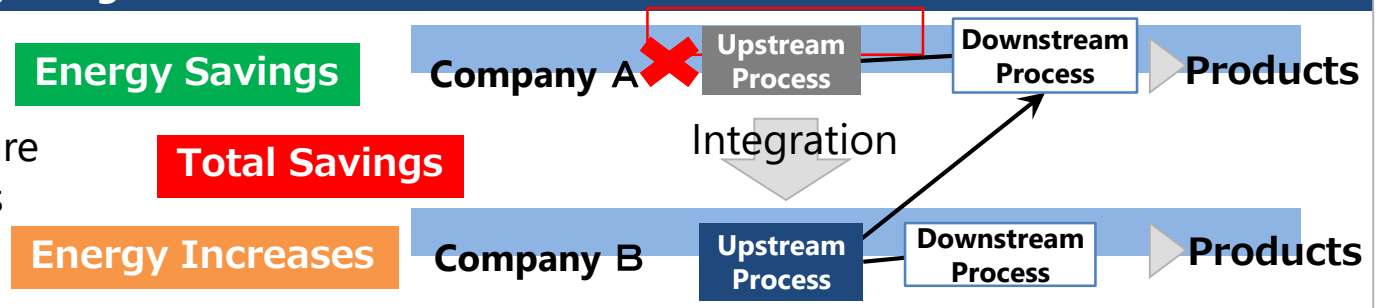
Recent Amendment of the EE Act (2018)

【Current】
Regulation for each single business entity

【Amendment】
Allows joint efforts from plural business entities

(Example) Production facility integration

- Companies integrating production process can share the result of energy savings from such effort.



【Current】

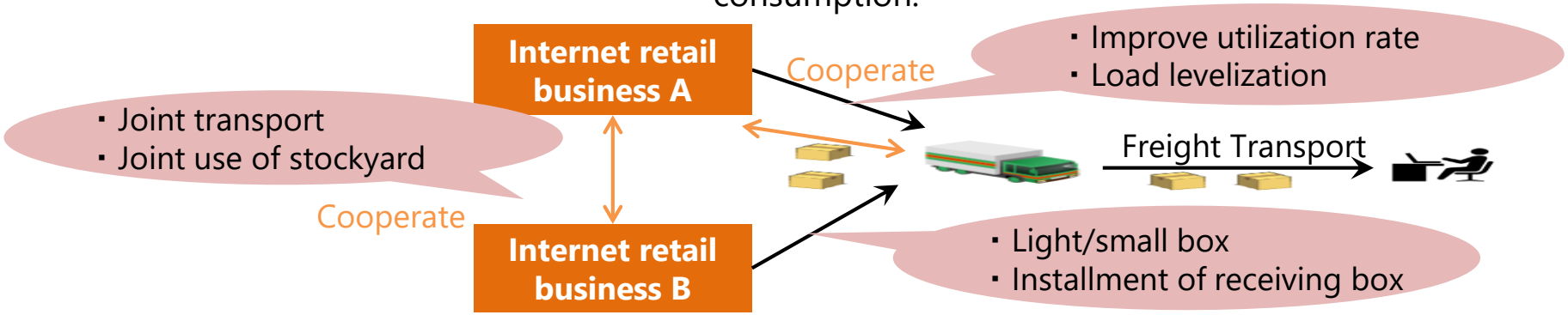
Freight Owner ＝Owner of transporting goods

Some of the internet retail business entities were outside of this regulation.

【Amendment】

Freight Owner＝Those entities determining the transport methods

The Law will cover wider internet retail business entities, which will have a greater impact on energy consumption.



THANK YOU !

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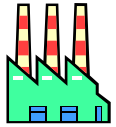
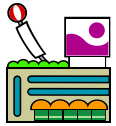
Appendix

Fields subject to Regulations under the EE Act

(1) Manufacturing plants & business establishments

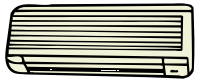
◆ Business operators with an annual energy consumption of at least 1,500kl (equivalent crude oil) at manufacturing plants and business establishments.

(2) Transportation


◆ Freight carriers with a transportation capacity of a minimum certain scale, such as 200 trucks or 300 railway cars for railroads, etc.

