Energy Efficiency and J-Credit Scheme

Jun MORIKAWA
Environmental Economy office
Ministry of Economy, Trade and Industry
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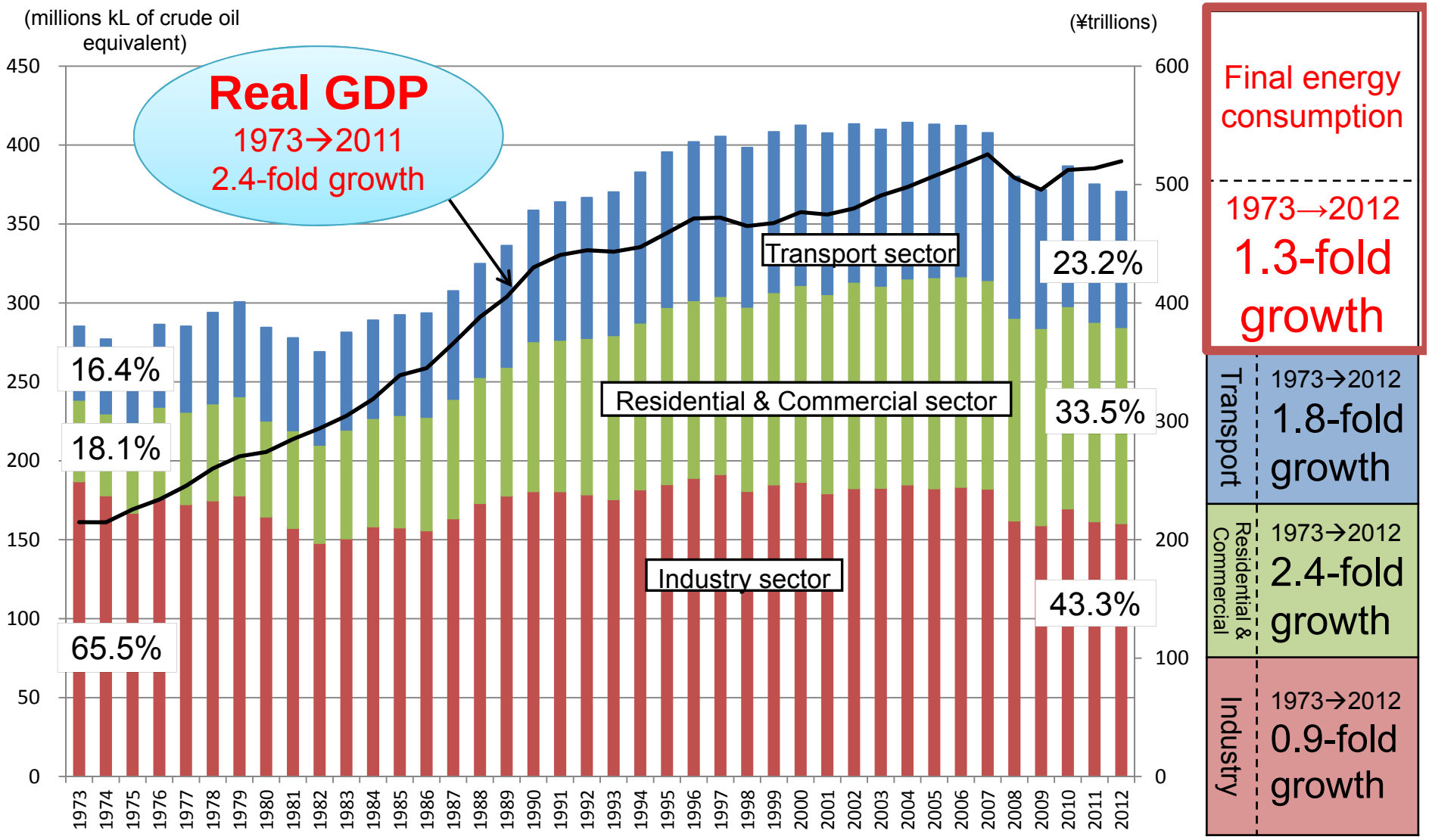
1.Overview

Trends in Final Energy Consumption in Japan



Sources: "Comprehensive Energy Statistics (Preliminary Report for 2012) " and "Annual Report on National Accounts."

Japan's Energy Policy History

Japan lacks natural resources which are indispensable to economic and social activities. In order to meet changing economic and energy situations at home and abroad, Japan has reviewed its energy policy in order to ensure energy security, economic efficiency, and environmental preservation.

1970s

[(1) Responding to the oil crises (1970s-80s)]

Energy security

1973: First oil shock

1980s

1979: Second oil shock

[(2) Promoting regulatory reform (since 1990s)]

1990s

Energy security + Economic efficiency

[(3) Coping with global warming issues (since 1990s)]

Energy security + Economic efficiency + Environment = 3Es

1997: Kyoto Protocol adopted

2000s

2005: Kyoto Protocol came into effect

[(4) Enhancing resource security (2000s)]

Energy security + Economic efficiency + Environment

Enhanced resource security

[(5) Current Basic Energy Plan]

2002: Basic Act on Energy Policy enacted

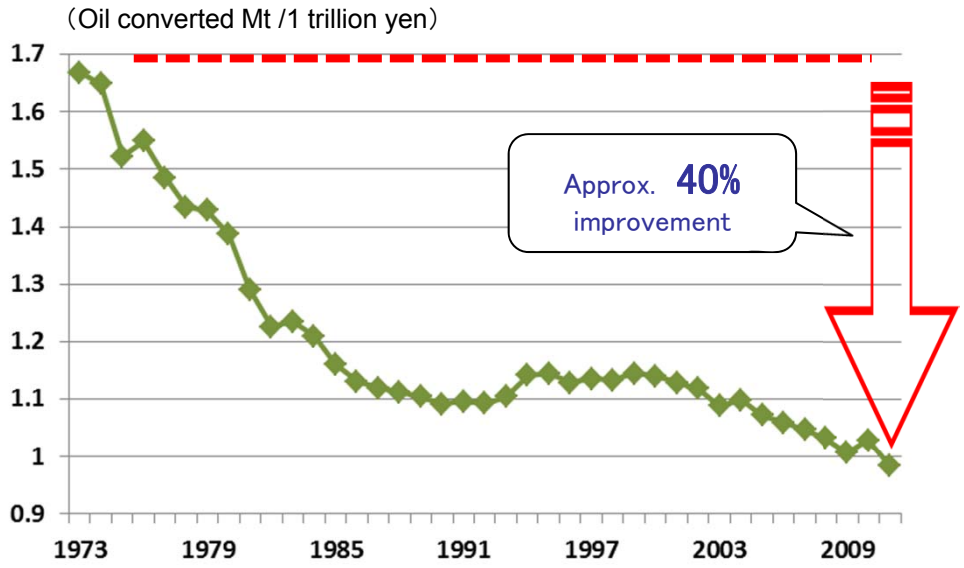
2003: Basic Energy Plan established (revised in 2007 and 2010)

2. Energy Efficiency

Japan's Energy Conservation Efforts after the Oil Crises

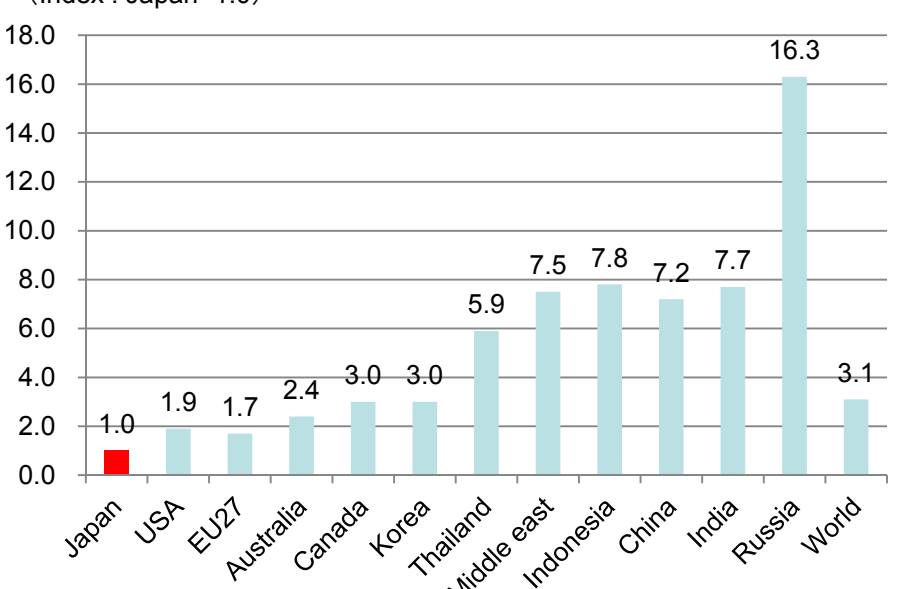
- Japan has improved energy efficiency by approx. 40% after the oil crises in the 1970s as a result of positive actions by both public and private industrial sectors.
- Japan intensively introduced "Energy Management System based on Energy Conservation Law", then achieved the lowest level of energy consumption per GDP in the world.

