Workshop on Energy Conservation for
Kyrgyz Republic and Republic of Tajikistan (ECCA1)

Status of Energy Conservation Efforts in Japan's Transportation Sector

February 6, 2025

The Energy Conservation Center, Japan

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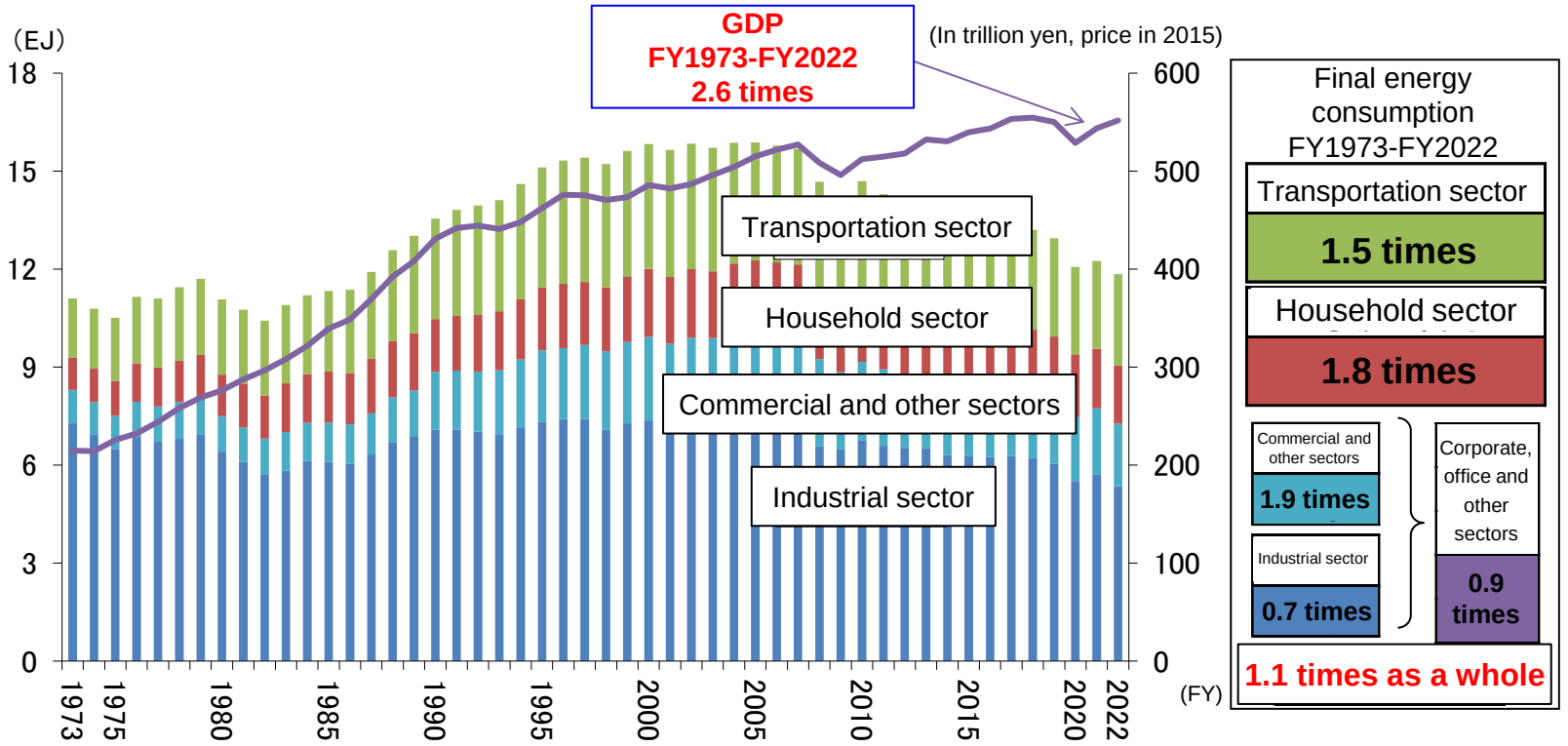
Research Department (and CN Solutions Department)

1. Transportation Sector in Japan (1/3)【Final energy Consumption】

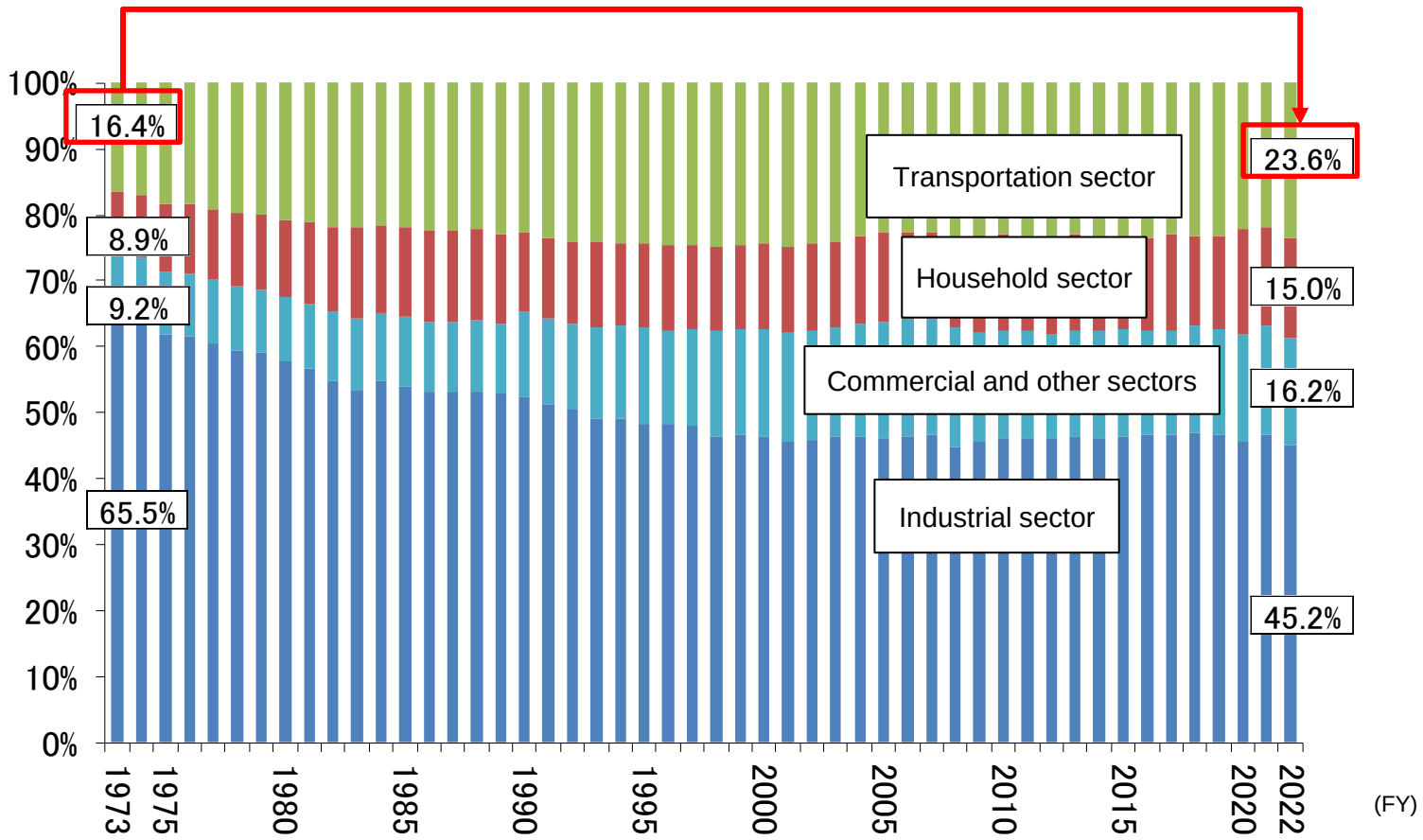
- Final energy consumption has increased since the mid-1980s, partly due to low oil prices.
- Since the mid-2000s, final energy consumption has been on a downward trend after peaking in FY 2005, partly due to higher crude oil prices.
- Looking at final energy consumption by sector, the companies, establishments, and others sector increased by 0.9 times (0.7 times for industry and 1.9 times for business and others), the residential sector increased by 1.8 times, and the transportation sector increased by 1.5 times.
- In the enterprises, establishments, and others sector, final energy consumption remained at the same level due to progress in energy conservation, especially in the manufacturing sector.
- In the residential and transportation sectors, final energy consumption increased due to the spread of energy-using equipment and automobiles.