◆ Cargo owners with an annual freight transport order of at least 30 million tons .

(3) Machinery & equipment




◆ Passenger cars, air conditioners, television sets, etc., 32 items.

(Comprises about 70% of household energy consumption.)

(4) Residential buildings & structures

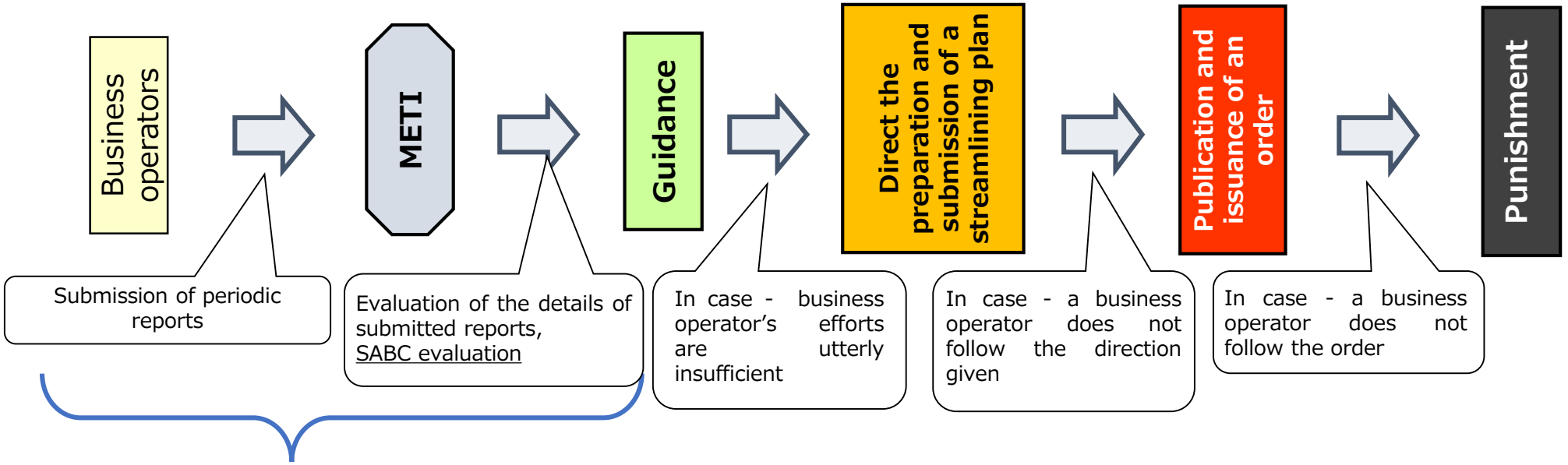

◆Act on Improvement of Energy Consumption Performance of Buildings

Imposition of obligation to ensure buildings

※ compliance with energy efficiency standards [Houses and Buildings]

* Application starts from large-sized non-residential buildings by stages.

Implementation Flow of Reporting System under the Act



< Matters to be stated in periodic reports >

- **Implementation status of energy efficiency measures**
- **Changes in specific energy consumption**
- **Status of the benchmark indices (for only applicable types of business)**

○ **Judgement on standards for energy efficiency measures** (Matters to be observed concerning business operators' management systems and management methods of individual devices

○**Non-binding target** (Reduction by 1% or more on an annual average basis)

○**Benchmark index/target levels** (for several business sectors (e.g. manufacture of steel, power supply, manufacture of cement, manufacture of paper, petroleum refinery, and manufacture of chemicals)

Example of Behaviour Change Measures (Industry):

