

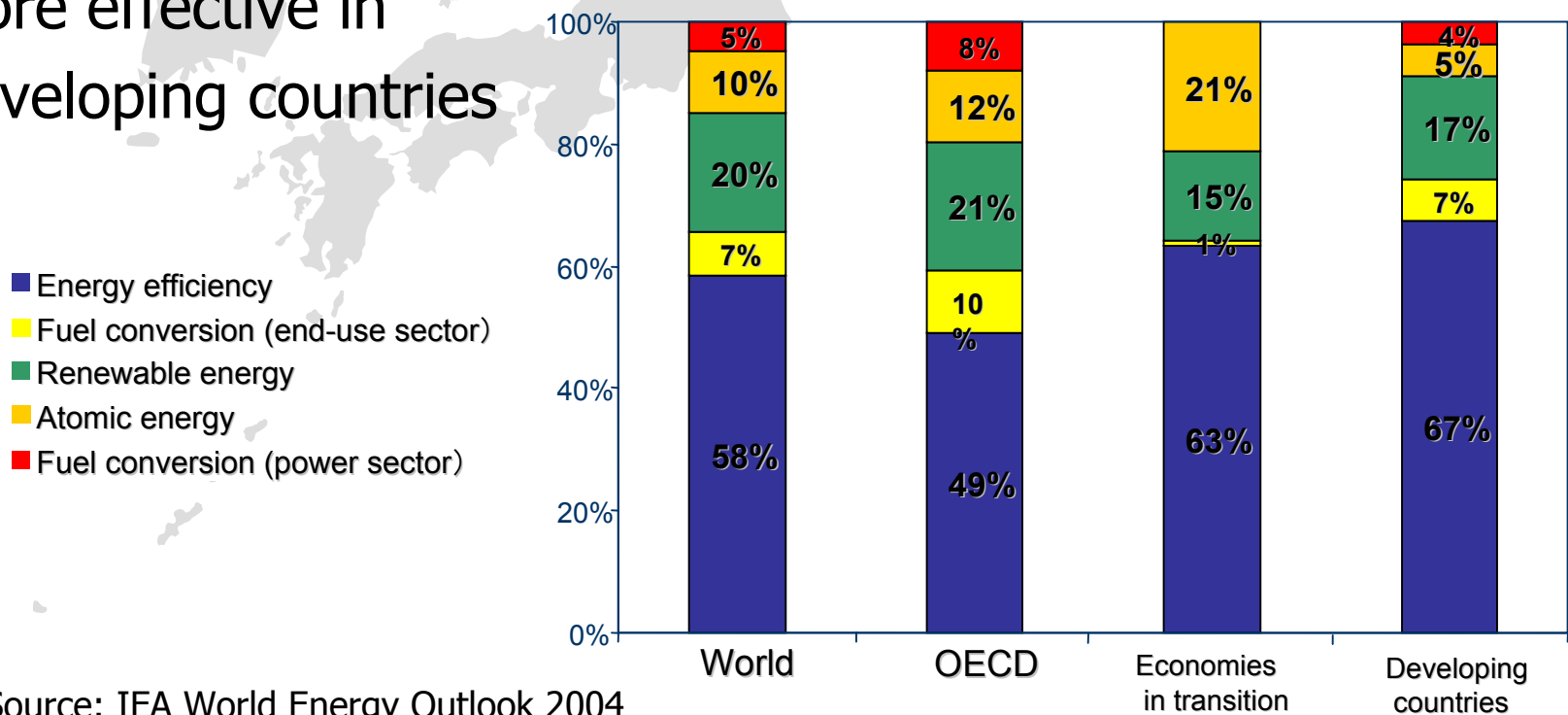
# **Global CO2 Reduction Potential: Approach from Energy Efficiency**

