

# **Policy Evaluation System for Reduction of CO<sub>2</sub> Emissions in Transport Sector**

Report from Japan

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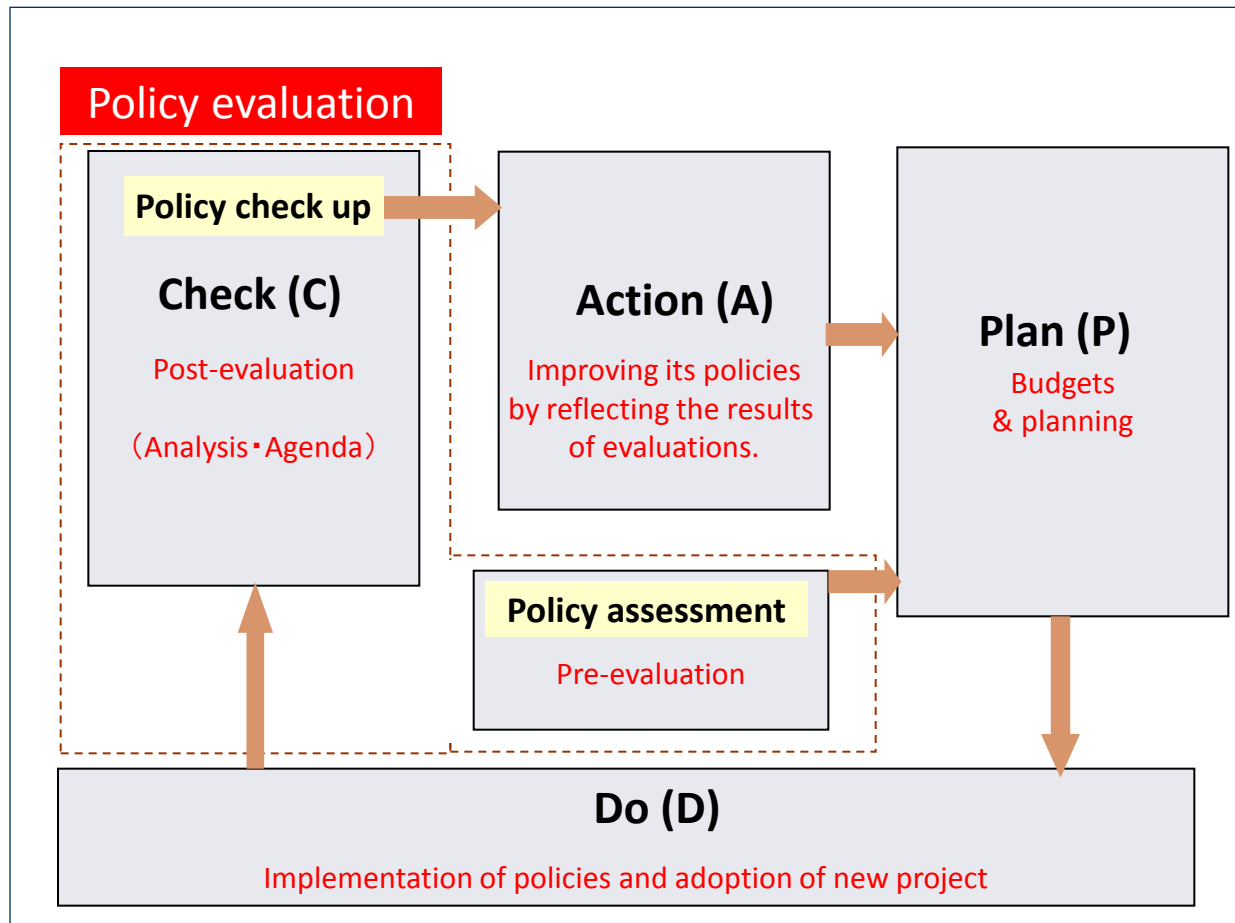
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# Policy Evaluation System of MLIT, Japan

MLIT has introduced “Management Cycle” for policy evaluation in which “policy assessment” and “policy check up” are implemented.



## Policy assessment

Evaluate the importance, effectiveness and efficiency of adopted projects, while disclosing necessary information on project selection and implementation with clear targets. By applying policy assessment based on defined objectives and indicators, the results are reflected upon planning of new projects while controlling the quality of policies.

## Policy check up

Processes of monitoring the plan-do-see-cycle of its policies and assessing their performance in light of policy goals whether it satisfies the expectations of the public. Based on such assessment, the ministry continues to implement necessary policies in an effective and efficient manner, while maintaining transparency of their implementation.

