

**How Sectoral Approach will work
for Advanced Developing countries under the
Future Framework
- Japan's Experience in Iron & Steel Sector -**

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Essence of SA

[sectoral intensity] X [activity level] = [sectoral emissions]

[aggregated sectoral emissions] = [economy-wide emissions]

- Promote sectoral emissions reduction by setting a “sectoral intensity target” with a common methodology, taking into account the BAT/BP, cost of measures and national circumstances.

[Examples of intensity in priority sectors]

- Energy intensive industry (Iron & Steel, Cement, Aluminum, etc.): CO₂/ton-product
- Power generation: CO₂/kWh
- Road Transport: fuel efficiency of vehicles
- Methodology including identification of BAT/BP should be determined under public-private partnership.
 - WSA, IAI, CSI of WBCSD, E8, APP

Two types of Sectoral Target

Sectoral Intensity Targets: Japan

- Sectoral intensity targets show the cleanness of production.
- Intensity targets can be set based on global/regional benchmarks and on national conditions and respective capabilities.
- Sectoral intensity targets are compatible with economic growth and could be reasonably set on the basis of the available data such as introduction rate of BATs.

Sectoral Absolute Targets = Sectoral Caps: EU

- Sum of the sectoral absolute targets leads to economy-wide cap.
- Sectoral absolute targets are not always compatible with economic growth. If economy expand more than expected, sectoral absolute targets are difficult to be achieved.