**Agency of Natural Resources and Energy,  
Ministry of Economy, Trade and Industry, Japan**

**Toshiyuki SHIRAI**

# Why is energy efficiency important?

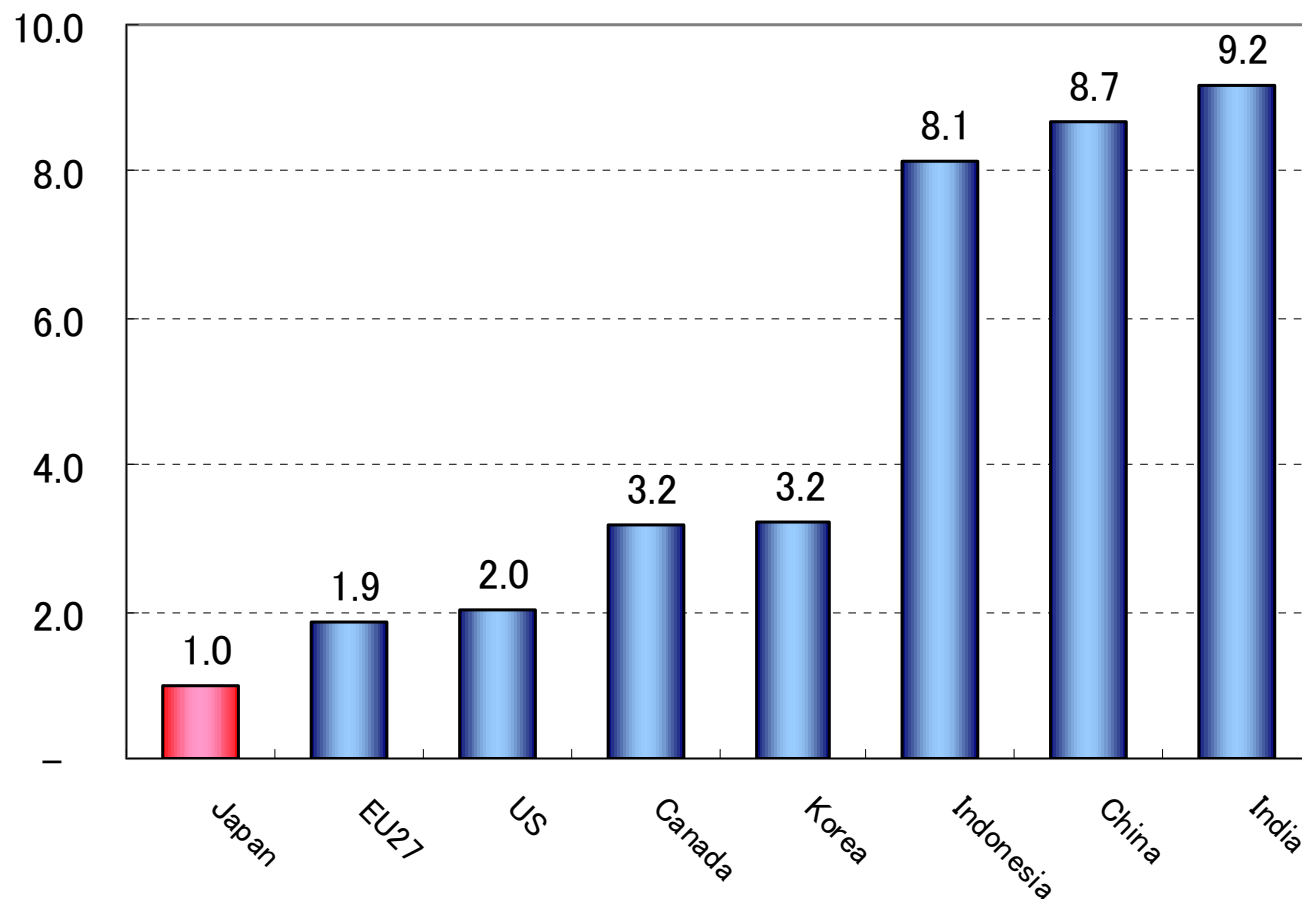
- **“Energy efficiency is a domestic energy resource for all countries.”**
  - Cost-saving effects
  - Prompt effect expected through use of prevailing technologies
- **CO2 reduction potential (from 2002 to 2030)**
  - Roughly 60% of reduction is attributable to energy efficiency
  - More effective in developing countries



