Energy Efficiency and Conservation Policies in Japan

-Accelerating the energy transition for a sustainable future

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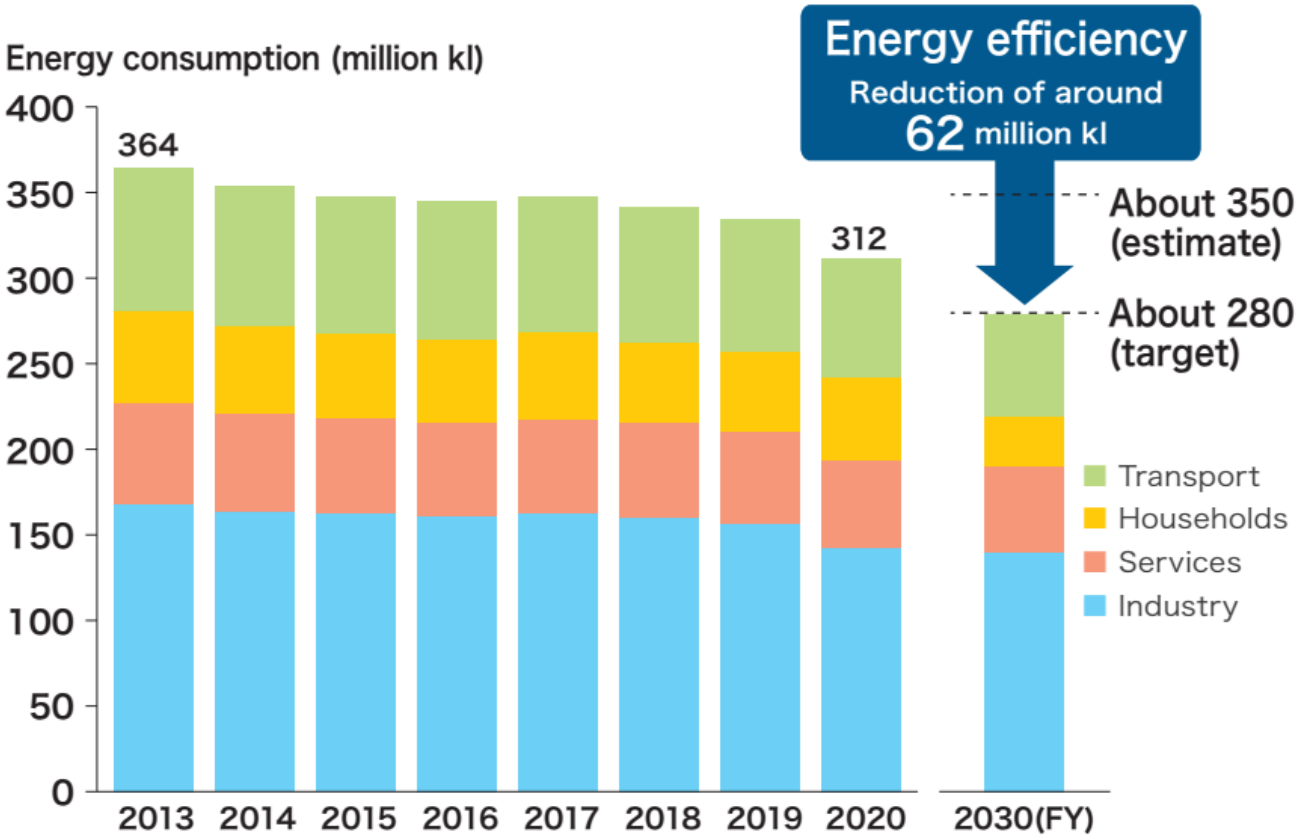
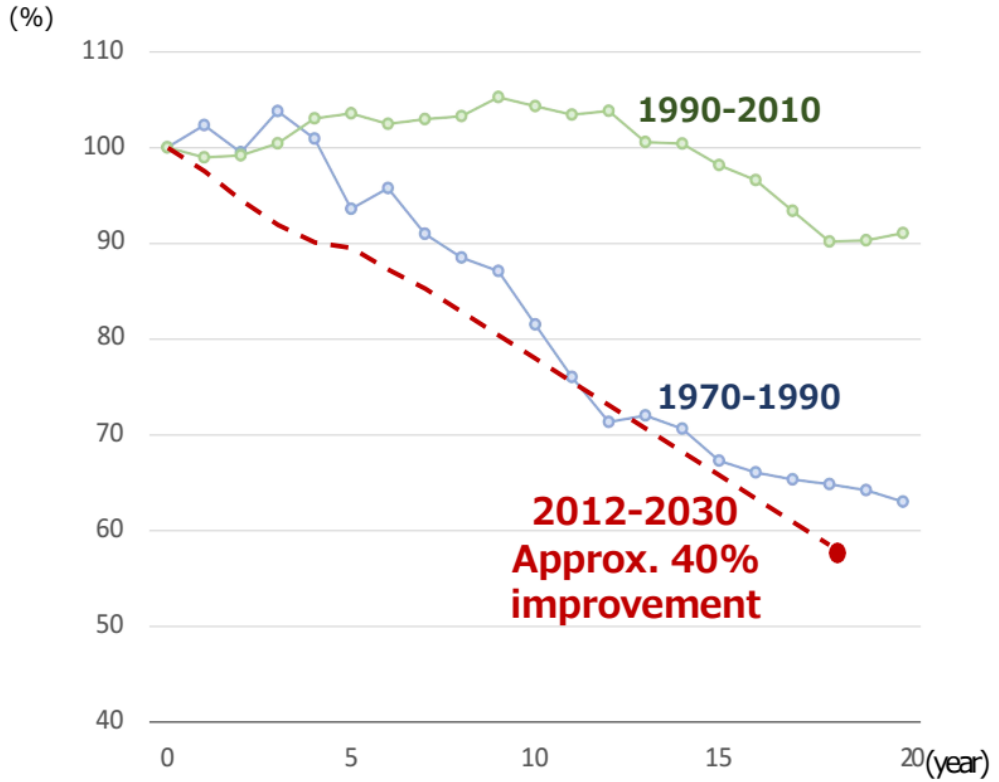
Role of Energy Efficiency for Japan's Path toward Carbon Neutrality

