

A light gray silhouette of a world map is centered in the background of the slide. The text is overlaid on this map.

Latest developments of energy conservation policies in Japan and its challenges for the future goal

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12-13 April, 2018

The Institute of Energy Economics, Japan (IEEJ)

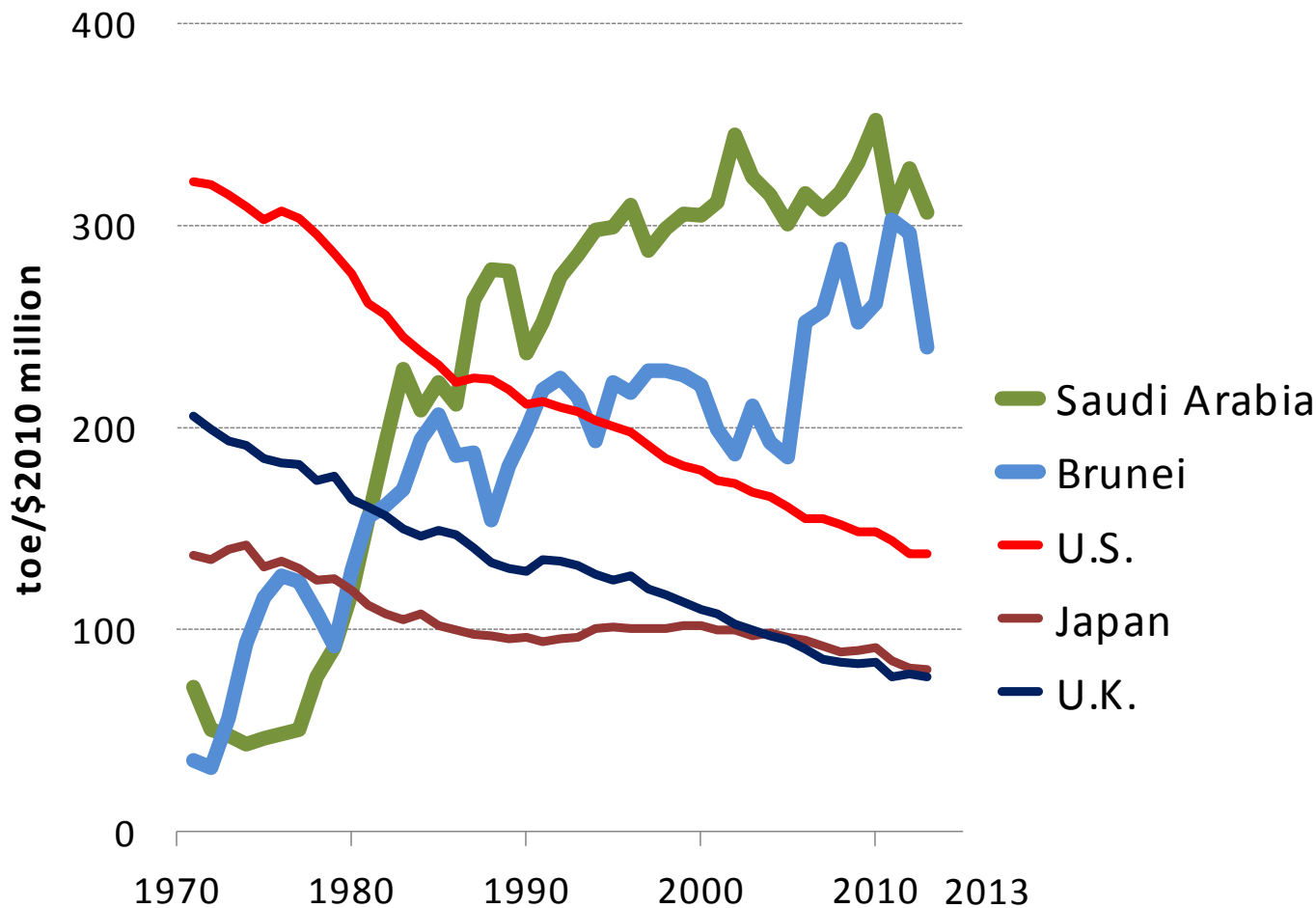
Outline

- 1. International Comparison of Total Primary Energy Consumption per GDP**
- 2. Energy Supply/Demand Structure toward CO₂ Emissions Reduction Target in 2030**
- 3. Japan's Energy Efficiency and Conservation Policy Framework**
- 4. Latest Development: Draft Amendment of Energy Conservation Law**
- 5. Toward Deepening Japan's Energy Efficiency Efforts – New or Enhancing Energy Efficiency**

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1. International Comparison of Total Primary Energy Consumption per GDP