Source: IEA World Energy Outlook 2004

# Japan has achieved the highest level of energy efficiency

- Primary energy supply per GDP in 2004 by country

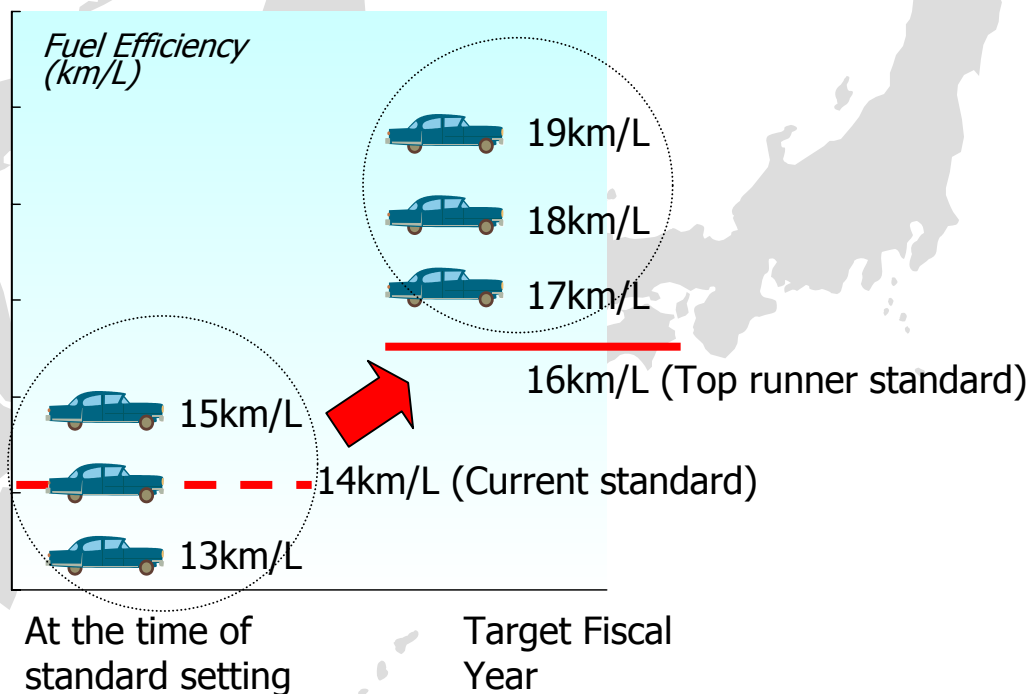


Source: IEA Energy Balance 2006

# Top Runner Program promotes innovation and energy efficiency

- Energy efficiency standards for domestic appliances and vehicles.
- Manufacturers obligated to meet the standards.

## *Top Runner Program*



## *Target products (Example )*

- 1. Passenger vehicles (\*1)**
- 2. Freight vehicles (\*1)**
- 3. Air conditioners**
- 4. TV sets (\*2)**
- 5. Fluorescent lights**
- 6. Copiers**
- 7. Computers**
- 8. Electric refrigerators**

\*1: Heavy vehicles weighing over 3.5 tons (buses, trucks) were added to the applicable products in April 2006.

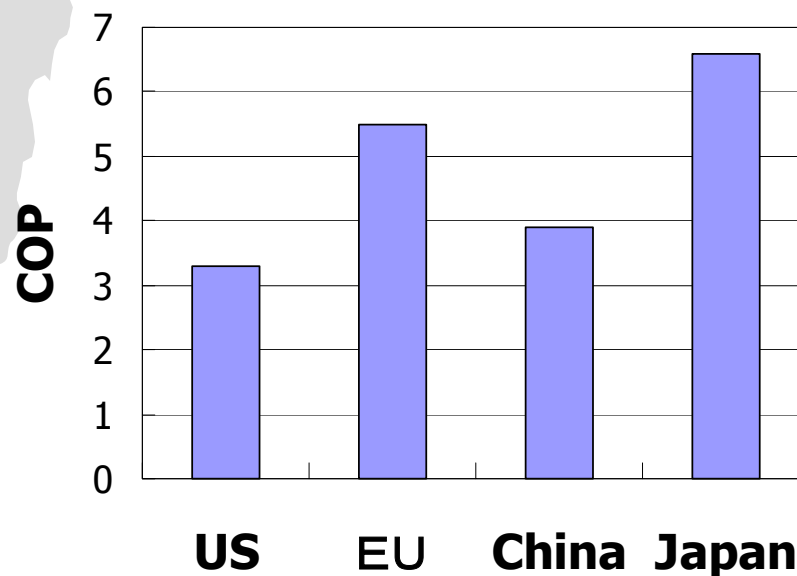
\*2: LCDs and plasma display TVs were added to the applicable products in April 2006.