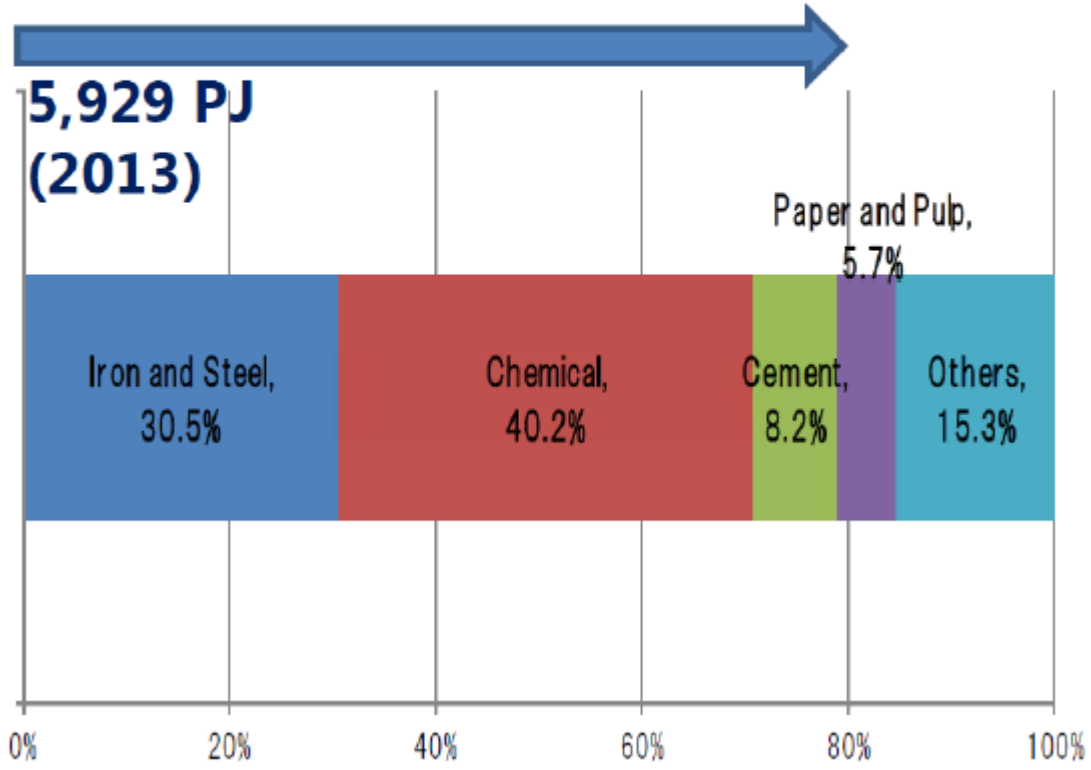
Evaluation system by Business Operator Classification

Class S	Class A	Class B	Class C
Business operators superior in energy efficiency efforts 6,469 companies（56.7%）*1	General business operators 3,333 companies（29.2%）*1	Business operators whose energy efficiency efforts are not progressing 1,601 companies（14.0%）*1	Business operators requiring close monitoring
[Levels] (i) Having achieved the non-binding target*2 or (ii) Having achieved the benchmark target*3 [Measures] The name and number of years during which the relevant business operator has been classified into Class S continuously are publicized on the METI website to praise the business operator as an excellent one.	[Levels] Not falling under Class S nor Class B [Measures] No particular measures are taken.	[Levels] (i) Having failed to achieve the non-binding target and increased specific energy consumption from the preceding year for two years in a row or (ii) Having increased specific energy consumption by 5% or more on average for five years [Measures] A written notice is sent and on-site inspections, etc. are conducted intensively.	[Levels] Among business operators classified into Class B, those that are especially bad at complying with judgment standards [Measures] Guidance based on Article 6 of the Act on the Rational Use of Energy is provided.

*1 Calculated based on the total number of business operators that have submitted periodic reports in FY2017 (regarding performance in FY2016) (11,403 companies)
*2 Non-binding target: Reduction of specific energy consumption by 1% or more on average for five years
*3 Benchmark target: Levels to be aimed at in the medium- and long-term in business types and fields covered by the Benchmark System