Support under Sectoral Approach

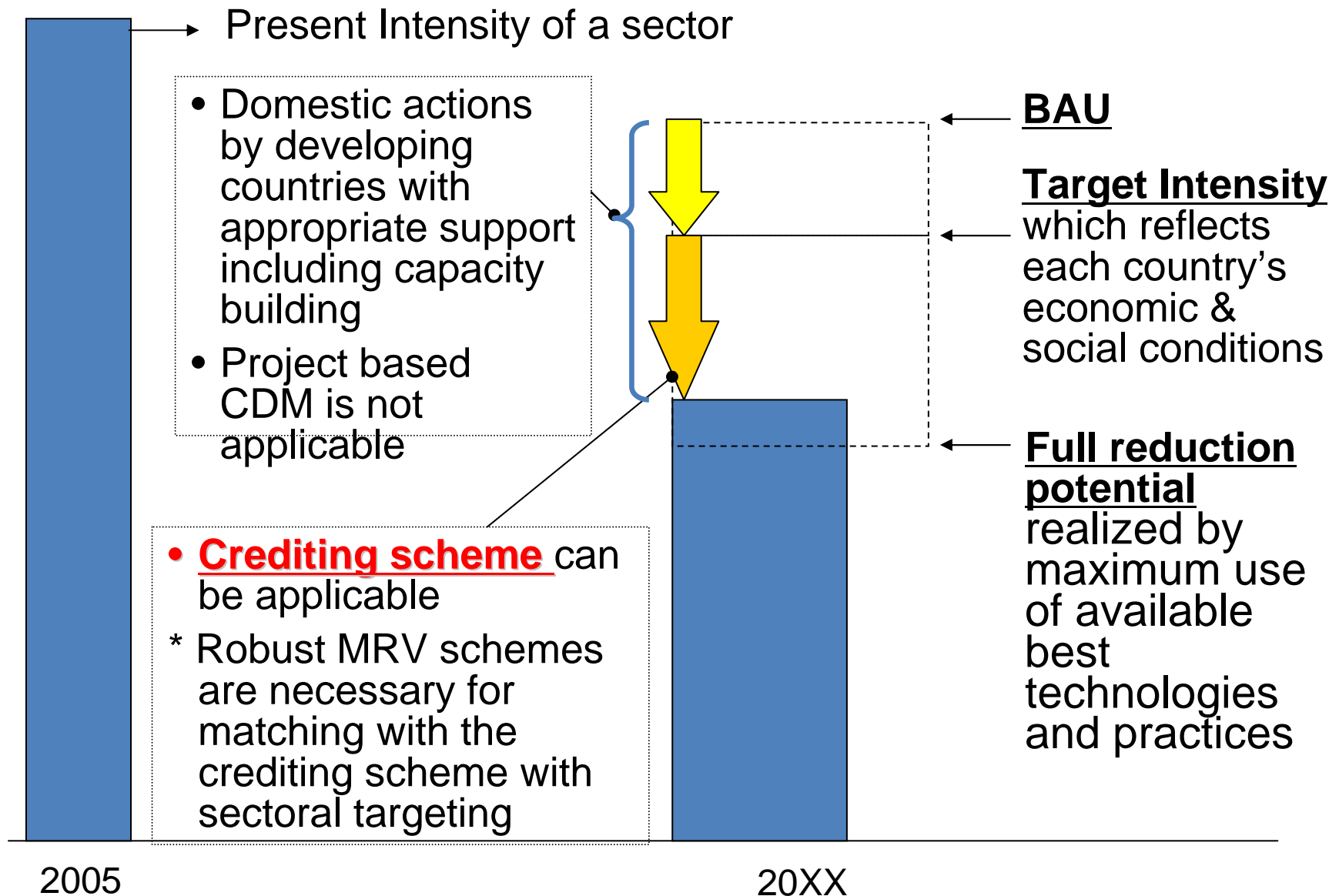
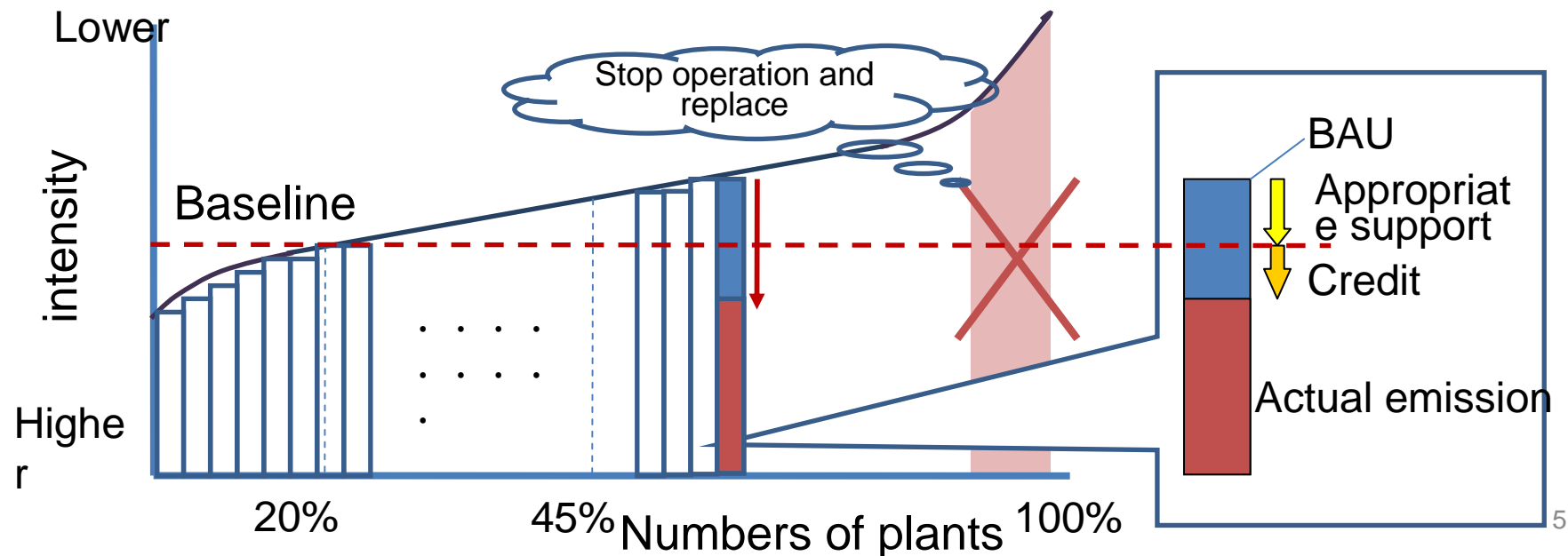


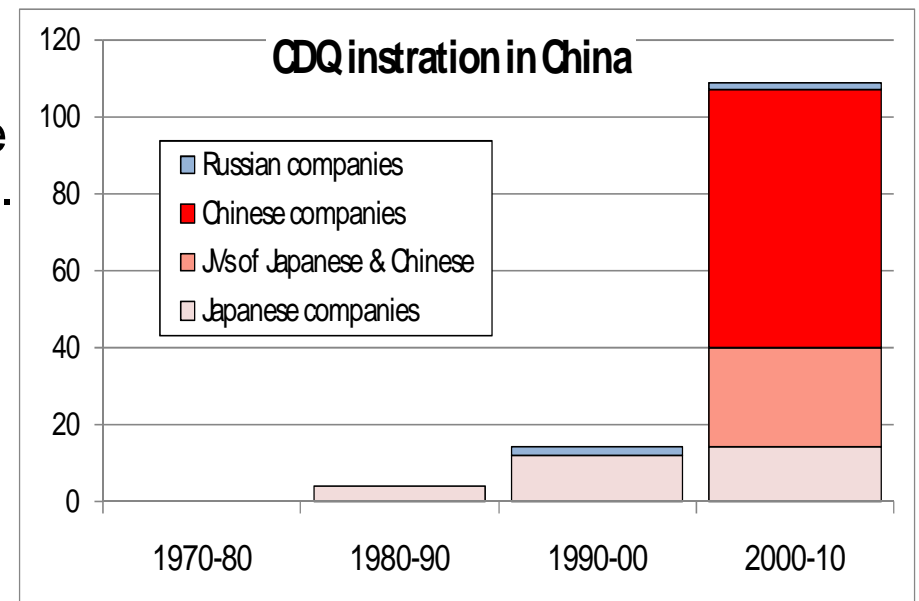
Image of crediting scheme to promote sectoral actions