# Better energy efficiency realized under the top runner program

- Efficiency improvement achieved

Equipment	Improved efficiency (actual)	Improved efficiency (planned)
Air conditioners*	67.8% (FY1997-2004)	66.1%
Electric refrigerators	55.2% (FY1998-2004)	30.5%
Gasoline passenger vehicles*	22.8% (FY1995-2005)	23.0% (FT1995-2010)

- Air Conditioner Efficiency



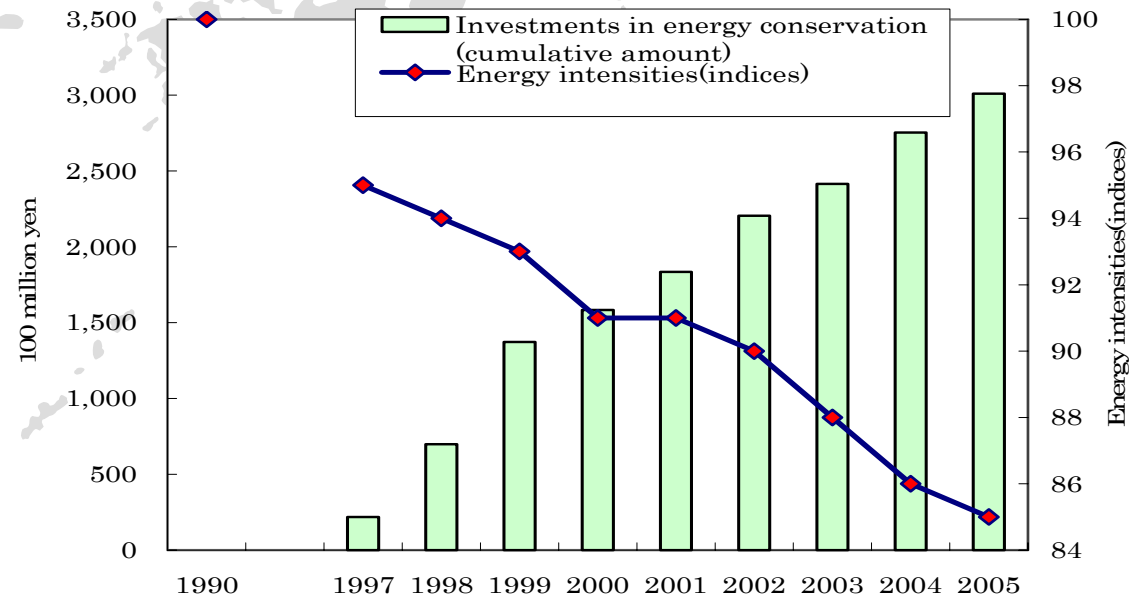
Source: The Energy Conservation Center, Japan

\*Note that the effects of reducing energy consumption are indicated as inverse numbers because COP or fuel economy (km/l) is used as an energy efficiency index

# Pledge & review by industrial sector: Steady implementation of “Voluntary Action Plan”

- Laid down by industrial sector to foster voluntary CO2 reduction.
- 35 industries such as steel and chemical pledge their targets.
- Achieved its target for six years in a row since fiscal year 2000.
- 10 industries have revised their targets to a higher level.