Final energy demand with the planned energy demand in 2030



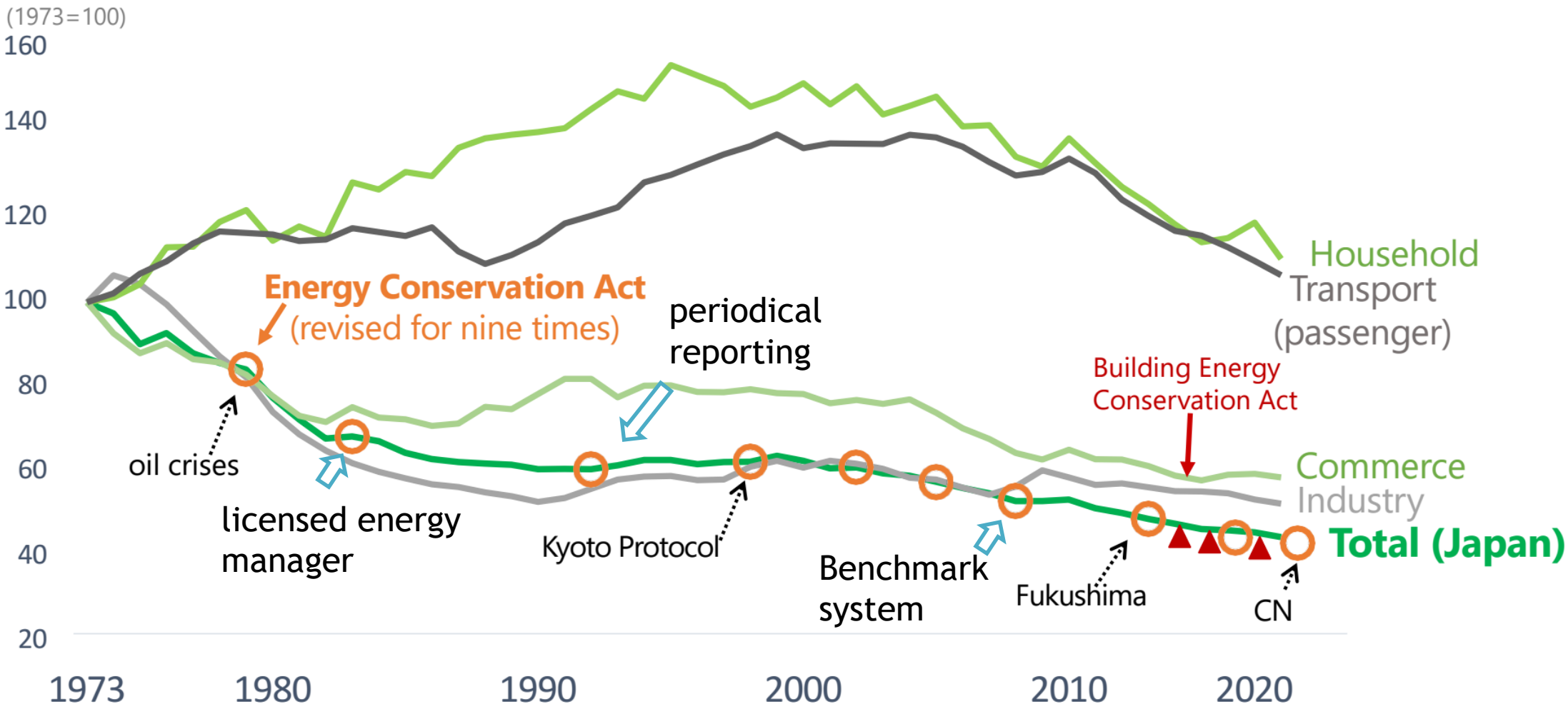
Energy efficiency improvements



※Energy efficiency =Final energy consumption/real GDP

Source: Agency for Natural Resources and Energy (2023), Japan's ENERGY (2022 EDITION)