Benchmark System

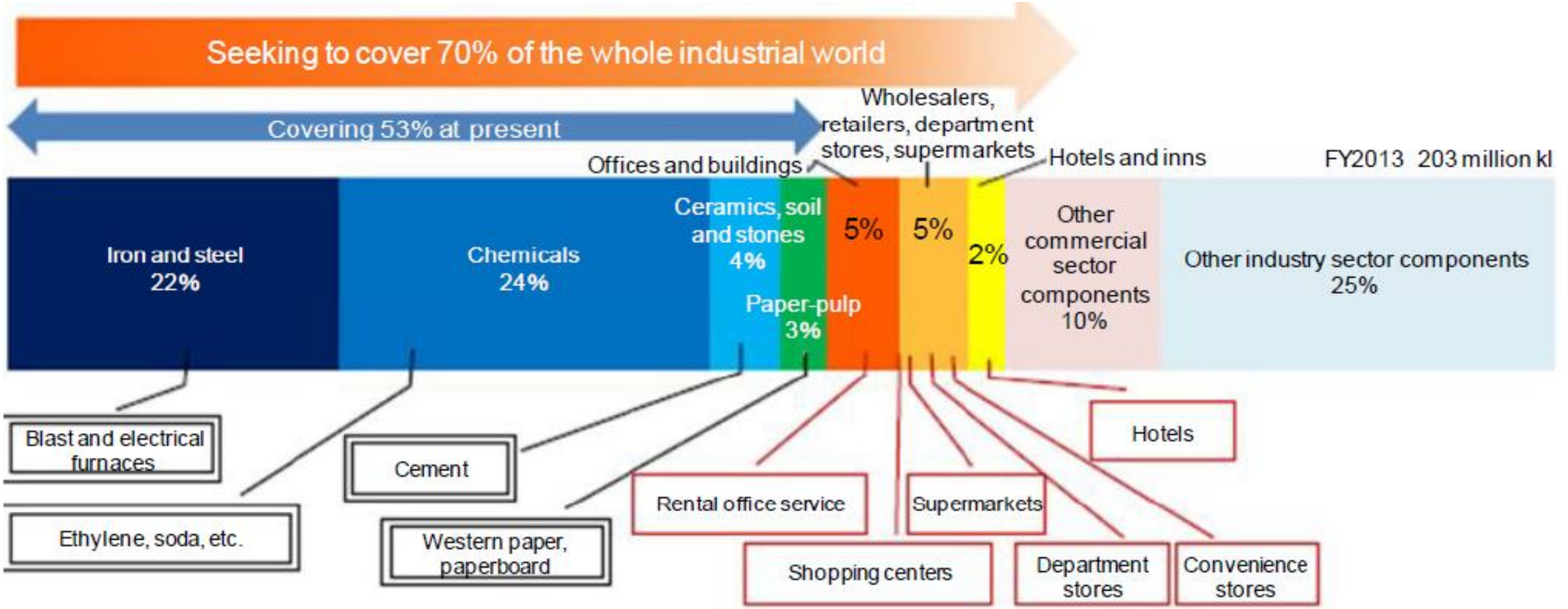
Coverage of Benchmark System:
80% of industrial energy consumption



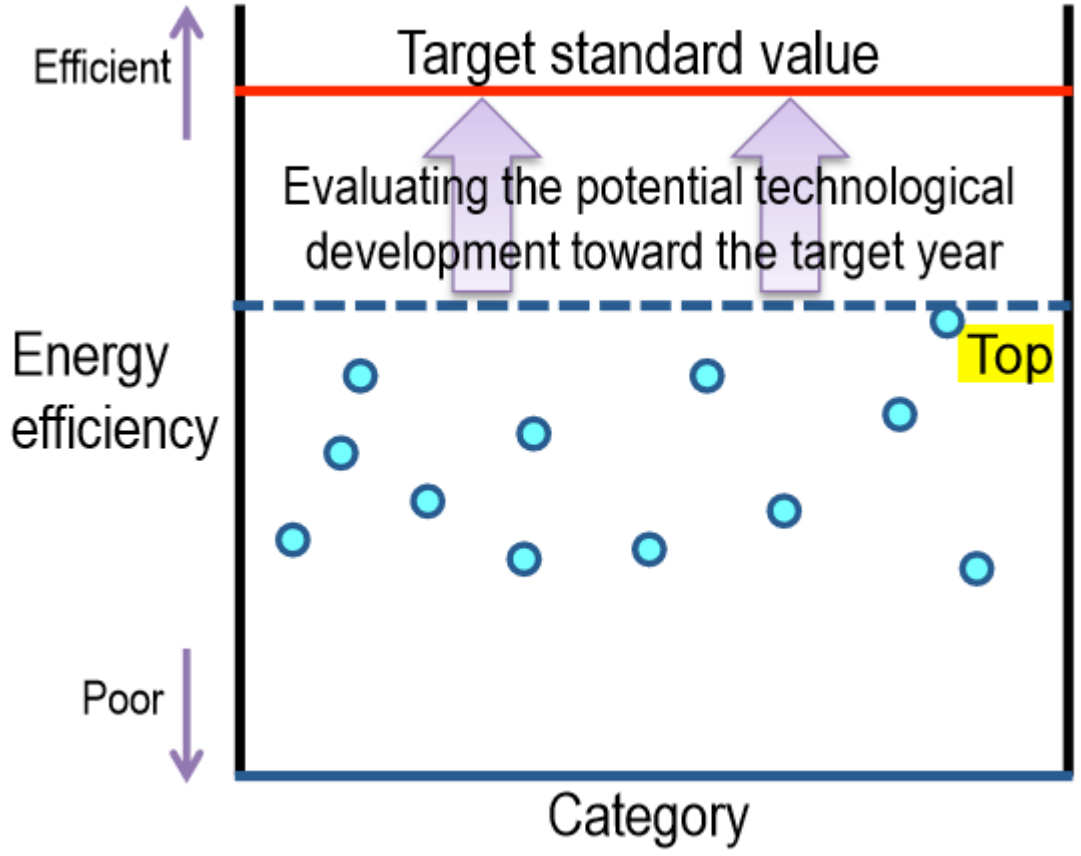
Industry Sub-sector Covered by Benchmark System;