# Outline of Policy Check-up in MLIT, Japan

	Public Policy	Measures and Policies	
1	Ensuring the safety and improving the quality of life responding to falling birth rate and the aging population.	<ul style="list-style-type: none"> <li>•Secure stable housing supply while improving the quality of housing environment.</li> <li>•Ensure smooth transaction of housing services (purchase, leasing, renovation and management) in real estate market.</li> </ul>	
2	To realize good living environment, conservation of natural environment, and barrier-free society.	<ul style="list-style-type: none"> <li>•Promotion of a comprehensive barrier-free environment.</li> <li>•Preservation, revitalization, development of coastal and marine areas and ports and harbors, promotion of marine waste management, prevention of marine pollution.</li> <li>•Planning and development of comfortable road transportation system.</li> </ul>	<ul style="list-style-type: none"> <li>•Securing clean water supply, promoting reservoir area development.</li> <li>•Promoting comfortable urban areas with nature, while protecting cultural and historic features in rural areas.</li> <li>•Maintenance of clean water and water front environment, building a network of water and greenery, sewage facility, and circulation of sewerage system.</li> </ul>
3	Protection of global environment	<ul style="list-style-type: none"> <li>•Protection of environment against global warming, etc.</li> </ul>	
4	Reducing the risk of damage by natural disasters such as water hazard.	<ul style="list-style-type: none"> <li>•Provide necessary information and forecast on weather while developing communication networks to reduce damage caused by natural disasters.</li> <li>•Improving disaster-prevention in urban, residential areas.</li> </ul>	<ul style="list-style-type: none"> <li>•Reduce or prevent the damage by floods and landslides.</li> <li>•Reduce or prevent damage by natural disasters caused by seismic sea wave, erosion, etc.</li> </ul>
5	To provide reliable transportation system and to secure public safety.	<ul style="list-style-type: none"> <li>•Ensure safety an public transportation, prevention of hijack and airplane terrorism.</li> <li>•To improve and enhance road traffic safety.</li> <li>•Provide system of aid and support for victims of traffic accidents.</li> </ul>	<ul style="list-style-type: none"> <li>•Improve safety of motor vehicles.</li> <li>•To ensure safety and security of ship transport.</li> </ul>
6	Reinforcement of global competitiveness, promotion of tourism exchange and inter-regional co-operation, etc.	<ul style="list-style-type: none"> <li>•To provide comprehensive distribution systems, such as the development of marine transport logistics and ports, to ensure and secure stability in international marine transportation.</li> <li>•To promote a "Tourism-Oriented Country".</li> <li>•To plan and create attractive landscapes and tourist sports with good sceneries.</li> </ul>	<ul style="list-style-type: none"> <li>•Facilitate construction of road transport network.</li> <li>•Facilitate construction of new lines for Shinkansen.</li> <li>•Reinforcement of air transportation network.</li> </ul>
7	To promote regeneration of urban & local areas.	<ul style="list-style-type: none"> <li>•Plan and promote the activities for regeneration of urban &amp; local areas.</li> </ul>	
8	Enhance comfort and convenience of urban & regional transport.	<ul style="list-style-type: none"> <li>•Reinforcement and utilization of railway transportation network.</li> <li>•To promote maintenance and activation of regional public transportation network.</li> </ul>	<ul style="list-style-type: none"> <li>•Promote implementation of comprehensive strategies on traffic system in urban and rural areas.</li> <li>•To facilitate smooth flow of traffic and transportation.</li> </ul>
9	Create favorable market environment, improve industrial productivity and promote consumer protection.	<ul style="list-style-type: none"> <li>•Effective management of infrastructure.</li> <li>•Facilitate infrastructure development in the real estate market, appropriate land utilization of land and implementation of required regulations</li> <li>•Facilitate infrastructure development in the construction industry.</li> <li>•Dissemination and utilization of statistic data on market and industry.</li> </ul>	<ul style="list-style-type: none"> <li>•Promote and survey on national land.</li> <li>•Facilitate the development of market conditions for transportation industry.</li> <li>•Create better business environment for shipping industries, including securing human resources, etc.</li> </ul>
10	Promote comprehensive development, conservation, and maintenance of national land.	<ul style="list-style-type: none"> <li>•To promote and implement a comprehensive policies on national spatial plan.</li> <li>•Provide support for research and management of geospatial information used for defining locations and shapes of national land.</li> </ul>	<ul style="list-style-type: none"> <li>•Promote regional development of isolated islands.</li> <li>•Promote Hokkaido Comprehensive Development Plan.</li> </ul>
11	To facilitate the utilization and R&D of ICT technologies.	<ul style="list-style-type: none"> <li>•To promote and facilitate R&amp;D of new technologies.</li> <li>•To promote the shift towards an information-oriented society.</li> </ul>	
12	Promotion of international cooperation and partnerships.	<ul style="list-style-type: none"> <li>•To promotion of international co-operation and coalitions.</li> </ul>	
13	To enhance the convenience and security of government facilities.	<ul style="list-style-type: none"> <li>•To maintain, preserve safe and useful government facilities that are environmentally sound.</li> </ul>	

# Public Policies for Global Environmental Protection and Their Performance Indicators in MLIT, Japan

Business Description	Performance Indicator
<ul style="list-style-type: none"> <li>• In order to promote and facilitate energy efficiency policies and measures in transport sector, monitoring process on activities for research and analysis for energy-saving policies, including the level of enforcement of regulations, as well as the trainings for assigning responsible officials of business operators, provide advisory and support for business operators for their energy-saving efforts.</li> </ul>	<p>Energy conservation rates of specified freight carriers.</p>
<ul style="list-style-type: none"> <li>• Holding seminars on transportation ecology.</li> <li>• Implementation of new systems and research and investment activities for building a social infrastructure for cross-sectional policies against global warming.</li> <li>• Investment on promotion and protection of biodiversity.</li> </ul>	<p>Web traffic volume on environment portals.</p>
<ul style="list-style-type: none"> <li>• Organize lending programs for the administration of the designated specified engines of certified off-road diesel construction equipments, and notification of the type of off-road diesel construction equipment, as well as for off-road construction equipments meeting standards.</li> <li>• Organize lending programs for the administration of the regulation on certification process for low-carbon building equipment, and for off-road construction equipments that are meeting the standard.</li> </ul>	<p>Protecting the environment by implementing construction machineries and devices.</p>
<ul style="list-style-type: none"> <li>• Consideration of issues regarding environmental policies and regulations within the context of Construction Material Recycling Law.</li> <li>• Consideration of issues regarding policies and regulations on construction materials for the reduction of disposal of mixed construction waste.</li> <li>• Consideration of issues regarding dismantling on sight in the process of promoting recycling of plasterboard.</li> </ul>	<p>Recycling ratios of construction waste, utilization ratio of surplus construction soil.</p>
<ul style="list-style-type: none"> <li>• Obligatory requirement for energy-saving measures implemented on housings based on energy-saving law.</li> <li>• Provide financial support for construction of houses with energy-saving measures by loans, subsidies, etc.</li> <li>• Obligatory requirement for energy-saving measures implemented on buildings based on energy-saving law.</li> <li>• Provide financial support for construction of buildings with energy-saving measures by loans, subsidies, etc.</li> <li>• Promoting “greenization” of government facilities.</li> </ul>	<p>Saving energy in housing and buildings.</p>
<ul style="list-style-type: none"> <li>• By evaluating levels of achievement on fuel-efficiency targets, it is possible to facilitate the dissemination of fuel-efficient heavy vehicles, for example, by setting new targets when necessary.</li> </ul>	<p>An average rate of fuel efficiency improvements for heavy vehicles.</p>
<ol style="list-style-type: none"> <li>1. Promoting the program by developing coalition between cargo owners and distributors. <ul style="list-style-type: none"> <li>• Provide subsidy-programs for promotional activities such as promotion of modal shift.</li> </ul> </li> <li>2. Promoting modal shift in or rail freight transportation. <ul style="list-style-type: none"> <li>• Freight transport capacity reinforcement of railway freight between Kitakyushu and Fukuoka.</li> <li>• Freight transport capacity reinforcement of Sumidagawa Station.</li> <li>• Promotion of the “Eco-Rail Mark” system.</li> </ul> </li> <li>3. Strengthening the competitiveness of coastal shipping. <ul style="list-style-type: none"> <li>• constructing terminal for internal transport designed for multimodal transport.</li> <li>• Promoting modal shift in sea freight transportation.</li> <li>• Provide subsidy-programs for promotional activities for low-carbon emissions in marine traffic.</li> <li>• Facilitate a modal shift by Joint ownership building system</li> <li>• Achieve the practical use of safety management system.</li> </ul> </li> </ol>	<p>Indicators of modal shift</p>
<ul style="list-style-type: none"> <li>• Promoting formation of advanced metropolitan environment.</li> </ul>	<p>The number of cities committed to the implementation of comprehensive policy on protection of urban environment at local level.</p>
<ul style="list-style-type: none"> <li>• Facilitation and development of energy-saving technologies for ships and vessels (high performance vessels).</li> </ul>	<p>Average score of adopted projects at annual reviews.</p>