History of Evolving Energy Efficiency Policies in Japan



Denominators of intensity: final consumption (GDP), industry (IIP), households (households), business (floor area), passengers (persons/kilometers)

Source: EDMC(2023) Handbook of Japan's & World Energy & Economic Statistics; edited

Overview of Japan's Energy Efficiency Policies

	Industry	Commerce	Household	Transportation
Regulatory measure	**Progress report and evaluation** (periodic report, evaluation criteria, target of 1% improvement per year)			Progress report, etc.
	Compliance with energy conservation standards at the time of construction (effort target for residential building)			
		Top Runner Program, Energy performance labeling program		
	Benchmark System (Industry's Top Runner Program)			
Support measure	Subsidies (investment in energy-saving equipment, introduction of clean energy vehicles, etc.)			
	Tax incentives for investment (tax credits and special depreciation)		tax reduction for renovations	ECO-car tax reduction
	Free energy audit for SMEs			
	Providing information on energy conservation, national campaigns, and commendation programs			
	R&D grants (AI, IoT technology, etc.)			

Regulatory measures in Energy Conservation Act

- Over 10,000 businesses have been covered, covering 93.9% of energy consumption in the industrial sector and 46.0% in the commercial sector.

Factories & workplaces	Transport	Buildings	Appliances
Threshold of business operators: Energy consumption more than **1,500kl/year** **Admin:** Establish and announce the criteria as a requirement for the designated entities. **Responsibilities:** ❶Point out energy managers ❷Required to set their own management criteria based on those set by the guideline ❸Periodical reporting on energy use, etc. ❹Submission of mid- and long-term plans **Target :** ❶Improvement in energy intensity by an average of 1% or more per year over 5 years ❷Benchmark system	**Freight Carriers:** more than 200 trucks **Shippers:** more than 30 million Ton・kilometers	**Commercial Buildings:** over 300 m2 **Residential building:** provide 150 units or more per year ※regulated by Building Energy Conservation Act since 2015	Top Runner Program Energy Labeling Program

Classification Evaluation System

- Companies are classified into 4 categories (SABC) based on their energy efficiency performance.
- Prior to the introduction of the evaluation system (FY2017), on-site surveys were randomly selected from companies that had not achieved the 1% reduction target.
- B class might be subject to on-site inspections, report collection to verify compliance. If the investigation finds that the compliance status is not sufficient, it will be designated as a Class C and receive guidance.

S Class(Superior)

★㊀ Achievement of 1% annual energy intensity improvement for 5 years average Or ㊁Achievement of benchmark target
☆Publication of company name on the METI website, Submission frequency once every few years (revised in 2019)

6,219(52.0%)(FY2023)

A Class(Average)

★do not belong to either S class or B class

4,054(33.9%)

B Stagnant

1,686 (14,1%)

C

B Class

★㊁Effort targets have not been achieved and energy intensity has increased compared to the previous year for the last two consecutive years Or ㊁Average energy intensity for 5 years increased by more than 5%
☆Send notification and conduct focused on-site surveys.

C Class

★Those companies in Class B with substantially poor performance

☆Guidance by the government

Source: Agency for Natural Resources and Energy 省エネポータルサイト(Energy saving portal site);edited