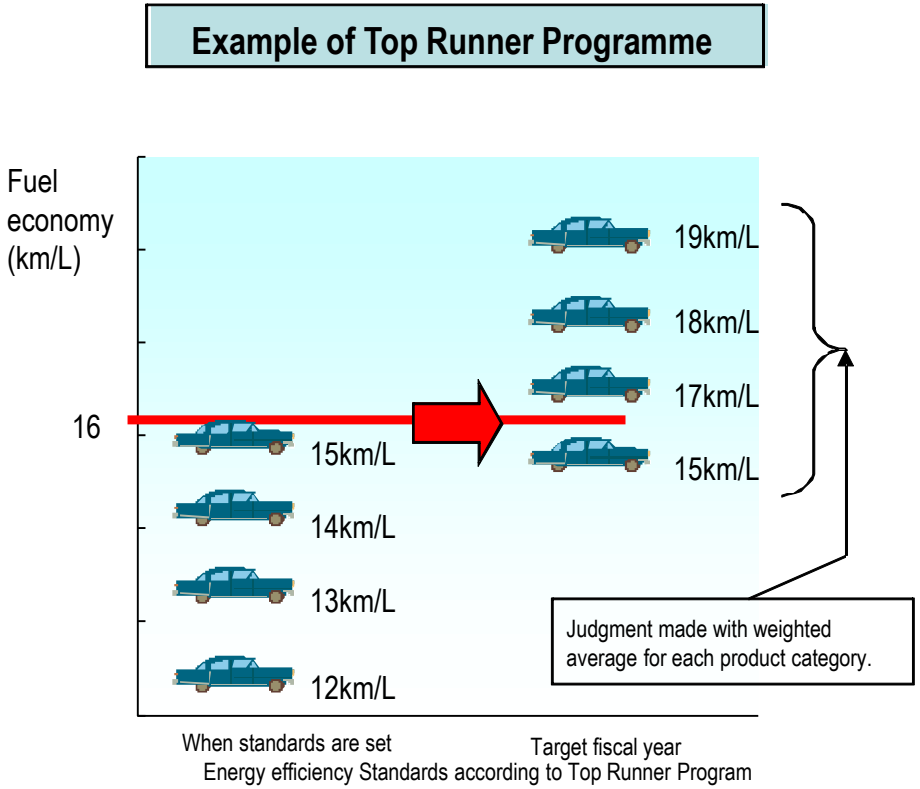
1. Iron and Steel (Blast Furnace)
2. Iron and Steel (EAF,Ordinary Steel)
3. Iron and Steel (EAE,Special Steel)
4. Electric Suppliers
5. Cement
6. Paper
7. Pulp
8. Refinery
9. Chemical
10. Chlorine production

