

Introduction of Benchmarks under the Energy Efficiency Law in Japan

September 2009

Akihiro MATSUTA

Deputy Director

Energy Efficiency and Conservation Division

Agency for Natural Resources and Energy

Ministry of Economy, Trade and Industry, Japan

Key Questions

- What was the background of the recent introduction of benchmarks in Japan?
- How were they developed? What issues were most hotly debated during the discussion?
- What are the commonalities between the Japanese and the emerging EU benchmarks? How much will they differ?
- What is the possible future development of the Japanese benchmarks?

Overview of Japan's Energy Efficiency Law and Sectoral Benchmarks

Japan's Energy Efficiency Law

- Energy Efficiency Law is the pillar of Japanese energy conservation policies.
- The law was enacted in 1979 in the light of the oil shock.

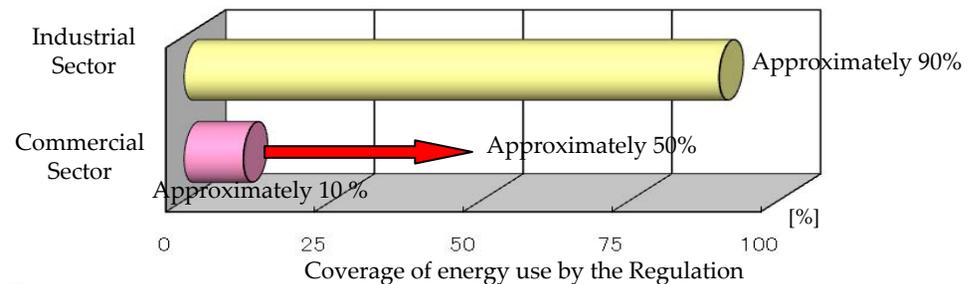
➤ This comprehensive **law covers all sectors** as follows

(1) Energy management in manufacturing, commercial and transportation sectors

(2) Energy efficiency standards for vehicles and appliances ("Top Runner Program")

(3) Energy efficiency standards for houses and buildings

- (i) Target is to improve annually energy intensity 1% or more on average .
- (ii) Current coverage: 7,000 companies (9,000 factories and 5,000 workplaces)
Industrial sector: approx. 90%
Commercial sector: approx. 50%
(increased from 10% by the latest revision of the law)



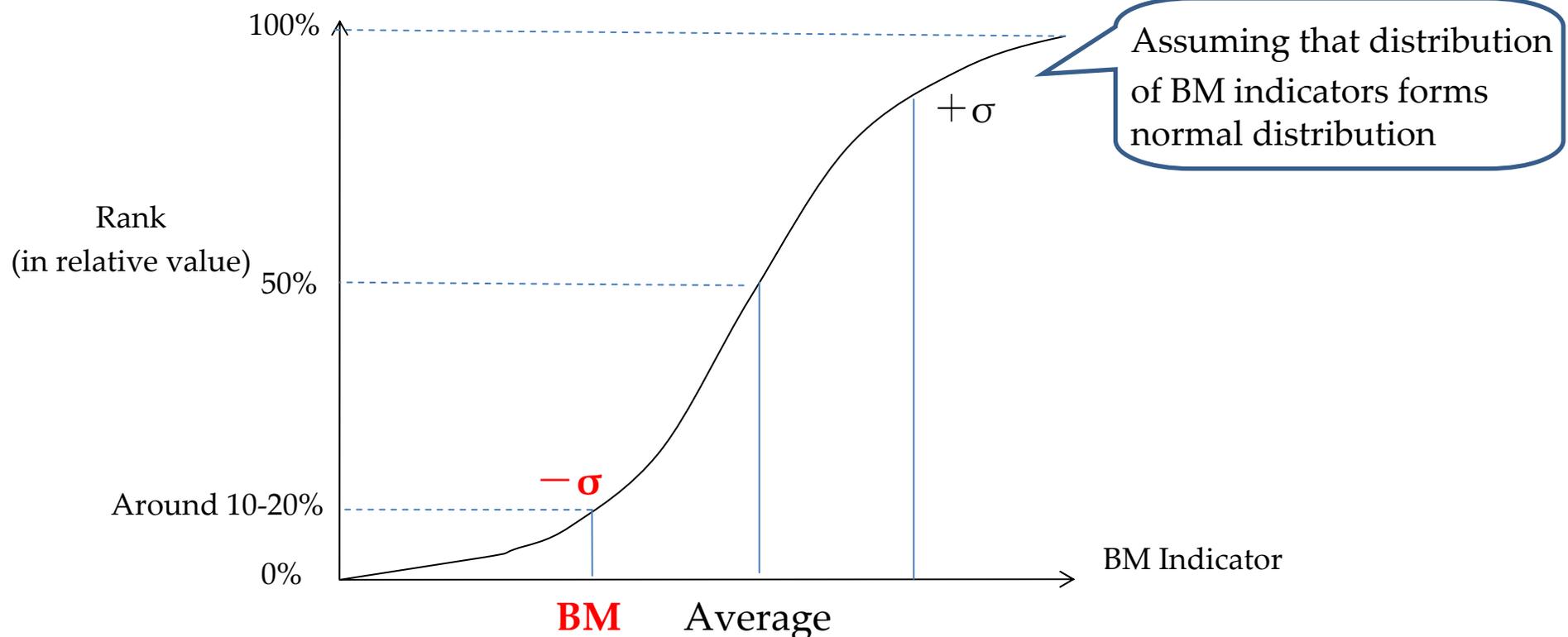
Why Sectoral Benchmarks ?