Disclosure of Classification Evaluation Result

Industry sub sector	特定事業者番号	主たる事業所の所在地	Company Name	Evaluation result			
				2019年	2020年	2021年	2022年
16 化学工業	111	北海道	苫小牧共同酸素株式会社	☆			
16 化学工業	141	三重県	株式会社エムイーピーコム四日市				☆
16 化学工業	151	大阪府	富士酸素株式会社				
1 農業	161	広島県	世羅菜園株式会社		☆		☆
16 化学工業	171	愛媛県	松山酸素株式会社		☆	☆	☆
9 食料品製造業	181	福岡県	株式会社デリカフレンズ	☆	☆		
37 通信業	191	沖縄県	ＦＲＴ株式会社	☆	☆	☆	☆
35 熱供給業	211	北海道	苫小牧熱供給株式会社				
36 水道業	221	福島県	福島地方水道用水供給企業団				
22 鉄鋼業	241	愛知県	株式会社　岡島パイプ製作所				
1 農業	261	岡山県	有限会社美咲ファーム	☆			
18 プラスチック製品製造業（別掲を除く）	271	徳島県	四国トーセロ株式会社				
75 宿泊業	281	宮崎県	青島リゾート株式会社	☆		☆	☆
16 化学工業	291	沖縄県	株式会社おきさん	☆			
69 不動産賃貸業・管理業	311	北海道	札幌駅総合開発株式会社	☆		☆	☆
41 映像・音声・文字情報制作業	321	青森県	株式会社 東奥日報社				☆
18 プラスチック製品製造業（別掲を除く）	351	滋賀県	株式会社エコパレット滋賀			☆	☆
1 農業	361	広島県	株式会社東城ポートリー				☆
21 窯業・土石製品製造業	371	徳島県	吉見石灰工業株式会社	☆	☆		
26 生産用機械器具製造業	381	熊本県	株式会社　井関熊本製造所				
56 各種商品小売業	391	沖縄県	株式会社　リウボウストア		☆	☆	☆

Source: Agency for Natural Resources and Energy 省エネポータルサイト(Energy saving portal site);edited
https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.enecho.meti.go.jp%2Fcategory%2Fsaving_and_new%2Fsaving%2Fenterprise%2Foverview%2Finstitution%2Fdata%2Fr4_classify.xlsx&wdOrigin=BROWSELINK

Benchmark System

- Introduced in 2009, BM System now covers 7 industries/12 categories for the industry. In 2016, the commercial sector was also included, and today 10 categories are covered.
- Target is to be the **Top level** (10 to 20%)- "Top runner program for industries"-
- Now cover 80% of Industrial & Commercial energy consumption.

Key for Benchmark System

(1) Business
Identify industries and business types that consume energy by similar or very similar methods

(1) Benchmark Index
Set evaluation indicators taking into consideration the special characteristics of industries and business

(1) Target level
Set a high standard to aim for in the medium to long term (top 10% to 20%)

Business	Benchmark Index	Target
Iron and steel (blast furnace)	Energy consumption (kℓ)/ crude steel production volume (t)	0.531kℓ/t

Source: Agency for Natural Resources and Energy (2016.11).「ベンチマーク制度の概要について」(Overview of the benchmark system);edited
https://www.meti.go.jp/shingikai/enecho/shoene_shinene/sho_energy/kojo_handan/pdf/2016_001_03_00.pdf

Benchmark System：Index and Target (Industry)

Industry	Benchmark Index	Target
Iron and steel (blast furnace)	Energy consumption per crude steel production volume	0.531kℓ/t
Iron and steel (EAF, ordinary steel)	energy intensity of the upper process (energy consumption per amount of crude steel) + energy intensity of the lower process (energy consumption per amount of rolled steel)	0.150kℓ/t
Iron and steel (EAF, special steel)	energy intensity of the upper process (energy consumption per amount of crude steel) + energy intensity of the lower process (energy consumption per amount of rolled steel)	0.36kℓ/t
Electricity suppliers	Thermal power generation efficiency index A Thermal power generation efficiency index B	1.00 44.3%
Cement	energy consumption per production volume (shipment volume) in each process such as raw material process, firing process, finishing process, shipping process, etc.	3,739MJ/t
Paper	Energy consumption per unit of paper produced in the paper manufacturing process	6,626MJ/t
Cardboard	Energy consumption per cardboard production volume in the cardboard manufacturing process	4,944MJ/t
Refinery	Energy consumption per standard energy consumption in the oil refining process (the sum of the oil passing amount of each device included in the process multiplied by a coefficient recognized as appropriate)	0.876t/t
Petrochemical	Energy consumption per production volume of ethylene, etc. in ethylene production facilities	11.9GJ/t
Soda chemical	energy consumption per weight of caustic soda discharged from the electrolyzer in the electrolysis process + heat usage of steam per weight of caustic soda liquid in the concentration process	3.00GJ/t
Compressed/liquefied gas (LNG cold heat)	Energy consumption per unit of compressed gas/liquefied gas production by cryogenic separation method corrected for differences in product types	0.077kl/1000Nm3
Compressed/liquefied gas (other)		0.157kl/1000Nm^3

Source: Agency for Natural Resources and Energy (2023.3). 省エネ法の手引き(Guide of Energy conservation act); edited
https://www.enecho.meti.go.jp/category/saving_and_new/saving/media/data/shoene_tebiki_01.pdf