- Credits will be applicable to the over achievement of the target.
- Credits will be created ex-post basis.
- In case of sectoral absolute targets, hot air will be created when economy stagnates and no chance for credits when economy grows rapidly.
- In case of sectoral intensity targets, proper efforts will create.
- Sectoral Credit Mechanism and the present project-based CDM will not be compatible in a sector.
- Projects which aren't fit to current CDM such as energy conservation projects can be covered by this new mechanisms.



Support by Tech. Transfer (iron & steel sector)

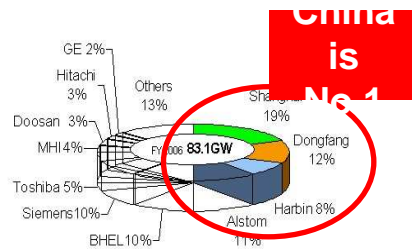
- The Asia-Pacific Partnership (APP) promotes sector-specific cooperation among 7 countries. (54% of global CO2 emissions)
- The Steel TF identified 64 key technologies and calculates their CO2 reduction potential.
 - Only 10 key technologies have reduction potential of more than 1 Mt/year.
 - The aggregate CO2 reduction potential by 10 technologies is estimated at 127Mt/year (equivalent to 100 CCS projects)
- Coke Dry Quenching (CDQ) was successfully installed in China.
 - Initial transfer was supported by the Japanese government and industry.
 - Establishment of JV by Japanese and Chinese companies stimulates market competition.
 - Drastic increase started in 2000s as a result of the Chinese policy push. (the 10th/11th Five-Year Plan of China set intensity targets based on the CDQ)



Tech. Transfer in other sector

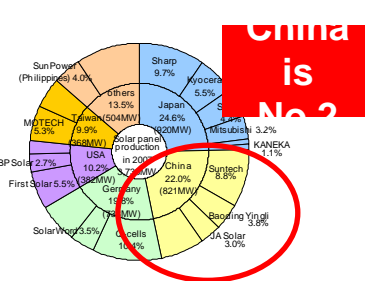
- Transfer of the technologies takes place in various ways .
 - Product exports, Foreign Direct Investment, JVs and licensing
- Many Chinese companies become global market leaders.

Steam turbine



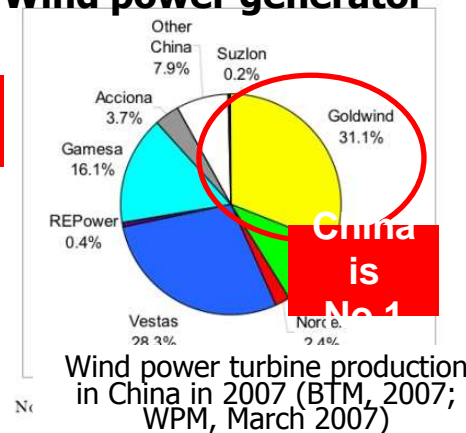
Steam turbine production in world in 2006 (Mitsubishi Heavy Industries)

Solar Panel



Solar panel production in world in 2007 (PV News 2008.3)

Wind power generator



Wind power turbine production in China in 2007 (BTM, 2007; WPM, March 2007)

Automobiles

- Chinese automobile production is 7 millions in 2006, No.3 globally.
 - Local factories related to Japanese companies
 - 42 factories in China**
 - 10 factories in India**
 - Local procurement rate
 - 56% in China**
 - 81% in India**
- (Japan Automobile Manufacturers Associations, Inc)

- Governmental support by developed countries have promoted such transfer of the technologies.
 - About 40% of Japan's ODA donation is used for transfer of the technologies field.
 - Japan has many bilateral cooperation programs including the "Japan-China Energy Conservation and Environment Forum"
 - The "Green Aid Plan" for introducing model project of energy efficiency is another example of Japanese government's support on transfer of the technologies.

Developing the Sectoral Approach

Three Points for Success

1. *Measurability*

- Establish common scientific scale for measurement.
- Proper input of WSA/APP guidelines into the UNFCCC process
- Use of ISO/IEC process for authorization
Third party's authorization mechanism is applicable if necessary.

2. *Data collection*

- Recognize the difficulty of covering all facilities in developing countries.
There exist small/medium/old factories.
- Limit to proper/large facilities (e.g., energy saving law in Japan).