1. The more energy efficiency is improved, the more difficult it is to continue to reduce 1% or more of energy intensity. To ensure fairness in evaluating companies' energy saving efforts, Benchmarks have become necessary.
2. Japan has advocated Sectoral Approaches for multilateral tables such as the UNFCCC, APP and IEA. In order to appeal effectiveness of this approach, Japan needed to introduce it as a domestic regulation as the world's first attempt.

➤ Targets have been set at the energy efficiency level of the best performing companies (**top 10%-20%**) in each sub-sector (“Average value - Standard deviation”).

A **higher level target** is adopted if further energy-saving potentials can be taken into account.

[Distribution of BM indicator (as an image)]



- Companies in these sub-sectors are obligated to **report every year the status of benchmarking indicator**, in addition to the ratio of energy intensity reduction and implementation of energy management system.
- Based on companies' reports, the indicator's average value and standard deviation for each sub-sector will be published by the government.
- The names of companies performing well beyond the target will be also published.

Why did we select three sectors ?

[Basic principle]

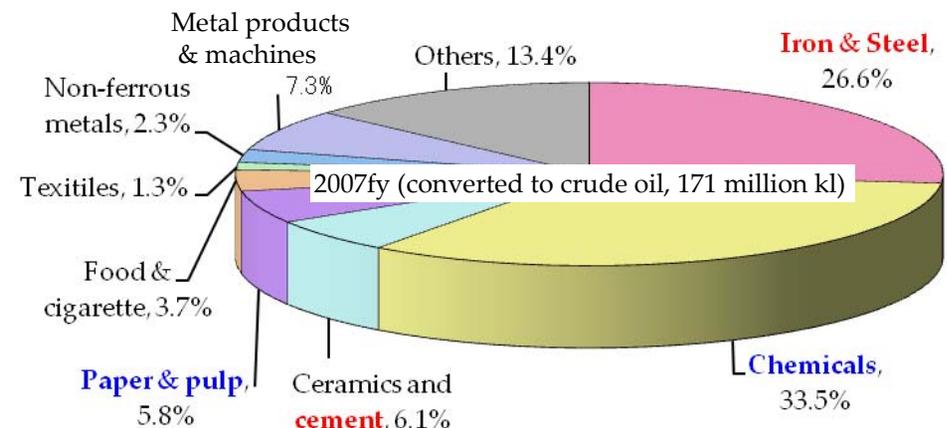
- The three sectors were selected to begin with, taking into account energy consumption and progress of international discussions of each sector.
- The coverage will be expanded to other sectors; commercial sector is also envisaged.

(Energy consumption by industries participating the Voluntary Action Plan in 2007fy)

Industry(Industrial sector)	Converted to crude oil, 1,000 kl
Federation of Electric power Companies of Japan	155,000
Japan Iron and Steel Association	63,400
Japan Chemical Industry Association	29,930
Petroleum Association of Japan	17,250
Japan Paper Association	8,300
Japan Cement Association	6,280
Japan Auto Parts Industries Association	3,740
Japan Automobile Manufacturers Association	3,370
Japan Federation of Construction Contractors	2,090
Japan Mining Industry Association	2,050

Source : the Fiscal 2008 Follow-up to the Voluntary Action Plan on the Environment, Japan Business Federation

