

Chapter 04

We take care of the global environment

The Cosmo Oil Group is grateful to benefit from the planet's ancient fossil fuels and is dedicated to continuing its work to protect the irreplaceable treasures of the natural environment.

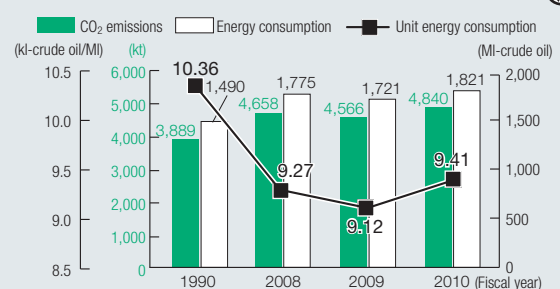
The oil that the Cosmo Oil Group delivers to its customers is an invaluable source of energy that is essential to modern lifestyles. The fact is, however, that the use of oil impacts the global environment in no small measure. To deal with this, the Cosmo Oil Group works on various fronts, striving to produce and deliver environmentally friendly oil products, while also focusing on renewable energy, the protection of biodiversity and other activities designed to preserve the planet's irreplaceable natural environment for future generations.

Working Hard to Conserve Energy as an Energy Provider

Initiatives to combat climate change are an important focus for an enterprise that works with fossil fuels like the Cosmo Oil Group. Although each stage of the process involved in extracting crude oil, shipping oil, and storing oil products generates CO₂ emissions, approximately 60% are generated by oil refining. Employees at Cosmo Oil refineries work together to reduce this figure, conserving energy both by increasing the efficiency of equipment and improving operational performance. In addition to improving the efficacy of gas compressor and furnace performance, the reevaluation of operational conditions, reduction of steam consumption, and other initiatives also helped reduce CO₂ emissions in fiscal 2010.

The Third Consolidated Medium-Term Environmental Plan set a CO₂ reduction (cumulative effect of individual measures) target of 16,800 tonnes (crude oil equivalent of 6,400 kiloliters) for fiscal 2010. By the end of the year, the refineries had reduced CO₂ emissions by 29,000 tonnes (crude oil equivalent of 11,080 kiloliters), exceeding the goal by a considerable margin. Total CO₂ emissions, however, increased in fiscal 2010 with the launch of full heavy oil cracking facility operations at the Sakai Refinery. In order to create momentum in society for conserving energy, the Cosmo Oil Group will continue, as a responsible energy provider, to improve existing policies and introduce new energy-saving measures of the sort that only an energy provider can make viable.

Energy Consumption and CO₂ Emissions at Four Refineries



Notes:

- Unit energy consumption indicates total energy consumption divided by the total crude oil equivalent processed, taking into account the complexity of refining technology. The unit used is kiloliters of crude oil equivalent/megaliters (kl-crude oil/MI). Total energy consumption is calculated by converting heat, electricity, and other energy use into the megaliters of crude oil equivalent (MI-crude oil). The unit used for CO₂ emissions is kilotonnes (kt).
- Beginning with fiscal 2006 results, the method of calculating CO₂ was revised as stipulated by Japan's Act on Promotion of Global Warming Countermeasures.
- CO₂ emissions for fiscal 2009 and 2010 have been calculated using the CO₂ emission factor for electricity for fiscal 2008 and 2009 respectively. CO₂ emissions up to fiscal 2008 have been calculated using the CO₂ emission factor for electricity for each fiscal year.
- In addition to the figures shown in the graph, N₂O released from the catalyst regeneration tower amounted to 21 kilotonnes of CO₂ equivalent in fiscal 2010.



Oil and Non-Petroleum Energy: Pursuing Environmental Technologies for Today's Needs



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Gasoline, diesel fuel, and heavy fuel oil are all manufactured by refining crude oil using distillation, desulfurization, and other processes. Of these, the desulfurization process of removing sulfur from crude oil is a technique that has been developed most recently for manufacturing the sulfur-free (sulfur at 10 ppm¹ or less) gasoline demanded for automotive fuel. A highly efficient catalyst is essential to the desulfurization process. My job involves researching the development of more efficient catalysts in order to further improve this process. Sulfur-free fuel is essential for ensuring the effective operation of processing units that remove the toxic gases (nitrogen oxide, particle matters and hydrocarbons) from automobile emissions, and was introduced in Japan first in the world.

Most manufacturers purchase the catalysts they use in desulfurization and all other processes from catalyst manufacturers. At Cosmo Oil, however, we are working to develop our own catalysts for use in manufacturing, capitalizing on our expertise in the field to create more efficient catalysts than those available on the market. The Research and Development Center is also committed to developing technologies that help preserve the environment, including the development of environmental technologies designed to reduce waste, new non-fossil fuel energy technologies, and technologies that produce ALA (5-aminolevulinic acid) using fermentation.

1. 1 ppm: Parts per million; unit indicating 1/1,000,000

Taking on the Challenge of Renewable Energy

Cosmo Oil is working to secure an electricity supply generated by wind power, a renewable green energy that emits no greenhouse gases.

Eco Power Co., Ltd. joined the Cosmo Oil Group in March 2010. A pioneer in wind power generation in Japan, Eco Power operates wind farms in the northern part of Japan where wind conditions are especially good. As of the end of March 2011, the Cosmo Oil Group operates 131 wind turbines with a total output capacity of 148,510 kilowatts. In

fiscal 2010, the Group supplied 250 gigawatts per hour of wind-generated power. This annual output corresponds to an approximately 140,000-tonne reduction in CO₂.

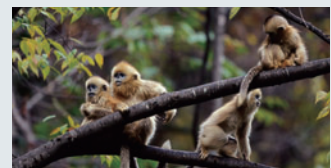


Rumoi Wind Farm

Protecting Biodiversity and Satoyama in Business Operations

Cosmo Oil joined the Japan Business Initiative for Conservation and Sustainable Use of Biodiversity in February 2010, and uses the organization's Map of Corporate Activities and Biodiversity[®] to help ascertain the impact of its business operations on biodiversity. The Cosmo Oil Group recognizes the potential impact from all of its businesses, including oil exploration, production, refining, shipping and marketing, and will continue to strive in the future to minimize its impact on biodiversity by ensuring safe and secure business operations.

Supported by donations from Eco Card members, the Cosmo Oil Eco Card Fund (see page 20 for details) has helped finance the Qin Ling Mountains Forest and Ecosystem Recovery Project, as well as other projects designed to preserve biodiversity. In fiscal 2010, the Fund added preservation of biodiversity to its activity themes and began looking at activities that focus on biodiversity. The Cosmo Oil Chiba Refinery, Sakai Refinery, and Cosmo Matsuyama Oil Co. Ltd. will also continue to work on preserving *satoyama* (managed woodlands near populated areas) and to focus on the preservation of biodiversity.



Golden snub-nosed monkeys in the Qin Ling Mountains