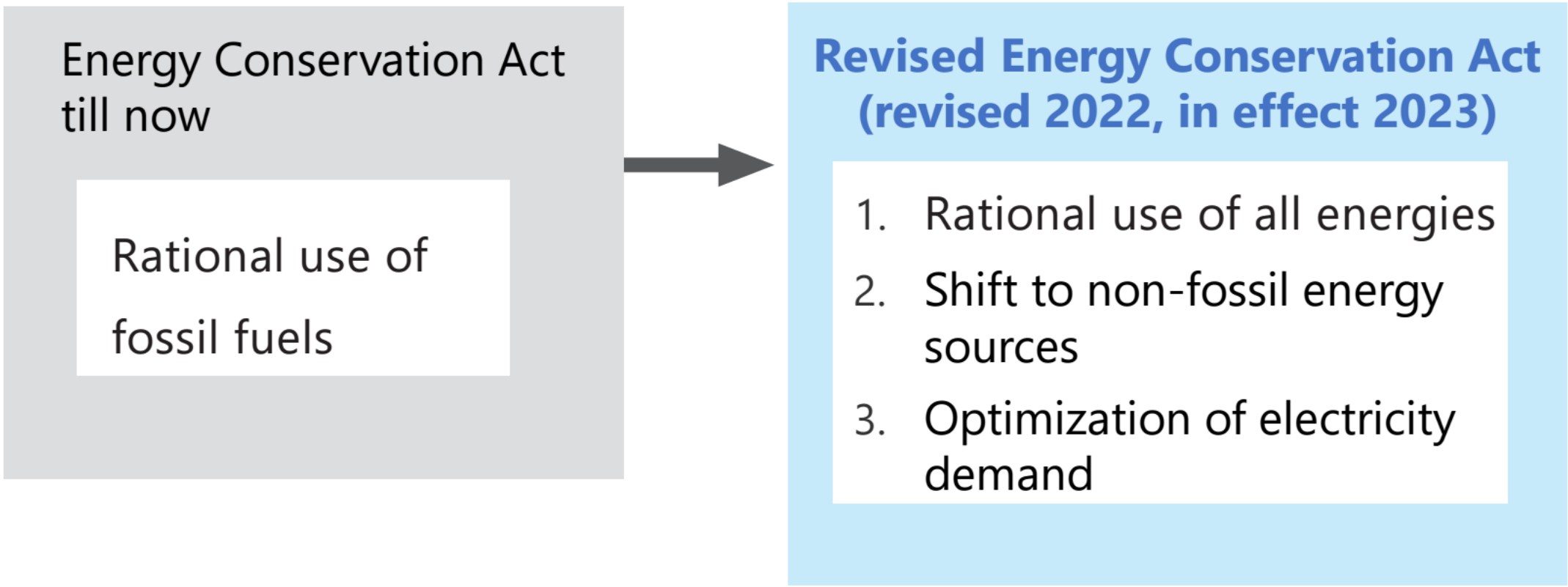
Benchmarking System: Index and Target (Commerce)

Commerce	Benchmark Index	Target
Convenience store	Total amount of electricity consumption per total sales of the store	707kWh/MJPY
Small sized convenience store		308kWh/MJPY
Hotel	Energy consumption per the average energy consumption of hotels of the same size, service, and operating status	0.723
Department store	Energy consumption per the average energy consumption of a department store of the same size and sales	0.792
Grocery supermarket	Energy consumption per the average energy consumption of stores of the same size, operating status, and equipment status	0.799
Shopping mall	Energy consumption per total floor area	0.0305kl/m2
Office for rent	Energy consumption per total floor area by the standard value determined for each area category.	1.00
University/College	Energy consumption of a campus per the total amount of ⊖ and ⊜, and the weighted average value by the amount of energy used for each campus. ⊖ Value obtained by multiplying the total area of the Faculty of Liberal Arts and other faculties by 0.022 ⊜ Value obtained by multiplying the total area of the Faculty of Science and Faculty of Medicine by 0.047	0.555
⑧Amusement pachinko	Weighted average energy consumption /(⊖ +⊜ + ⊛) ⊖ total floor area * 0.061 ⊜ the number of pachinko machines* 1/1000 of the annual business hours * 0.061 ⊛ the number of reel-type gaming machines * 1/1000 of the annual business hours * 0.076.	0.695
⑨Government office	Weighted average energy consumption / (⊖ +⊜ + ⊛) ⊖ (floor area of the computer room * 0.2744) + 96.743 ⊜ floor area other than the computer room * 0.023 ⊛ Number of employees * 0.191	0.700
⑩Data center	Energy consumption (Limited to those related to facilities used for data center business. Unit: kWh) / Energy consumption of IT equipment (limited to those related to facilities used for data center. Unit: kWh)	1.4

Source: Ibid. ; edited

Latest amendment of Energy Conservation Act (2022)

