Saving energy measures

We are promoting saving energy activities by the continuous implementation of saving energy diagnosis, and the development of saving energy measures in the main plants based on the results of the diagnosis, to achieve the reduction of energy unit requirement and carbon dioxide emission unit requirement at a rate of 1% or more annually on average, which is the goal of the third saving energy activities (a plan for five years).

As a result of the saving energy activities, we have accomplished the goal of the reduction of energy unit requirement by 1% or more annually on average in five plants out of seventeen plants. However we could not accomplish the goal in remaining plants because of the reasons such as the decrease of output, the decline of sale prices and so on. So the energy unit requirement and carbon dioxide emission unit requirement increased by 6.9% and 7.0% respectively on an unconsolidated basis in fiscal 2002, compared with fiscal 1998. As a whole, it is a main cause of this increase that the energy efficiency in the equipment-based industries with a large amount of energy consumption such as cast iron pipes, castings, roofing materials and so on declined.

The goals of saving energy activities

The third saving energy activities (fiscal 1999 to fiscal 2003)
Target year: fiscal 2003

Goal: energy unit requirement reduction by 5% or more for five years (compared with fiscal 1998)
Goal: carbon dioxide emission unit requirement reduction by 5% or more for five years (compared with fiscal 1998)
Goal: total carbon dioxide emission control under the level of fiscal 1990 (in fiscal 2010)
(These goals were set up in the voluntary action plan.)

Reference: energy unit requirement = equivalent crude oil to energy used / in-house output
Carbon dioxide emission unit requirement = emitted amount of carbon dioxide / in-house output

Examples of in-house saving energy measures
(The third saving energy top-runner campaign)

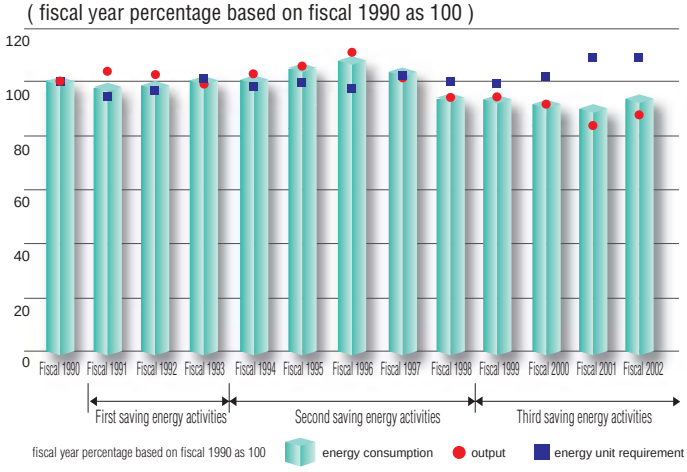
Plant	Name of theme in saving energy top-runner campaign	Saving energy effect		
		In terms of crude oil kℓ / year	Carbon dioxide t / year	Cost effect 10 thousand yen / year
Hanshin	Introduction of the high-efficiency gas engine cogeneration, and the reduction of steam loss	504	1,382	20,50
Hirakata	Restructure of the construction machinery and the painting workshop	369	658	12,46
Tsukuba	Reduction of air consumption by the improvement of the air-blow equipment	43	45	2,43
Kyuhoji	Rationalization and saving energy by the reduction of workshops	124	143	8,77
Shiga	Saving energy by voluntary planned maintenance of the autoclave	296	216	7,62
Odawara	Saving energy in feeding of cooling water for pipes and in cooling water producing equipment	284	408	13,91
Ohama	Saving energy by recycling waste thinner	348	628	10,86
Others	Saving energy in compressors and air conditioners, and saving energy by inverters	253	372	21,12
Total		2,221	3,852	97,67

Moving lecture on saving energy (Ohama plant)

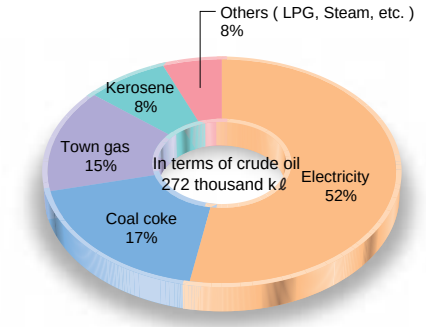
Energy consumption reduction

The energy consumption in Kubota was 272 thousand kℓ in terms of crude oil in fiscal 2002.
We made an effort to raise management level and energy efficiency, tackling energy control in detail while the output was declined. In addition, we registered and promoted the 267 themes of saving energy by digging them up. As s result of them, we saved 520 million yen annually.
We also implemented the saving energy campaign in the wake of the previous year to stimulate the saving energy activities. Especially eighteen effective themes were available. As a result, we reduced energy consumption by 2,221 kℓ in terms of crude oil and carbon dioxide by 3,852 ton.
Typical saving energy measures are as follows:
Leaving out processes and eliminating wastes by recycling waste thinner,
Introduction of high-efficiency gas engine cogeneration and the reduction of steam loss,
Introduction of the drastic saving energy measures in the restructure of painting line,
A large amount of reduction of air consumption when air blown,
Saving energy by the rapid reduction of workshops complied with the change of business contents and so on.
We promote the measures to stimulate the saving energy activities from now on.