# CO<sub>2</sub> Emissions Reduction Efforts in Transport Sector

## ■ Measures and policies against global warming implemented by MLIT

### Transport sector

- Improvement in fuel efficiency of automobiles (the “top-runner standard”).
- Setting new fuel efficiency standards.
- Promotion of environmentally low emission vehicles. (clean & energy efficient automobiles, etc).
- Promotion of green driving.
- Biomass fuels, etc.

- Providing safe and comfortable driving environment.
- Promotion of ITS technologies, green-driving.
- Elimination of bottleneck railroad crossing, etc.

Independent policy on automobile emissions  
Differentiation of environmental standards  
by mode of transportation

Traffic flow control

Measures and policies for automobiles, road freight transport.

### Others

Improved energy efficiency  
in rail, ship, and air transport

### Developing environmentally-friendly transportation network

Improved logistics efficiency

Promoting public  
transportation system

- Improve efficiency in truck freight transportation.
- Modal shift to rail, sea freight.
- Reduction in use of in-land transport for international marine containers.
- Supporting the growth and activities by the “Green Partnership”, etc.

- Develop new railways, etc.
- Promoting the use of existing transportation system.
- Promotion of eco-friendly commuting, etc.

# Example of CO<sub>2</sub> Emissions Reduction in Transport Sector

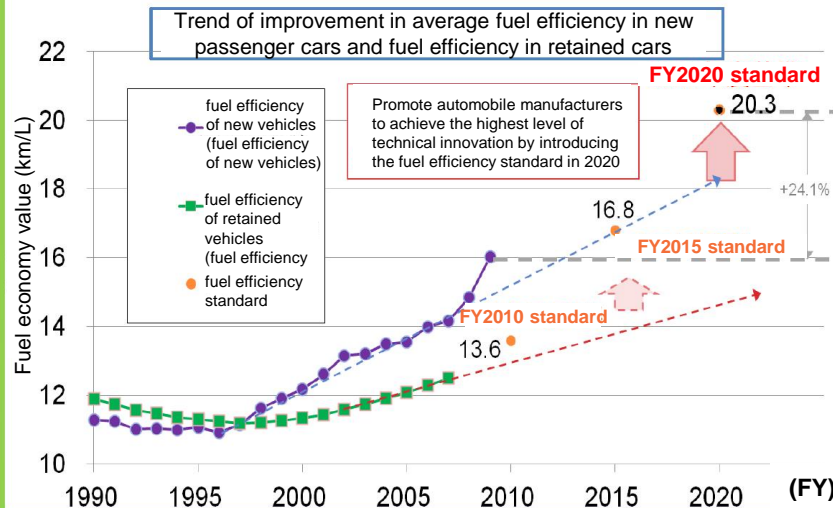
## Promotion of environmentally-friendly vehicles

- Future development targets are set through the introduction of ambitious fuel efficiency standards.
- Tax incentives and subsidies are given based on their environmental performance.

### Development of fuel efficiency standards

#### ■ Development of ambitious standards

- Setting future development targets, which will be reviewed as necessary.
- Fuel efficiency standard for heavy vehicles established for the first time in the world in 2006.
- Fuel efficiency standard for passenger cars, considered to be the highest level in the world, is to be established for the year 2020



### Tax incentives and installation support

#### ■ Tax incentives (tax breaks for eco-cars)

- Reduction and exemption of vehicle taxes for electric vehicles and other next-generation vehicles
- Induction of technical innovation by, based on the level of fuel efficiency, reducing and exempting tax for gasoline vehicles

#### ■ Installation support of environmentally friendly vehicles

- A certain amount of financial support will be given when purchasing vehicles with superior environmental performance

Gasoline vehicle having fuel efficiency equivalent to that of hybrid vehicle



Electric vehicle



Compressed natural gas (CNG) vehicles

# Example of CO<sub>2</sub> Emissions Reduction in Transport Sector

## Smarter use of vehicles

- Energy-saving driving of vehicles such as green driving are promoted.
- Urban spaces are developed for environmentally-friendly vehicles.
- Future lifestyle using electric vehicles has been proposed.

### Promoting green driving

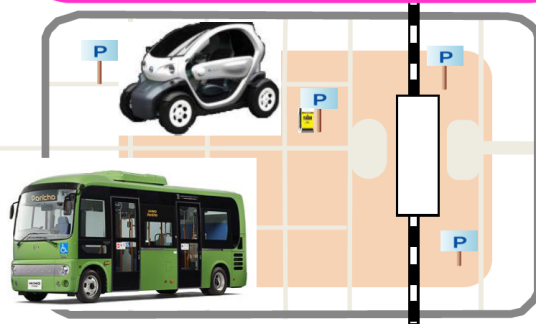
The way of using vehicles with less impact on environment (green driving, etc.) has penetrated widely into the society, making it possible to reduce CO<sub>2</sub> of not only new vehicles, but also retained vehicles. Awareness raising and promotion of green driving by means of "10 recommendations for green driving" and EMS (green driving support equipment