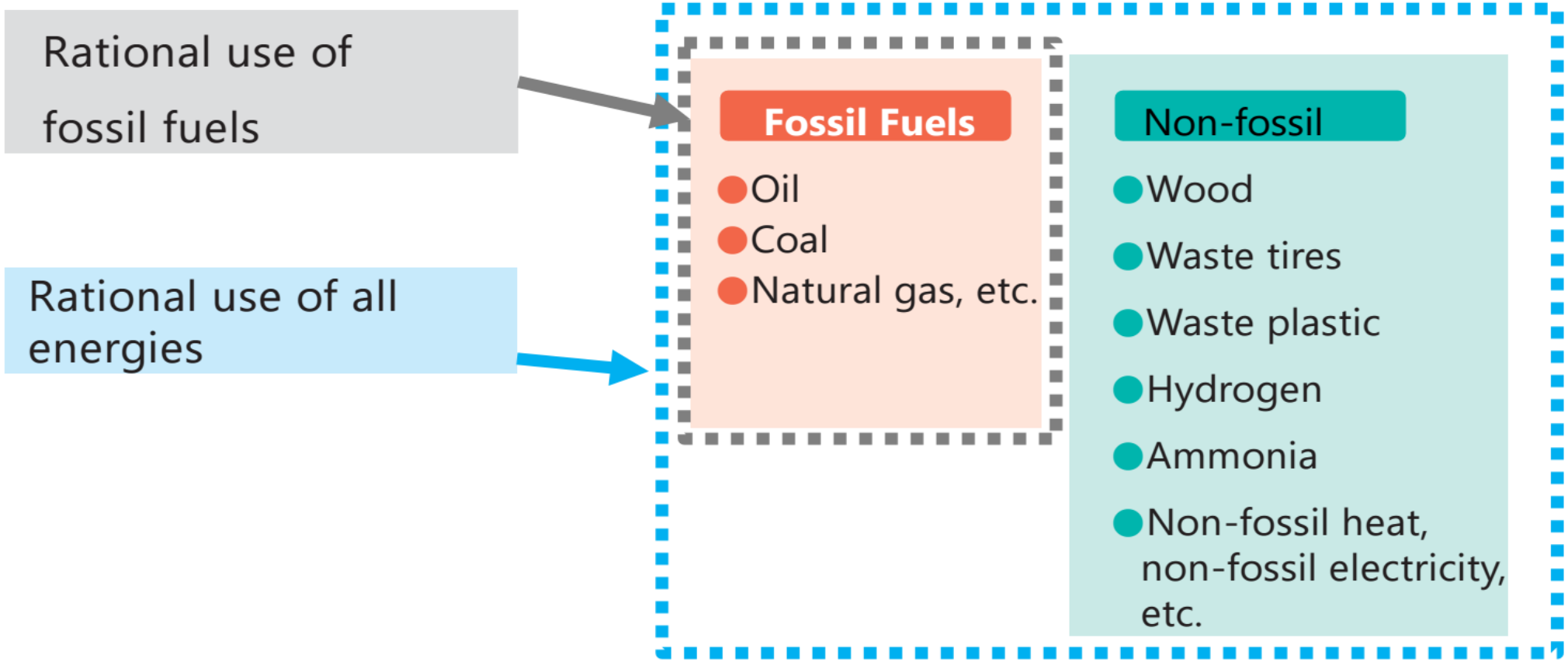
- April 2023 has marked the start of the latest amendment to the Energy Conservation Act.



Source: Agency for Natural Resources and Energy

Rational use of all energies

- The scope of rationalization of energy use is expanded to encompass **all energy usage**, which includes **non-fossil energy**.