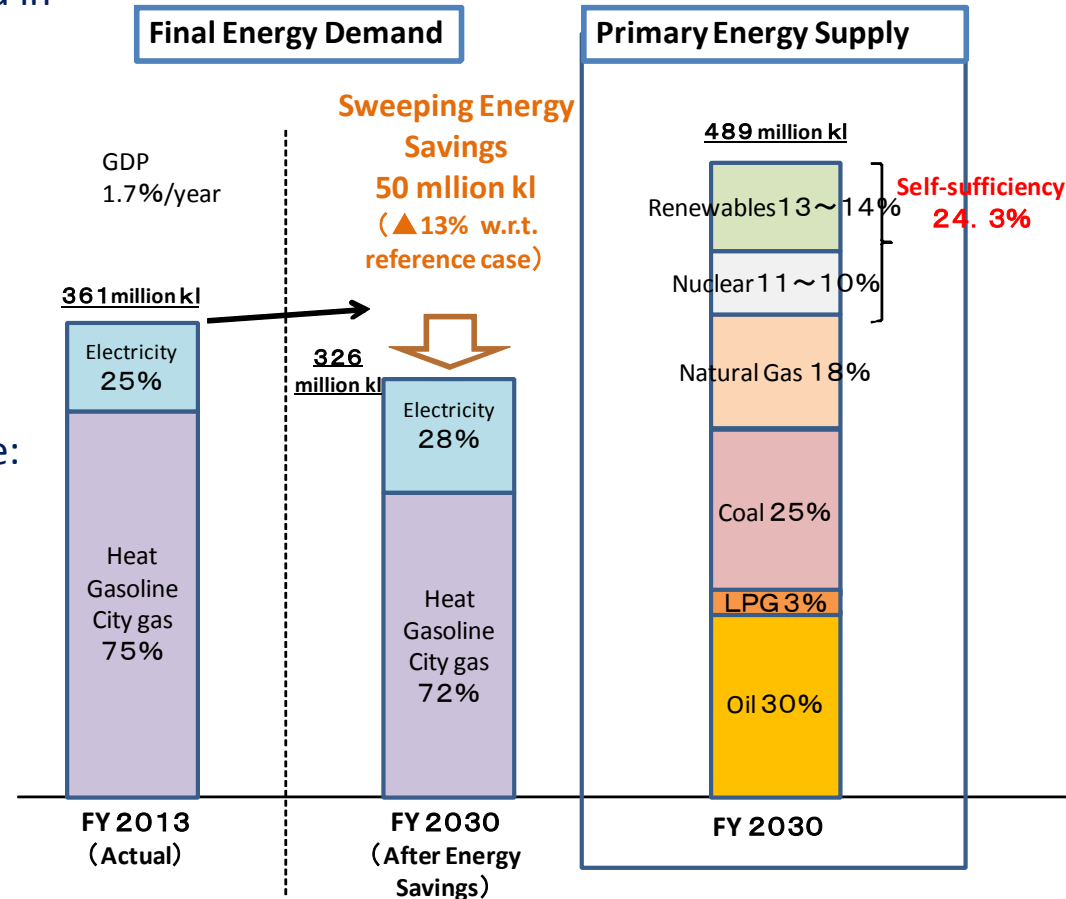


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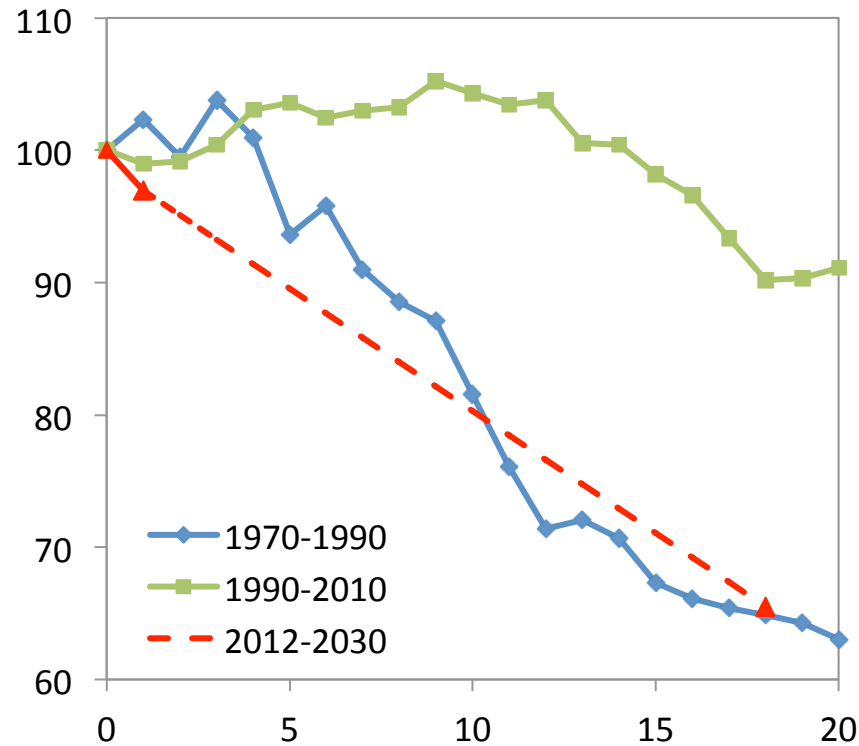
2-1. Energy Supply/Demand Structure toward CO₂ Emissions Reduction Target in 2030

- 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 CO₂ emissions reduction target** (**26% CO₂ emissions reduction** in 2030 compared with 2013 level)



2-2. Need for Further Improvement of Energy Efficiency

【Improvement in Energy Intensity】



- Thorough energy conservation measures could save final energy demand by 13% to 326 million kl.
- Energy conservation measures would be accumulated to improve energy efficiency as much as just after the oil crises.

2-3. 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 (CO₂ 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

2-4. Progress on Energy Efficiency toward 2030 Target

▲ 6 million kl (11.8%) in 2015

Industry < ▲ 10.4 million kl >

▲ 1.12 Million kl (11.5%) in 2015

- LED [330 thousand kl/1080 thousand kl (30.6%)]
- Industrial Heat Pump [31thousand kl/87.9万kl (3.5%)]
- Industrial Motor [40 thousand kl/1660 thousand kl (2.4%)]
- FEMS [62 thousand kl/672 thousand kl (9.2%)]

Commercial < ▲ 12.3 million kl >

▲ 1.26 million kl (10.3%) in 2015

- LED [490 thousand kl/2288 thousand kl (21.4%)]
- Top Runner [250 thousand kl/2784 thousand kl (6.1%)]
- BEMS [430 thousand kl/2353 thousand kl (19.6%)]

Residential < ▲ 11.6 million kl >

▲ 1.1 million kl (9.5%) in 2015

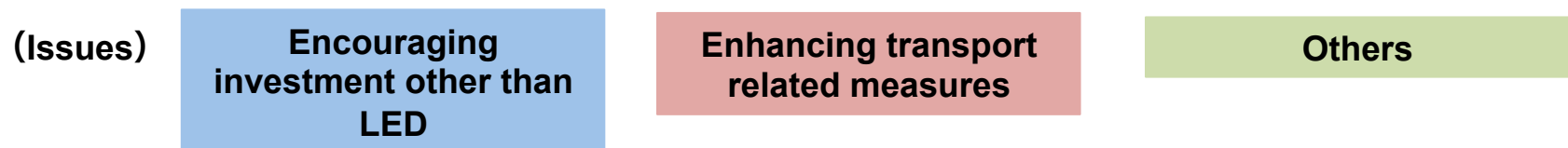
- LED [600 thousand kl/2011 thousand kl (29.8%)]
- Top Runner [108 thousand kl/1335 thousand kl (8.1%)]
- HEMS [1.0kl/1783 thousand kl (0.6%)]

Transport < ▲ 16.1 million kl >

▲ 0.7 million kl (4.5%) in 2015

- Alternative Vehicles [591 thousand kl /9389 thousand kl(6.3%)]

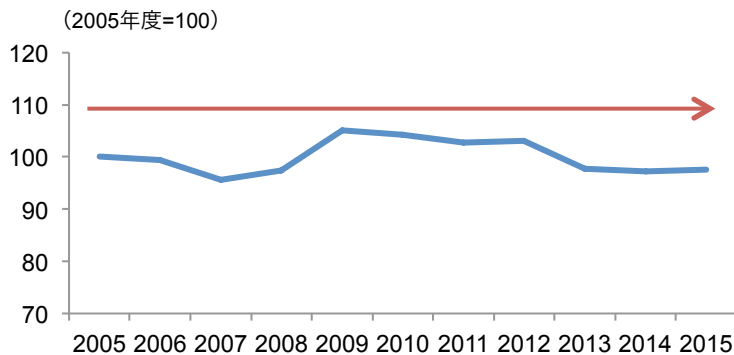
Source: METI (2017) ※Compiling data related to EE measures under Energy Mix



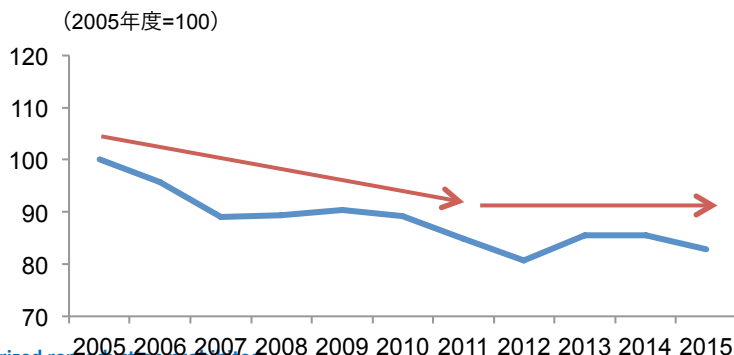
- Industry and commercial energy intensity had improved substantially, while the rate of improvement has been slowed recently. Nearly 30% of entities under the annual reporting obligation has shown energy intensity deterioration.
- It is important to encourage joint energy efficiency improvement among multiple business entities.