Primary energy use per real GDP of Japan



Source) Total Energy Statistics by ANRE/METI

Primary energy supply per GDP unit of each country (2009)

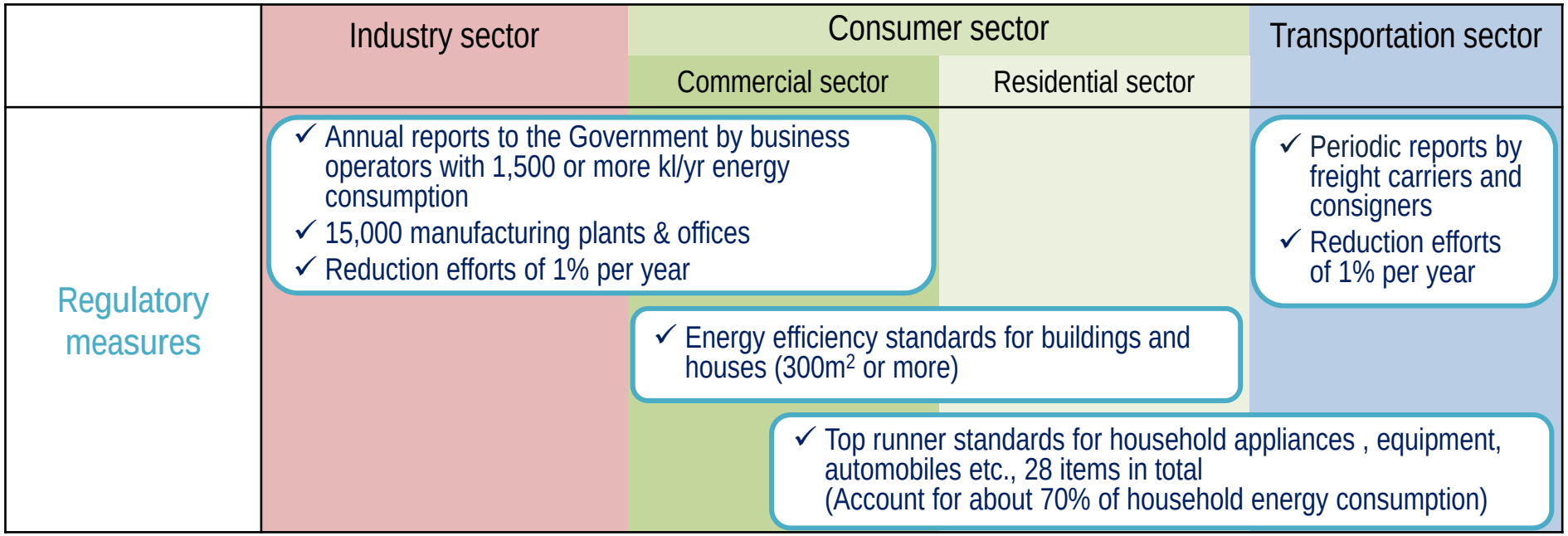


Calculated according to IEA statistics

Energy Conservation Law

- "Energy Conservation Law" was introduced in 1979 .
- The Law covers energy consumption in industry, commercial & residential and transportation sectors.
- The Law specifies

1) the framework which requires the business operators to annually measure and report their energy consumption to the Government,
2) energy efficiency standards for buildings and houses, and
3) the "Top Runner program" which is applied to household appliances, equipment and automobiles.



Current Regulatory Scheme at Manufacturing Plants, etc.

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

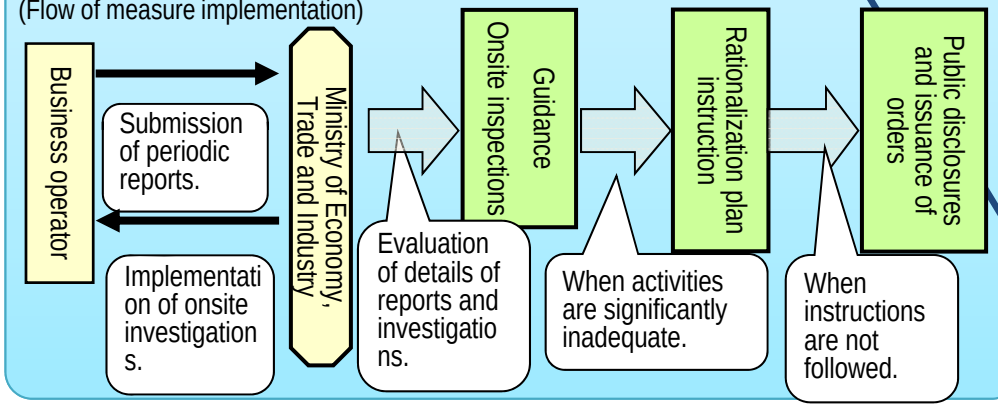
On the basis of energy consumption, about 90% of the industriy sector and about 40% of the commercial sector are covered subject to regulations.

○Obligation to report periodically

① Transition of energy unit consumption
② Status of activities relating to energy conserving measures
③ Obligation to annually report on status of benchmark indices (for subject business lines only), etc.

Measures, such as instructions, public notices and orders (fines in case of violation against orders) implemented when energy conservation activities of a business operator are significantly inadequate.

(Flow of measure implementation)



* Fines imposed when orders are not followed.

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

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

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

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

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

Top Runner Program

- The “Top Runner Program” is a mandatory program for companies (manufacturers and importers), to fulfill the efficiency targets within 3 to 10 years, which encourages competition and innovation among the companies without increasing market prices.
- Companies make efforts toward those goals, so the program has contributed to improving energy efficiency of consumer electronics and automobiles in Japan.
- For instance, we had expected energy efficiency improvements of 16.0km/L for medium class gasoline passenger vehicles in fiscal year 1999, but actually, it attained 19.9km/L.

