

## International Comparison of Energy Efficiency in Participating Industries

### Electric Power (Federation of Electric Power Companies)

Fossil-fired power generation efficiency (electric power output per unit of energy input)

Japan	Nordic countries	U.K.	France	Germany	U.S.A.	China
100	94	93	83	83	83	75

Source : Data for foreign countries from ECOFYS, *COMPARISON OF POWER EFFICIENCY ON GRID LEVEL*, March 2004.

Data for Japan from Agency for Natural Resources and Energy, *Denryoku jukyu no gaiyo 2002*.

The higher the number, the larger the amount of electricity produced per unit of energy input.

Comparison of CO<sub>2</sub> emissions intensity for the electric power industry ("generating-end")

Japan	France	Canada	U.K.	Italy	Germany	U.S.A.
100	14	56	125	133	142	164

Source: Energy Balances of OECD Countries 2001-2002

CO<sub>2</sub> emissions intensity is low for France because 80 percent of its electric power is produced through nuclear power generation, and for Canada because 60 percent of its electric power comes from hydroelectric power generation.

### Iron and Steel (Japan Iron and Steel Federation)

Integrated steelworks energy consumption intensity

Japan	South Korea	EU	U.S.A.	China (large scale)	China (whole country)
100	105	110	120	130	150

Source : Data from Korea Iron & Steel Association, China Iron and Steel Industries Association, and individual interviews

### Chemicals (Japan Chemical Industry Association)

CO<sub>2</sub> emissions intensity in relation to ethylene production

Japan	Europe	U.S.A.	Global
100	129	100	121

Electric power consumed in relation to production of electrolytic caustic soda

Japan	Taiwan	South Korea	China	U.S.A.	Western Europe	Eastern Europe
100	100	104	108	113	120	123

Source : SRI Chemical Economic Handbook; Japan Soda Industry Association, *Soda Handobukku* (Soda Handbook)

### Paper and pulp (Japan Paper Association)

Total energy consumption for paper and paperboard produced (before adjustments for imported and exported pulp)

Japan	U.S.A.	Canada	Sweden	Germany
100	144	135	124	52

Source: Data for Japan from Japan Paper Association follow-up report for 2003, "Sekiyuto shouhi dotai tokei"; for U.S.A. from the American Forest & Paper Association's annual statistics for 2002; for Canada from Forest Product Association of Canada, *Environmental Report 2000-2001*; for Sweden and Germany from Confederation of European Paper Industries, *Energy Profile 2001*.

Since Germany relies largely on recycled pulp and imported pulp, its energy consumption related to pulp production is low. In addition, demand for quality such as whiteness of toilet paper is relatively low in Germany, which can also be considered a factor contributing to low energy consumption.

### Cement (Cement Association of Japan)

Energy consumption per clinker ton (for 2000)

Japan	Western Europe	South Korea	Central and South America	China	U.S.A.	Russia
100	130	131	145	152	177	178

Source: Battelle, *Toward a Sustainable Cement Industry Substudy 8: CLIMATE CHANGE*, 2002.

### Mining (Japan Mining Industry Association)

Energy consumption intensity of copper refineries

Japan	Europe	Asia	North America	South America
100	130	140	160	210

Source: Sample data collected through interviews. Comparison is of energy consumption intensity (MJ/ton) of copper refineries

### Aluminum (Japan Aluminum Association)

Energy consumption in the plate rolling process

Japan	Global
100	127

Source: International Aluminium Institute, *LCI Report*