## Investments and Intensities of Chemical Industry

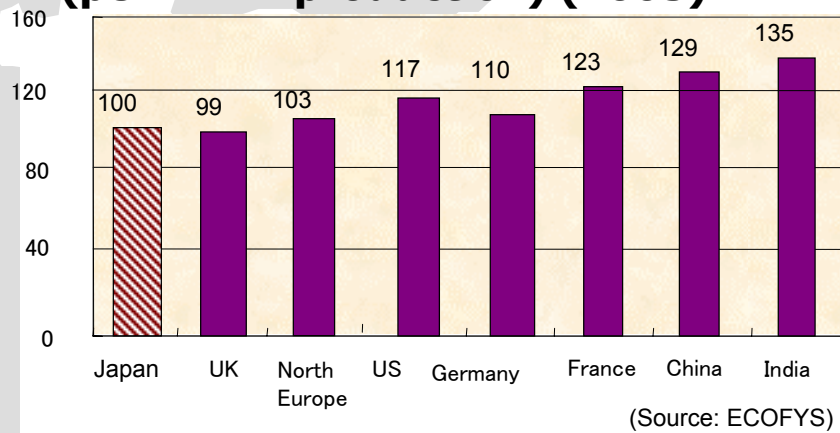


Source: Compiled by the Japan Chemical Industry Association (JCIA)

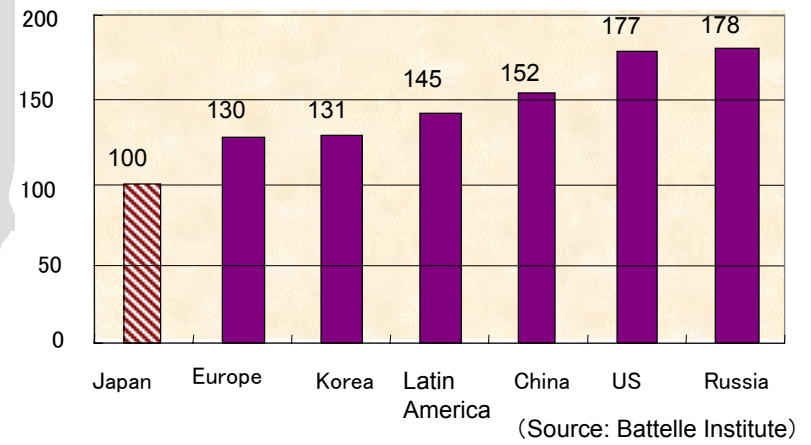
# The highest level of efficiency was achieved by a sectoral approach

## Energy intensity of major sectors

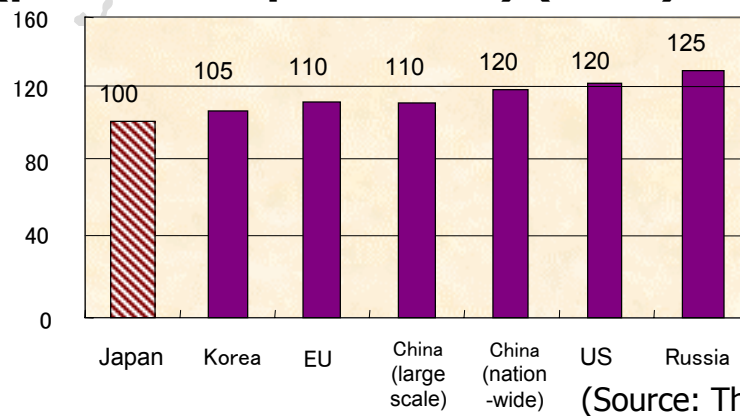
**Power generation  
(per 1kwh production) (2003)**