Energy Intensity Improvement

<Industry>



<Commercial>



Energy Intensity of Designated Business Entities

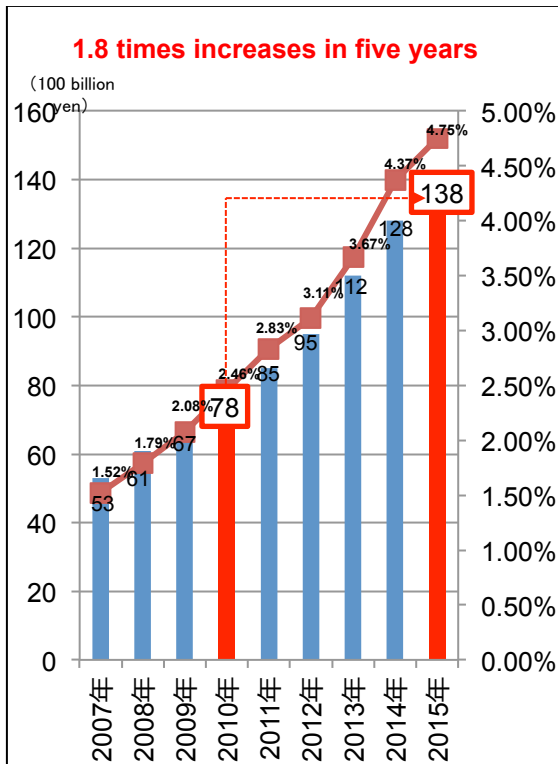
	Number of business entities	More than 1% improvement	0 ~ 1 % improvement	Those did not improve
Industry	5,545	2,743 (49%)	759 (14%)	2,043 (37%)
Commercial	5,513	3,439 (62%)	777 (14%)	1,297 (24%)
Total	11,058	6,182 (56%)	1,536 (14%)	3,340 (30%)

Source : METI(2016). "Research study on factories and freight transport owners' energy conservation situation".

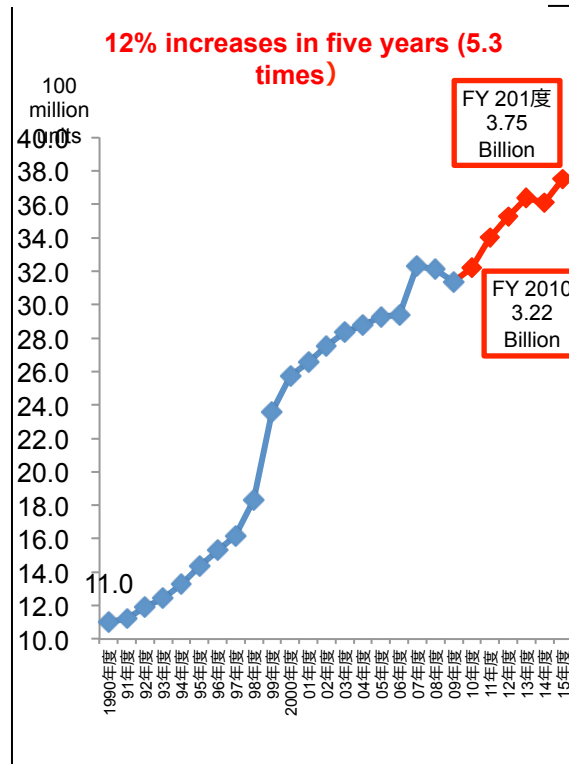
Issues ② Transport (Freight) Increases in small delivery and impacts on energy consumption

- Rationalization of freight transport would have to make progress aside from fuel economy improvement.
- Meanwhile, the below factors might increase freight transport energy consumption.
 - ✓ Market expansion and resulting increases in home delivery and re-delivery
 - ※ About 25% of energy consumption from home delivery results from re-delivery accounting for 100 million liter.
 - ✓ Increases in waiting time in B to B transport.

【Market expansion of internet order】

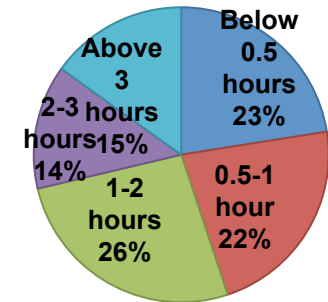


【Increases in home delivery】



【Waiting time】

・ waiting time per one transport
Over 1 hour: 55.1%, over 2 hours : 28.7%



・ Waiting time for both depart and arrival

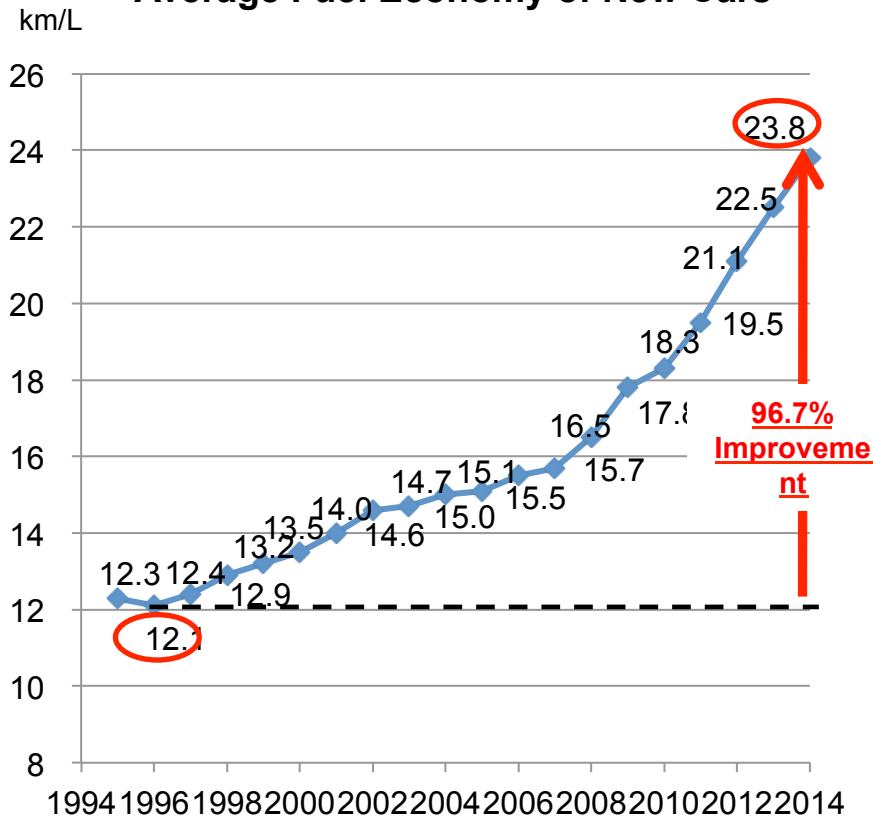
	Total : 13,101 times	Average time
Depart	(48.5%)	1:11
Arrival	(51.5%)	1:03

(Reference) Energy Efficiency Improvement

- Fuel economy of new passenger vehicles improved by **97%** (1996→2014) , while AC efficiency improved by **31%** (2001→2014) .