Achievement of Top Runner Program

Gasoline passenger vehicles

48.8% (FY1995→FY2010)

Air-conditioners

(Types other than direct airflow & wall-mount)

32.3% (FY1997→FY2007)

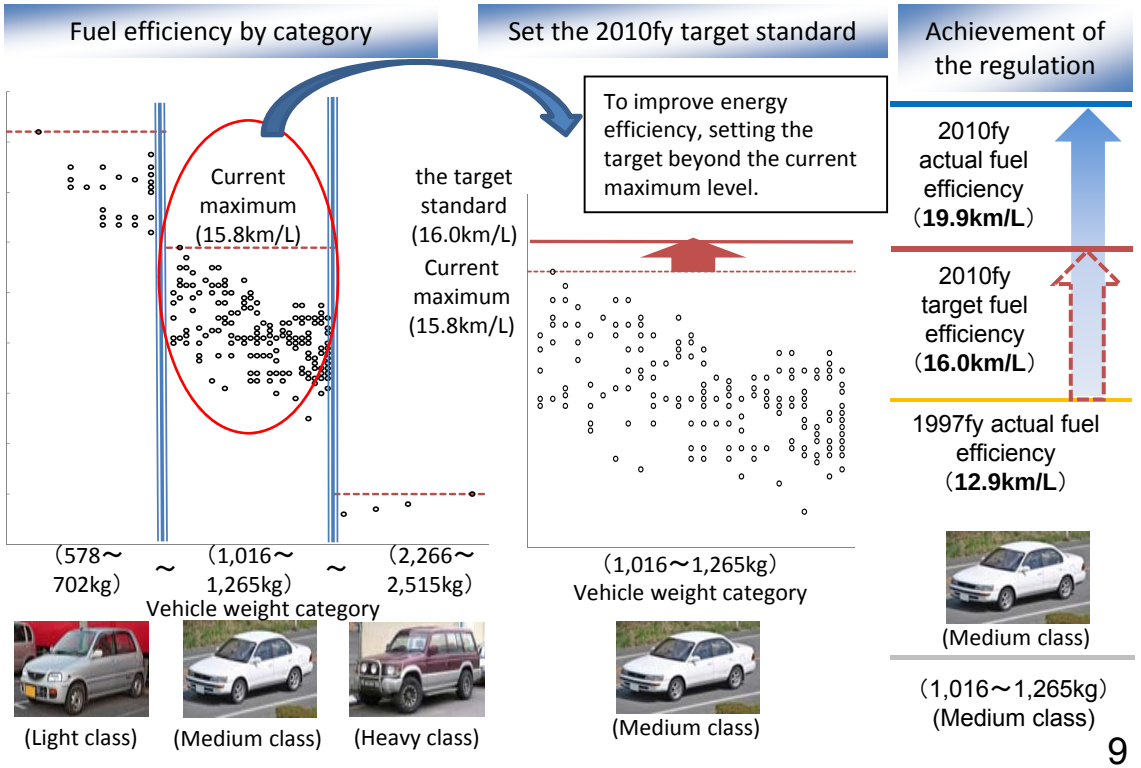
Electric refrigerators

43.0% (FY2005→FY2010)

TV sets (LCD and PDP TVs)

29.6% (FY2004→FY2008)

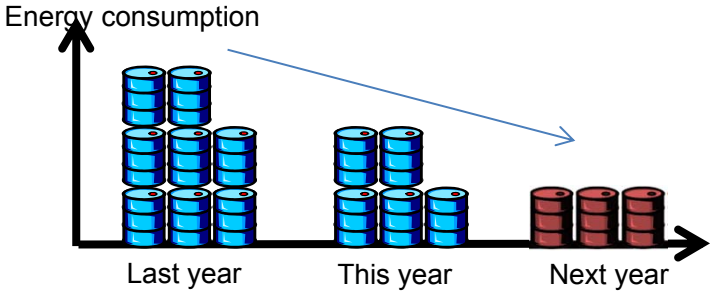
Basic mechanism of Top Runner Program (The case of gasoline passenger vehicles)



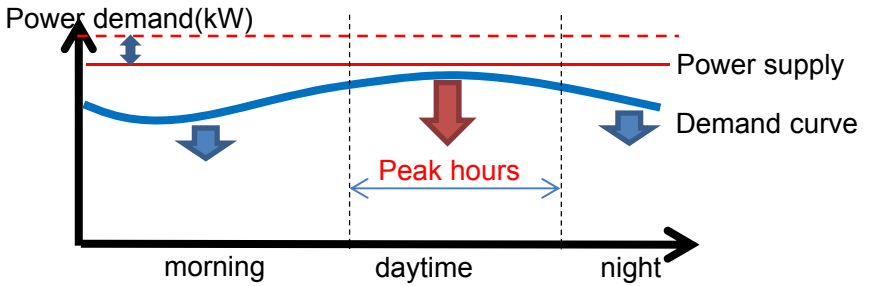
Policy Development After the Earthquake

■The challenge is to keep consumer efforts focused on energy conservation.

Standard energy conservation



Peak Demand Management



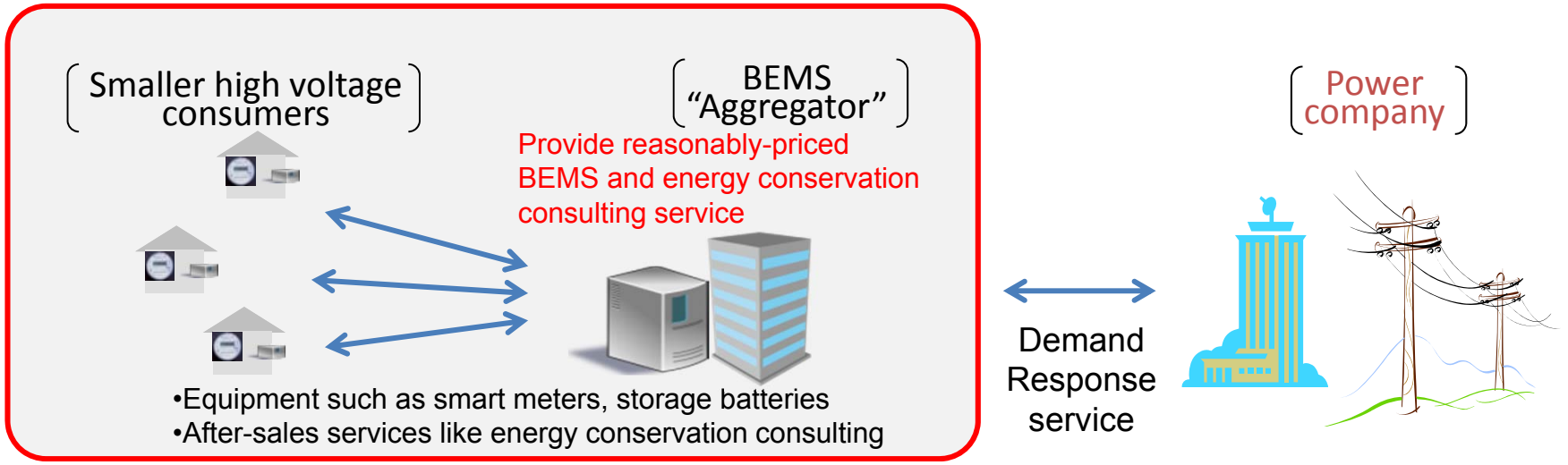
Improve Energy efficiency of houses and buildings

Promote Energy Management Systems

Promote introduction of Energy Management Systems (BEMS and HEMS)

"BEMS" means Building Energy Management Systems. "HEMS" means House Energy Management Systems.

- "Energy Management System" is a product that systematically works together with other equipment and intelligently manages energy usage with sensors and ICT tools.
- For efficient and effective support, the "BEMS Aggregators" provide energy management and operation services to small- and medium-sized buildings.
- In future, it is expected that the "BEMS Aggregators" will provide Demand Response (DR) services, in which consumers are allowed to adjust electricity consumption taking into account fees for peak hours, point systems, and megawatt trade.



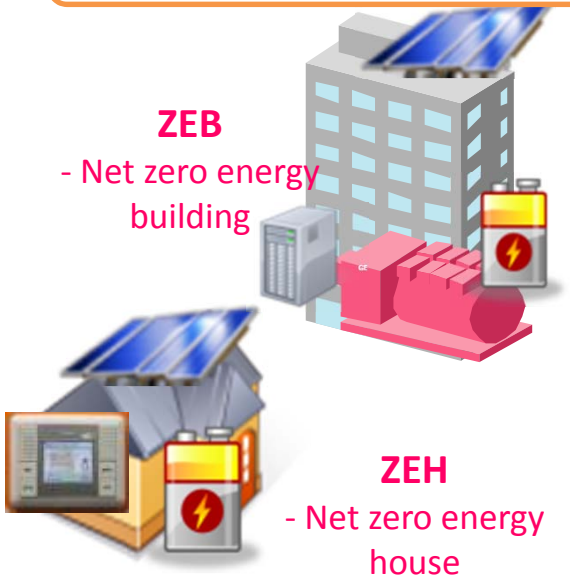
Spread BEMS for small and medium size buildings → **Develop energy management servicers - "Aggregators"** → **<future prospect> Develop DR services**

Next step in Energy Management

- Handle electricity supply-demand problem with promotion of introduction of HEMS / BEMS, high efficient air conditioners, lighting and hot-water supply.
- Pursue energy efficiency of entire systems by managing entire houses and buildings.
- In addition, more efficient energy management can be realized by cross-management of houses and buildings, or regional management.