Source: Agency for Natural Resources and Energy

Promoting shift to non-fossil energy sources

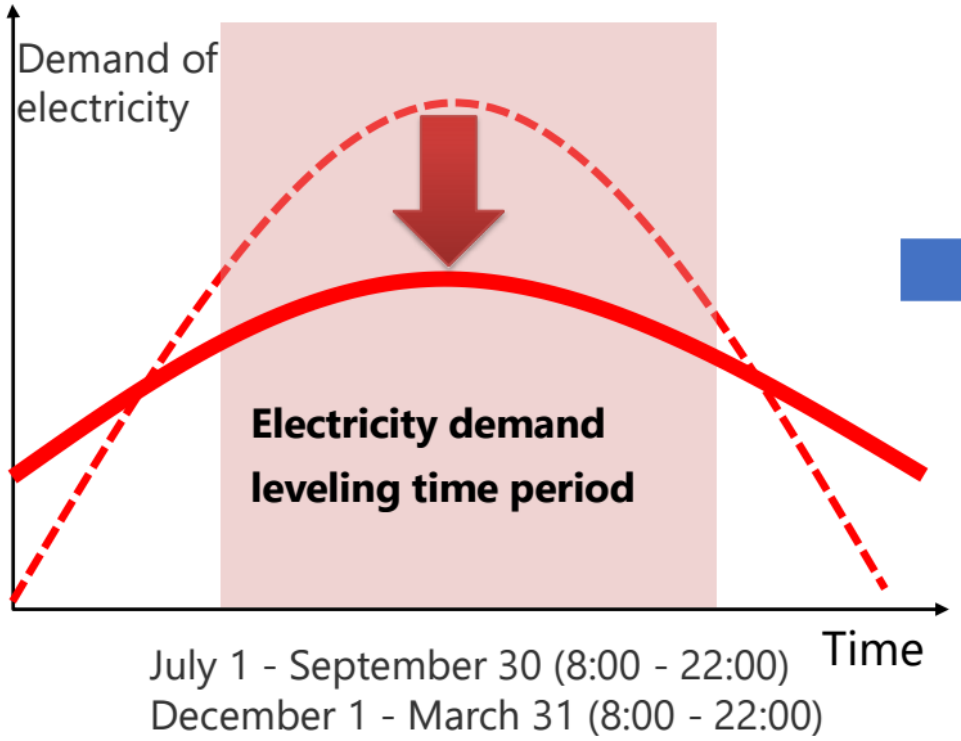
- Companies are required to develop medium- to long-term plans and report periodically on the shift to non-fossil fuel.
- In addition, Cement, paper and pulp, petrochemical, iron and steel, automobile manufacturers, and transport business entities are required to meet the **non-fossil fuel target by 2030**.

Industry	Current situation	Target non-fossil ratio (2030)
cement	・The industry average ratio of non-fossil fuels in kilns, etc. is approximately **21%.**	Non-fossil fuel ratio (kiln, etc.): **28 %**
car	・Electricity consumption accounts for approximately 70% of total energy consumption. ・Non-fossil electricity: **23% of total electricity used**	Non-fossil electricity: **59%**
petrochemical	・Coal accounted for **27.0%** in FY2020.	・Coal boiler: Reduce coal usage by **30 %** ・Other: Non-fossil ratio of externally procured electricity **59%**
paper & pulp	・Non-fossil ratio is 53%, coal **25.9%** in FY2021.	
iron and steel	・**80%** of blast furnace energy consumption is coal. ・Electricity accounts for approximately 76% (ordinary steel) and **57%** (special steel) of the energy consumed by electric furnaces. Non-fossil electricity accounts for approximately **24-25**% of electricity used	Blast furnace: **Reduce coal usage per ton of crude steel by 2.0% compared to FY2013** Electric furnace: Non-fossil electricity accounts for **59%**

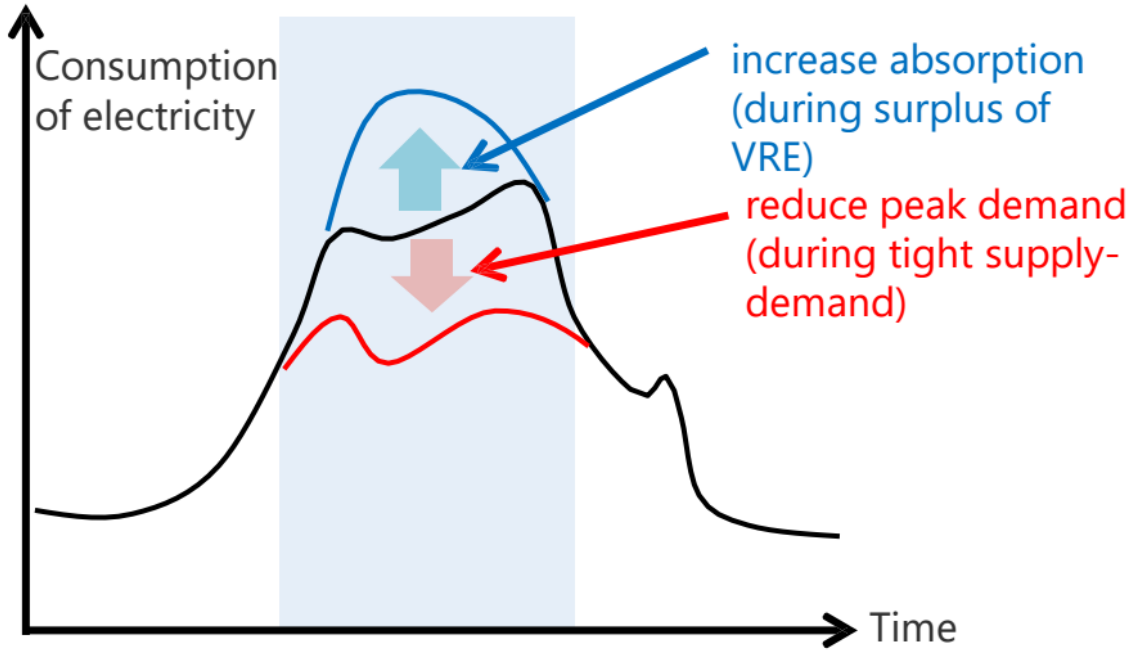
Source: Agency for Natural Resources and Energy

Optimization of electricity demand

- Report electricity consumption: daytime/nighttime/leveling time (daytime in summer and winter).