●10 Advice for Eco Driving

### Urban development using environmentally-friendly vehicles

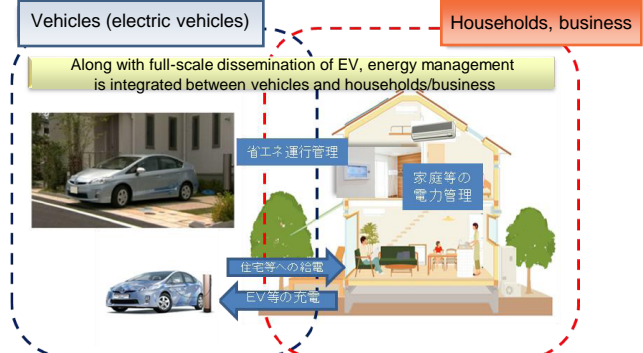
Promotion of development and dissemination of extra-small mobility through inter-sector cooperation between urban development and vehicles. Extra small mobility highly convenient and low in environmental impact, is appropriate for traveling within regions that are difficult to be covered by public transportations and bicycles. Also promote dissemination of zero-emission EV with low noise and vibration by encouraging the introduction or development of electric charge system and linking it with urban development



- Benefits from introducing and disseminating extra-small mobility
- CO<sub>2</sub> reduction
- New transport means in the city and region (supplementary to public transportation)
- Tourism and regional development
- Support movements of the aged and families with small children

### Integrated energy management of vehicles and households

Integrated implementation of the vehicle energy management and household/business energy management will induce energy conservation activities, leading to further energy conservation.



- Dissemination of EV by linking it with Power supply to the houses Charging EV households
- Easy energy conservation management at the household (green driving), improvement of convenience
- Integrated management of vehicles types and numbers
- Mutual utilization among manufacturers

- Effective utilization of batteries
- Effective utilization of unused power of car-mounted batteries in the households
- Minimization of power loss and securing of durability of batteries



# Example of CO<sub>2</sub> Emissions Reduction in Transport Sector

## Improvement of traffic flow

- Smooth traffic flow improves fuel efficiency and reduces CO<sub>2</sub> emission from vehicles.
- Ring roads and other trunk road network have been invested for reducing traffic congestion.
- Bicycle-friendly infrastructure and ITS have been introduced
- Bottleneck railroad crossings have been eliminated in urban area.

### Principal countermeasures

#### Development of a bicycle-friendly environment



Mitaka City, Tokyo (bicycle road)  
Amagasaki City, Hyogo (bicycle lane)

#### Promotion of the Intelligent Transport System (ITS)



■ Development of bicycle roads by reorganizing the road space

■ Promotion and dissemination of VICS, which offers information on congestion to the drivers, allowing them to take optimum routes

#### Elimination of bottleneck crossings

Before

After

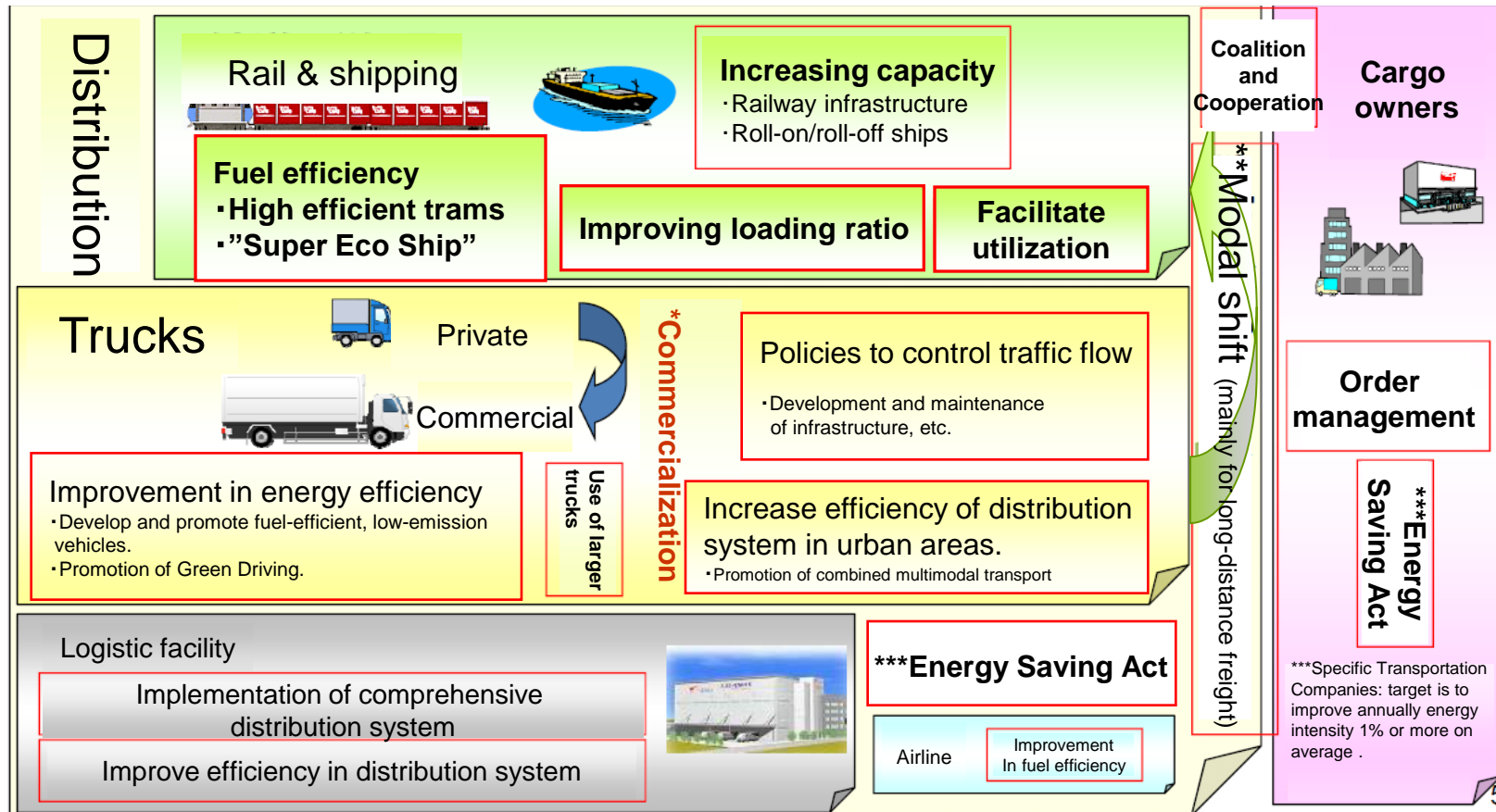


Continuous grade separation project of the Keihin Kyuko Line and Keihin Kyuko Airport Line (Tokyo)