Installation of energy management equipment ▶ **Optimize houses and buildings** ▶ **Regional or cross-regional optimization**

Cooperate by buying equipment such as efficient air conditioners and lighting, and controlling them with HEMS or BEMS.



"Net zero energy" means that net annual primary energy consumption is approximately zero.

3.J-Credit Scheme

Japan's emission reduction policies to achieve 6% emission reduction target of Kyoto protocol

Act on Promotion of Global Warming Countermeasures

Establish (1)basic policy for promotion of global warming countermeasures, (2)guideline of emission limitation of government, enterprises and people and (3) target of amount of emission reduction/absorption enhancement (Article 8, article 9)

Kyoto Protocol Target Achievement Plan

Voluntary Action Plan of Industry Sector

Utilize credits to achieve targets

Japan's Domestic credit

CER

Credit (Certified Emission Reduction)

- Promote emissions reductions not only from SMEs but also across broad sectors such as operations and households whose emissions are increasing.
- Since October 2008 when this scheme launched, **1,466 projects were registered and** 1,319 projects were verified.
- **1.504 Million t-CO2 credits were verified from these projects.**

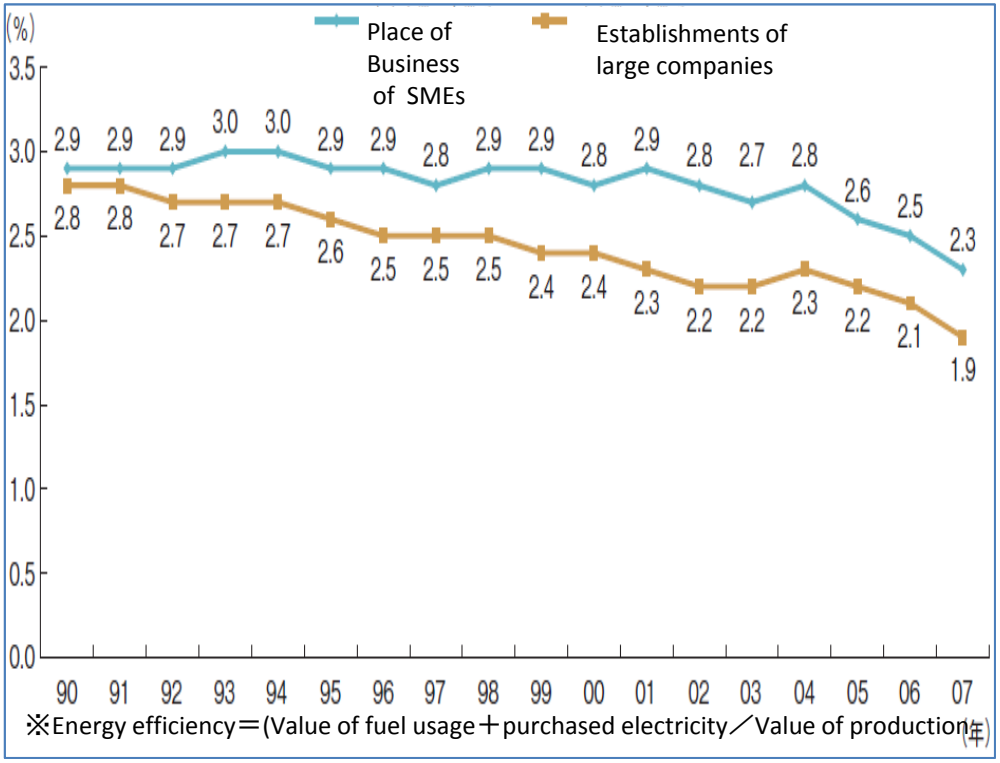
Other Policies

Status of Low Carbon Investment of SMEs ~ Potential of Energy efficiency ~

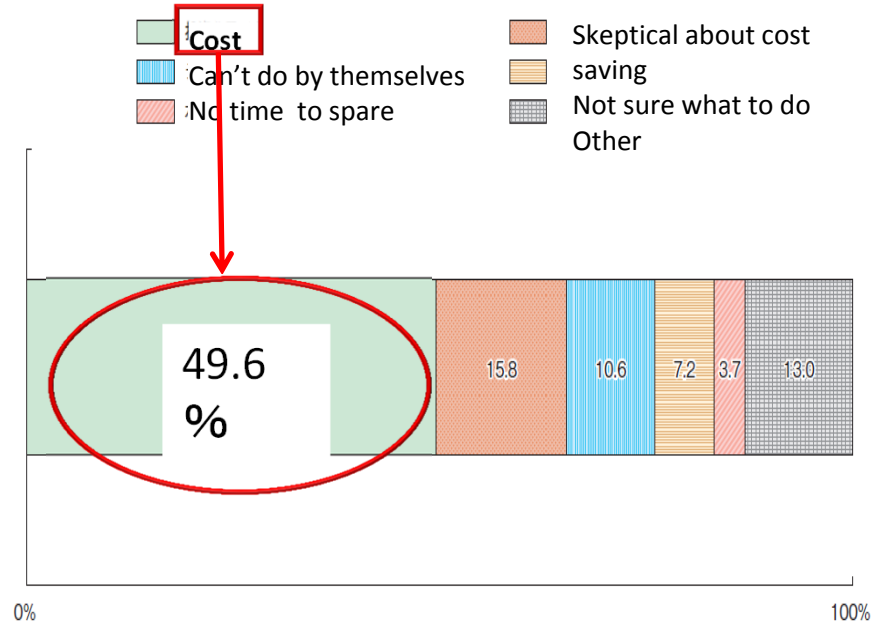
- The difference in energy efficiency between large enterprises and SMEs has gradually increased over the last 15 years. SMEs can improve energy efficiency by up to 20%.
- Cost is the major factor to discourage SMEs from making investments in lower emissions equipment.

It is necessary to promote emissions reductions from SMEs & the agriculture and forestry, civil and transportation sectors by providing incentives for lower emissions investments.

Comparison of Energy efficiency between large enterprises and SMEs



The reason why SMEs hesitate to make lower emissions investment



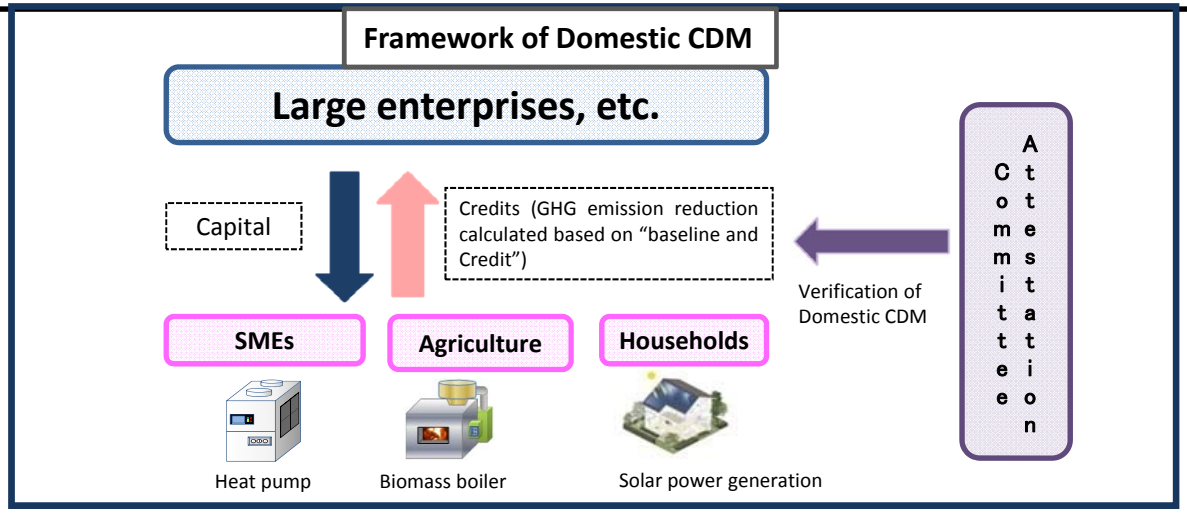
(Source) White Paper on Small and Medium-sized Businesses 2010