3. *Target-setting*

- Baseline should be carefully considered in order to make proper incentives to make projects.
- Benchmarking: global/regional/national best
- No-lose intensity target

Iron & Steel Industry in China

- Steel outputs produced by over 2Mt companies account for **74.3%** of the total production.
- Most of “Important enterprises” in China seem to be over 2Mt companies.

	Steel output (2006)	Rate
China	418.8Mt	100.0%
Important enterprise	335.1Mt	80.0%
Over 10Mt (9)*	136.0Mt	32.5%
5~10Mt (12) *	78.9Mt	18.8%
2~5Mt (32) *	96.4Mt	23.0%
Under 2Mt	107.4Mt	25.7%

74.3%

*(x) is the number of companies in each category

Example of MRV indicators

[Existing sectoral indicators]

	Iron & Steel	Cement	Power
<p>China</p> <p>-target in 2020</p> <p>-Mid & Long-term Energy Saving Plan (2004)</p> <p>- Based on China's 11th Five-Year Plan (2006-2010)</p>	<p>700 kg-ce*/t-steel</p> <p>≈ 1.82 t-CO₂/t-steel</p> <p>*ce= coal equivalent</p>	<p>129 kg-ce/t-cement</p> <p>≈ 0.34 t-CO₂/t-cement</p>	<p><Coal fired power plant></p> <p>320 g-ce/kWh</p> <p>≈ 0.83 kg-CO₂/kWh</p> <p>Ex. Raise the proportion of renewable energy (inc. hydro) in primary energy supply up to 10% by 2010</p> <p>- From "China's National Climate Change Program" (2007)</p>
<p>Japan</p> <p>-target in 2010</p> <p>-Voluntary action plan under Kyoto Protocol</p>	<p>2,274 Pjour/t-steel</p> <p>≈ 1.53 t-CO₂/t-steel*</p> <p>*Supposing that iron & steel output in2010 will be 100Mt.</p>	<p>3,451 MJ/t-cement</p> <p>≈ 0.23 t-CO₂/t-cement</p>	<p><Electric power industry as a whole ></p> <p>0.34kg-CO₂/kWh</p> <p>Ex.</p> <ul style="list-style-type: none"> •Photovoltaic generation : 3.0Mkw •Wind generation : 2.5Mkw

<Reference>

- CO₂ intensity of Coal : 3.7620 Gg-CO₂/10¹⁰kcal
- CO₂ intensity of Crude oil : 2.8641 Gg-CO₂/10¹⁰kcal
- 1 MJ = 2.58258 x 10⁻⁵ kiloliter of crude oil equivalent

- Calorific value of Coal : 6,928 kcal/kg
- Calorific value of Crude oil : 9,126 kcal/L
- 1 MJ = 2.58258 x 10⁻⁵ kiloliter of crude oil equivalent

(Source):EDMC Handbook of Energy & Economic Statistics in Japan

Japan's Recent Action for Sectoral Approach

- **Amendment of Japan's Energy Efficiency Law**
 - Energy Efficiency Law was enacted in 1979. This comprehensive law covers all sectors.
 - In 1997, So-called "Top-runner Mechanism" was introduced.
 - Last year the law was amended to strengthen measures to address climate change, including those for commercial sector. This amendment also introduces Sectoral Approaches as the basis of domestic regulation (since April 2009).
- **Sectoral approaches as the basis for regulation (Sectoral benchmarking)**
 - Sectoral benchmarking is introduced as the basis for domestic regulatory measure.
 - Specifically for certain sub-sectors including steel industry,
 - Determine indicators enabling companies to benchmark the levels of energy efficiency.
 - Set medium and long-term targets (for around 2015-20).

About Setting Benchmarking Indicators

- **Targets:** Set at the energy efficiency level of the best performing companies (top 10%-20%) in each sub-sector ("Average value - Standard deviation").
- **Sub-sector:** In addition to iron and steel, cement, and electricity suppliers, chemical, oil refining, and paper and pulp will be covered in the near future.

Conclusion

- SA is able to contribute to a next protocol in various aspects.
 - SA can make the most of Montreal's lesson: technology development, deployment and cooperation. Sectoral advisory group with public and private experts is important in this respect.
 - SA can satisfy the two key principles of convention: CbDRRC and MRVability.
 - SA is useful for both developed and developing countries.
 - Contribute to proper allocation of emission rights among sectors.
 - Provide scientific information for setting fair targets based on comparable efforts among develop countries.
 - Identify key technologies, remove the barriers against technology diffusion and promote technology transfer.
 - Prevent leakage. etc.
 - SA and emission trading such as SCM are not contradictory, but rather complementary.

Possible Image for Advisory Group for Sectoral Technology Cooperation