【Passenger vehicles】

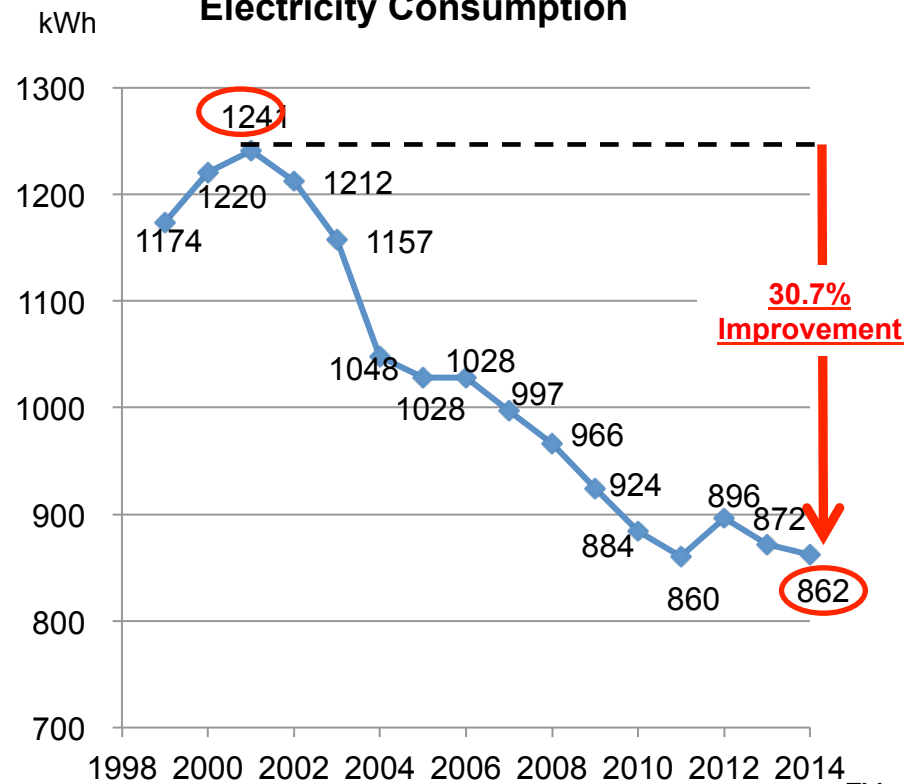
Average Fuel Economy of New Cars



- Gasoline passenger vehicles fuel economy at 10/15 mode
- Source : Ministry of Land and Transport

【AC】

Electricity Consumption



- AC average energy consumption at cooling capacity of 2.8 kW
- Electricity consumption data is sourced from JISC9612:2005
- Source : Energy efficiency catalogue (Summer and Winter)

Outline

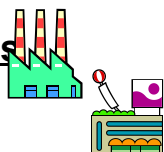


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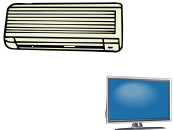
3-1. Historical Development of Energy Conservation Law

Industry	Residential/Commercial	Transport
1979 Establishment Designated Energy Management Factories Guidance for Buildings and Appliances		Energy Conservation Law has been amended 7 times to cope with the changing market situation
1983 Introduction of licensed energy manager system	1992 Amendment Periodical reporting	
1992 Introduction of periodical reporting system	1998 Amendment: Introduction of Top Runner Program	2005 Amendment Reporting System on Energy by Carriers
1998 Amendment: Expand coverage of factories	2002 Amendment Energy Management of Office Buildings	
2005 Amendment: Integration of Heat and Power Control	2008 Amendment Energy Management of Office Buildings	
2008 Amendment: Company based rather than plant based regulation, introduction of Bench Marking.	2013 Amendment on building EE&C evaluation to primary energy basis, introduction of building material TR	
2013 Evaluation of Peak Shift	2015 New Establishment of Energy Conservation Law for Buildings	
2015 SABC class system		
2018 Amendment joint energy efficiency implementation		2018 Amendment on freight owner responsible for annual reporting system

3-2. Overview of Energy Conservation Law

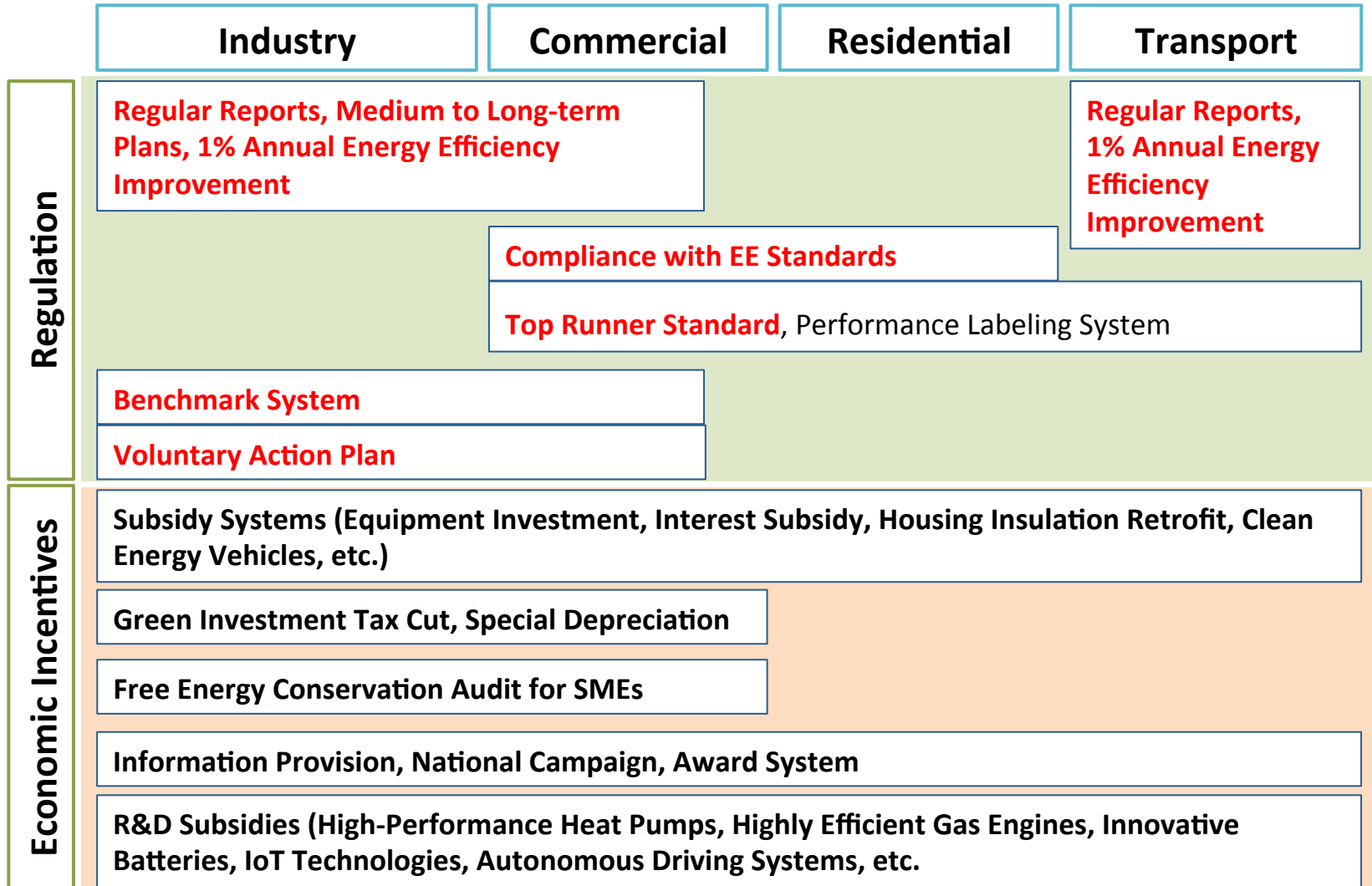
- The Law provides guidelines for factories, commercial business entities and transport business entities and owners to follow and requires them to report their energy efficiency activities, middle and long-term plans. If their activities are not sufficient, necessary instructions and guidance will be made.
- For manufactures of appliances and automobiles are required to meet the respective targets. Necessary recommendations will be made if not sufficient actions are taken.