(Energy consumption of manufacturing industries)



Source : Energy & Economic Statistics in Japan

Red: sectors already covered

Blue: sectors to set target in FY2009

1. Ensure consistency with multilateral discussions
 - Consistency with discussions in international sector associations and APP.
 - Report of CO2 emission is also part of regulatory requirements.
2. Evaluate total energy consumption
 - The law also covers indirect consumption of purchased electricity, steam, etc.
3. Reflect high energy efficiency level in Japan
 - Setting, as necessary, more detailed benchmarking indicators.
4. Report benchmarking value for entire company rather than individual sites or facilities.
 - Optimal operation of each facility does not necessarily lead to optimization of a manufacturing site as a whole. Likewise, a company optimizes its entire business rather than each business site.

Specific discussions in each sector

- (1) Iron and Steel
- (2) Cement
- (3) Thermal Power Plants

Benchmark for Iron and Steel

Basic concept is the same as that of the World Steel Association.

(1) For energy consumption, [direct + upstream - credit] are included in calculation.

* EU-ETS counts direct emissions without upstream.

(2) As denominator, crude steel production is used.

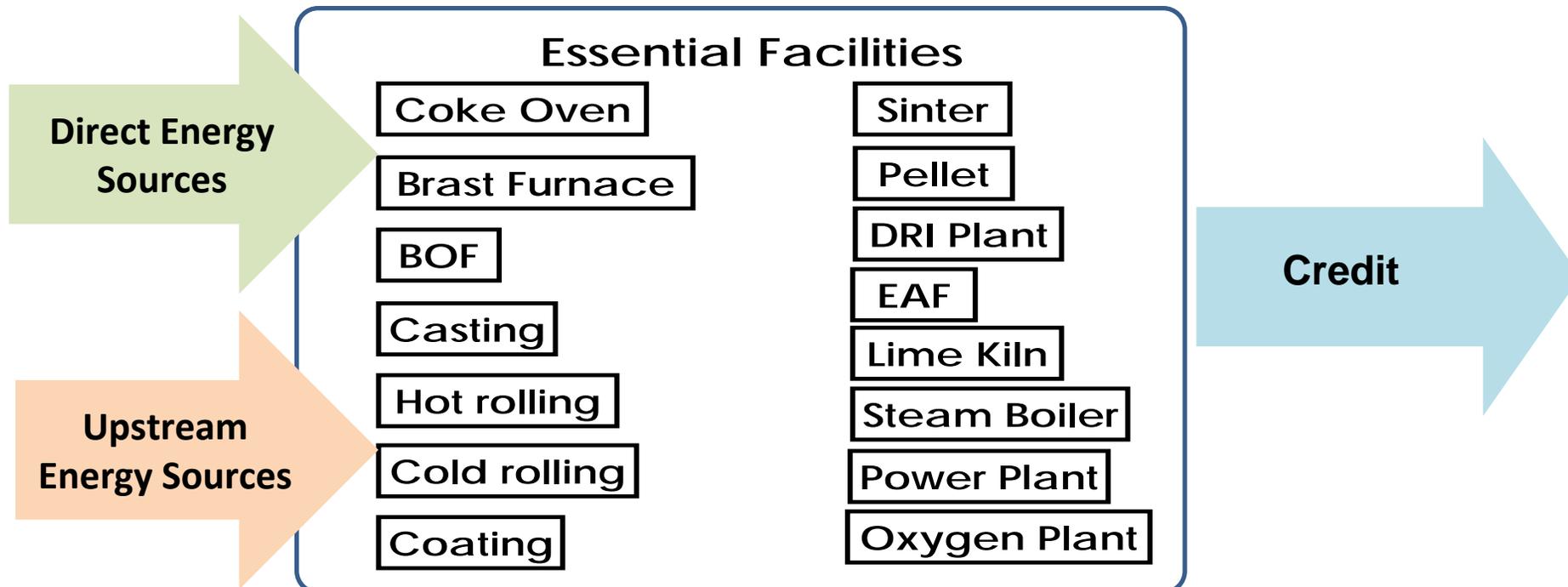
(3) Blast furnace and electric arc furnace are divided as sub-sectors.

(In Japan, the latter is further divided into ordinary and specialty steel.)

(4) A benchmarking value is calculated for an production site as a whole.

* In the EU-ETS, each facility will have a benchmarking value in the third trading period.

→ Practices of Japan's Energy Efficiency Law have been reflected to discussions in the World Steel Association and the APP Steel Task Force.