**Cement production  
(per 1t Clinker production) (2003)**

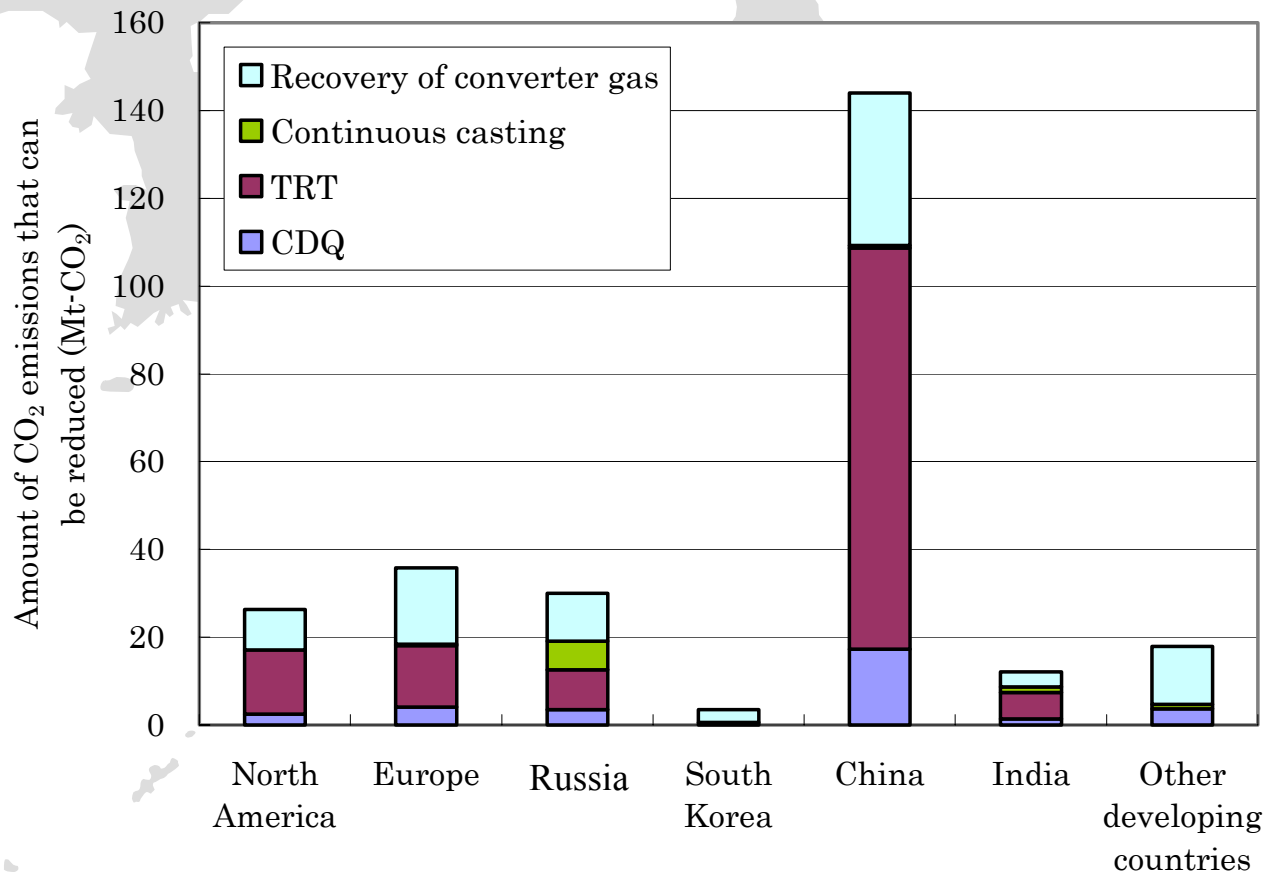


**Iron and steel production  
(per 1t steel production) (2003)**



# CO2 reduction potential in steel industry through use of BAT

**About 300Mt CO2 emission reduction potential was identified in the steel industry through using BAT such as CDQ and TRT.**



Source: NEDO



# Japan's International Energy Efficiency Cooperation in Asia

- Supports the capacity building of Asian countries.
- Conducts energy-saving model programs for high-energy consumption industries such as iron and steel, cement, etc.