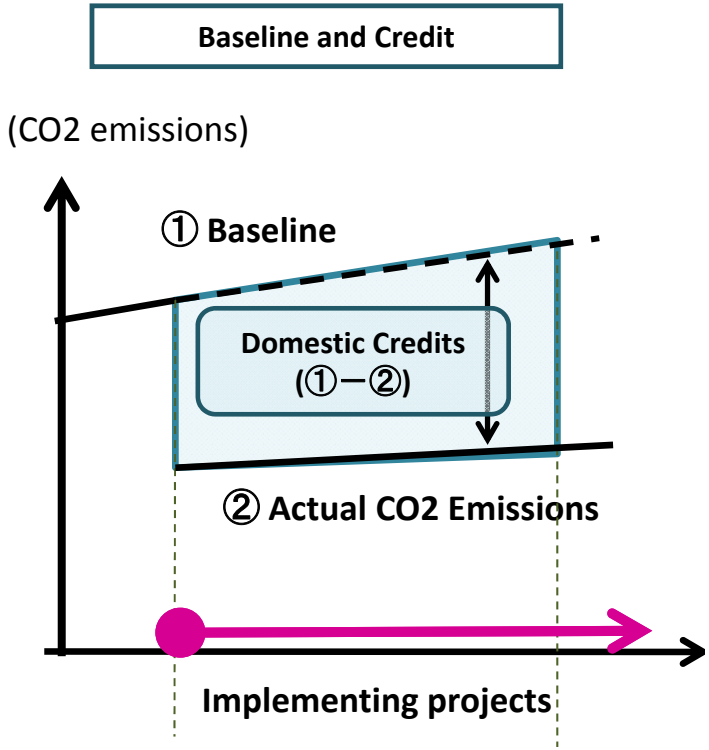
★GHG emissions from SMEs in Japan are 154 million t-CO2. They cover 12.6% of all emissions and 11% of emissions from Japan's industrial sector.

Outline of Domestic CDM

○ Japan's Domestic CDM is a scheme in which large companies and SMEs conduct joint projects for GHG reduction. Large companies provide necessary capital in exchange for domestic credits, which are certified as credits by the Domestic CDM Certification Committee. They utilize those credits to achieve voluntary action plan goals for the Kyoto Protocol, CSR, offsets, etc.

○GHG emission reduction is valued based on idea of "Baseline and Credits". Concrete Evaluation will be conducted based on GHG emission reduction methodologies which are established with respect to emission reduction technologies ※68 methodologies are approved.





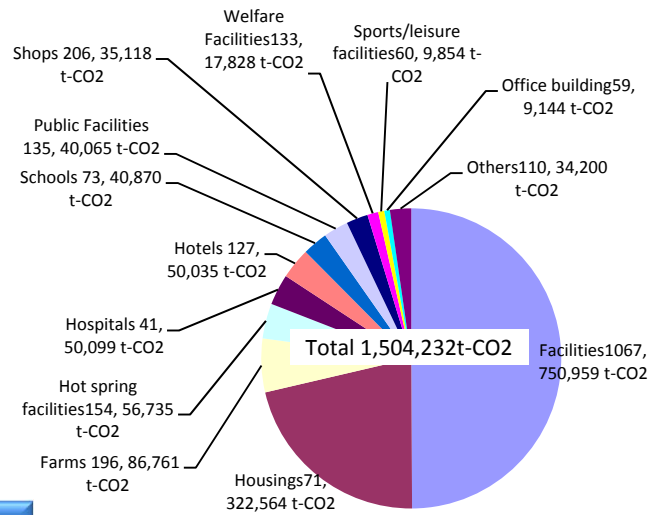
Item	内容
Grounds	Kyoto Protocol Target Achievement Plan
Management	Ministry of Economy, Trade and Industry, Ministry of Environment, Ministry of Agriculture, Forestry and Fishery
Terms	October 2008~ March 2013
Participants	SMEs that are not participating voluntary Action Plan
Projects	GHG Emission reduction projects
Application	Submit application form to the Attestation Committee
Usage of credits	①Achieve target of the Voluntary Action Plan ②Report based on Act on Promotion of Global Warming Countermeasures and Act on Energy Efficiency ③CSR (Voluntary Carbon Offsetting)
Registered projects	1,466 projects (as of July 2013)
Certified Credits	1.504 Million t-CO2 (2,432 times)

Place of projects and other stats of Domestic CDM

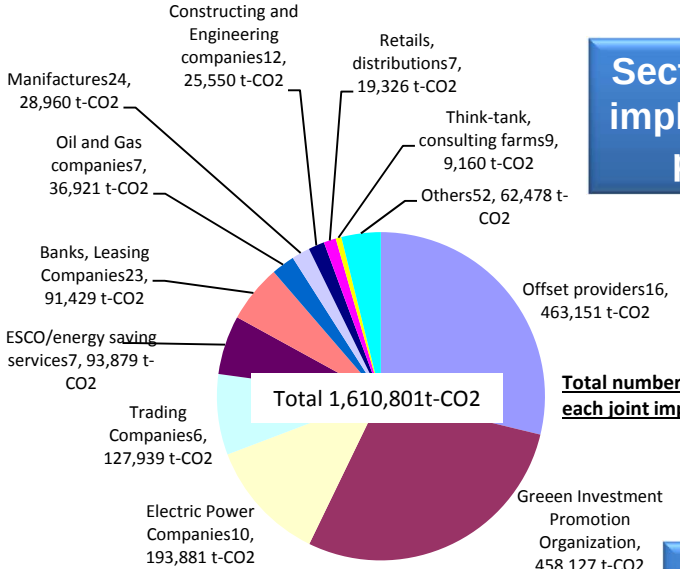
During the period of the scheme from 2008 to 2013

- Implementation of boilers at factories and implementation of solar power generations at households are mainstream of projects.
- While electric companies and trading companies are two major sectors as join implementation partners, proportion of Offset providers is high overall.

Place of Projects

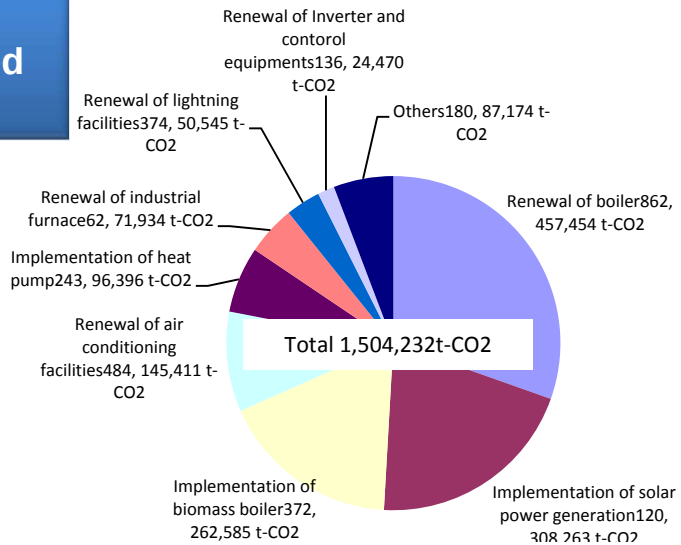


Sectors of joint implementation partners

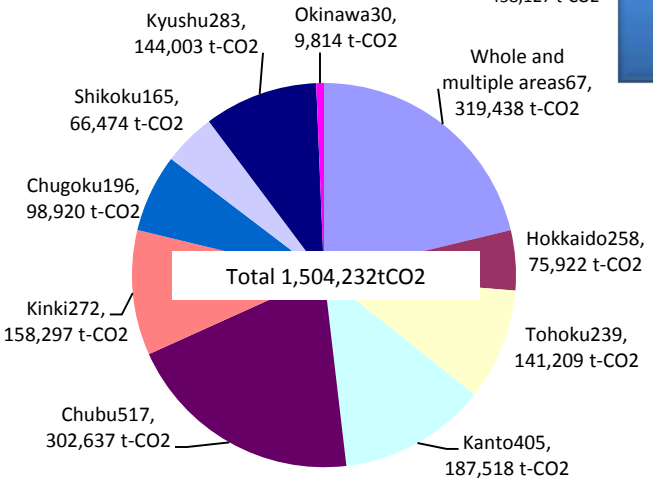


Total number stands for by counting each joint implementation partner.