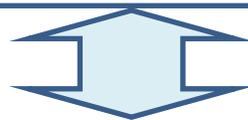


Benchmark for Iron and Steel

Sub-sector	Benchmarking Indicator	Target
Steel company using blast furnace		Below 0.531 kl/t
Ordinary steel company using electric arc furnace	$\frac{\text{Energy consumption for total process}}{\text{Crude steel production}}$	Below 0.143 kl/t
Specialty steel company using electric arc furnace	<p>*As for the two sub-sectors of electric arc furnace, energy consumption for downstream process (Rolling Process etc.) shall be adjusted according to the quantity of the semi-finished products purchased from or sold to external organization.</p>	Below 0.36 kl/t (crude oil equivalent)

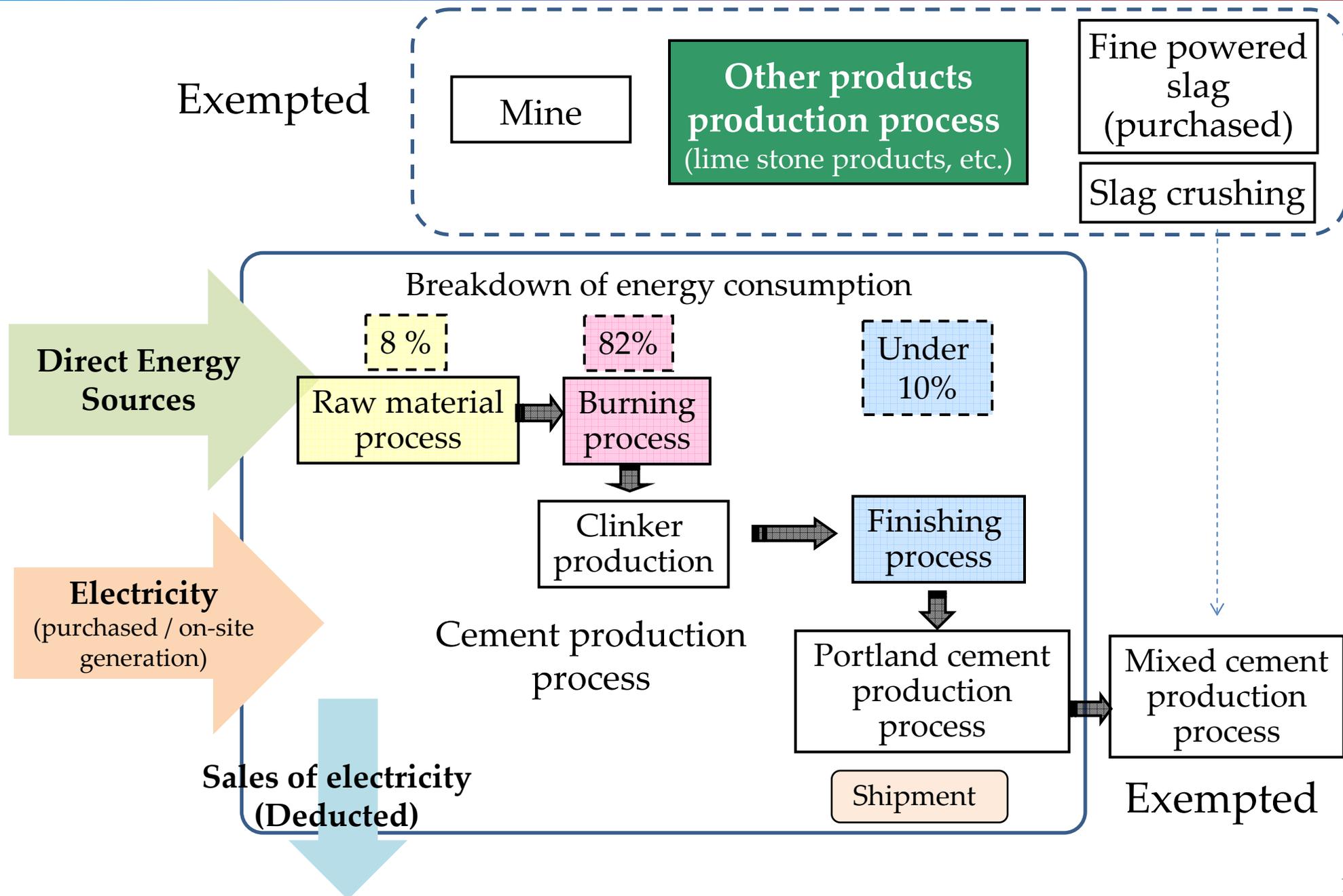
Benchmark for Cement

- (1) Basic concept is the same as those considered in PCA (U.S.) and CEMBUREAU (EU). Denominator is based on clinker production.