■ Reduction of CO<sub>2</sub> emission brought by higher traveling speed

# Example of CO<sub>2</sub> Emissions Reduction in Transport Sector

## Improvement of efficiency in logistics and freight distribution system

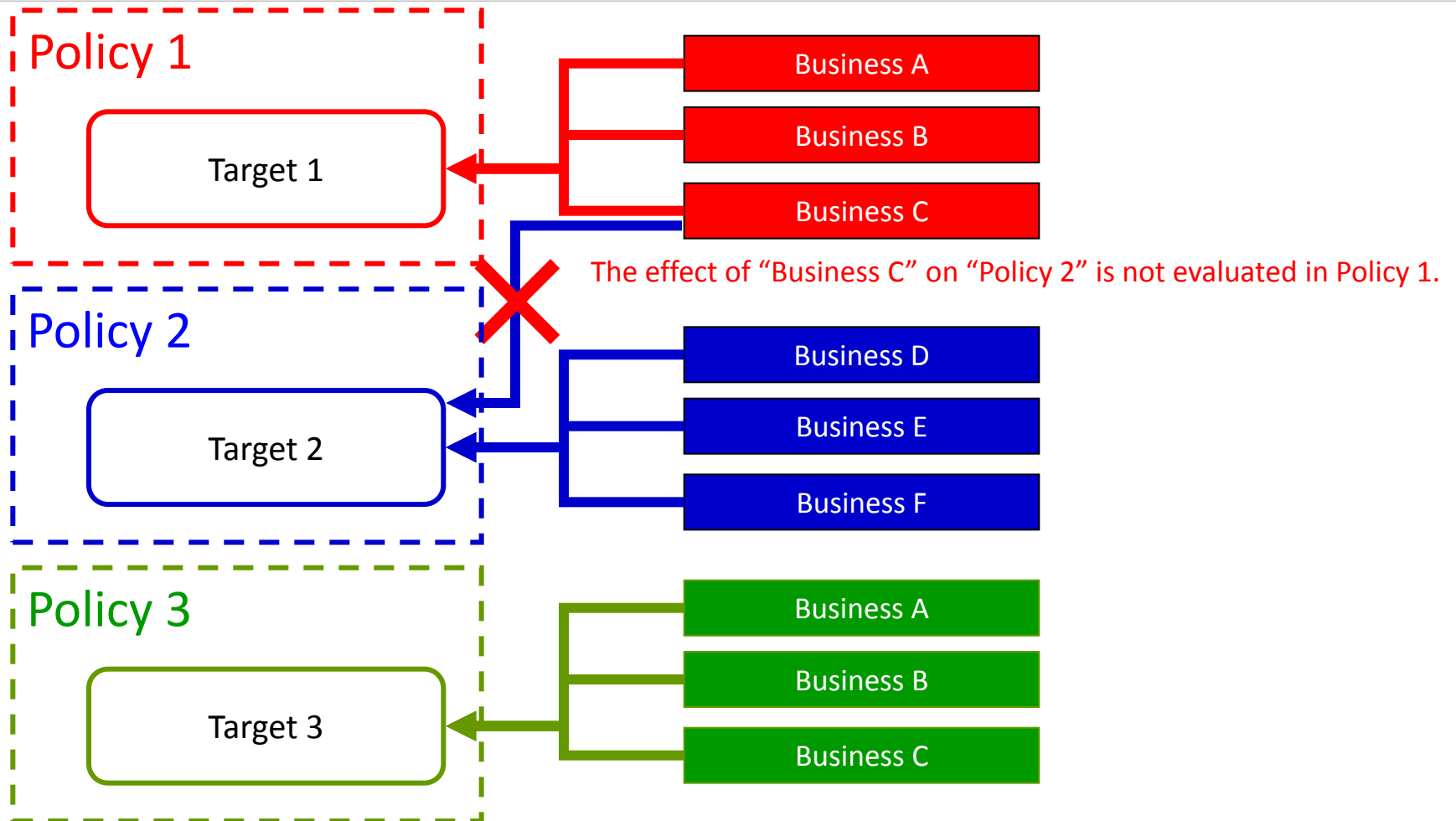


\*CO<sub>2</sub> emissions (g-CO<sub>2</sub>/ton km) from commercial truck is 1/7 of emissions from non-commercial truck.

\*\*CO<sub>2</sub> emissions (g-CO<sub>2</sub>/ton km) from ship is 1/3, and from train is 1/6 of emissions from truck.

# Problems in Current Policy Evaluation System

Businesses are structured and managed with expectations for achieving their initial targets. While there are influence of sub-effect generated by the implementation of policies, the evaluation have been done only by measuring the level of achievement in meeting the specific targets.



# Sub-effects of Environment Policy in Transport

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Policies implemented for reduction of CO<sub>2</sub> emissions in transport sector could have many sub-effects through the impact on the supply and demand of their services.

## ***Examples of sub-effects from environment policy in transport***

Transport policy to the supply side

Examples of sub-effects

- Maintenance of arterial highways → Reduction of traffic congestion
- Provide infrastructure for bicycle → Increase of health benefits from cycling
- Promotion of green vehicles → Technological innovation