Source: Energy White Paper 2024

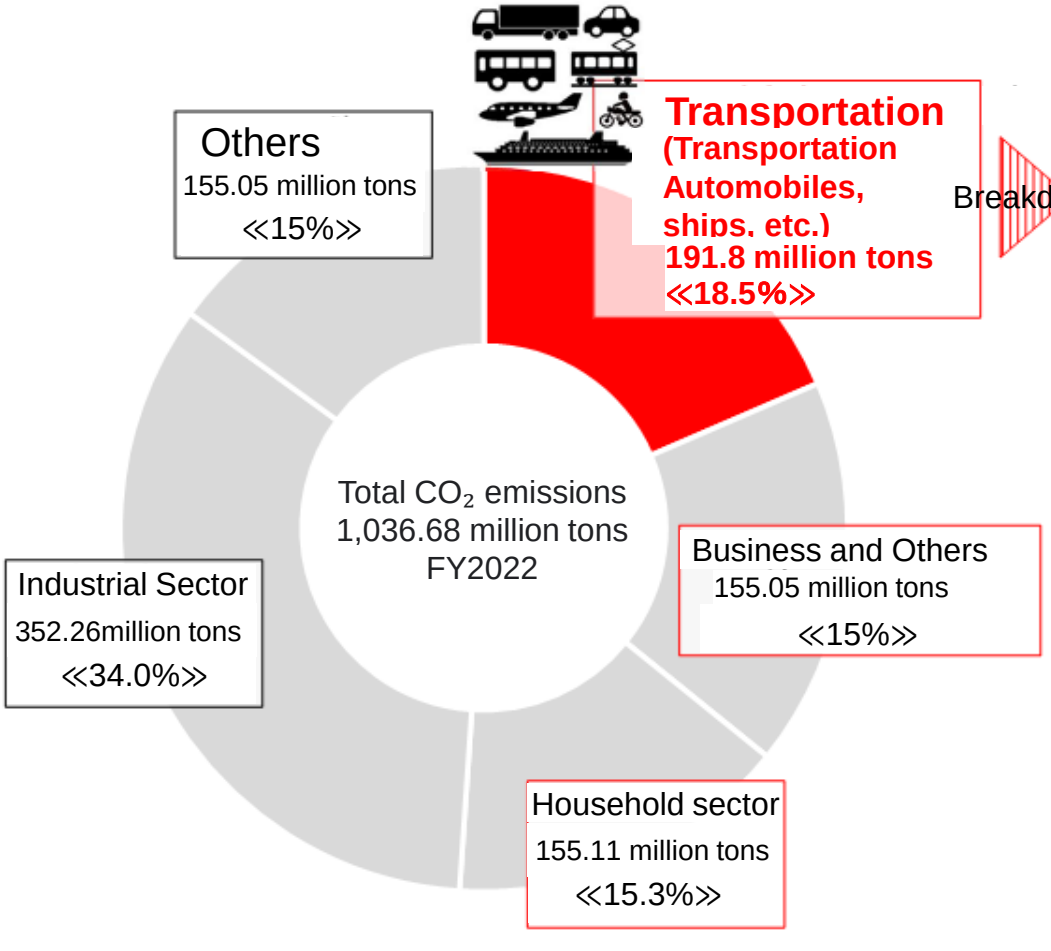
1. Transportation Sector in Japan (2/3)【Final energy consumption rate by sector】

The transportation sector accounts for **23.6%** of total energy consumption (1.4 times higher than in 1973).

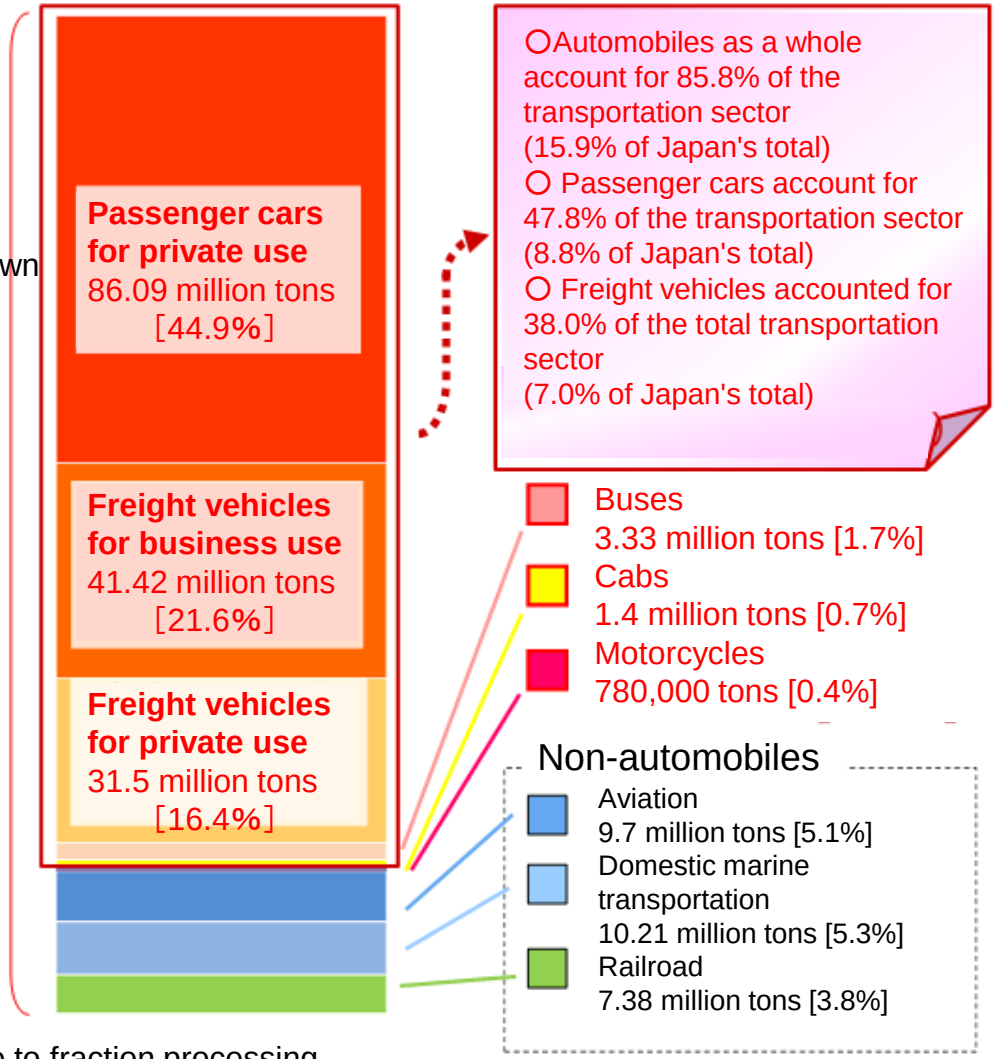


1. About Japan's transportation sector (3/3)【CO_2 emissions in the transportation sector】

CO_2 emissions in each sector in Japan



CO_2 Emissions in the Transportation Sector



※Total figures may not match due to fraction processing.

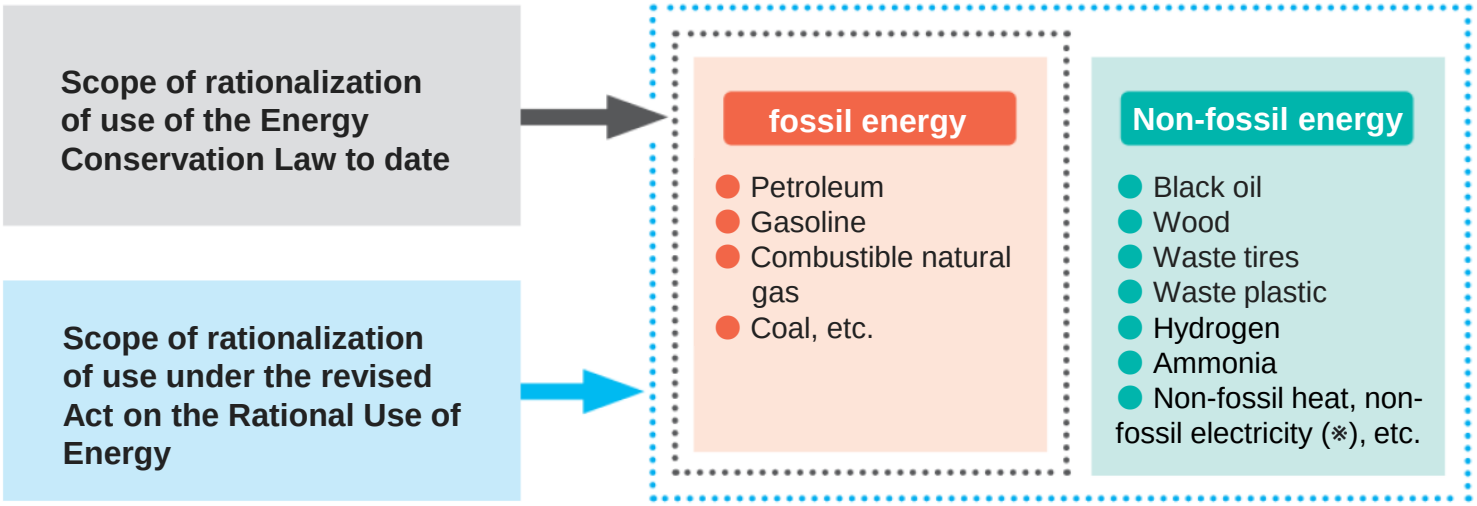
2. Act on the Rational Use of Energy and Conversion to Non-fossil Energy (1/2)

What is the Energy Conservation Act?