Benchmark System



Top Runner Programme: Basic Concept on how to set the Target Efficiency Standard





Top Runner Programme: 32 Equipment and Materials

1. Passenger vehicles
2. Air conditioners
3. Lighting equipment
   (Using only fluorescent lamps as main light source)
4. TV sets
5. Photocopy machines
6. Computers
7. Magnetic disk units
8. Freight Vehicles
9. Video cassette recorders
10. Electrical refrigerators
11. Electrical freezers
12. Space heaters
13. Gas cooking appliances
14. Gas water heaters
15. Oil water heaters
16. Electric toilet seats
17. Vending machines
18. Transformers
19. Electric rice cookers
20. Microwave ovens
21. DVD recorders
22. Routers
23. Switching unitts
24. Multifunction devices
25. Printers
26. Electric water heaters
27. AC motors
28. Self-ballasted LED lamps
29. Showcase
30. Insulation materials
31. Sashes
32. Multi-paned glazing

*1.-9.:Apr. 1999, 10.-11.: Dec. 1999, 12.-18.: Dec. 2002, 19.-21.: Apr. 2006, 22.-23.: Jul. 2009, 24.-26.: Mar. 2012, 27.-28.: Nov. 2013, 29.: Feb.2016, 31.-32.: Nov. 2014

Labelling Programme supports Top Runner Programme

Example of Energy-Saving Label (displayed by the manufacturer)

Energy-saving standard achievement rate **154%**

Annual electric power consumption **330kWh/ year**

Target year: FY 2010

Energy-saving standard achievement rate **90%**

Annual electric power consumption **590kWh/ year**

Target year: FY 2010

Example of the Uniform Energy-Saving Label (displayed by the retailer)

Example of refrigerator

Label to show the fiscal year of the version

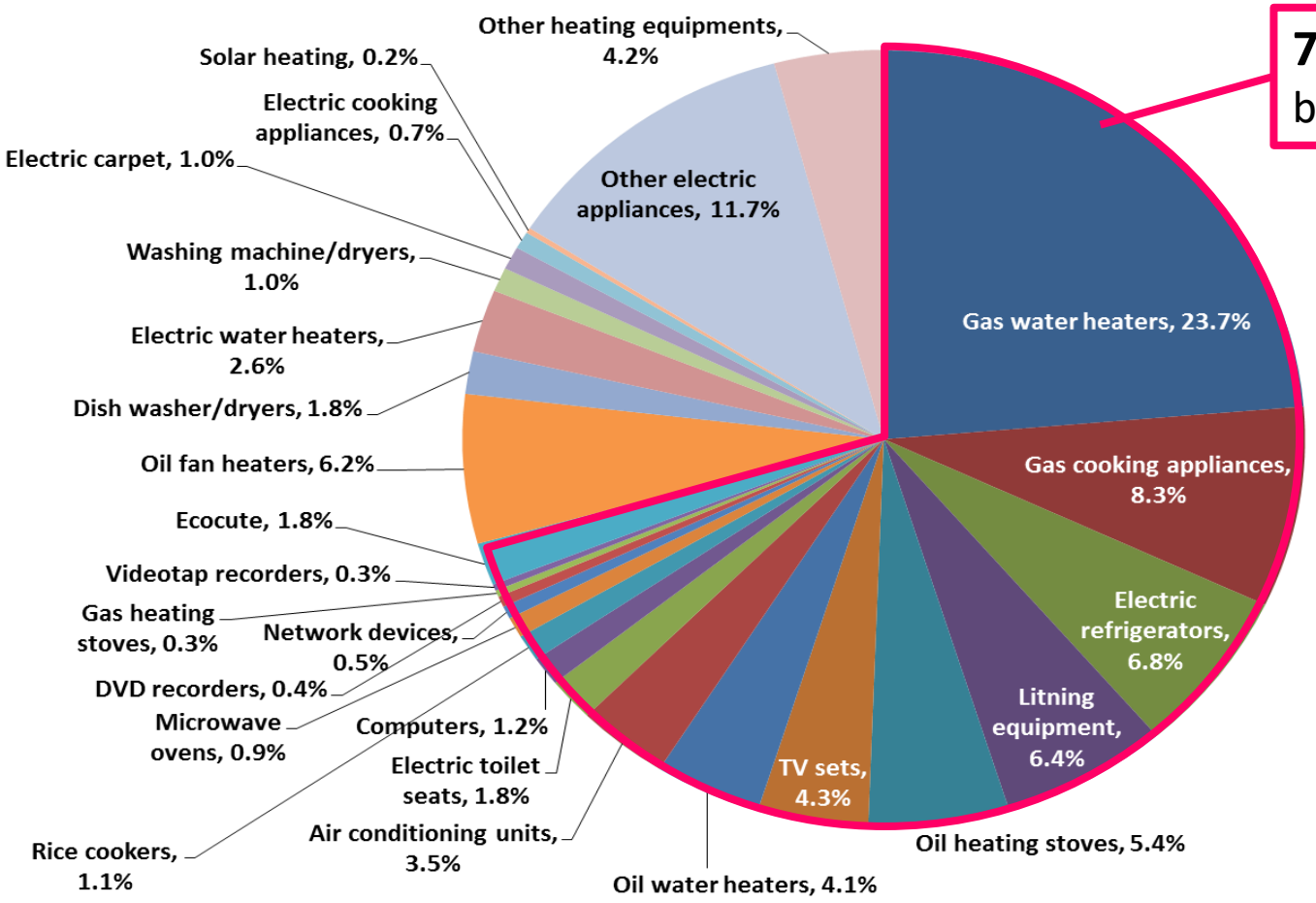
Label to show non-fluorocarbon logo for refrigerators not using CFC

