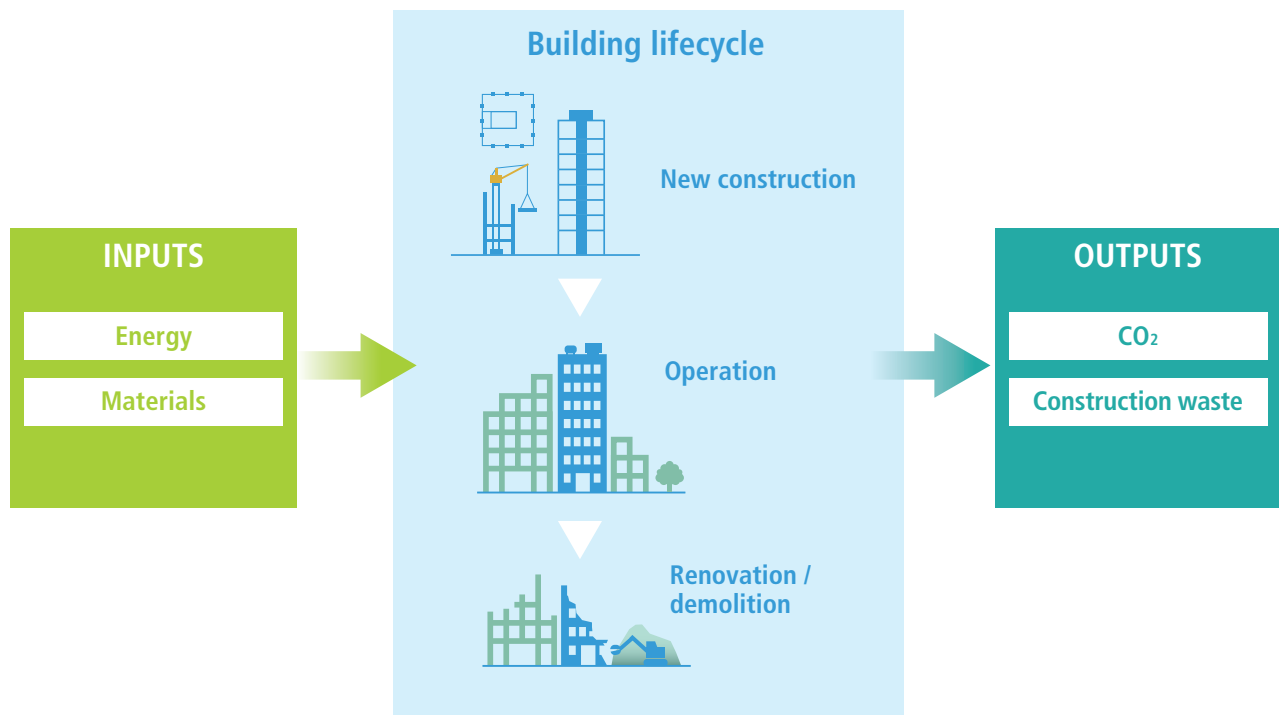


# Material Flow: Inputs and Outputs

The construction industry requires vast amounts of construction materials and energy to build vital infrastructure, and also generates a great deal of waste.

These pages present Kajima's environmental data for 2007, including the volumes of resources and energy procured, emission levels, and initiatives for reducing emissions.



## INPUTS

### Principal energy usage volumes

	Construction	Office	Total
Fossil fuel	Diesel oil	82,803 kl	82,803 kl
	Kerosene	3,106 kl	3,106 kl
Electricity	191,870 kWh	20,270 kWh	212,140 kWh

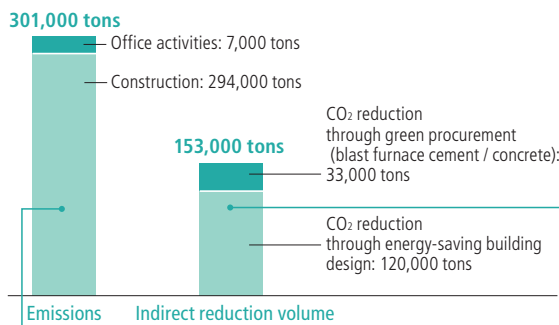
### Principal materials

	Construction (unit: tons)	Green procurement (unit: tons)	Green procurement rate
Steel products	544,000	421,000	77%
Cement	199,000	130,000	65%
Ready-mixed concrete	6,576,000 (1,000,000)	608,000 (93,000)	9%
Aggregate	1,844,000	1,352,000	73%
Asphalt	75,000	64,000	85%
Total	9,238,000 (3,663,000)	5,575,000 (2,061,000)	56%*

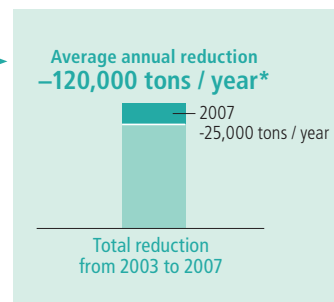
\*Figures in parentheses are the cement portion of ready-mixed concrete.