- The Law Concerning the Rational Use of Energy and Conversion to Non-fossil Energy, etc. (hereinafter referred to as the "Energy Conservation Law")) is a law enacted in 1979.
- The objective is to ensure the effective use of fuel resources in accordance with the economic and social environment surrounding energy, both domestically and internationally.
- The criteria for determining when to implement energy conservation initiatives are stipulated **for factory operators, transporters, and shippers**.
- Businesses above a certain size are required to report on their energy use and other information, and guidance is provided as necessary.

Energy in the Energy Conservation Law (Energy to be reported)

- Energy in the Energy Conservation Law covers **fuel, heat, and electricity** as shown in the blue box below.
- New non-fossil energy sources are added to the reporting scope from April 2023.

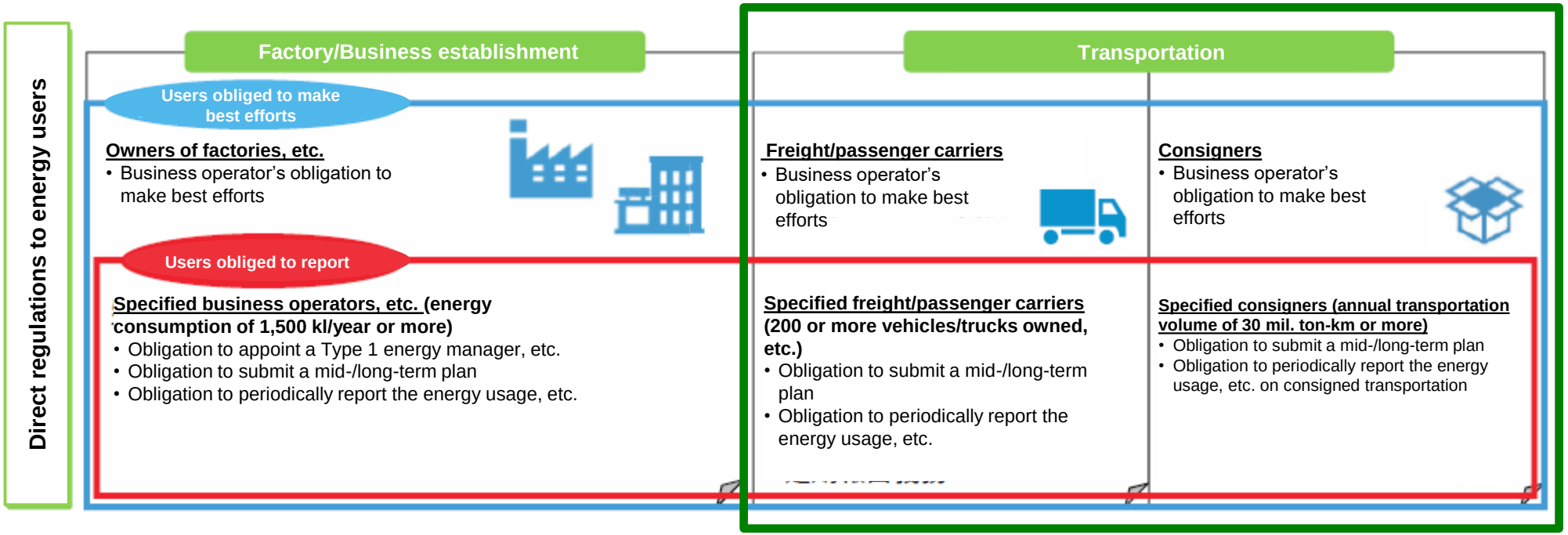


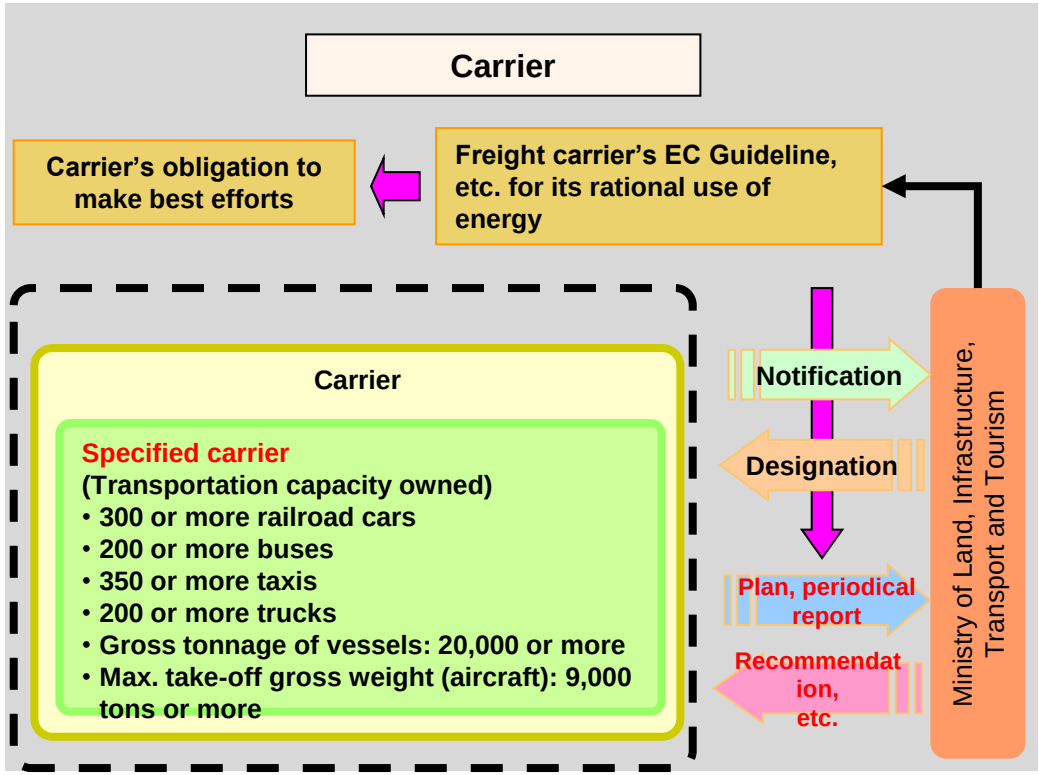
※Solar heat, solar power, etc.

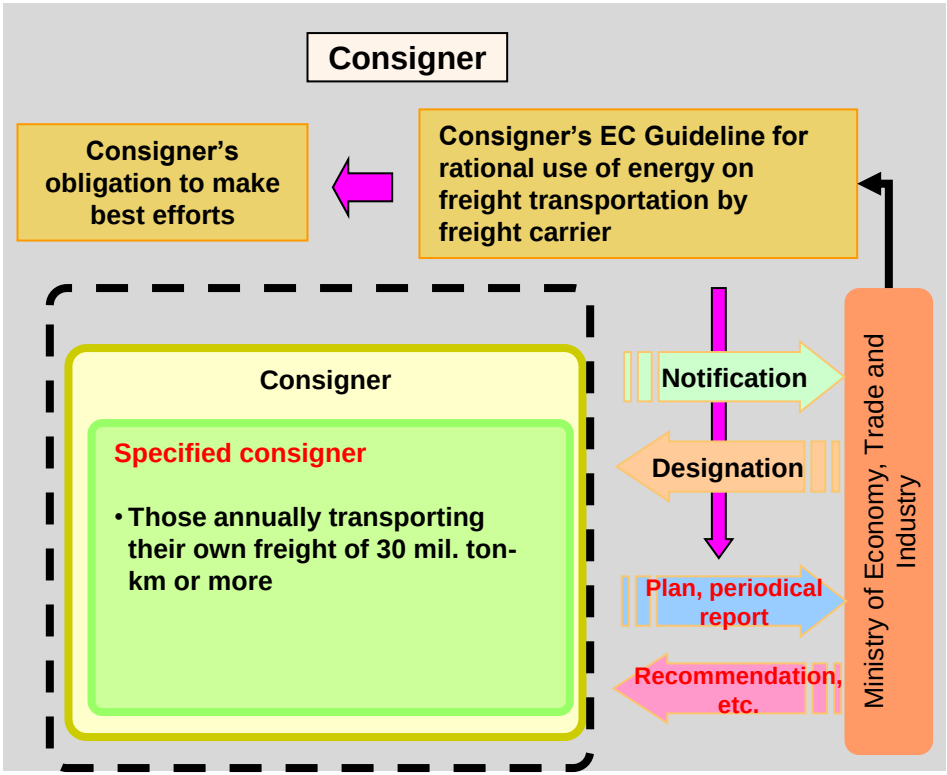
2. Act on the Rational Use of Energy and Conversion to Non-fossil Energy (2/2)

Sectors regulated by the Energy Conservation Act

- The business fields regulated by the Energy Conservation Law are factories, workplaces, and the transportation sector.
- The standards of judgment (e.g., target for improvement of energy consumption efficiency (1% per year), etc.), which should serve as a guideline for installers of factories, etc. (factories, offices, and other workplaces), transportation companies, and shippers when implementing initiatives related to energy conservation and non-fossil fuel conversion, are stipulated.
- Businesses above a certain size are required to report on their energy use, etc., and are given guidance and advice if their energy conservation efforts are insufficient, instructions to prepare rationalization plans, and guidance, advice, and recommendations if their non-fossil fuel conversion efforts are insufficient.