5-Star Rating

Energy-Saving Label

Expected annual electricity charge (¥)

Top Runner Programme covers 70% of appliances and equipment in Household

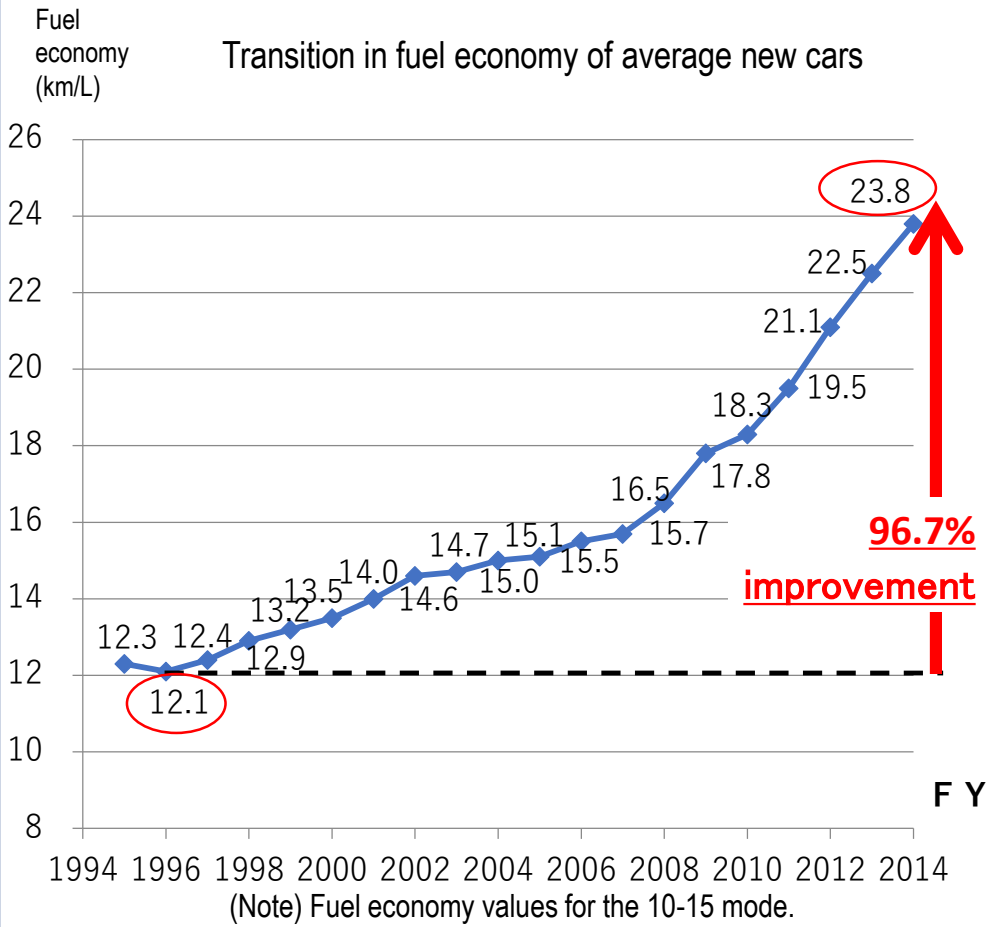


*1. Estimated by the Institute of Energy Economics, Japan (IEEJ), based on the Agency for Natural Resources and Energy's FY2009 Residential and Commercial Sector Energy Data Survey (10,040 valid responses) and Supplementary Survey concerning Appliance Use(?) (1448 valid responses)