 - Practices of Japan's Energy Efficiency Law have been reflected in discussions of the APP Cement Task Force.
- (2) Advanced energy efficiency of Japan's cement industry has been taken into account.
 - All energy efficiency measures in clinker production process have already been implemented in Japan.
 - Energy efficiency can be improved mainly in clinker grinding process in which electricity is used.
 - Considers intensity of clinker grinding in finishing process for Portland cement production as well.



Slightly different from boundary definition of others. However, consistency is easily ensured for international comparison, only by removing Japan's specific element from calculation.

Benchmark for Cement



Benchmark for Cement

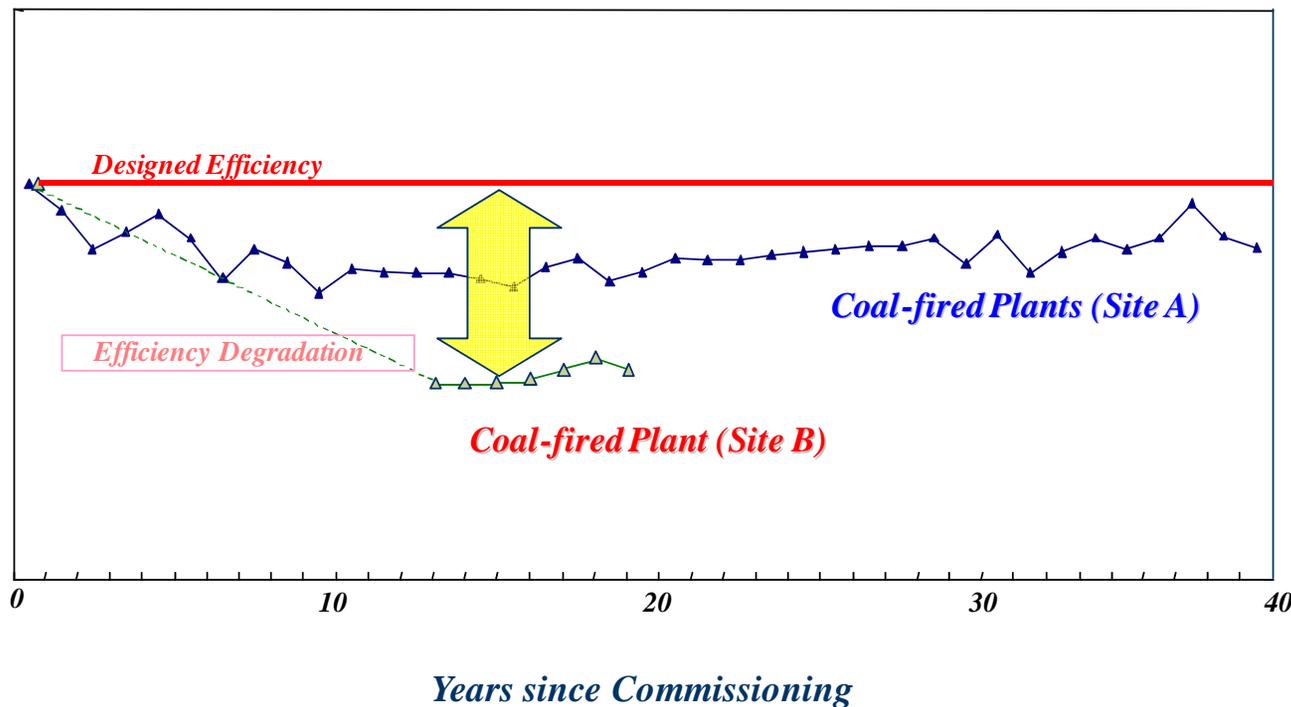
For cement, the target is set at even more ambitious level than top 10-20% ("Average value – Standard deviation"), due to greater energy conservation potential.