Carrier
Carrier's obligation to make best efforts
Freight carrier's EC Guideline, etc. for its rational use of energy
Carrier
Specified carrier
(Transportation capacity owned)
• 300 or more railroad cars
• 200 or more buses
• 350 or more taxis
• 200 or more trucks
• Gross tonnage of vessels: 20,000 or more
• Max. take-off gross weight (aircraft): 9,000 tons or more
Notification
Designation
Plan, periodical report
Recommendation, etc.
Ministry of Land, Infrastructure, Transport and Tourism

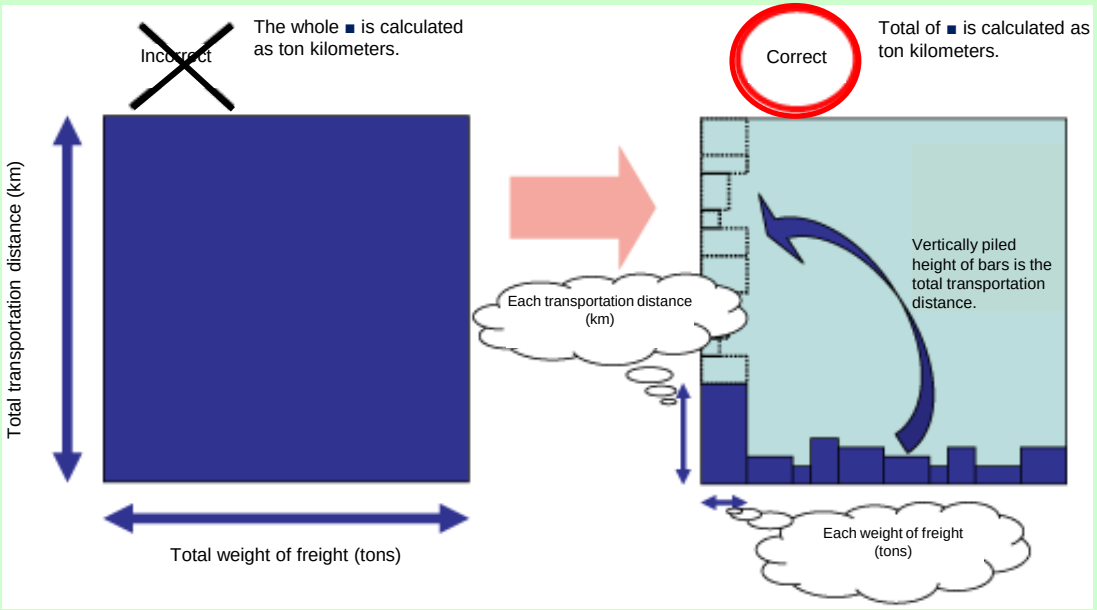

Consigner
Consigner's obligation to make best efforts
Consigner's EC Guideline for rational use of energy on freight transportation by freight carrier
Consigner
Specified consigner
• Those annually transporting their own freight of 30 mil. ton-km or more
Notification
Designation
Plan, periodical report
Recommendation, etc.
Ministry of Economy, Trade and Industry

<What is transportation ton kilometer?>

One ton kilometer refers to a transportation volume when transporting 1-ton freight 1 km and is calculated as follows for each freight or route.

Weight of freight [tons] × **Transportation distance [km]** = **Transportation volume [ton-km]**

* Not overall weight of freight multiplied by overall transportation distance.



5. Measures Pertaining to Consigners in Energy Conservation Act (1/2)

Background of the consigner system in the Energy Conservation Act

- In the freight sector of the Energy Conservation Law's transportation sector, **"shippers," which are not the entities that directly use energy but are in the** position of placing orders with freight forwarders, are also required to formulate energy conservation plans, report energy consumption, and take other actions.
- The use of railroads and ships through modal shift, joint transportation and delivery, and other initiatives are only possible with the proactive involvement of shippers, and we have determined that encouraging cooperation between freight forwarders and shippers is effective in promoting energy conservation measures, and have decided to **request** shippers **to take energy conservation initiatives ahead of the rest of the world.** The decision was made to request shippers to take energy conservation measures ahead of the rest of the world.

Definition of the consigner

[Type 1 consigners]
Those continually having the freight carriers transport freight in connection with their own business
[Type 2 consigners
Those practically deciding a transportation method, etc. of the freight based on a contract or other arrangements with the other business operator and conforming to the requirements set forth by the ordinance of the Ministry of Economy, Trade and Industry

5. Measures Pertaining to Consigners in Energy Conservation Act (2/2)

Consigner's obligations

- Shippers whose transport volume exceeds 30 million ton-kilometers are designated by the Minister of Economy, Trade and Industry as "**Specified Shippers**.
- All shippers are required to keep track of their own cargo transport volume and submit a "Cargo Transport Volume Notification Form" to the Director of the Regional Bureau of Economy, Trade and Industry in their area of jurisdiction when their new annual **transport volume is 30 million ton-kilometers or more**.
- Specified shippers **submit a medium- to long-term plan and a report on energy consumption for transportation to the competent minister.**

Image of 30 million ton-kilometer transport room

20 cars per day, 600 km one way between Tokyo and Osaka, each carrying 11 tons of cargo per car for 240 days per year,
If 20 cars are loaded with 11 tons of cargo per car per day and transported 240 days per year between Tokyo and Osaka, 600 km one way, 600 (kam) × 20 (cars) × 11 (1) × 240 (days) = 31,680,000 ton-kilometers.

Preparation of a medium- to long-term plan

Example of plan

・Establishment of a person in charge of energy conservation in each business unit
・Establish a manual for modal shift implementation, etc.

Periodic reporting

Reporting details

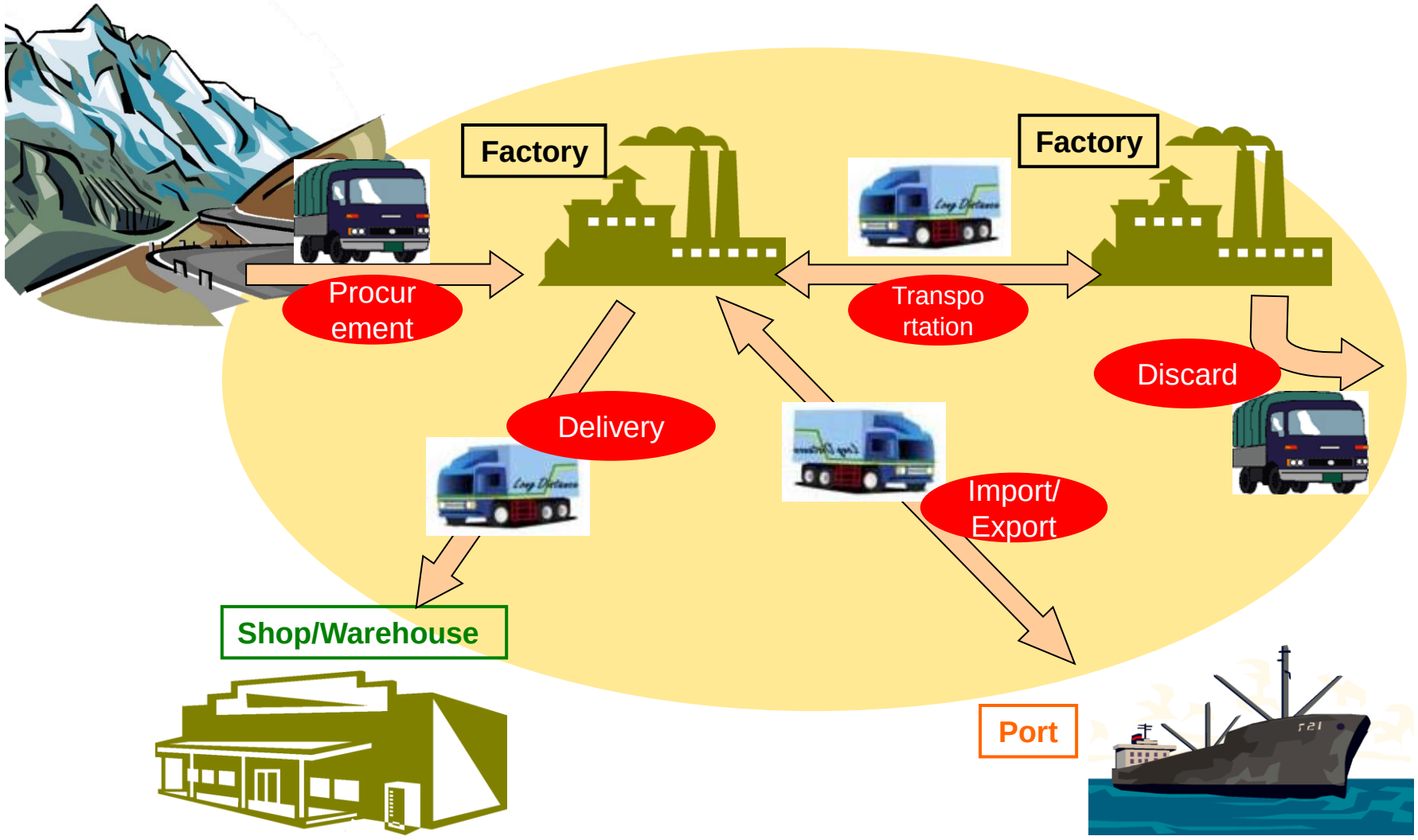
・Energy consumption for transportation

・Energy consumption per unit of transportatio = Energy consumption for transportation ÷ Value closely related to energy consumption for transportation*.