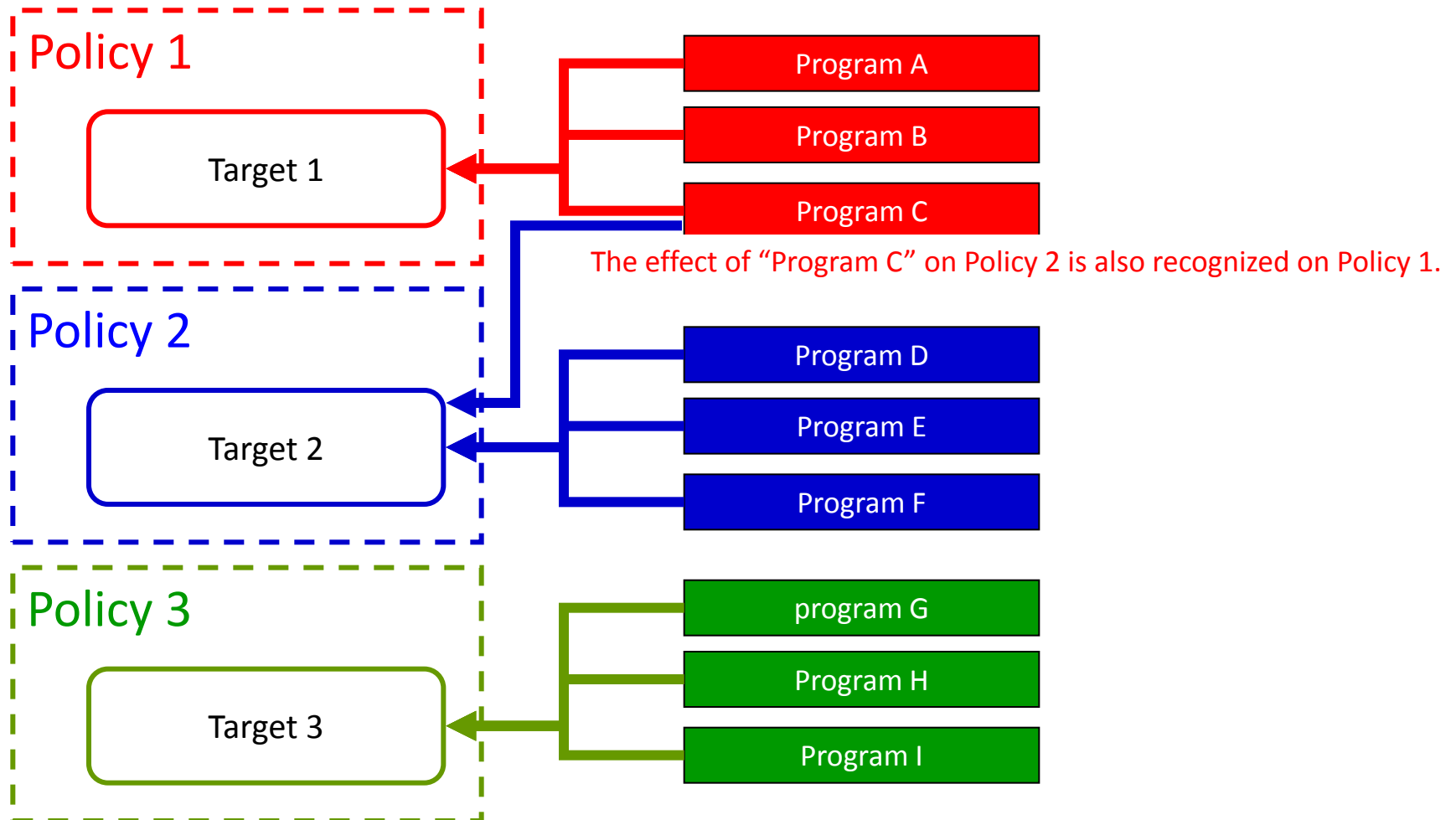
Transport policy to the demand side

Examples of sub-effects

- Promote use of public transport → Neighborhood revitalization by increasing visitors to urban areas
- Facilitating modal shift → Improvement of management efficiency through cost reduction

# Flexible Policy Evaluation System: Proposal

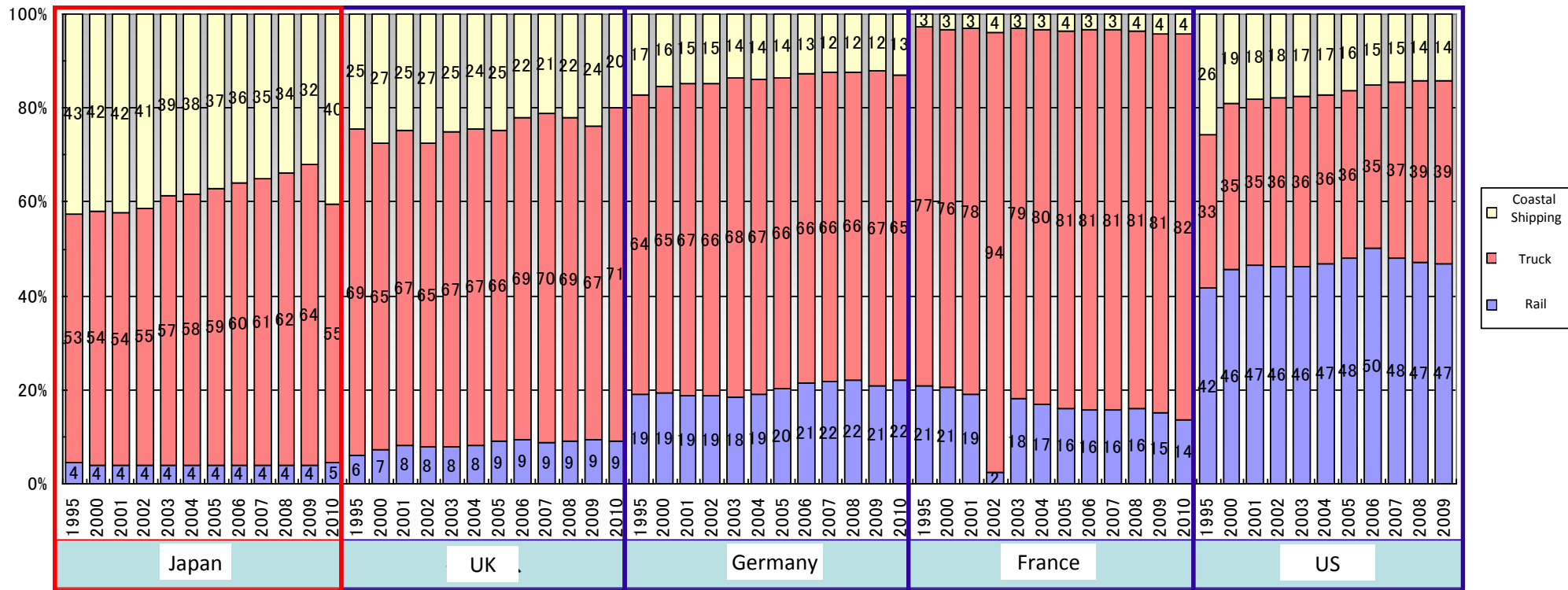
By structuring the expected impacts of a given program for CO<sub>2</sub> reduction, it would be possible for us to recognize its sub-effects on other policies.