	Factory • Business	Transport	
Direct Regulation	<p>Aspirational Target</p> <p>Factories/commercial businesses</p> <ul style="list-style-type: none"> • Aspirational target 	<p>Freight/passenger transport businesses</p> <ul style="list-style-type: none"> • Aspirational target 	<p>Freight owner</p> <ul style="list-style-type: none"> • Aspirational target 
	<p>Reporting Obligation</p> <p>Special business entities (Annual energy consumption over 1,500kl/year)</p> <ul style="list-style-type: none"> • Designation of energy manager • Reporting obligation of middle, long-term plan • Reporting obligation of annual energy consumption 	<p>Special business entities (Owning trucks of more than 200 units)</p> <ul style="list-style-type: none"> • Reporting obligation of middle, long-term plan • Reporting obligation of annual energy consumption 	<p>Special business entities (freight transport goods of more than 30 million ton km per year)</p> <ul style="list-style-type: none"> • Reporting obligation of middle, long-term plan • Reporting obligation of annual energy consumption

In-direct Regulation	<p>Top Runner Program</p> <p>Manufactures (At above certain level)</p> <ul style="list-style-type: none"> • 32 products are under the energy efficiency improvement target 	<p>Information</p> <p>Retailers of appliances and energy</p> <ul style="list-style-type: none"> • Information provision to consumers (Aspirational goal)
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※Building energy efficiency is regulated under the building energy conservation law since 2019.

3-3. Energy Efficiency and Conservation Policy Framework



3-4. 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

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4-1. Draft Amendments on Energy Conservation Law

- **Encouragement of Joint Energy Efficiency Improvement**
- **Permission for Group Company Reporting System**
- **Redefinition of Freight Owner**

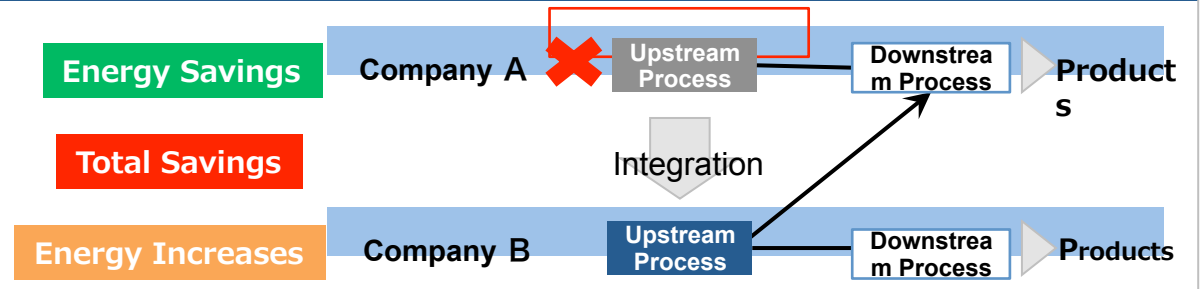
Amendment ① Joint Energy Efficiency Improvement

Article from 46 to 50 (Factories · Businesses), from 117 to 121 (Freight owners), from 134 to 138 (Transport businesses)

【Current】 Evaluation by business entity → 【Amendment】 Energy savings from joint efforts among different business entities would be shared among participating them.

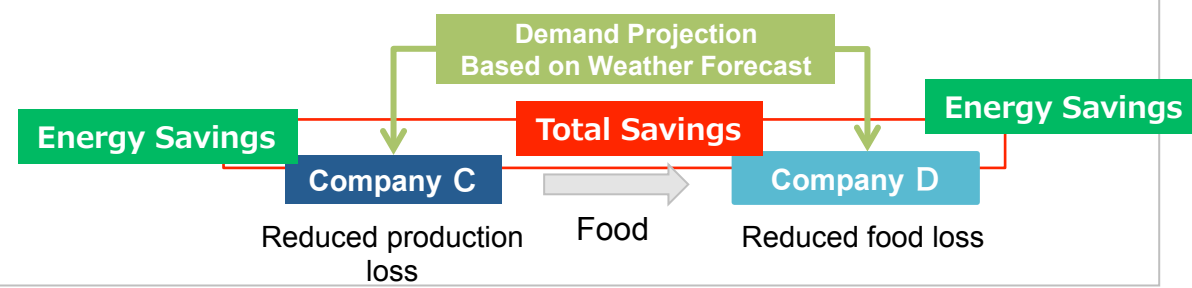
1 Production facility integration

- Savings from the integration of production process will be shared among the participating companies



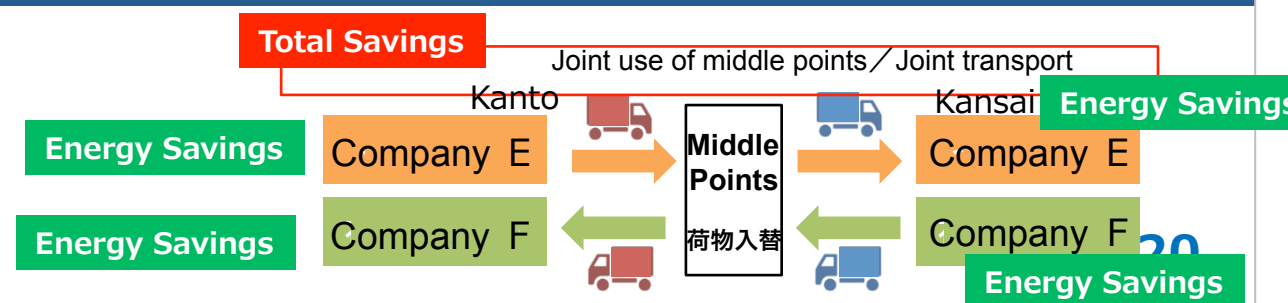
2 Coordination in supply chain

- Savings would be shared among the supply chain to encourage the joint efforts.