*Freight transport volume [ton-kilometers], weight of cargo for rent, and sales volume, etc.

・Status of implementation of energy conservation measures
・ CO_2 emissions from energy use, etc.

6. Scope of calculation of specified shippers (image)



・The scope of understanding as a shipper is the scope of ownership of the cargo. Industrial waste is within the scope of the responsibility of the generator.
・The customs clearance location is the boundary for imports and exports since only domestic transportation is covered.

The following three methods are available to calculate energy consumption.

Fuel method

Energy consumption [GJ] = Fuel consumption [kl] x Unit calorific value [GJ/kl]

Fuel efficiency method

Transportation distance [km] ÷ Fuel efficiency [km/l] x 1/1,000

Ton kilometer method

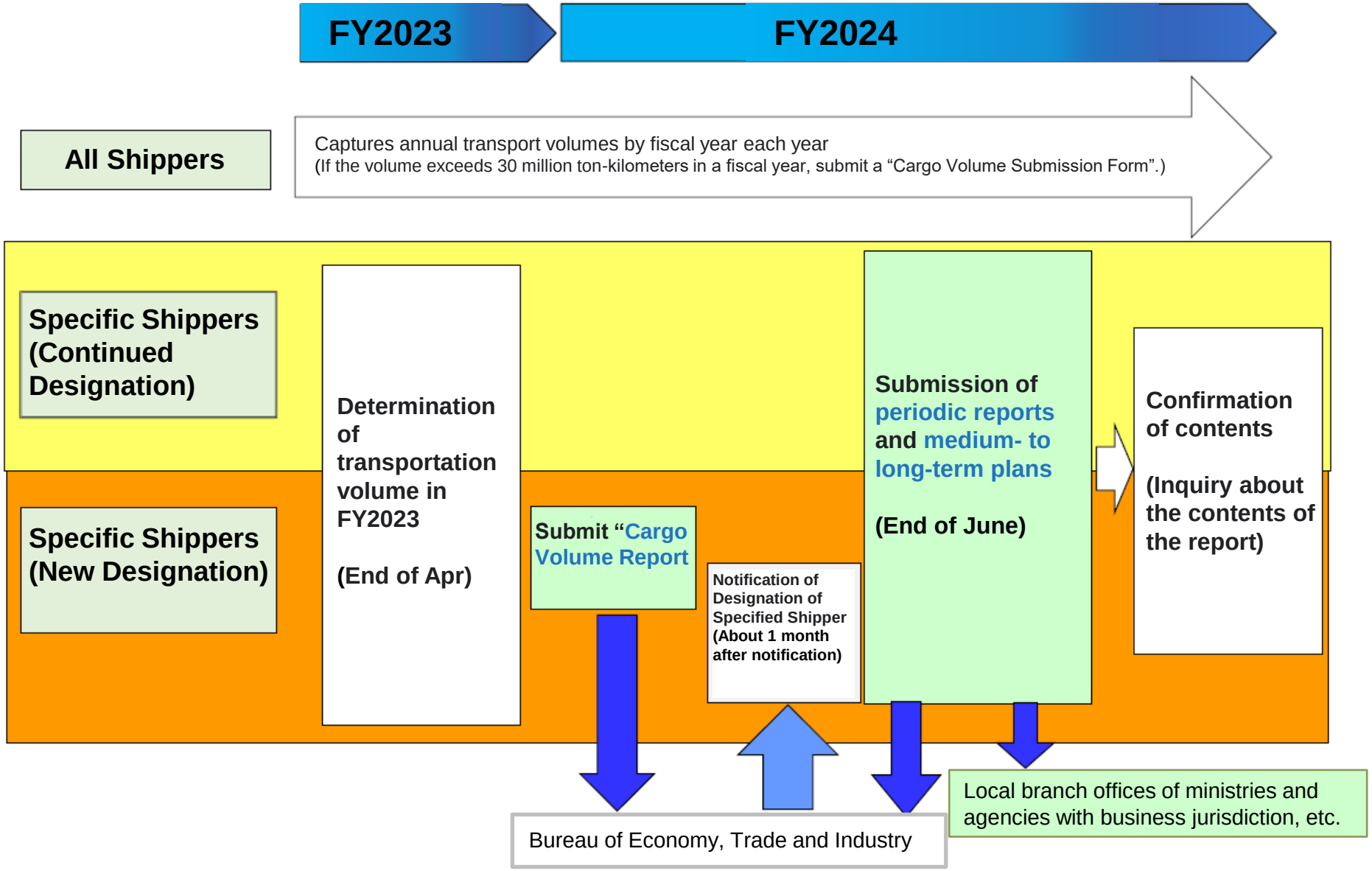
[Truck]

Energy consumption [GJ] = Transportation volume [ton-km] x Fuel consumption per ton kilometer[l/ton-km] x 1/1,000 x Unit calorific value [GJ/kl]

[Vessel, railroad, aircraft]

Energy consumption [GJ] = Transportation volume[ton-km] x Energy consumption intensity [MJ/ton-km] x 1/1,000

8. Annual schedule of specific shippers



9. Current status of specified shippers (1/2) [Designation status].

- Designated 802 companies nationwide as specified shippers as of the end of June 2022.
- By industry, the chemical industry topped the list with 112 companies (14.0%), followed by the food backstacking industry with 89 companies (11.1%).

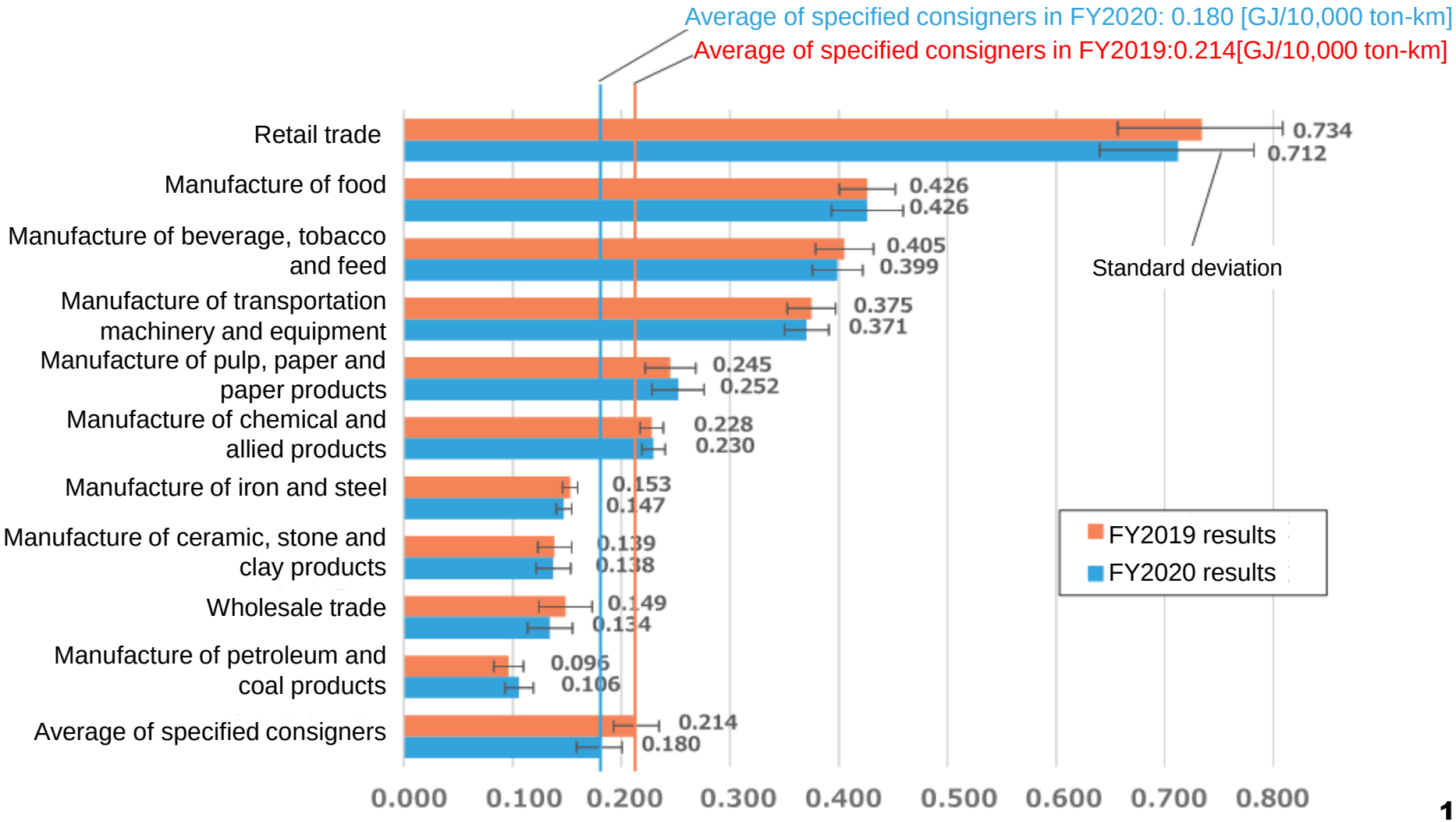
Type of industry	Number of specific shippers	Ratio
Manufacture of chemical and allied products	112	14.0%
Manufacture of food	89	11.1%
Manufacture of ceramic, stone and clay products	64	8.0%
Manufacture of iron and steel	57	7.1%
Manufacture of transportation machinery and equipment	54	6.7%
Manufacture of beverage, tobacco and feed	43	5.4%
Manufacture of pulp, paper and paper products	31	3.9%
Plastic Products Manufacturing(Excluding those listed separately)	26	3.2%
Wholesale trade	93	11.6%
Retail trade	26	3.2%
Other	207	25.8%
Total	802	100%