# Case Study: Freight Transport

In Japan, shipping and rail are more dominant in long-distance freight transport whereas trucks are dominant in short-distance freight transport.

## Volume of freight transport by country (billion ton-km)



Source: MLIT \* There is a discontinuity in data from FY2010.

UK: Transport Statistics Great Britain 2012

Germany, France: Eurostat

US: U.S. Department of Transportation Statistics 2012

# Example of Modal Shift in Freight Transport, Japan

## Outline:

Implemented a centralized pick-up and delivery system based on milk run logistics in Kansai area, and modal shift from arterial transit to rail freight containers in Saitama. The deliveries were done between the cargo owners and the four suppliers (A ~ D) in order to improve efficiency in delivery system and to reduce CO<sub>2</sub> emissions.

## Impacts:

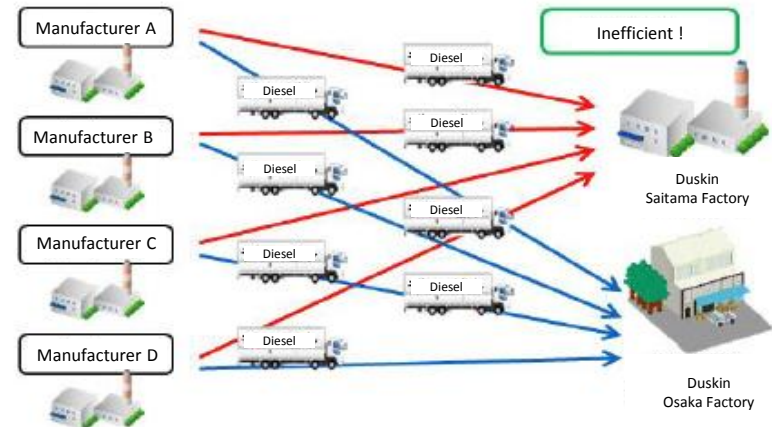
By reducing fleet mileage of diesels trucks, reduction was achieved not only in CO<sub>2</sub>, but also in NOX, PM emissions, as well as in the number of traffic accidents. The operating company (Duskin) was also able to cut back on their transportation costs.

## Observed improvement:

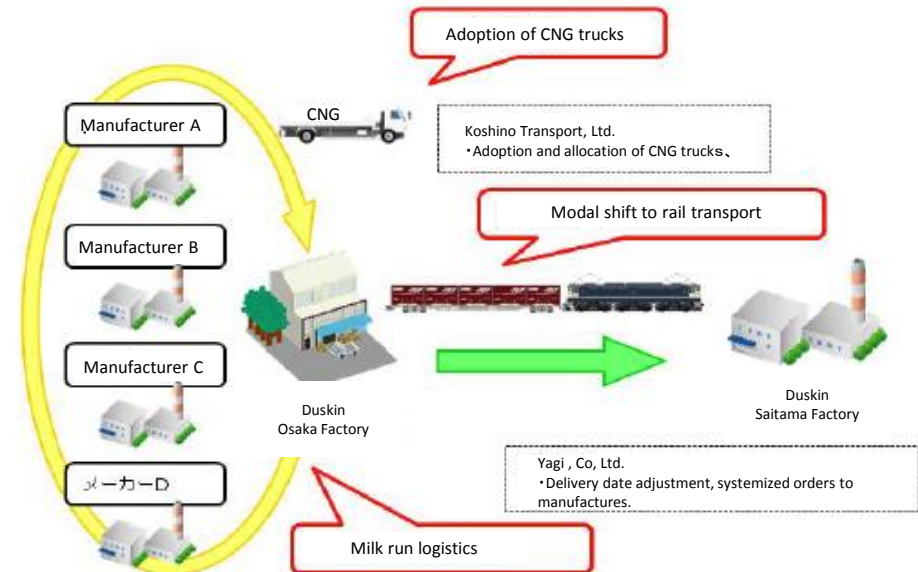
CO<sub>2</sub> reduction: 64 tons per year