*2. This survey is based on tabulation and analysis of each energy source, with values unified and converted on megajoule (MJ) basis. Electric power in secondary conversion value.

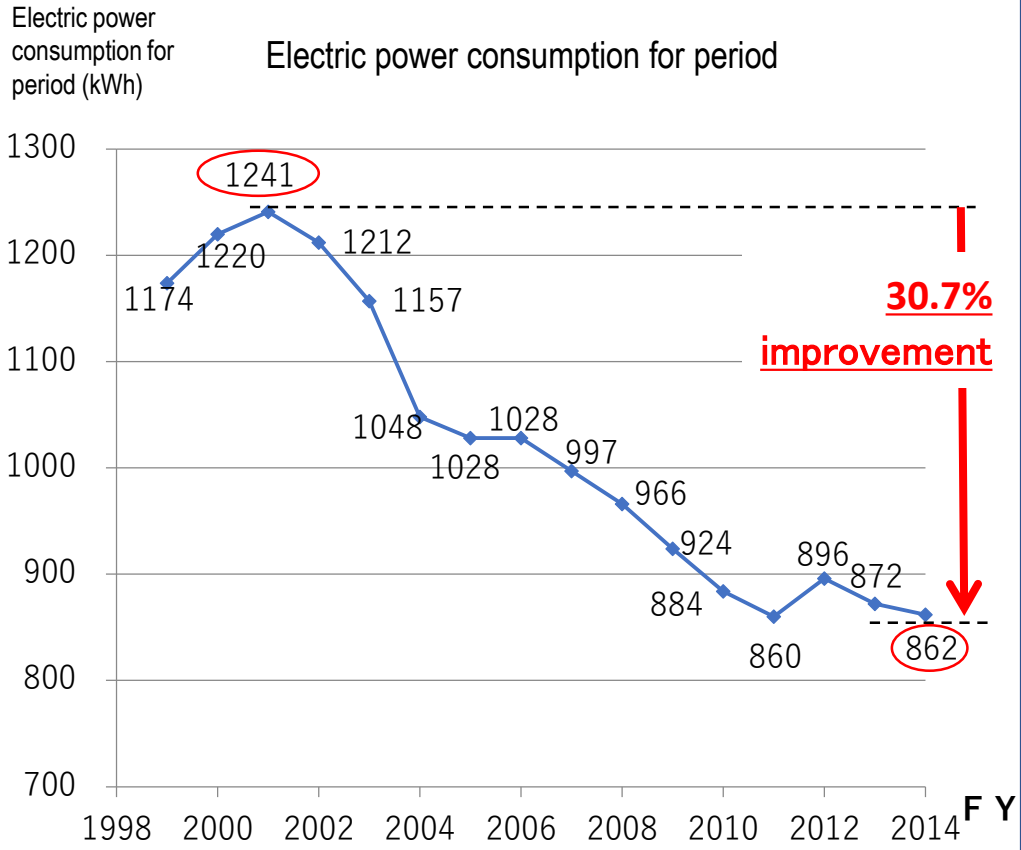
EE improvement with Top Runner Programme

[Passenger vehicles]



(Note) Fuel economy values for the 10-15 mode.

[Air conditioners]



(Note) Wall mounted cooling and heating units with cooling capacity of 2.8kW-class model; simple average values for a representative model of energy conserving-type products.