## OUTPUTS

### CO<sub>2</sub> emission and reduction volume

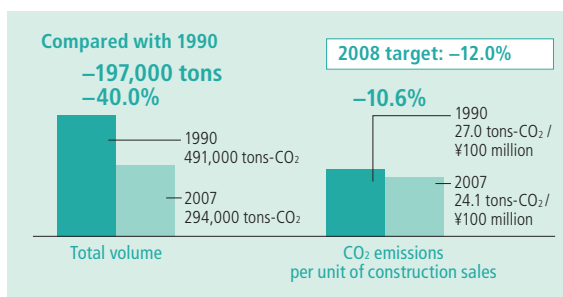


#### CO<sub>2</sub> reduction through energy-saving building design



\* The figure of 120,000 tons/year is the average annual CO<sub>2</sub> reduction since 2003, since the CO<sub>2</sub> reduction during building operation continues every year.

#### CO<sub>2</sub> emissions during construction



During construction, CO<sub>2</sub> emissions are directly generated through the operation of cranes, trucks and other heavy equipment, and indirectly generated through the use of electricity. Emissions from construction processes in 2007 totaled 197,000 tons, which represented a decrease of 10.6 percent per unit of construction sales, compared to 1990. In 2008, Kajima is aiming to achieve a reduction of CO<sub>2</sub> emissions of 12.0 percent per unit of construction sales, compared to 1990.

#### CO<sub>2</sub> reduction activities at project sites

- Fuel-saving equipment operation, and reducing or eliminating idling
- Using fuel-saving heavy equipment and vehicles
- Proper maintenance of heavy equipment and vehicles
- Reducing the volume of soil carried out of the construction site and shortening transportation distances, etc.

In order to save energy during building operation, Kajima has set its own standards for energy-saving methods that must be met in the design process. As a result, buildings designed by Kajima have energy performance that is on average 26 percent better than required by national standards. The annual CO<sub>2</sub> reduction resulting from the operation of these buildings is about 25,402 tons of CO<sub>2</sub>.

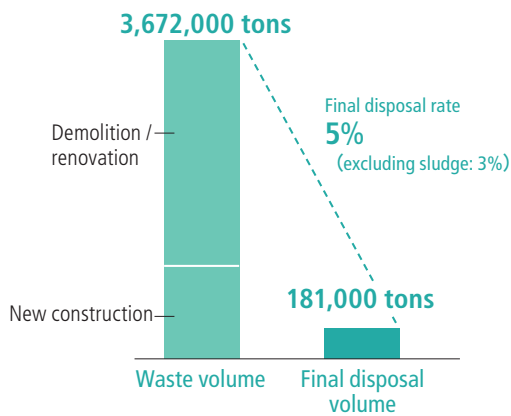
#### Performance of buildings with energy-efficient design in 2007

Activities / Issues	Item	2007
Achievement of voluntary standard	Projects implemented	117 projects
	Projects that met voluntary standards	82 projects
	Achievement rate	70%
Greater energy efficiency	Average energy efficiency rate	26% improvement
	CEC* air-conditioning	37% savings
	CEC ventilation	33% savings
	CEC lighting	41% savings
	CEC water heating	15% savings
	CEC elevators / escalators	28% savings
Annual CO <sub>2</sub> reduction (calculated from these 117 projects)		25,402 tons-CO <sub>2</sub>

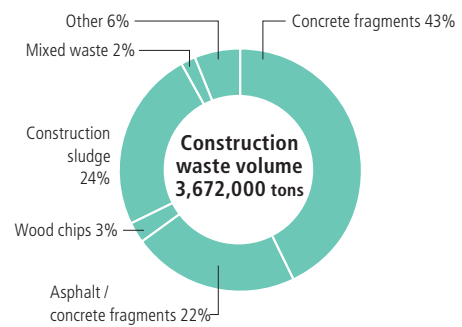
\* CEC (Coefficient of Energy Consumption) is an indicator of the energy efficiency of building facilities.

## OUTPUTS

### Construction waste volume and final disposal volume



#### 2007 waste volume by type



Kajima is taking the following three measures in order to reduce the volume of final waste disposal: (1) controlling waste generation; (2) reducing the volume of mixed waste through material sorting; and (3) improving the recycling rate (i.e., lowering the final disposal rate) for each type of waste, especially for construction sludge.

In 2007, total waste was up about 14,000 tons from the previous year to 2,557,000 tons. The final disposal volume was 181,000 tons, down about 40 percent compared to the previous year, and the final disposal rate was 5 percent well below the industry average of 7.8 percent.

Construction surplus soil: 1,618,000 m<sup>3</sup>

Volume of hazardous substances processed:

Material containing asbestos	11,000 tons
CFCs and halon recovered	2.5 tons
Devices containing PCB	26
Florescent tubes	31 tons

#### Construction waste volume and final disposal volume

	Waste volume (unit: tons)	Final disposal volume (unit: tons)	Final disposal rate	Reference / mixed waste volume (unit: tons)
2004	3,248,000 (1,635,000)	444,000 (112,000)	13 (6.3) %	98,000
2005	2,497,000 (1,476,000)	301,000 (116,000)	12 (6.3) %	83,000
2006	2,543,000 (1,579,000)	316,000 (106,000)	12 (8.5) %	81,000
2007	2,557,000 (1,667,000)	181,000 (91,000)	5 (3.3) %	76,000

\* Figures in parentheses exclude construction sludge.

\* 2007 figures exclude the increase of debris following the major earthquake in Niigata.

#### Final disposal rate by type

	Asphalt / concrete fragments	Concrete fragments	Construction sludge	Mixed waste	Wood chips
2004	3.7%	1.0%	19.4%	37.4%	4.2%
2005	1.1%	0.9%	19.7%	36.3%	4.0%
2006	1.1%	1.4%	18.9%	37.4%	5.3%
2007	0.1%	0.4%	10.2%	21.5%	1.2%