Reduction rate: 86%

## Before

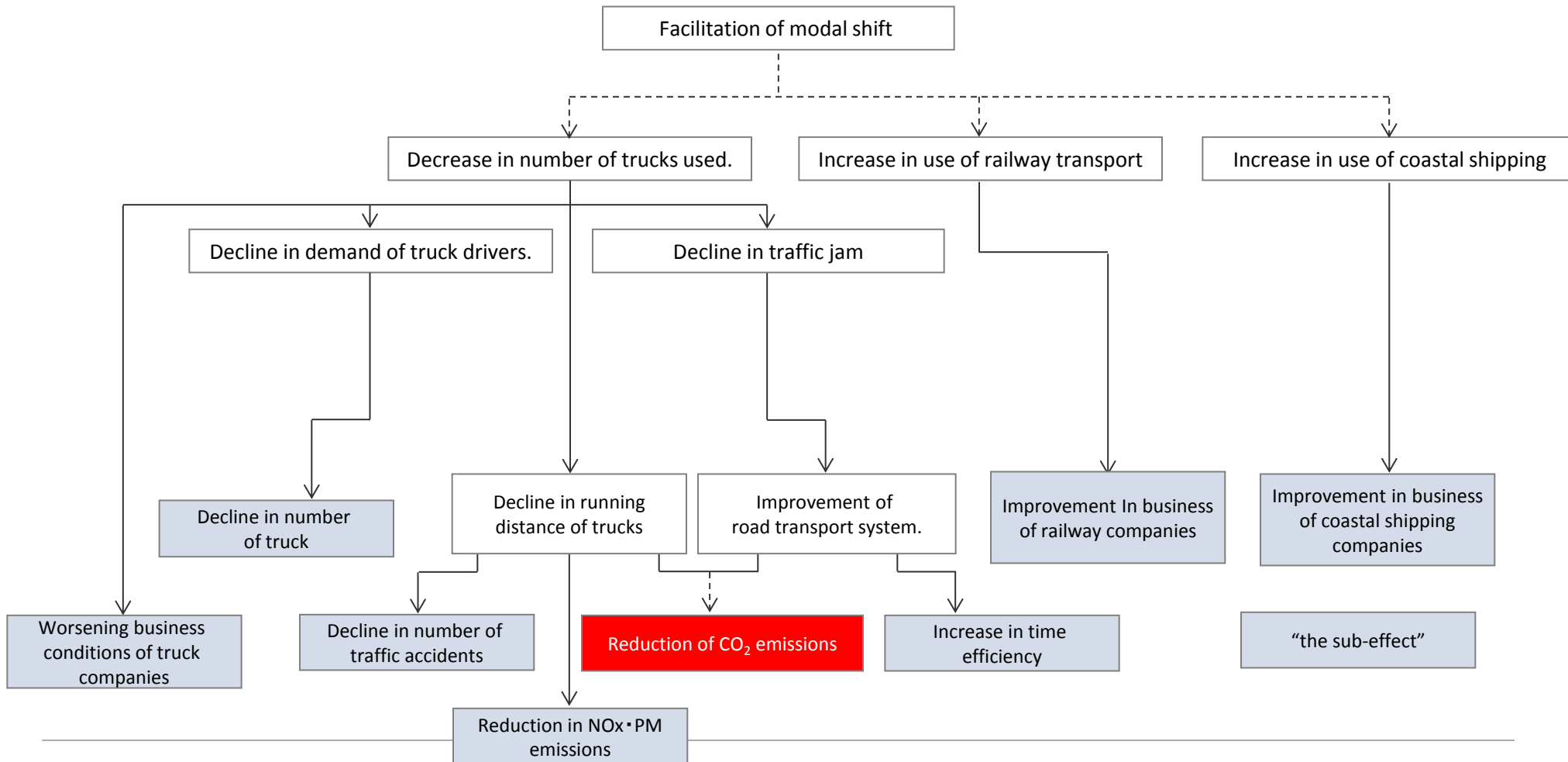


## After



# Structuring of Expected Sub-effects of Modal Shift

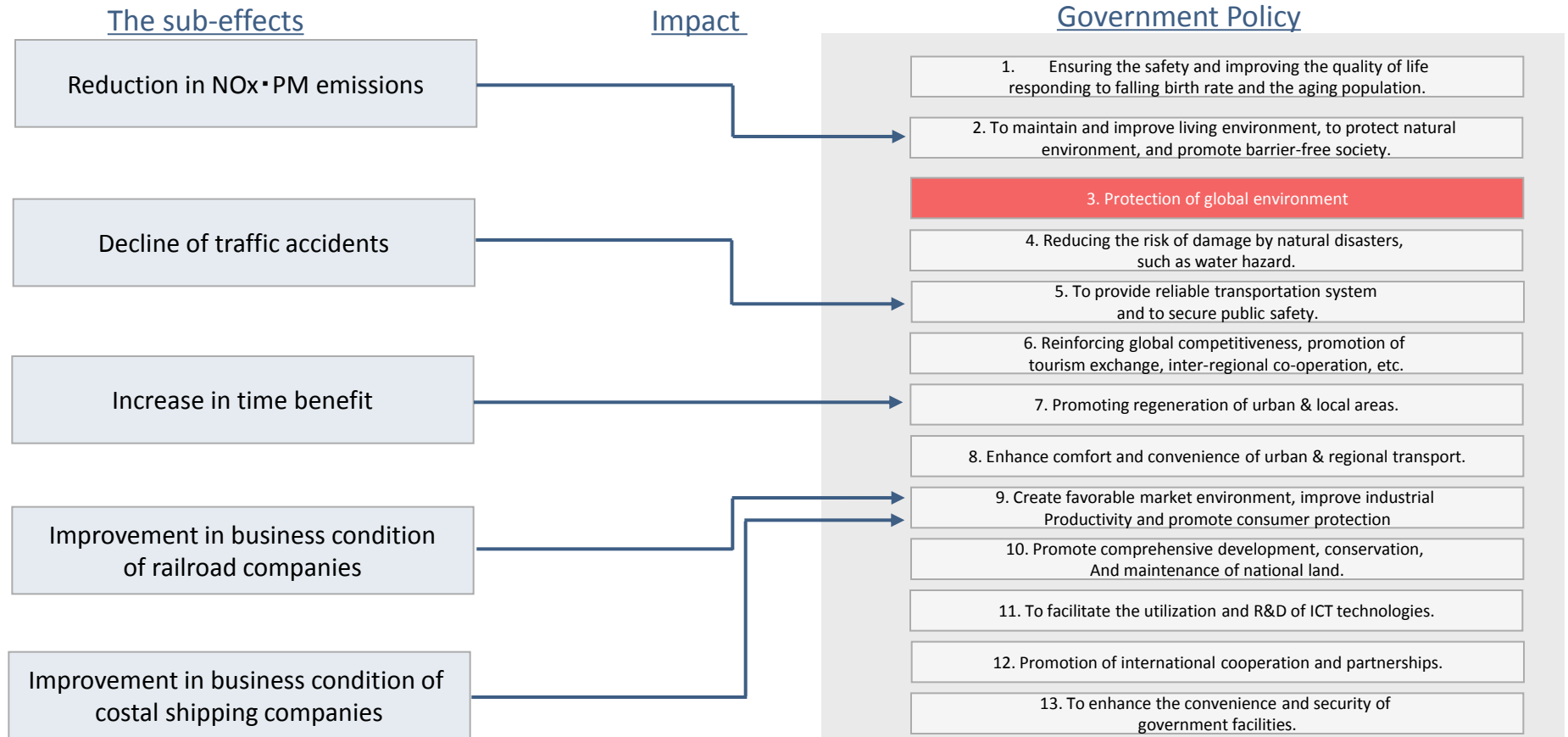
Modal shift from trucks to rail and coastal shipping may have positive impacts on several aspects of our society such as reduction of CO<sub>2</sub> and other greenhouse gas emissions, decline of traffic accidents, and improvement of efficiency in transport system.





# Sub-effects of Modal Shift on Multiple Policy Goals

Modal shift could contribute to “protection of global environment”; “improvement and protection of the living, natural environment”; “barrier-free society”; “reliable transportation system that ensure public safety”; and “regeneration of urban & local areas”.



# Conclusions

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- Policy evaluation of CO<sub>2</sub> emission reduction have typically highlighted to what extent the given targets have been met.
  - However, the environment policy in transport sector usually has the “sub-effects.”
  - By examining the “sub-effects”, the correlation between different policies could be identified.
  - This may enable us to enhance the feasibility of the policy evaluation system for CO<sub>2</sub> emissions in a more systematic and holistic manner.
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