3 Coordination in freight transport

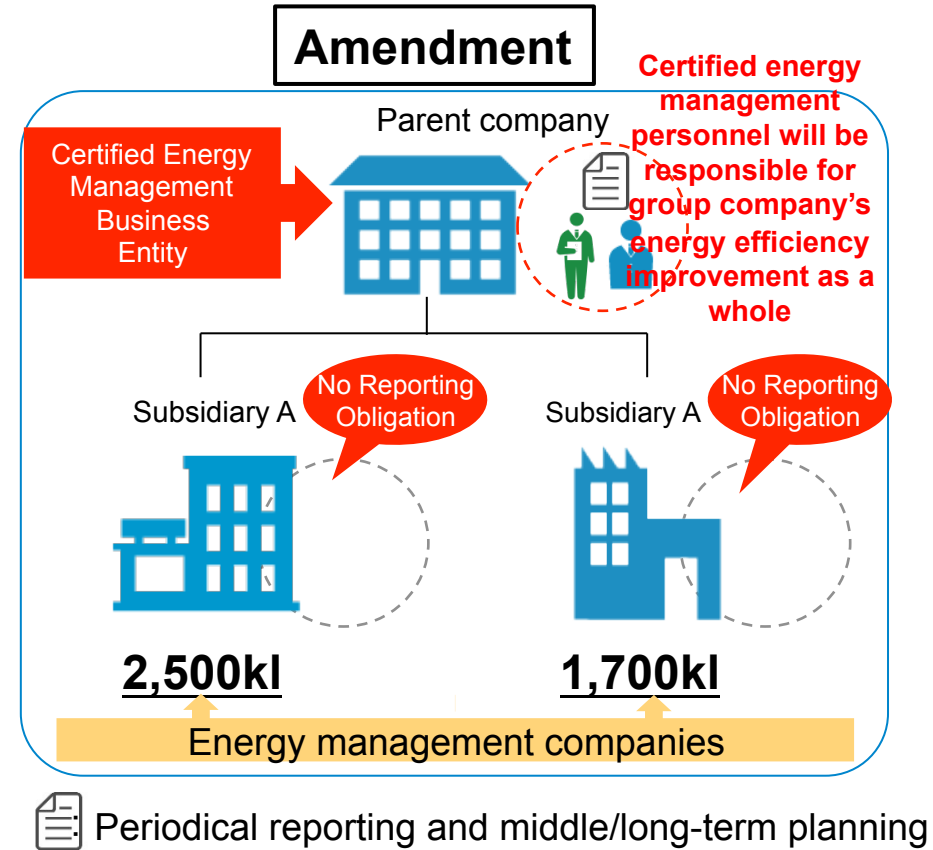
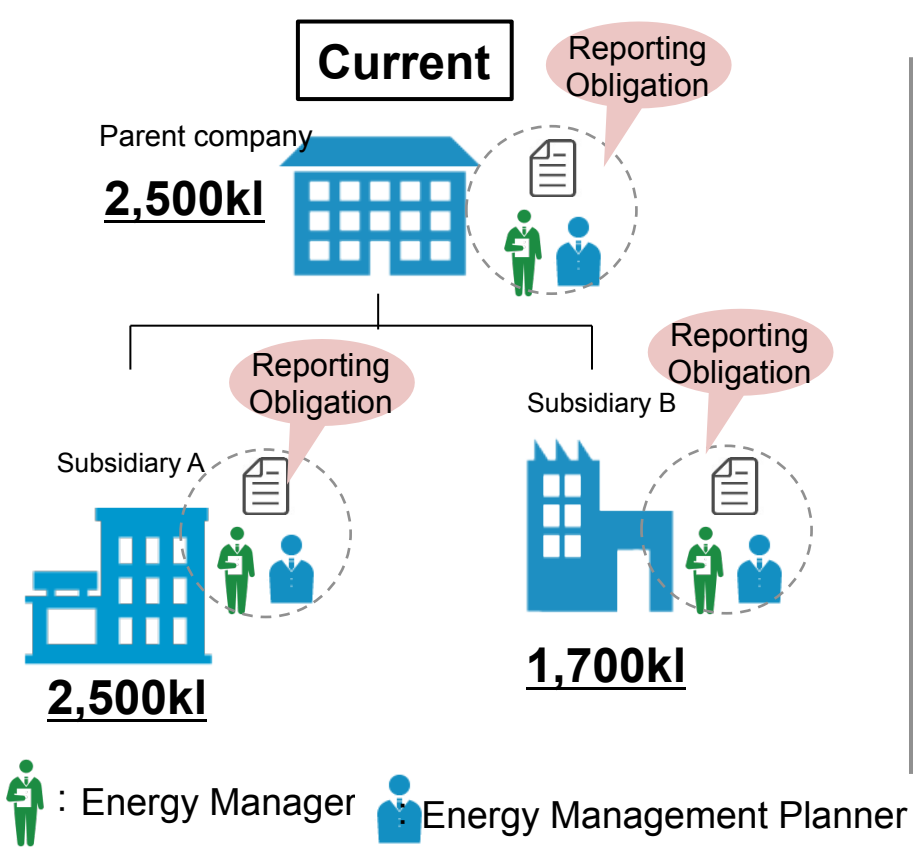
- Savings would be shared among the supply chain to encourage the joint efforts in freight transport.



Amendment ② Permission for Group Company Reporting System

Article from 29 to 4 (Factories · Businesses) , from 113 to 116 (Freight Owners) , From 130 to 133 (Transport businesses)

- Certified energy management business entities will be able to implement energy efficiency efforts among group company.



Amendment ③ Redefinition of Freight Owner

Article 105

- Regardless of the freight goods ownership, those entities determine the mode of freight goods are defined as freight owner. This expands the coverage to include internet retail business entities under the energy conservation law.
- Superior examples implemented by internet retail business entities will be included as examples to follow in the guidelines of energy conservation law.