Benchmarking Indicator	Target
$ \begin{aligned} & \frac{\text{Energy consumption of raw materials preparation process}}{\text{Production volume of raw materials process (clinker base)}} \\ + & \frac{\text{Energy consumption of burning process}}{\text{Clinker production volume of burning process}} \\ + & \frac{\text{Energy consumption of finishing process}}{\text{Production volume of finishing process (Portland cement base)}} \\ + & \frac{\text{Energy consumption of shipping and other processes}}{\text{Shipment volume (Various kind of cement and clinker)}} \end{aligned} $	<p>Below 3891 MJ/t</p>

Benchmark for Thermal Power Plants

Measures to be considered	Conceptual indicator	Possible MRVable indicators
<p>Fossil fuels</p> <ol style="list-style-type: none"> O&M improvement Renovation & Replacement BAT installation 	<p>Thermal Efficiency</p>	<ul style="list-style-type: none"> Deviation from designed efficiency Minimum efficiency standard for incoming new plants

Thermal Efficiency

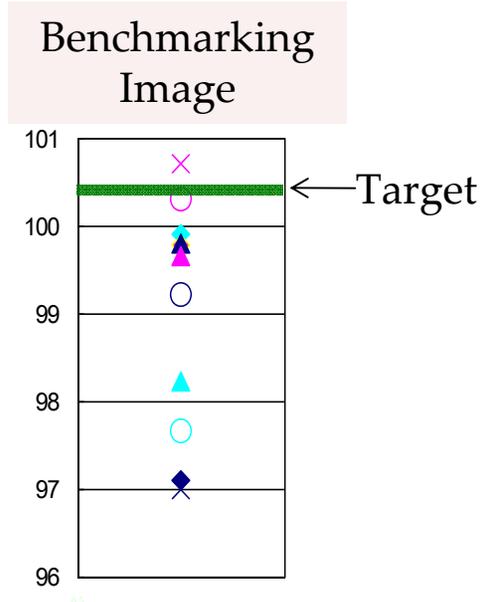


→ Common approach under the APP (try to maintain or increase the efficiency for existing thermal power plants through peer review)

Benchmark for Thermal Power Plants

1. Target to minimize deviation from or even surpass designed efficiency (to assess the level of maintenance)

Benchmarking Indicators	Target
$\frac{\text{Thermal Efficiency in performance test at standard output}}{\text{Designed thermal efficiency at standard output}}$ <p style="text-align: center;">Thermal Efficiency</p>	Over 100.3 %



2. Minimum efficiency standard for incoming new plants
 → Fulfill requirement of the world-wide BAT

- Discussion is now underway to expand the sectoral coverage, to chemical, oil refinery, paper & pulp sectors.
(Approx. 70% of Japan's industrial sector will be covered.)
- Further expansion to commercial sector is in prospect: the discussion to be finalized by the end of 2009.

Chemical: 3 BMs (sub-sector: naphtha cracker, Chloro-alikali and Boiler/CHP)

- Covering approx. 64% of energy consumption in this sector.
- Energy consumption from direct combustion, steam generation and electricity generation are also included (both on-site and purchased).

Oil Refinery: 1 BM (actual energy consumption / standard energy consumption)

- Standard energy consumption: Σ ([BM factor by process] X [throughput by process])
- For BM factor, data from Solomon Associates LLC. is used.

*General approach to be adopted worldwide

Paper and Pulp: 2 BMs (sub-sector: paper and paperboard)

- Energy consumption from power generation, pulp production and utilities are also included.
- Cooperation among sector associations in Japan, China, South Korea and ASEAN is underway for data collection.

Possible Future Tasks

[National]

- Base for future regulatory scheme

[Overseas]

- Use in Sectoral CDM methodologies
- Comparative tool for energy-saving efforts

Ex. Apply in case of introduction of border adjustment

- Japan is exposed to much greater competitive pressure from China than U.S or EU in the energy intensive industries such as iron & steel.

(Related activities)

- Global expansion through APP and bilateral cooperation
 - * Developing countries in particular, including China.
 - * APP Steel TF and Cement TF have been conducting data collection based on common methodology under Japan's initiative.
- International Standardization through ISO, etc.
 - * As for iron & steel sector, works to establish ISO standards for calculation method of CO2 intensities are underway.

Conclusions

- Benchmarks in Japan have been set to ensure fair evaluation for progress of energy efficiency in domestic industries and consistency with international discussions.
- Benchmarks as a regulatory scheme has just been started. There is significant potential of expanding this scheme in both domestic and international efforts for energy-saving.
- Our experiences about benchmarks could be helpful for the discussion in EU. The Government of Japan is pleased to cooperate with the ongoing EU discussion.

Thanks