Type of implemented facilities



Area of projects



(Source)METI

Outline of J-Credit Scheme

Vitalize new scheme by resolving the confusing situation that two similar schemes (Domestic CDM, J-VER) that create credits exist(Enhance usability by uniting two previous schemes)

- ◆ Promote GHG emission reduction and absorption in Japan after 2013 continuously and actively
- ◆ Enhance actions of industries, actions of CSR, Voluntary Carbon Offsetting

Until end of March 2013

Domestic CDM

「Voluntary Action Plan」participants, etc.

Capital

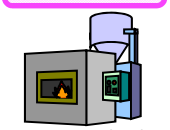
Credits(GHG emission reduction)

Certification of Domestic CDM

Committee / Attestation

SMEs | Agriculture | Households


Heat pump


Biomass boiler


Solar power generation

※Local governments also participate

+

J-VER

GHG emission enterprises, etc.

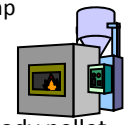
Enterprises | Local govs | Agriculture | Households

Application for registration, certification

Attestation Committee

Certification of credits


Heat pump


Woody pellet


Forest management, Afforestation

After April 2013

J-Credit Scheme

Application for project registration, application for certification

Central government ⇄ Project participants

Credits

Discussion

Steering committee | Attestation Committee

Credits

Capital

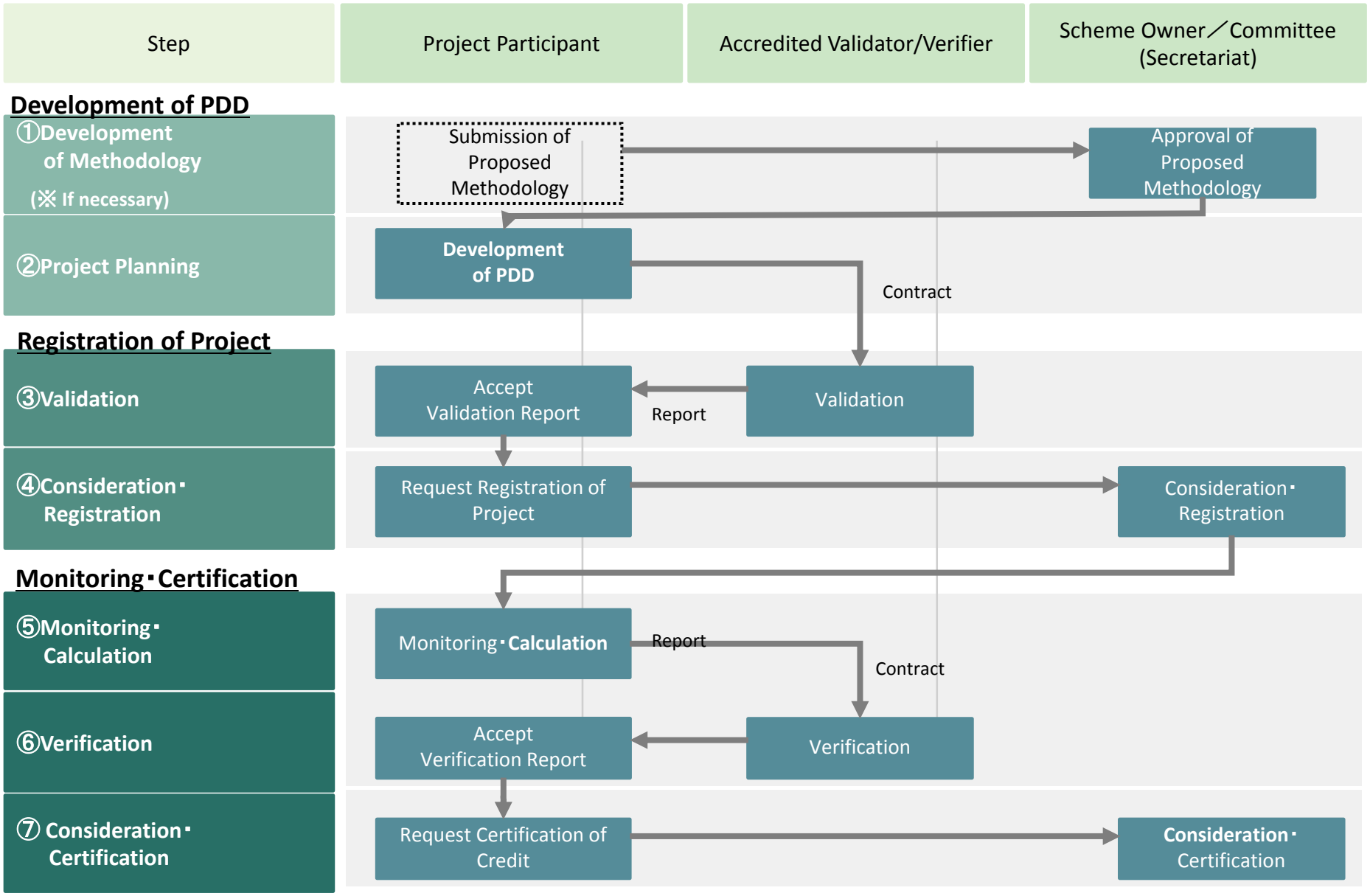
Users of Credits

- Utilize for "Keidanren's commitment to a low carbon society"
- Utilize for voluntary Carbon Offsetting
- Utilize for Act on Promotion of Global Warming Countermeasures (※1)
- Utilize for energy efficiency act (※2)