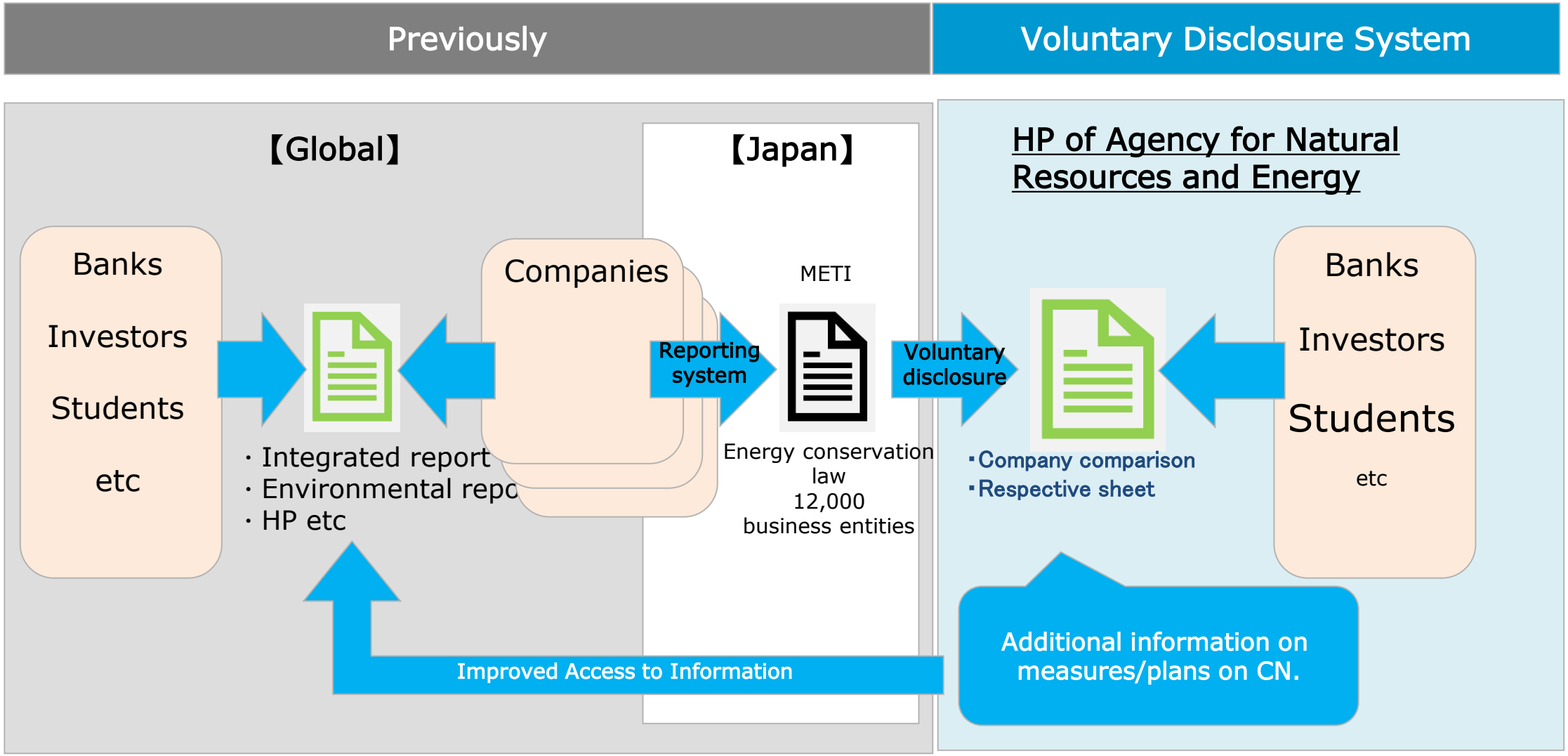


- Report electricity consumption: by month (in units of 1 month) or by time period (in units of 30 minutes or 60 minutes);
- Report the number of days of DR.



Sources: METI (2023) Measures based on the revised Energy Conservation Act; edited; METI (2021) Regarding the Energy Conservation Act in the future; ANRE, April 2023 – Energy Conservation Act will change; edited.

Voluntary Disclosure System



Source: Agency for Natural Resources and Energy

Thank you for your attention!