9. Current status of specific shippers (2/2) [Energy consumption intensity

一般財団法人省エネルギーセンター

- The average energy use per cargo transported by specific shippers in major industries averaged 0.180 [kℓ/ten thousand ton-kilometers] (FY 2019: 0.214 [kℓ/ten thousand ton-kilometers]), although there were variations by industry sector.
- Small value for industries that often transport large quantities of heavy goods by ship or other means.

Specific shipper energy consumption intensity



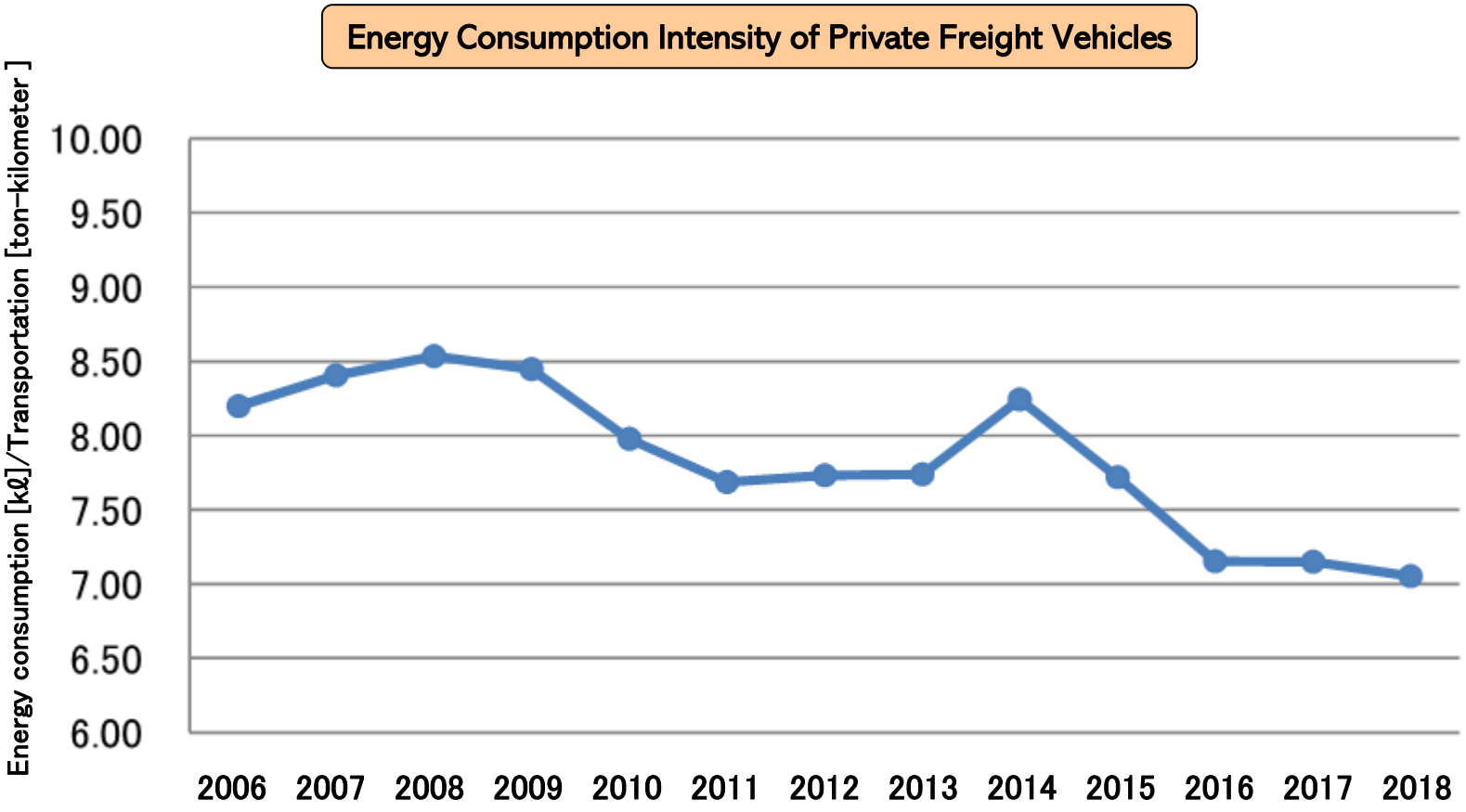
10. Current Status of Specified Transporters (1/2) [Designation Status]

- As of March 31, 2023, 564 companies nationwide have been designated as specified transport operators.
- By transportation category, 301 (53%) of the companies designated as "Business Freight Vehicles" were in the top position, followed by 90 (16%) for "Passenger Buses" and 76 (14%) for "Private Freight Vehicles," with these three industries accounting for 83% of the total.

Transport Classification		Number of specified transport operators
Cargo	Railroad	1
	Business Freight Vehicles	301
	Freight vehicles for private use	76
	Ships	35
	Subtotal	**413**
Passenger	Railroad	26
	Buses	90
	Taxi	20
	Vessels	13
	Subtotal	**149**
Aviation		**2**
Total		**564**

10. Current status of specified transport operators (2/2) [Energy consumption intensity]

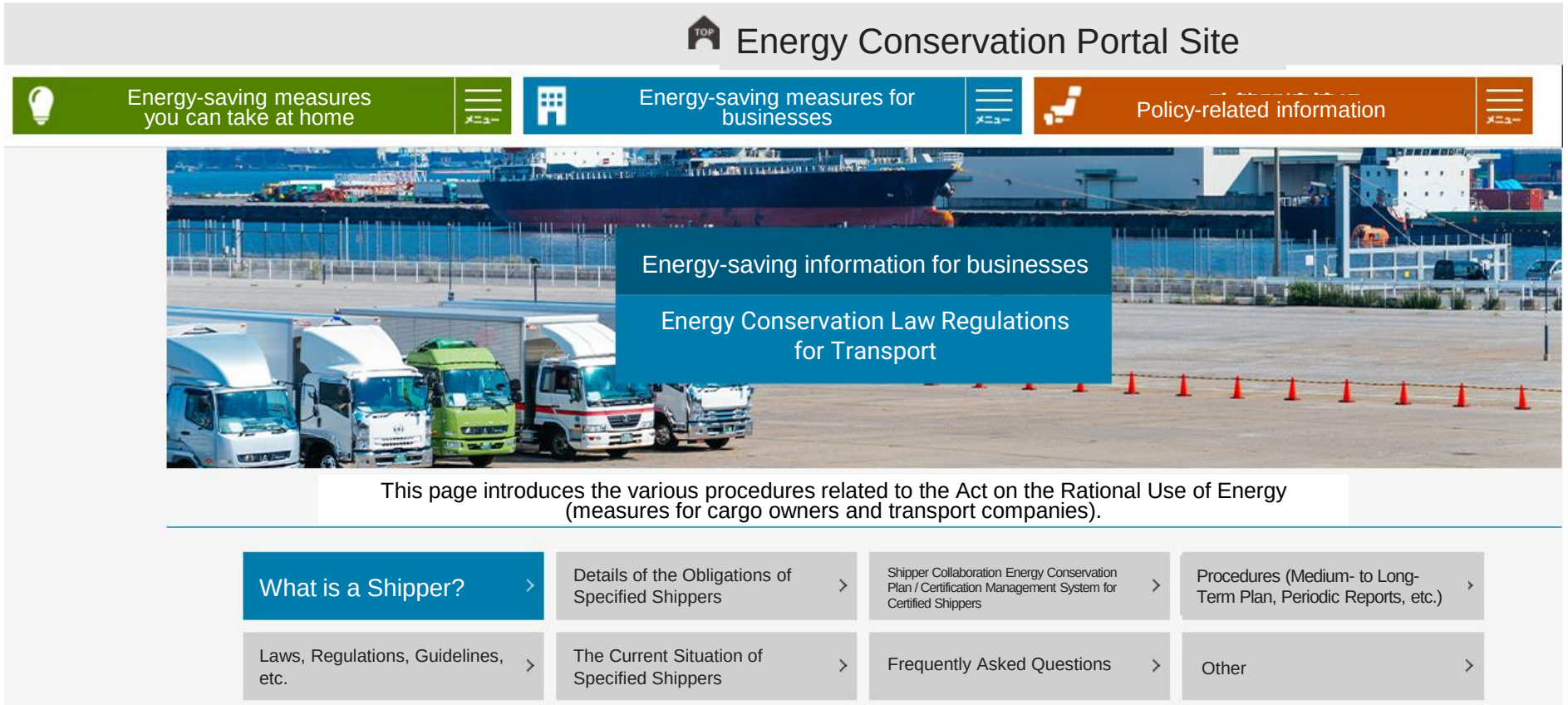
- The average unit energy consumption of the entire business has been improving in recent years, although there was a period of temporary increase.
- Progress has been made in energy conservation through the efforts of businesses.