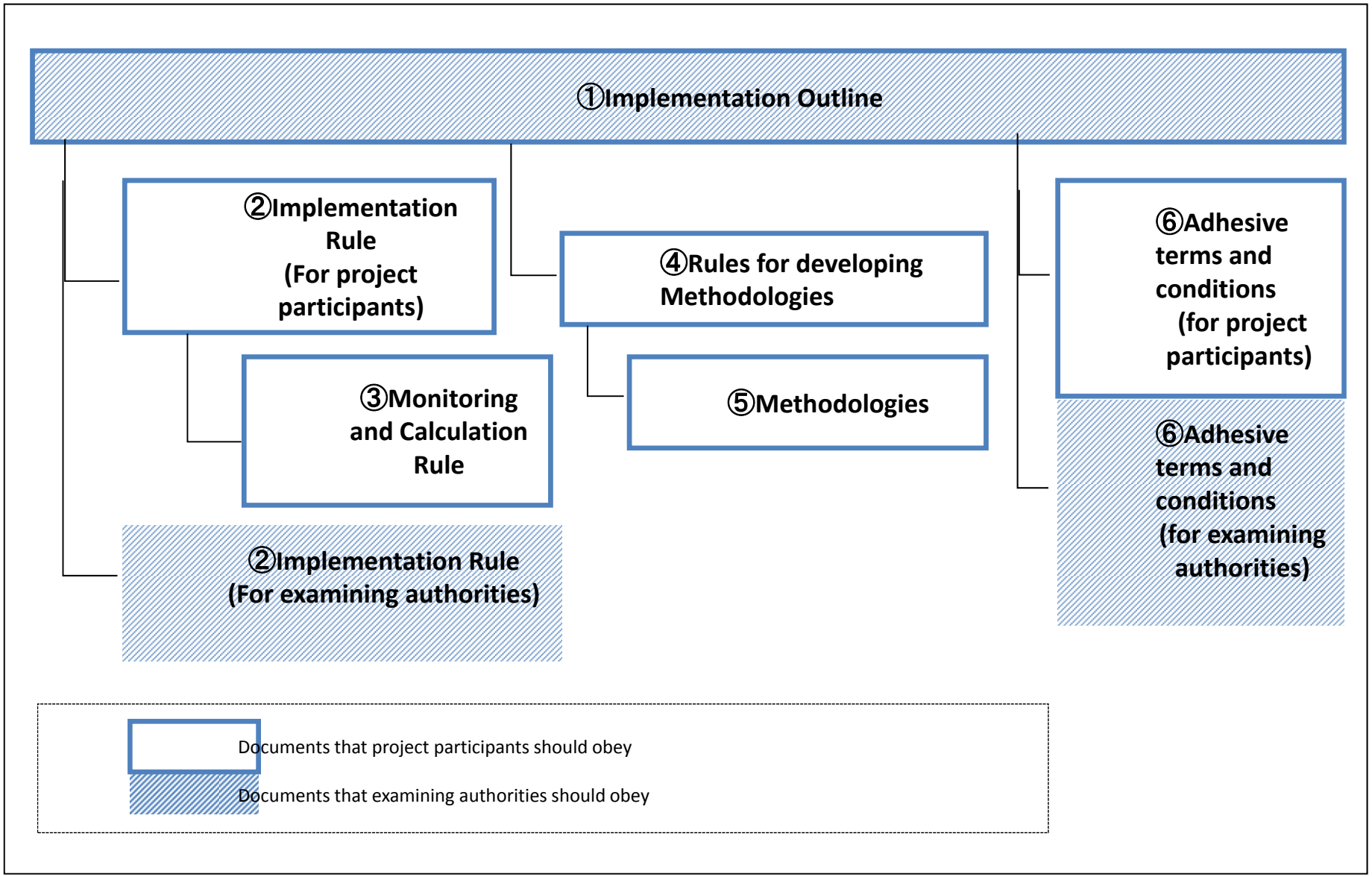
(※1)Adjustment of amount of emission under GHG emissions reporting system based on the act on promotion of global warming countermeasures

(※2)Can report the registered projects as "joint energy efficiency projects" easily under the Energy Efficiency Act

Process of the J-Credit Scheme



Document Architecture of J-Credit Scheme



Major Players at J-Credit Scheme

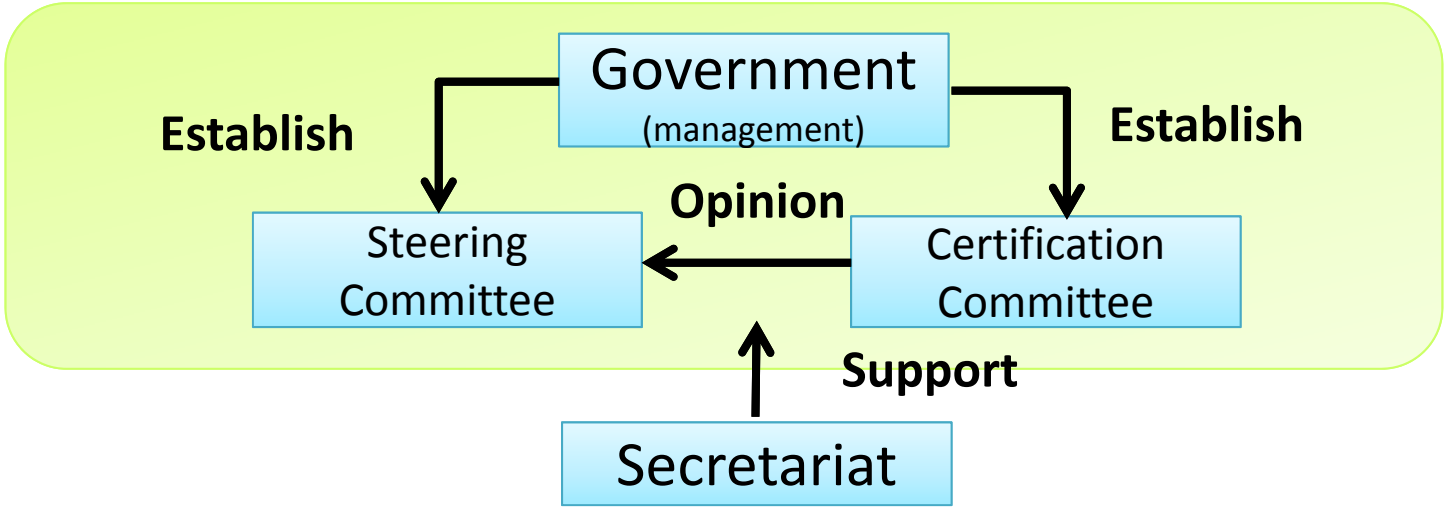
Management (Ministry of Economy, Trade and Industry, Ministry of Environment, Ministry of Agriculture, Forestry and Fisheries)

○Role

For management of J-Credit Scheme, the management has the authority to approve and revise documents, register projects, certify credits and approve Regional J-Credit Schemes, etc.

○Task

① **Approval and Revision of Documents**
② **Establishment of Steering Committee and Certification Committee**
③ **Registration of projects**
④ **Certification**
⑤ **Creation and Management of Registry**
⑥ **Registration of Examining Authorities**
⑦ **Approval of Regional J-Credit Scheme**
⑧ Others



Examining Authorities

A general term for institutes that execute validation and verification

※Validation：examination before registration of projects

※Verification：examination before certification

Condition for registration

✓Holding ISO 14065 certification to guarantee credibility of the scheme

Eligible Projects for J-Credit Scheme

・Projects

Action that reduce GHG emissions or enhance GHG absorption

Conditions for Registration

① Implemented within Japan
② Implemented after April 1, 2013
③ Satisfied additionality
※In principle, payout time for facilities of projects need to be more than three years
④ Implemented based on methodologies
⑤ Validated by validation authorities
⑥ Take action to keep permanence (Forest sink only)
⑦ Others

・Methodologies

Methodologies rule boundary, calculation formula and method of monitoring for each technology of emission reduction and absorption.

Type of Methodologies

●**Energy (EN)**

✓Energy saving(EN-S)

Areas that reduce energy related emissions by reducing fossil fuel

✓Renewable energy(EN-R)

Areas that reduce energy related emissions by substituting fossil fuel to renewable energy

●**Industrial Processes (IN)**

Areas that reduce GHG emissions from industrial processes through chemical or physical change

●**Agriculture (AG)**

Areas that reduce GHG emissions from agricultural area (livestock, farm land)

●**Waste (WA)**

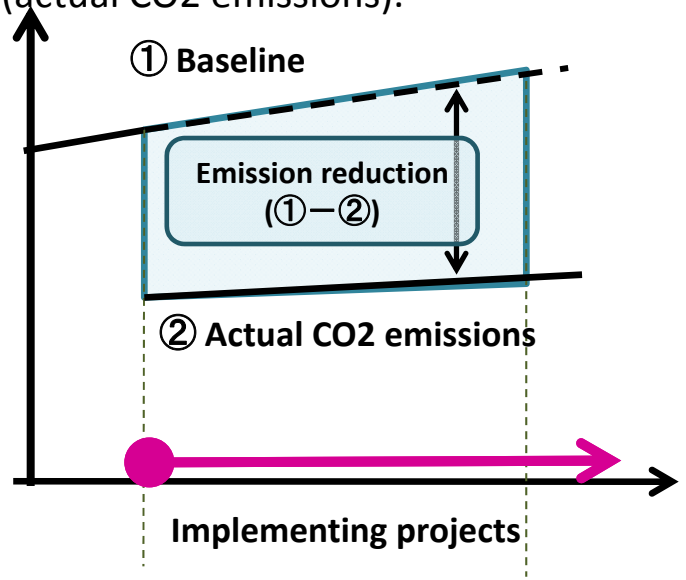
Areas that reduce GHG emissions from waste management

●**Forest (FO)**

Areas that absorb GHG by implementing forest management

Basic idea of "Baseline and Credit"

Emission reduction is the difference between the baseline emission and emission after implementation of facilities (actual CO2 emissions).