## Dispatch of experts & acceptance of trainees



*Accepted about 300 trainees  
Sent about 200 experts from 2000  
to 2005.*

## Business-based technology transfer promoted under the program

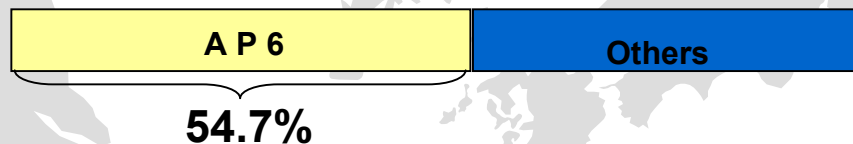
1. **Coke Dry Quenching (CDQ)  
Equipment: 33 units**
2. **Top Pressure Recovery Turbine (TRT) :  
4 units**
3. **Cement Waste Heat Power Generation System: 21 units**



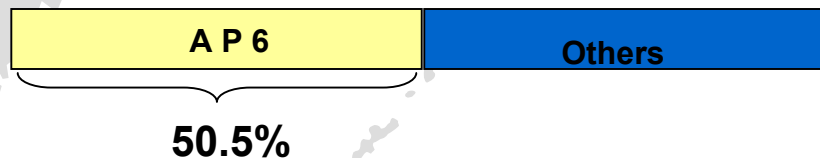
# Asia-Pacific Partnership on Clean Development and Climate (APP)

- Aimed at promoting regional cooperation for the development, permeation and transfer of clean and efficient technologies.
- Member countries (AP6): Japan, the U.S., Australia, South Korea, China and India.
- 8 sectors targeted such as power generation, steel and cement

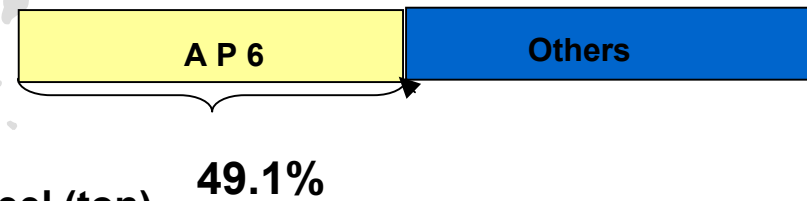
Actual GDP (2003)



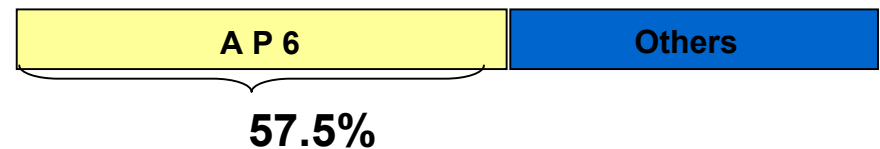
CO<sub>2</sub> emissions (2003)



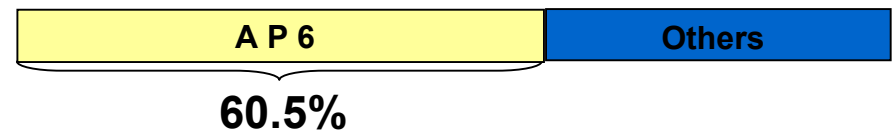
Power (kWh)



Steel (ton)



Cement (tons)



Sources: IEA, CO<sub>2</sub> Emissions From Fuel Combustion, 2006  
 IEA, Energy Balance of OECD, non-OECD countries, 2006

# East Asia Summit

- **The leaders signed the Cebu Declaration on East Asian Energy Security.**
- **Each country agreed to promote energy efficiency by voluntarily formulating an action plan and setting its own target.**



## CEBU DECLARATION ON EAST ASIAN ENERGY SECURITY

**Take concrete actions toward improving efficiency and conservation, while enhancing international cooperation through intensified energy efficiency and conservation programs. Set individual goals and formulate action plans voluntarily to improve energy efficiency.**

# Conclusions

- Energy efficiency is a key to substantial CO2 reduction and thus an important policy target for all countries.
- Reduction potential can be identified by a sectoral approach.
- To realize the potential, the transfer of BAT as well as R&D for successful future is necessary.
- Bilateral and multilateral activities are important.
- APP is taking an effective bottom-up approach for the realization of the potential.