Transition of energy consumption on an unconsolidated basis
(fiscal year percentage based on fiscal 1990 as 100)



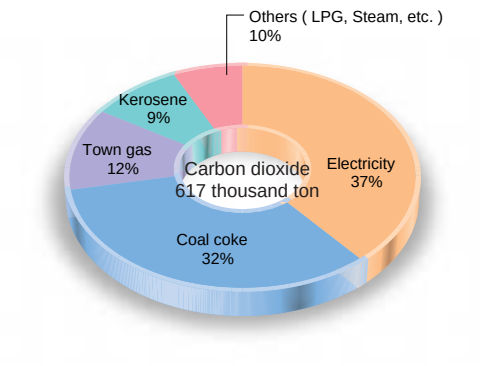
Energy consumption by type of energy



Carbon dioxide emission reduction

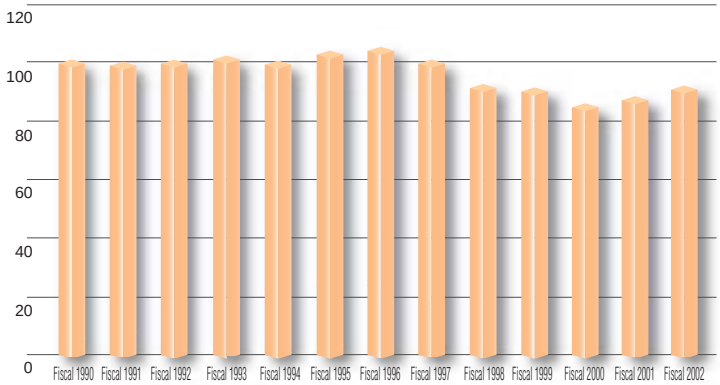
In fiscal 2002, carbon dioxide emission amounted to 617 thousand ton.
We reduced carbon dioxide emission by 6% compared with fiscal 1990, while the goal of our voluntary action plan was under the level of carbon dioxide emission in fiscal 1990.
We would like to maintain the goal of reduction from now on by saving energy activities, fuel conversion and so on.

Carbon dioxide emission



Transition of carbon dioxide emission

(fiscal year percentage based on fiscal 1990 as 100)



* an unconsolidated data until fiscal 2000

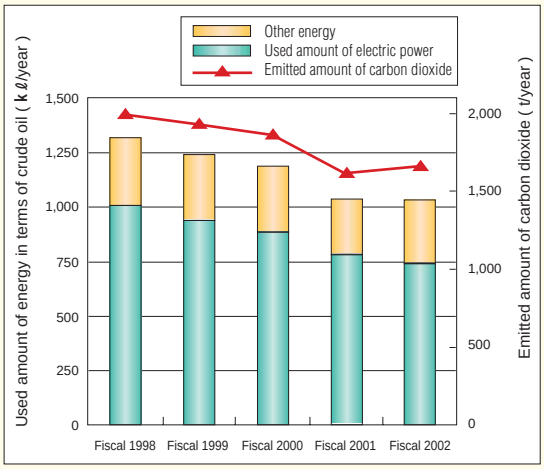
Moving lecture on saving energy (Ohama plant)

An example of saving energy measures in Kyuhoji plant

(an example of top-runner campaign)

In Kyuhoji plant, we promoted the planned and steady saving energy activities every year. As a result, we largely reduced energy consumption and carbon dioxide emission.
We received “the director general award of Agency for Natural Resources and Energy for the excellent energy management plant (an electric department) in fiscal 2002,” admitted the results of these activities.
The transitions of the amount of energy consumption and carbon dioxide emission, and improved contents in each year are shown below.

Transitions of the amount of energy consumption and output



Improved contents in each year

Fiscal year	Items	Improved contents
Fiscal 1999	Reduction of electric power for lighting by natural lighting •Though it was shiny outside, mercury lamps were lit because it was dark inside. •Though it was shiny inside because of the transparent roofing material, it was hot. ▼ We reduced the use of electric power by turning off the mercury lamps by day.	•We used the roofing material through which the light canpass without absorbing heat, polarizing and dispersing the light (solar dome). We turned off lighting for 5.6 hours out of 8 hours a day, by day. ▼ Reduction of electric power consumption = 39,110 kWh / year
Fiscal 2000	Rationalization by reducing workshops •Though the output decreased, the workshop area and the amount of energy consumption did not decrease. ▼ We reduced the number of workshops and offices.	•The reduction of workshops was conducted in FA engineering department. ▼ Reduction of workshop area = 1,058 m^2 Reduction of electric power consumption = 31,610 kWh / year Reduction of town gas consumption = 16,980 m3 / year
Fiscal 2000/2001	Saving energy by reducing the transformer capacity and adopting amorphous transformer •Since the transformer was old and its capacity was too large, a lot of electric power was lost. ▼ Reducing transformer capacity and adopting high-efficiency one	•We installed the amorphous transformer partly for the reduction of the transformer capacity and partly for the replacement of the transformer (the reduction of electric power loss in the transformer). ▼ Reduction of the capacity of the transformer = 2,850 kVA Reduction of electric power consumption = 235,663 kWh / year
Fiscal 2000/2001	Saving energy by the exchange of stabilizers of fluorescent lamps (adopting inverters) •About 3,600 fluorescent lamps were used in the offices. •A lot of electric power was lost because of old stabilizers. ▼ We reduced electric power loss by adopting inverters instead of old ones.	•We exchanged the old stabilizers in the fluorescent lamps for the inverters. ▼ Reduction of electric power consumption = 17,139 kWh / year
Fiscal 2000/2001/2002	Saving energy by controlling the operation of compressors for air conditioners •Electric air conditioners and gas air conditioners are used. •Electric power consumption in summer increased by 450kW compared with that in spring and autumn, because of the use of electric air conditioners. •The peak of electric power consumption depends on whether the electric air conditioners are used or not. ▼ Saving energy by controlling the operation of air conditioners	•We conducted the operation of turning off, for three to nine minutes in every 30 minutes, the compressors of four air conditioners (3.75 kW) in our office (within the extent of not being hot). ▼ Reduction of electric power consumption = 2,592 kWh / year