Approved Methodologies ①

As of February, 2014, 58 methodologies have approved.

- **Energy saving, 38, Renewable energy, 9, Industrial Processes, 5, Agriculture, 3, Waste,1, Forest, 2**

Area	Methodologies
Energy saving	Implementation of boilers
	Implementation of heat pumps
	Implementation of industrial furnaces
	Implementation of air conditioning facilities
	Renewal of fan and pump or installation of inverter and controlling equipment
	Implementation of lighting facilities
	Implementation of co-generation equipment
	Renewal of transformers
	Switch from private heat source equipment to outside heat sources
	Implementation of electric generators utilizing waste steam
	Utilizing heat source from recovered waste heat
	Implementation of electric vehicles
	Delivery efficiency of Propane gases utilizing IT
	Reducing meter reading utilizing IT
	Implementation of vending machines
	Implementation of refrigeration equipment
	Renewal of roll ironers
	Renewal of electric marine vessels
	Switch from fossil fuel or grid power to fuel from waste
	Renewal of fan and pump
	Renewal of construction machinery and industrial trucks by introducing power-operated machineries and trucks
	Renewal of productive facilities (machine tools, press machines or injection machines
	Implementation and utilization of digital tachograph and other equipment that support eco-drive

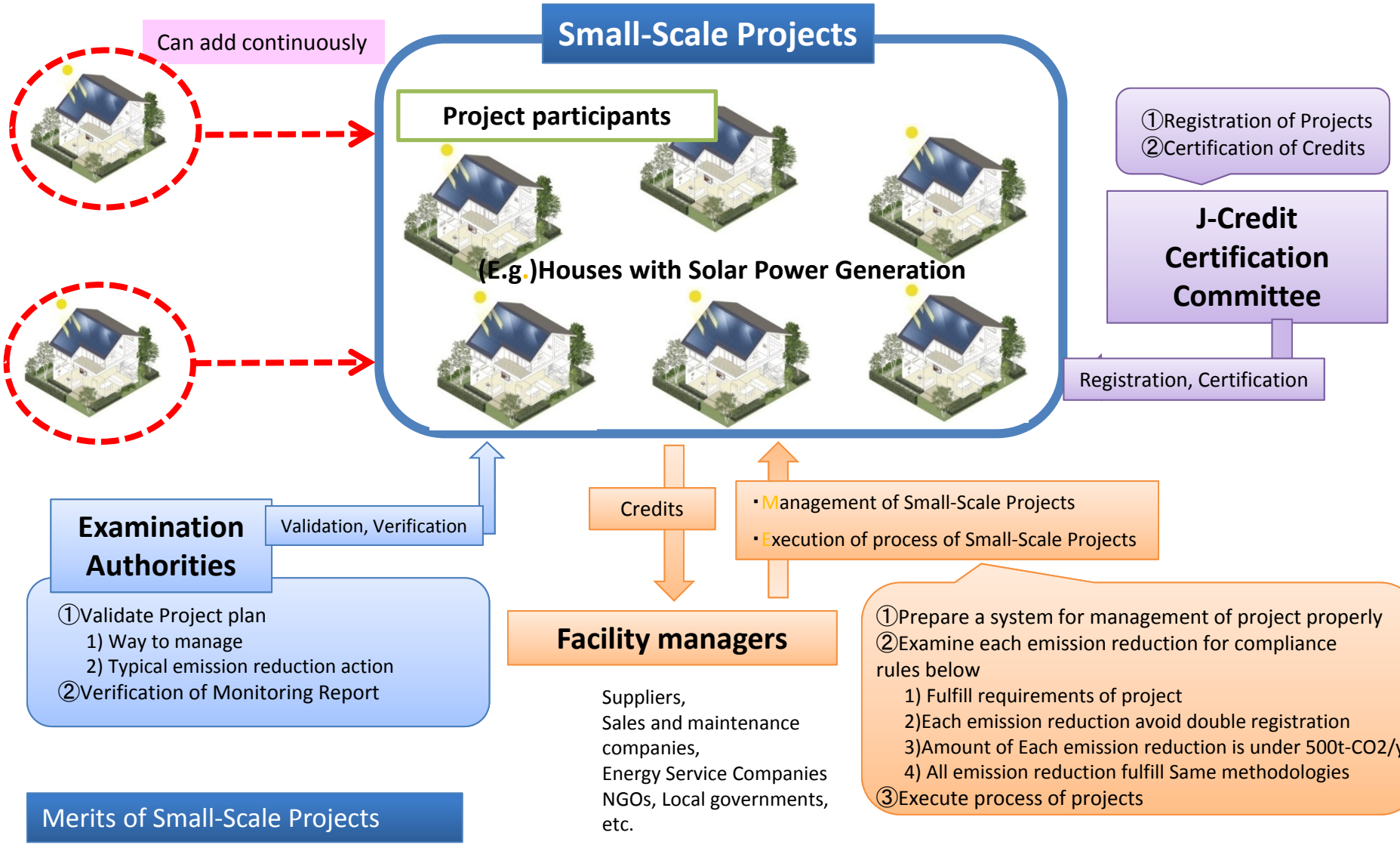
Methodologies ②

Area	Methodologies
Energy Saving	Renewal of private electric generators
	Renewal of drying machines
	Energy efficiency improvement of air conditioning facilities by installing a rooftop greenery
	Renewal of construction machinery and industrial trucks by introducing hybrid machineries and trucks
	Implementation of natural gas vehicles
	Implementation of printing machines
	Renewal of servers
	implementation of plumbing products
	Energy efficiency improvement by relocating servers to outside data centers
	Installation of Car Navigation Systems with Environmentally-friendly Driving Systems
	Efficiency Improvement of Land Transportation of Marine Container
	Reduction of Fossil Fuel of Sludge Disposal System by Renewal of Sewage Sludge Dryers
	Change to cooperative delivery
	Implementation of refrigerant treatment facility
Renewable Energy	Fuel Switch from Fossil fuel or Grid Power to Biomass Solid Fuel (woody biomass fuel)
	Introduction of solar power generation
	Renewal of heat source equipment utilizing renewable energy heat
	Fuel switch from fossil fuel or grid power to biomass liquid fuel (BDF, bioethanol, biooil)
	Fuel switch from fossil fuel or grid power to biomass solid fuel (biomass solid fuel from sewage sludge)
	Introduction of hydroelectric power generation
	Fuel switch from fossil fuel or grid power to biogas
	Introduction of wind generators
	Renewal of electric power facility utilizing renewable energy heat

Methodologies ③

Area	Methodologies
Industrial Process	Switch of cover gas in casting magnesium from SF6 to lower GWP gases
	Introduction of recovery and degradation systems of N2O used for anesthesia
	Gas Switch from SF6 to COF2 in the Liquid Crystal Display Production Process
	Introduction of GHG-free Insulated Switchgears and More
	Reduction of Green House Gas of canned dust blower for equipment maintenance
Agriculture	Abatement of N2O emissions from pig and broiler excreta disposal by utilizing low-protein feed
	Conversion of disposal management system for livestock excreta
	Mitigation of N2O Emissions from Tea Land Soil by Applying Chemical Fertilizers Containing Nitrification Inhibitor or Compound Fertilizers containing lime nitrogen
Waste	Reduction of fossil fuel for incineration treatment by volume reduction of sludge utilizing microbially-activated solvent
Forest Sink	Forest management project
	Afforestation project

Small-Scale Projects



Merits of Small-Scale Projects

1) Facility Managers can add new participants continuously after registration of the projects.
2) Reduction of Examination fees (Usually, each projects should be examined individually.)
3) Reduction of workload of project participants