11. Government provision of information for businesses (1/2)

一般財団法人省エネルギーセンター

- The Ministry of Economy, Trade and Industry's (Agency for Natural Resources and Energy) "Energy Conservation Portal Site" provides an overview of national regulations and various support programs related to energy conservation.
- If you want to learn more about the Energy Conservation Law, you can access the portal site for a variety of information.



11. Government provision of information for businesses (2/2)

一般財団法人省エネルギーセンター

Examples of energy conservation efforts by specific shippers

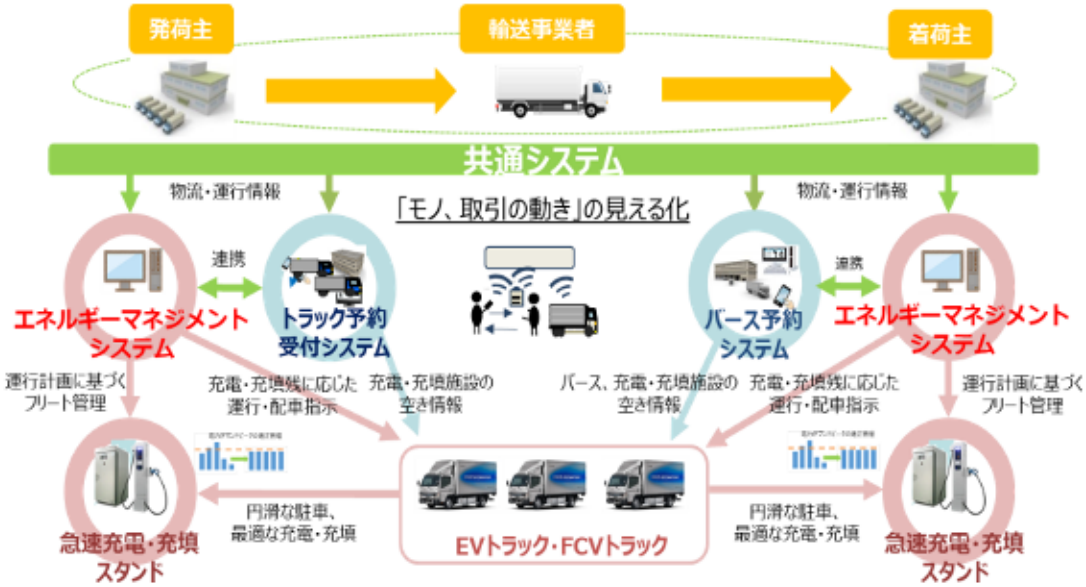
Downsizing of outer boxes – "Overall optimization" is a keyword –	**Advantages for customers by ordering by the full-load vehicle or the pallet** – The issue is next measures for joint logistics, eco-rail marks and more efficient unit of order –	**Use of cooperative relations with competitors for energy conservation in logistics** – Promotion of energy conservation and higher efficiency by joint delivery –	**Modal shift of frozen food transportation to vessels** – Simultaneous achievement of "environmental friendliness" and "cost reduction" –
Nippon Suisan Kaisha, Ltd.	Lion Corporation	Sapporo Breweries Limited	Nichirei Foods Inc.

Integration of forward and reverse logistics – Promotion of various approaches such as larger vehicles, eco-drive workshop and utilization of natural gas vehicles, in addition to promotion of recycling –	**Begin with understanding of the reality!** – Accurate understanding of data is the key to higher efficiency –	**Begin with building a basis, or an approach structure!** – Green logistics is one of 3 environmental approaches as a group –	**Promotion of efficient "planned delivery" by contracting ordering tasks** – With a load factor already enhanced to the limit, the key to higher efficiency is to increase each transportation volume –	**Collaborative approaches with the group's sales company** – With group-wide improvement of awareness, the approaches are achieved –
Tokyo Gas Co., Ltd.	Kokubu Group Corporation	Panasonic Corporation	Cosmo Oil Co., Ltd.	Isuzu Motors Limited
	Cooperation between multiple business operators is essential to approaches – Enhancement of further cooperation and information sharing to revitalize plateaued approaches! –	**Thorough understanding of transportation data by the freight** – Promotion of effective approaches based on affluent data –	**Promotion of reduction activities across the overall supply chain** – Accurate judgment of modal shift and IT-based centralized vehicle dispatch management –	**Energy conservation approaches begin with down-to-earth ones by collaboration with a broad view and propagation/ enlightenment** – Promotion of energy conservation approaches with cost reduction and improved logistics quality in mind –
	Canon Inc.	Sanyo Chemical Industries, Ltd.	Fujitsu Ltd.	Meiji Dairies Corporation

●Project to Promote the Use of New Technology to Improve the Efficiency of Transport and the Shift to Non-Fossil Fuels throughout the Supply Chain

(Ministry of Economy, Trade and Industry and Ministry of Land, Infrastructure, Transport and Tourism joint project) [FY2024 budget]

In the transport sector, which accounts for approximately 20% of final energy consumption in Japan, in order to achieve the 2030 energy conservation targets and carbon neutrality by 2050, it is important to further improve energy efficiency and promote the shift to non-fossil fuels.
To this end, this project will provide subsidies for part of the costs required for the demonstration of (1) the efficiency of the entire supply chain using advanced digital technology, and (2) the optimization of the allocation of charging infrastructure usage quotas for EV trucks, etc., by linking with transport planning, etc., in which multiple shippers, transport operators, and consignees on the supply chain work together.



・Subsidy targets: Expenses required for the construction of a common system, the introduction of equipment to improve the efficiency of supply chain transport, and the overall optimization of the allocation of charging and refueling infrastructure usage quotas for EV trucks and FCV trucks linked to the shared system, etc.
・Subsidy rate: Up to 1/2

Subsidy for projects to promote the rational use of energy and the conversion to non-fossil energy in the transportation sector

Budget amount for FY2016: 6.2 billion yen (new)

Energy Conservation and New Energy Department,
Energy Conservation Division
Agency for Natural Resources and Energy

Details of the project

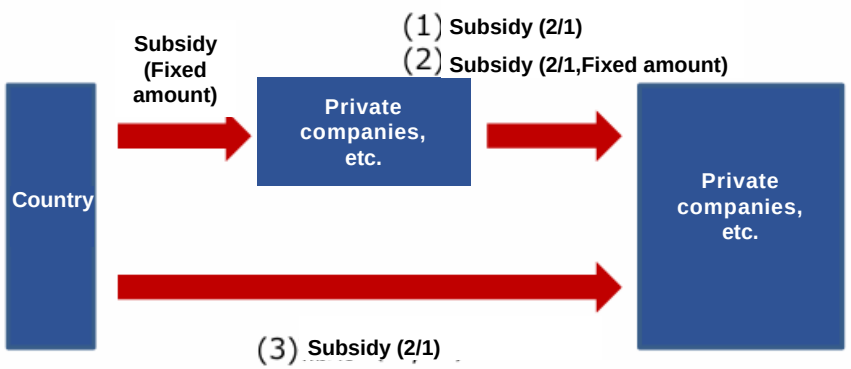
Purpose of the project

In the transport sector, which accounts for around 20% of final energy consumption, in order to achieve the 2030 energy conservation targets and the 2050 CN, it is important to further deepen energy conservation and also to promote the conversion to non-fossil energy. For this reason, the project aims to promote effective measures by improving the efficiency of transport throughout the supply chain and conducting demonstrations targeting truck transport and coastal shipping to further promote energy conservation and the conversion to non-fossil energy, and then disseminating the results of these demonstrations.

Project Summary

(1) Project to promote the use of new technology to improve the efficiency of the entire supply chain and to promote the use of non-fossil energy
This project supports the implementation of demonstrations to improve the efficiency of the entire supply chain through the use of advanced digital technology, and to optimize the allocation of charging infrastructure for electric vehicles (EVs) and other vehicles in conjunction with transport planning.
(2) Project to promote further energy conservation in truck transport
This project supports the implementation of demonstrations to improve the efficiency of transport through the use of advanced vehicle management and transport equipment in conjunction with vehicle allocation planning and reservation services, and to demonstrate the energy conservation benefits of this.
(3) Project to Promote Innovative Operational Efficiency and the Switch to Non-fossil Energy for Coastal Shipping
In addition to demonstrating the energy-saving effects of introducing innovative energy-saving technologies, this project will also support demonstrations aimed at introducing ships that use non-fossil energy.