Current

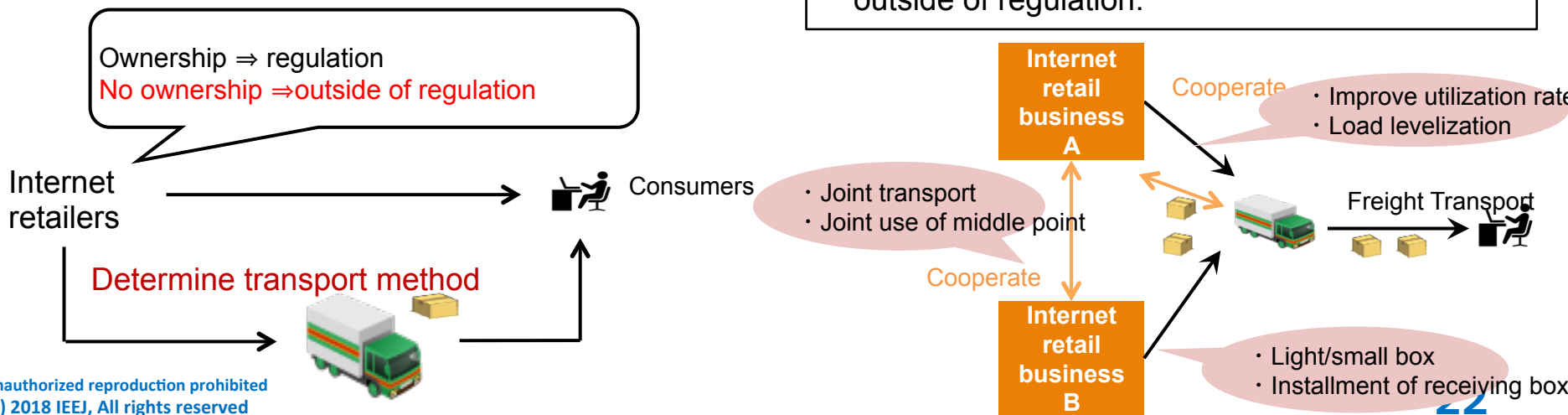
Freight Owner = Owner of transporting goods

- Transporting goods from factory to factory: Freight owner was defined as those owners of transporting goods.
- Some of the internet retail business entities were outside of this regulation. (Only 5 internet retailers out of top 10 entities.)

Amendment

Freight Owner = Those entities determining the transport methods

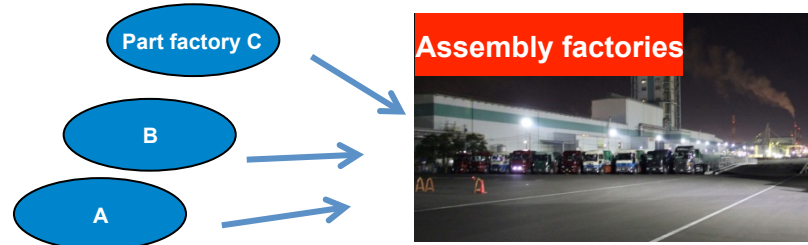
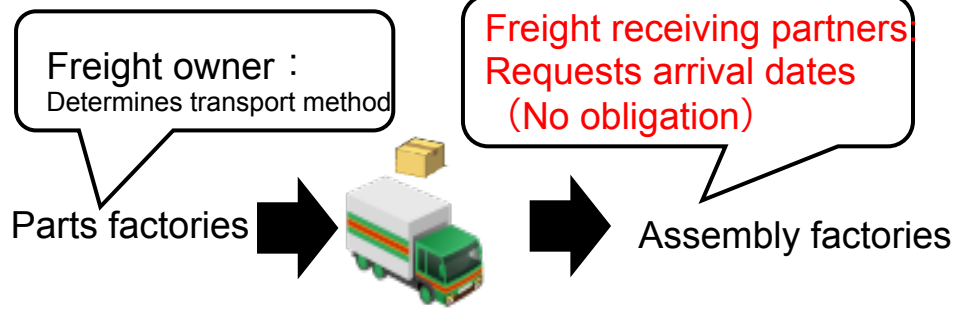
- Regardless of the freight goods ownership, those entities determine the mode of freight goods are defined as freight owner.
- Those mall business entities that do not determine the freight transport method will be outside of regulation.



- Under the transporting methods determined by freight owners, those receiving partners are defined as freight owner supporters to cooperate energy efficiency improvement through the coordination on the arrival date/timing (Aspirational target).

Current

No energy efficiency aspirational obligation for receiving partners

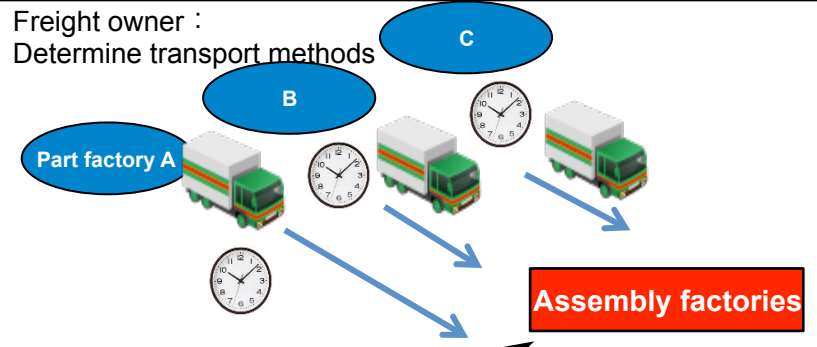


Unless receiving partners take appropriate actions, timing for the arrival would be random, and freight trucks would have to wait until the assembly factories are ready.

Amendment

Freight owner supporters = Those receiving partners that can designate the arrival dates/ time

- Coordination with freight owners is encouraged to efficiently handle the transporting goods (Aspirational target)



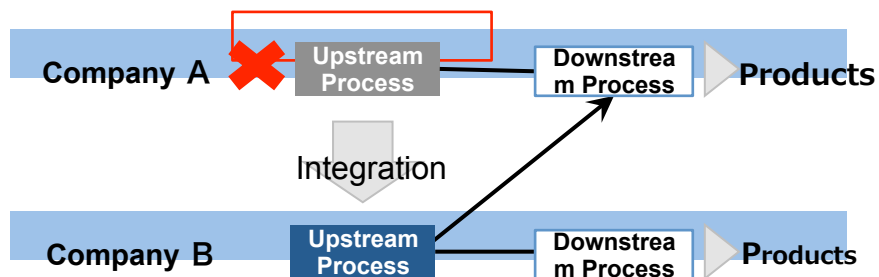
Freight owner supporters: Cooperation on energy efficiency regarding the arrival date/timing

- Guidelines are under consideration
- Directions on the timing for arrival

Amendment of energy conservation law and strengthening of incentives

Amendment

(1) Joint energy efficiency improvement



- Sharing the energy savings among the participating entities.