Project Scheme (Eligible Parties, Eligible Actions, Subsidy Rate, etc.)



Outcome targets

This is a three-year project from FY 2010 to FY 2026, and by FY 2030, it is aimed at reducing energy consumption in the heavy transport sector by approximately 625.25 kl per year in crude oil equivalent through this project and its ripple effects.

●Project to Promote the Electrification of Commercial Vehicles (joint project of the Ministry of the Environment, the Ministry of Economy, Trade and Industry, and the Ministry of Land, Infrastructure, Transport and Tourism [Supplementary budget for fiscal 2023]

The government has set the following targets for commercial vehicles by 2030: 20-30% of new vehicles sold should be electric vehicles for small vehicles (under 8 tons), and 5,000 cumulative electric vehicles should be introduced for large vehicles (over 8 tons), along with separate support for the introduction of passenger vehicles, support is being provided for the introduction of vehicles and charging facilities for the electrification of commercial vehicles (BEV, PHEV, FCV*), and the decarbonization of the entire transport sector is being promoted.
Specifically, for the percentage of non-fossil energy vehicles required in the medium- to long-term plan under the Act on the Rational Use of Energy, subsidies will be provided for a portion of the costs of introducing vehicles and charging facilities for businesses that have created ambitious targets for the introduction of BEV and FCV, and for businesses that will be affected by the shift to non-fossil energy, subsidies will be provided for a portion of the cost of introducing vehicles and charging facilities. In particular, for trucks, the target for the ratio of non-fossil energy vehicles to the total number of vehicles owned in 2030 is set at 5%, and support will be provided for 2/3 of the difference between standard vehicles (EV) and 3/4 (FCV).
※BEV: Electric vehicle, PHEV: Plug-in hybrid vehicle,
FCV: Fuel cell vehicle

【Trucks】 Subsidy rate: 2/3 of the difference between the standard fuel efficiency level vehicle, etc.

Example of subsidized vehicle

EV Truck Van

FCV Trucks

【Taxi】 Subsidy rate: 1/4 of the vehicle price, etc.

Example of subsidized vehicle

EV Taxi

PHEV Taxi

FCV Taxi

【Bus】 Subsidy rate: 2/3 of the difference between the standard fuel efficiency level vehicle, etc.

Example of subsidized vehicle

EV Bus

FCV Bus

【充電設備】 Subsidy rate: 1/2, etc.

Charging facilities

※In principle, the vehicle must be purchased together with the above vehicles.

Project to Promote the Electrification of Commercial Vehicles (A joint project of the Ministry of Economy, Trade and Industry and the Ministry of Land, Infrastructure, Transport and Tourism)

環境省

[Budget for fiscal 2023: 13,599 million yen (new)]

Aiming to achieve carbon neutrality by 2050, this project supports the electrification (BEV, PHEV, FCV) of trucks and taxis.

1. Purpose of the project

・The transportation sector accounts for approximately 20% of Japan's total CO2 emissions, of which approximately 40% is from commercial vehicles such as trucks, and in order to achieve carbon neutrality by 2050 and the greenhouse gas reduction target for FY2030 (46% reduction compared to 2013), it is essential to electrify commercial vehicles (BEV, PHEV, FCV).
・Therefore, this project will provide subsidies for the popularization of commercial vehicles (trucks and taxis), and by supporting the acceleration of their introduction during the initial stages of their spread, it will achieve both the strengthening of industrial competitiveness and economic growth through price reductions, as well as the reduction of greenhouse gas emissions.

2. Project Details

This project will provide concentrated support for the electrification of commercial vehicles (trucks and taxis) (BEV, PHEV, FCV*), and by attracting domestic investment over the next 10 years, it will achieve the 2030 target for commercial vehicles of 8 tons or less: 20-30% of new vehicle sales to be electric vehicles, 8 tons or more: 5,000 cumulative units to be introduced ahead of schedule, and, together with the separate support for the introduction of passenger vehicles, to promote the decarbonization of the entire transport sector. In addition, by reducing vehicle prices and accelerating innovation, price competitiveness will be improved.
Specifically, in line with the obligation to create medium- to long-term plans based on the “non-fossil energy conversion targets” newly institutionalized in the revised Act on the Rational Use of Energy, intensive support will be provided for the introduction of vehicles to businesses that have created ambitious introduction targets for BEVs and FCVs, as well as to businesses that will be affected by the conversion to non-fossil energy.

※BEV: Battery electric vehicle, PHEV: Plug-in hybrid electric vehicle, FCV: Fuel cell vehicle

3. Project Scheme

- ■ Project Type: Indirect subsidy (2/3, 1/4, etc.)
- ■ Subsidized Party: Private organizations, etc.
- ■ Implementation Period: To be implemented from FY2023

4. Project Image

【Trucks】

Subsidy rate: 2/3 of the difference between the standard fuel efficiency level vehicle, etc. (Example of subsidized vehicle)


EV Trucks


EV Vans

FCV Trucks

【Taxi】

Subsidy rate: 1/4 of the vehicle price, etc.
(Example of subsidized vehicle)


EV Taxi


PHEV Taxi


FCV Taxi

(Reference)

【Bus】The electrification of buses is supported through programs such as the “Acceleration Program for Environmentally Friendly Advanced Trucks and Buses” and the “Project to Promote the Use of Hydrogen Derived from Renewable Energy, etc. toward the Creation of a Decarbonized Society”.

お問合せ先： 環境省 水・大気環境局 自動車環境対策課 電話：03-5521-8302

●Subsidy for the introduction of charging and refueling infrastructure, etc. to promote the spread of clean energy vehicles[Supplementary Budget for FY2023/Initial budget for FY2024]

In order to achieve carbon neutrality by 2050, it is important to promote the use of clean energy vehicles, which excel in environmental performance. The purpose of this program is to promote the development of charging and hydrogen refueling infrastructure, which are two sides of the same coin when it comes to the popularization of vehicles, across the country. Furthermore, in the event of a power outage due to a disaster, electric vehicles can be used as emergency power sources, and this program supports the introduction of V2H charging and discharging equipment and external power supply equipment, which have an external power supply function for extracting electricity from electric vehicles

(1) Charging infrastructure projects, etc.

Subsidies are available for the purchase and installation of charging facilities for electric vehicles and plug-in hybrid vehicles, as well as for the purchase and installation of V2H charging and discharging equipment and external power supply equipment.

(2) Hydrogen filling infrastructure development projects

Subsidies are available for the purchase and installation of hydrogen station equipment and operating costs, which are essential for the popularization of fuel cell vehicles, etc.

Subsidy for the introduction of charging and refueling infrastructure to promote the spread of clean energy vehicles

FY 2024 budget: 10 billion yen

(1) Automobile Division, Manufacturing Industries Bureau
(2) Hydrogen and Ammonia Division, Energy Conservation and New Energy Department, Agency for Natural Resources and Energy Ministry of Economy, Trade and Industry

Details of the project

Purpose of the project

In order to achieve carbon neutrality by 2050, it is important to promote the use of clean energy vehicles with excellent environmental performance. The aim of this project is to promote the development of charging and hydrogen refueling infrastructure across the country, which is inextricably linked to the spread of these vehicles. Furthermore, in the event of a power outage due to a disaster, electric vehicles can be used as emergency power sources, and this project will support the introduction of V2H charging and discharging equipment and external power supply equipment that have an external power supply function for extracting electricity from electric vehicles.

Project Outline

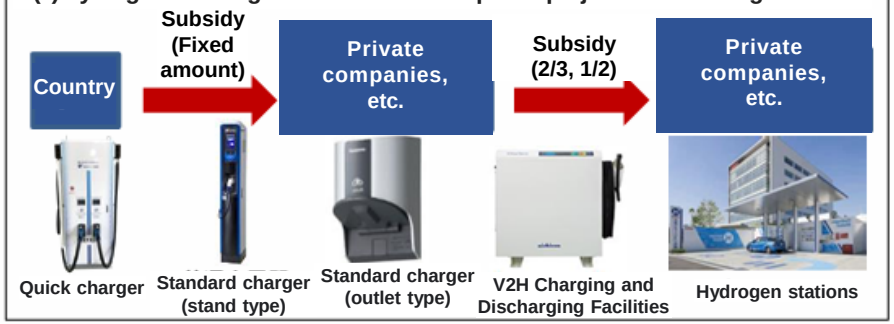
(1) Charging infrastructure development project, etc.
Subsidies are provided for the purchase and installation of charging facilities for electric vehicles and plug-in hybrid vehicles, as well as for the purchase and installation of V2H charging and discharging equipment and external power supply units.

(2) Hydrogen refueling infrastructure development project
Subsidies are provided for the development and operation of hydrogen stations, which are essential for the popularization of fuel cell vehicles, etc.

Project Scheme (Eligible Parties, Eligible Actions, Subsidy Rate, etc.)

(1) Charging infrastructure development project, etc.

(2) Hydrogen refueling infrastructure development project Outcome targets



Outcome targets

As infrastructure essential for the popularization of vehicles, 300,000 charging ports and around 1,000 hydrogen refueling stations will be developed by 2030.

Thank you for your attention!

The Energy Conservation Center, Japan

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