Strengthening of incentives (Subsidies/tax weaver)

【New】

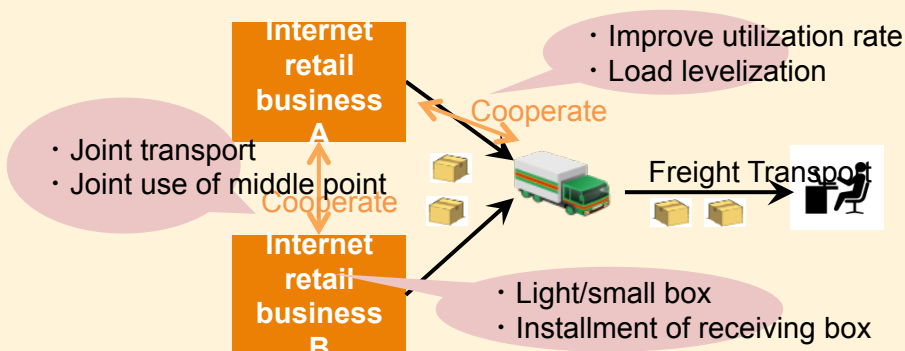
※Corporate tax : 30% special depreciation、 7% weaver (small/middle sized business)

【Continue】 (Energy efficiency subsidy)

Provision of subsidies facilitating the capital investment for joint energy efficiency

※ Provision of subsidies out of 60 billion budget in FY 2018

(2) Redefinition of freight owner



【New】

※Corporate tax : 30% special special depreciation、 7% weaver (small/middle sized business)

【Continue】

Provision of subsidies facilitating the capital investment for joint energy efficiency

※Provision of subsidies 6.05 billion yen in FY 2018

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5-1. Widening the Coverage of Benchmark System

Dialogue between Public and Private Sector (26 Nov, 2015)

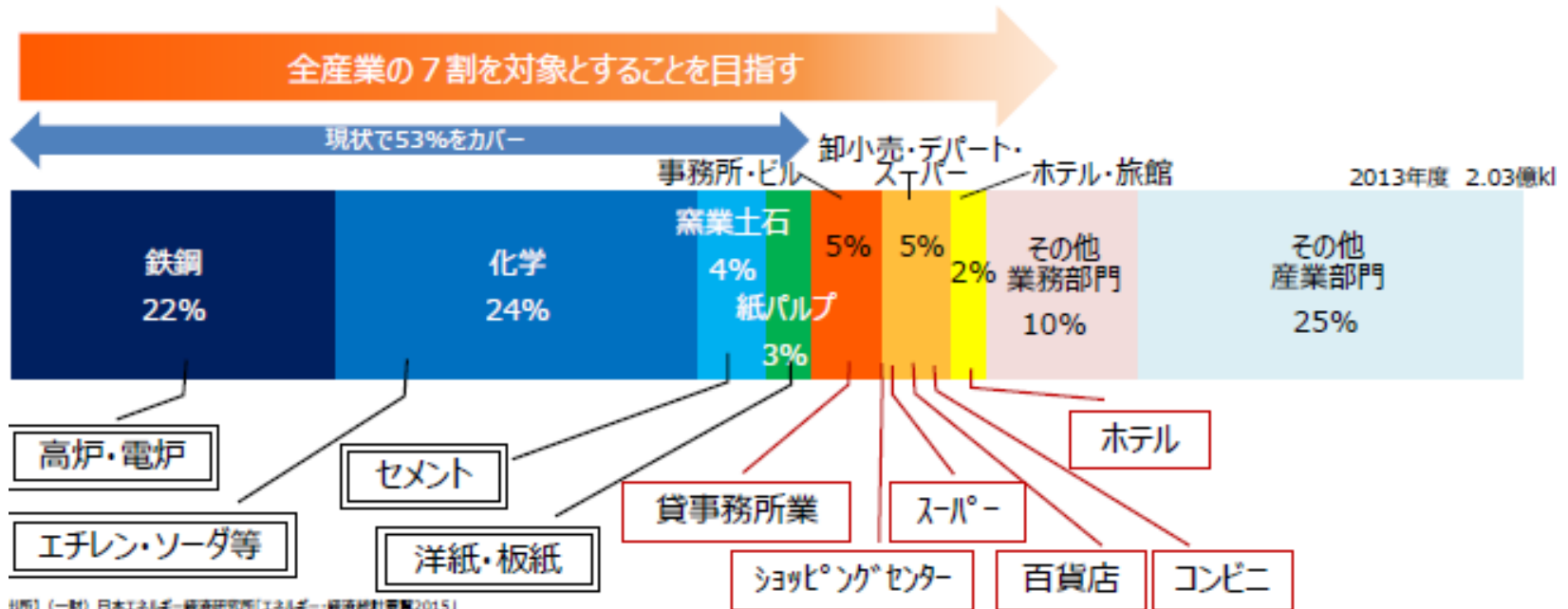


Prime Minister's Statement

We plan to expanding the benchmark system to the service industry with the coverage becoming 70% of total energy consumption of industry/commercial sectors.

官民対話

『日本再興戦略』改訂2015（平成27年6月30日閣議決定）に基づき、グローバル競争の激化や急速な技術革新により不確実性の高まる時代に日本経済が歩むべき道筋を明らかにし、政府として取り組むべき環境整備の在り方と民間投資の目指すべき方向性を共有するため、未来投資に向けた官民対話を開催。第3回ではエネルギー関連の投資と課題を議論。



出所】（一財）日本エネルギー経済研究所「エネルギー経済統計要覧2015」

6. Toward Deepening Japan's EE Efforts

- Japan is the leader in EE efforts across the world with the use of **(1) regulation, (2) economic incentives and (3) human resources (energy managers)**.
- Toward deepening Japan's EE efforts, **strengthening existing policies and practices** is the key with the use of new technologies.
- **Establishment of new policies** would be necessary with the changing policy/market environment.
 - Energy efficiency as the tool for grid stabilization
 - Demand response from energy efficiency and evaluation mechanism
 - Use of IT and measurement and verification
 - Zero energy building as the virtual power plant

(Reference) Toward Deepening Japan's Energy Efficiency – Overview of New or Enhancing EE Policies



Sector	Energy Savings in 2030	EE&C Policies to Realize the Estimated Energy Savings
Industry	Factories : 10.42 billion Liter	<ul style="list-style-type: none"> ■ Strengthening Benchmark Standard ■ Strengthening Review System for Energy Management System ■ Energy Audit for Small and Medium Sized Entities ■ Promoting Joint EE&C Efforts by Multiple Entities
Commercial	Buildings · Stores : 12.26 billion Liter	<ul style="list-style-type: none"> ■ Strengthening Benchmark Standard ■ Strengthening Review System for Energy Management System ■ Energy Audit for Small and Medium Sized Entities ■ Top Runner Standard ■ Mandatory Compliance on Building EE Standard ■ Wider Diffusion of Zero Energy Building ■ Provision of EE Information by Energy Suppliers and Potential for Energy Efficiency Obligation
Residential	Appliances : 6.03 billion Liter Housing : 5.57 billion Liter	<ul style="list-style-type: none"> ■ Top Runner Program ■ Mandatory Compliance on Housing EE Standard ■ Wider Diffusion of Zero Energy House ■ Provision of EE Information by Energy Suppliers and Potential for Energy Efficiency Obligation
Transport	Freight Truck : 6.68 billion Liter Vehicles : 9.39 billion Liter	<ul style="list-style-type: none"> ■ Traffic Demand Management · Eco-Driving ■ Improvement of Freight Delivery Service Increased from E-Commerce ■ Top Runner Program ■ Autonomous Car Driving